

[0075]

503 The pallets 15 of the returns module and the pallets 16 of the document storage module are controlled by sales specialists.

505 The rolling shutter doors 15b and 16b are remotely controlled by sales specialists.

506 The pallets of the returns module are used in the event that due to mistakes by sales specialists or logistics staff, the misdispensing of goods (such as medicines) to the wrong unit of the storage module occurs.

508 The document storage module is used for storage of certificate copies of commodities (eg, medicines) in the vending machine.

510 According to the buyer's request, the rolling shutter door 16b of the pallet 16 is remotely controlled by a sales specialist and controlled by a camera.

[0076]

515 Lights for night inscriptions, trays and button bars for vending mods can be mounted on the vending machine body.

[0077]

520 In order to prevent service personnel from electric shock, when opening the access door of the device and function module of the vending machine, the lock switch cuts off the circuit.

[0078]

525 Each vending machine is also equipped with a siren which, in case of any intrusion attempt, reports to the service desk of the nearest police department, connects all video cameras of that vending machine and starts recording inside the vending machine and an image of what is happening outside, simultaneously activating an audible alarm (siren).

529 In addition, the vending machine is connected to any available sales specialist, allowing him to make additional decisions while addressing the situation in real time, observing the situation.

531 Afterwards, a decision will be made on whether or not to dispatch the on-call repairer for the vending machine to the vending machine.

[0079]

536 Plus, a salesperson with additional access can connect to any vending machine and check its features, item inventory and test its own functionality.

[0080]

541 If the device used to regulate the temperature and humidity of the unit cabin fails, there will be another

temperature-sensitive alarm and report the failure to the sales commissioner station.

[0081]

546 The remote sales method proposed using the above-mentioned remote-controlled vending machine according to the present invention is suitable for remote sales of medicines, and the vending machine will be referred to as a medicine vending machine hereinafter.

[0082]

552 A method for remotely selling a regulated commodity using a vending machine for remote selling a regulated commodity provides control of one or more vending machines.

554 As illustrated in the flowchart in Fig. 2, one or more automatic vending machines for remote selling of controlled goods are connected to a sales specialist site (2) through a wired or wireless communication unit.

[0083]

559 Cables based on twisted-pair copper conductors (twisted pairs), coaxial cables with copper conductors, and fiber optic cables can be used as wired communication lines.

561 Fixed wireless communication, which is based on multipoint wireless communication channels for data transmission in radio frequency bands, can be used as the wireless communication network.

563 Each vending machine and sales specialist station is equipped with transmitting and receiving antennas and the necessary equipment for data preparation and transmission.

[0084]

568 The vending machine is equipped with hardware and software units to provide the reception and interpretation of the control commands of the functional characteristics and modules of the vending machine, the preparation of the data on the vending machine for sending to the sales commissioner station, the interpretation of the control signal from the sales commissioner station translate.

[0085]

575 The sales commissioner's station is equipped with a computer workstation, hardware and software units with a database, and a data storage control server.

577 The hardware and software units of the sales commissioner's station provide the process of data collection, as well as the preparation and transmission of operational control signals for remote sales of regulated goods by vending machines.

580 When vending machines are used as medicine vending machines, the sales specialists are pharmacists and vendors.

[0086]

- 585 When the buyer arrives at the medicine vending machine, the touch screen 4 of the vending machine may be in the advertisement playback mode or the vending machine is in the standby mode, and the vending machine initialization is completed from the advertisement playback mode or the standby mode by touching the touch screen , after the buyer touches the initial touch screen, the Call icon will appear.
- 589 A person with poor eyesight puts the vending machine into ready mode by pressing the call button 8 on the front panel of the medication vending machine, which is equipped with a graphic indicator in the form of a "call" button in Braille type.

[0087]

- 595 After pressing the "Call" icon or "Call" button 8 on the touch screen 4 , the medicine vending machine 1 is connected to the sales specialist station 2 .
- 597 In case of an incoming call, the hardware and software unit of the sales specialist station connects the medication dispenser to the computer workstation of the first serviceable sales specialist.
- 599 Therefore, the required time to connect to the sales specialist will first be displayed on the touch screen 4 of the medicine vending machine, or if the sales specialist is available, the video image of the sales specialist will appear immediately, and the video captured from the video camera 5 The buyer's image will appear on the screen at the sales specialist's station, so voice communication is also connected, and then a dialogue between the sales specialist and the buyer begins.
- 604 The dialogue between the sales commissioner and the buyer is recorded in the data storage server of the sales commissioner station, and stored there for a period of time, so that when there is a non-standard or a conflict with the buyer, a possible investigation can be carried out, and a video of the buyer can be generated Record.

[0088]

- 610 After the sales specialist's computer is connected to the drug vending machine, the operation interface will appear on the screen of the sales specialist station, which has various functional modules and devices of the drug vending machine (scanner, payment module, video camera, All control functions of the locking device for the rolling door of the document storage tray 16 and the rolling door of the return module tray 15).
- 614 In addition, the software (inventory software) also loads the data on the connected medicine vending machine, namely its geographic location, the quantity and name of the medicines contained in the vending machine, as well as the physical parameters (temperature and humidity of the various parts of the vending machine). ).
- 618 Afterwards, the sales specialist puts the audio and video unit of the vending machine into operating mode and displays a list of medicines and their prices on the touchscreen.

[0089]

- 623 During the dialogue with the sales specialist, the buyer speaks out the desired product (for example, medicine) and then the sales specialist selects the medicine requested by the buyer from the warehouse database, and the selection results are listed in the form of the medicine name, quantity and price, and the "total" number. The

form of the instruction list is displayed on the touch screen 4 of the vending machine.

627 If necessary, according to the purchaser's request, the sales specialist gives consultation on the medicine and the ordering procedure using the audio and video unit of the medicine vending machine.

629 In the event that authorization documents need to be submitted, such as a medical prescription, the sales associate unlocks the scanner and the purchaser scans the medical prescription.

631 After the order is completed, the icon "Confirm order" on the drug vending machine purchase interface will be activated.

633 The buyer confirms the order by pressing the icon "confirm order" or by pressing the "call" button 8 of the vending machine, and the order confirmation message will appear on the screen of the salesperson's computer.

636 Afterwards, the salesperson activates the operation of the cash and credit card accepting module, and then the buyer can use one of the receivers 10 or 11.

#### [0090]

641 If the medicine vending machine is used by a person with poor eyesight, a medicine selection process is performed using a voice dialogue mode of dialogue between the purchaser and the sales clerk.

643 The sales specialist informs the purchaser of the information on the medicines available for sale, generates a list of selected medicines, and then informs the purchaser of the selected total amount and total price by voice.

645 Order confirmation is carried out by the buyer pressing the "call" button 8.

646 If a credit card is used for payment, a plate 11a with a graphic indicator in Braille type indication is located near the credit card slot to aid in finding the slot.

648 If the buyer pays in cash, he/she uses a cash acceptor (10), near which he/she can also find a board with a graphic indicator indicated in the Braille type (10a).

650 In both cases, the sales specialist controls all the actions performed by the poor-sighted buyer by means of video communication, helping him find the module.

#### [0091]

655 As soon as the required amount is inserted or the transaction on the credit card account is completed, it will be displayed on the sales specialist's screen, and the settlement with the purchaser is carried out according to the sales specialist's instructions: the goods (such as medicines) are dispensed, and if necessary change.

658 Using the video cameras of the merchandise dispensing tray 14 and the change and receipt dispensing tray 13, the sales specialist initiates and controls the merchandise dispensing and change process.

#### [0092]

663 The visually impaired use a board with graphic indicators 14a and 13a of the pallet designation in Braille to locate the pallet, with the participation of a sales specialist if necessary.

#### [0093]



668 When ordering more than one drug, the drug dispenser dispenses the drugs sequentially, here from larger quantities to smaller quantities, which simplifies the visual control of the drug distribution by the salesperson, because the trays enter from the top Pharmaceutical packaging is unlikely to cover bottom packaging.  
671 Afterwards, change and receipts are dispensed to the change dispensing tray.

[0094]

675 If the buyer needs a prescription drug, the sales specialist will ask the buyer to submit a prescription for the drug.

677 The dispensing of prescription drugs is as follows: the commissioner asks the buyer to insert the prescription slip into the scanner, the scanned image will be displayed on the commissioner's screen, after the commissioner confirms that the prescription is correct and valid and after confirming that the medicine is available, it runs the steps like an over-the-counter drug purchase , and then the commissioner controls the entry of the prescription with the prescription slip into the container through a video camera located inside the container.

688 If the drug is not available in the drug vending machine, and there is no similar drug or the similar drug is not suitable for the purchaser, the prescription slip is returned to the purchaser from the scanner.

[0095]

688 If the buyer wants to browse the documents of the medicine located in the medicine vending machine, the specialist unlocks the rolling door 16b of the tray 16 of the document storage module, the buyer can open the rolling door and take out the folder with the copy of the medicine certificate, which is pressed Alphabetical placement to search by facet.

692 The return of folders is controlled by a video camera located in the tray.

693 After that, the sales specialist locks the door of the tray, or the sales specialist controls the closing and locking of the rolling shutter door to prevent automatic locking.

[0096]

698 In the event that the wrong drug is dispensed to the buyer due to a technical error, the situation is controlled by the sales specialist using the video camera of the merchandise distribution tray 14 who asks the buyer to put the wrong drug into the returns tray 15 .

701 The steps are as follows: the sales specialist unlocks the rolling door 15b of the return pallet, and the buyer opens the rolling door and places commodities there, such as medicine packaging.

703 After the tray's roll-up door is opened, the video camera located in the tray 15 is automatically switched on and the return of the pharmaceutical packages and their integrity are controlled by a specialist.

705 It has been confirmed that the goods are returned, and after closing the roller shutter door 15b of the tray, the sales specialist checks whether the goods are in the return tray 15.

707 Thereafter, the purchaser is either provided with the desired medication or refunded via a receipt and change tray 13 located on the front panel of the medication vending machine.

[0097]

712 After the purchase process is completed, once the automatic vending machine is not used by the buyer for a period of time, the automatic vending machine is set to the standby mode by the sales specialist or is automatically set to the standby mode.

[0098]

718 According to the present invention, the proposed invention also provides for the sale of regulated goods, wherein the regulated goods are ordered through a remote selling vending machine.

720 Carrying out such sales is for distance selling of goods that are not included in the standard list of goods sold by vending machines.

722 For example, it may involve the sale of medicines produced by a central prescription department on a pre-order basis.

[0099]

727 The container of the module with the merchandise unit is used to carry out such sales, in which the intended merchandise is located.

729 After the order has been placed in the container, the number of the container is reported to the buyer, and access to the goods in this container is performed by opening the door 9 of the corresponding container.

731 The door is equipped with an electronic locking device, which is controlled by the sales specialist when the distribution is controlled after payment.

733 Maintain the necessary storage temperature and humidity in containers by means of maintaining temperature and humidity conditions.

[0100]

738 Merchandise sales using containers of the merchandise module are implemented as follows:

[0101]

742 If a shopper needs medicines other than the standard list, he or she can place the order by visiting the company's webpage and then selecting a pickup point (the address of the medicine vending machine), or by communicating with a sales representative through the automated after-sales machine.

745 In the latter case, the buyer calls the sales specialist and informs him of the goods to be ordered.

746 If necessary, the purchaser submits authorization documents, for example, in the form of scanned images of documents.

[0102]

751 After preparing to order, inform the buyer of the unique purchase password and address of the vending

machine by email or text message.

[0103]

756 Afterwards, the buyer who has arrived at the vending machine starts the vending machine by touching the touch screen 6 or pressing the call button 8, and the buyer interface is displayed on the touch screen.

758 Touching the icon "Call" on the buyer's interface, the buyer establishes communication with the sales specialist station through the vending machine communication unit, and enters the purchase password from the buyer's interface.

761 For people with poor eyesight, the communication with the sales commissioner station is established by pressing the call button 8 repeatedly, and the voice information of the buyer is sent through the microphone 7 of the audio and video unit of the vending machine, and the unique purchase password is input by the sales commissioner .

765 The sales specialist makes the screen 4 of the automatic vending machine display the data about the purchased quantity and price, as well as the serial number of the container with the commodity unit, and informs the buyer by voice information.

768 After confirming the purchase via the corresponding confirmation icon on the buyer interface or the buyer's voice message, the sales associate unlocks the payment module to allow use of the payment module's cash or credit card acceptor.

[0104]

774 After payment is made through the receiver available for payment by the buyer, the sales associate unlocks the door 9 of the appropriate number of containers and the receipt and change dispensing module.

776 The buyer opens the door 9 and takes away the merchandise under the control of a sales specialist using a surveillance camera 1 located on the door 9 of the container of the module with the merchandise unit.

778 Issuance of change and receipts is also performed under the control of a sales clerk using a surveillance camera of the tray 13, similar to the steps performed during standard range merchandise purchases.

[0105]

783 During the sale of a predetermined commodity, for example, the commodity uses the drug unit of the commodity module of the vending machine, the purchaser is informed of the limited time that the commodity is stored in the unit.

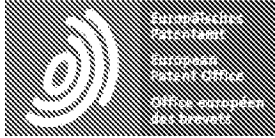
786 If the buyer does not remove the item (eg, medication) from the unit within the allotted time, the item is dispatched to the central office for storage and the buyer is notified by the chosen means of communication (mail/telephone).

789 The buyer will then have to pick up the item from the designated location.

[0106]

793 It should be noted that the vending machine and method for selling goods, especially medicines, specified in

this description, within the framework of the appended claims, do not limit the use of solutions of the related art within the scope and essence of the present invention Subject to deformation and modification.



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## CLAIMS CN108352094A

1.

*13* A vending machine for the remote sale of regulated goods, comprising a body (3) and the following items housed in the body:

*15* A communication unit, a software and hardware unit, a database and a data storage management server, which provide the possibility of establishing communication with a remote sales specialist station, where the sales specialist station includes at least one computerized workstation of a sales specialist for regulated goods, which Software and hardware units for data collection and operational control of vending machines for the remote sale of regulated goods,

*20* Software and hardware units to receive and interpret vending machine control commands and related vending machine functional features and modules for the receipt, payment and distribution of orders, including

*22* Audio and video unit, including data display unit, video camera (5), loudspeaker (6a, 6b) and microphone (7) and sales specialist call button (8), wherein the data display unit is a touch screen with buyer interface (4), the touch screen (4) is installed on the front panel of the fuselage, and the video camera (5) is located on the touch screen,

*26* a sales specialist call button (8) equipped with a plate on the front panel with a graphic pointing point in Braille type, and

*28* Controlled by the Sales Specialist:

*29* a commodity unit module configured as a container having a door (9) on the front panel with a surveillance camera (17) corresponding to the door (9),

*31* Authorized document reading means in the form of a scanner (12); at least one payment module with payment acceptors (10, 11) on the front panel of the fuselage,

*33* a commodity distribution module having a tray (14) on the front panel of the fuselage and equipped with a distribution module equipped with a rolling door (14b) and a corresponding surveillance camera on the rolling door (14b),

*36* a change and receipt dispensing module, which has a tray (13) on the front panel of the fuselage, and which is equipped with a surveillance camera,

38 A return module and a file storage module, the return module has a tray (15) on the side panel of the fuselage, and the file storage module has a tray (16) on the side panel of the fuselage, correspondingly, the return module and the file storage module are equipped with There are controlled rolling shutters (15b) and (16b) and surveillance cameras for returns and document distribution, here

42 A plurality of plates (10a, 11a, 13a, 14a, 15a) are placed in said payment acceptors (10, 11), the tray (13) of the change and receipt dispensing module, the tray (14) of the goods dispensing module and the Near the point of location of the tray (15) where the plurality of panels (10a, 11a, 13a, 14a, 15a) has a graphic indicator of the indication in Braille type.

## 2.

49 The vending machine according to claim 1, wherein

50 The commodity unit modules are equipped with means to maintain temperature and humidity conditions.

## 3.

54 A vending machine according to claim 1, wherein the authorization document reader is equipped with a container with a surveillance camera for receipt of prescription slips during sale of prescription drugs.

## 4.

59 The vending machine according to claim 2, wherein

60 The mechanism for commodity payment is configured in the form of a cash payment module and/or a credit card payment module.

## 5.

65 The vending machine according to claim 2, wherein

66 The work site of the sales commissioner station is the work site of a sales pharmacist or a business vendor.

## 6.

70 A method of remotely selling regulated goods using the automatic vending machine for remotely selling regulated goods according to claim 1, the method comprising

72 Activation of the vending machine from standby mode is performed by the purchaser by contacting the touch screen with a purchaser interface displayed on the screen, or by pressing a call button on the front panel of the vending machine,

75 The communication between the vending machine and the sales commissioner station is established by the buyer through a wired or wireless communication unit by touching the icon "call" on the buyer interface or pressing the call button on the front panel of the vending machine,

78 Determine the available sales specialist and upload the data of the activated vending machine to the sales specialist's computer work site, and display the operation interface for controlling the functional devices and

modules of the vending machine on the screen of the sales specialist's work site, which is started by the sales specialist Modes of operation of audio and video units for vending machines,  
82 A list of products is displayed on the touch screen of the vending machine, and the buyer selects the product to be obtained, and at the same time uses the scanner of the vending machine to submit the authorization document for the specified product type, and further displays the list of selected products on the screen of the sales specialist station,  
86 Display the total purchase amount on the touch screen of the vending machine, or inform the product quantity and price in the form of voice information of the sales specialist,  
88 Confirmation of selected items by touching the selected item confirmation icon on the buyer interface, or by pressing the call button on the front panel of the vending machine,  
90 Unlock the payment module of the vending machine by the sales specialist,  
91 Pay by selecting the receiver of the payment module, use the monitoring camera of the tray of the product distribution module and the change and receipt distribution module, and the sales specialist will further control the unlocking of the product distribution module and the change and receipt distribution module,  
94 Once the vending machine has not been used by the buyer for a period of time, the vending machine is placed into a standby mode by a sales specialist or automatically.

## 7.

99 The method according to claim 6, wherein during commodity selection, the sales specialist provides buyers with access to the commodity files through the tray of the document storage module, and the sales specialist uses the monitoring camera of the tray to further control the return of the documents.

## 8.

105 The method of claim 6, wherein  
106 Products are returned on a return pallet controlled by a sales representative using a surveillance camera on the product return pallet.

## 9.

111 A method of remotely selling predetermined regulated goods according to claim 1, which uses an automatic vending machine for remote selling, the method comprising  
113 The purchaser receives information about the address and number of the vending machine, the time when the ordered goods were delivered to the vending machine and the unique password for the purchase,  
115 Activation of the vending machine from standby mode is performed by the purchaser by contacting the touch screen with a purchaser interface displayed on the screen, or by pressing a call button on the front panel of the vending machine,  
118 The communication between the vending machine and the sales commissioner station is established by the buyer through a wired or wireless communication unit by touching the icon "call" on the buyer interface or pressing the call button on the front panel of the vending machine,  
121 The unique code is entered through the buyer interface on the vending machine screen, or by a sales

representative based on a voice message sent by the buyer through the microphone of the vending machine audio and video unit,

124 Display the total purchase amount on the touch screen of the vending machine, or inform the product quantity and price in the form of voice information of the sales specialist,

126 Order confirmation is made by touching the order confirmation icon on the buyer interface, or by pressing the call button on the front panel of the vending machine,

128 The sales specialist informs the container number of the product module unit through the buyer interface or through voice information,

130 payment for the order by the buyer through the receiver of the selected payment module, using the monitoring camera of the tray of the change and receipt dispensing module, further control of the container door of the module with the merchandise unit and the unlocking of the change and receipt dispensing module by the sales specialist,

134 Using the monitoring camera 17 of the door 9 of the container, the acquisition of the medicine in the appropriate container is controlled by the sales specialist,

136 Once the vending machine has not been used by the buyer for a period of time, the vending machine is placed into a standby mode by a sales specialist or automatically.





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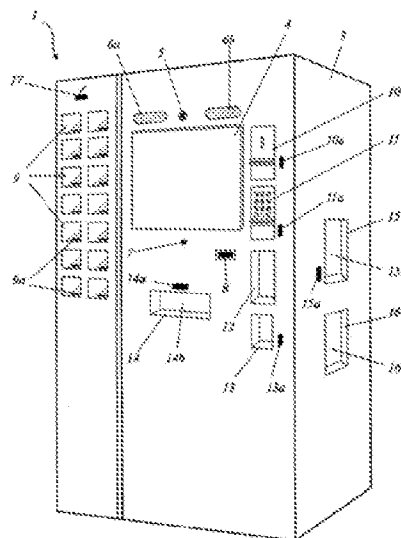
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(54)发明名称

用于远程销售受管制商品的自动售货机及方法

(57)摘要

本发明涉及用于远程销售受管制商品的自动售货机及方法。该自动售货机配备有商品退回和赔偿模块、提供自动售货机和指定营业站点之间通信链接的通信单元,以及使自动售货机适合视力不好的人使用的装置,所述装置是凸起盲文形式的图形标记。一种远程销售受管制商品的方法,使用所提出的用于远程销售的自动售货机来实现,并设想由专门的营业专员来监测和控制下订单、核准同意文件、付款、配货以及必要时退货的步骤。该方法由在专门的营业站点内的电算化工作站工作的专门营业专员,实现自动售货机的通信及其销售过程的远程控制。



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1. 一种用于远程销售受管制商品的自动售货机,包括机身(3)和安装在机身中的以下项:

通信单元、软件和硬件单元、数据库以及数据存储管理服务器,该通信单元提供与远程营业专员站建立通信的可能性,此处营业专员站包括至少一个受管制商品的营业专员的电脑工作站点,该软件和硬件单元用于数据收集和远程销售受管制商品的自动售货机的操作控制,

接收和解译自动售货机控制指令的软件和硬件单元以及用于订单的接收、支付和分配的相关自动售货机功能特征和模块,包括

音频和视频单元,包括数据显示装置、视频摄像机(5)、扬声器(6a、6b)和麦克风(7)以及营业专员呼叫按钮(8),其中数据显示单元为具有购买者界面的触屏(4)的形式,该触屏(4)被安装在机身的前面板上,视频摄像机(5)位于触屏的上面,

营业专员呼叫按钮(8),其配备有位于前面板上的板,该板具有盲文类型形式的图形指示点,以及

由营业专员控制的:

商品单元模块,其配置为容器,该容器在前面板上具有门(9),该前面板具有对应门(9)的监视摄像机(17),

授权文件读取装置,其为扫描仪(12)的形式;至少一个付款模块,其具有在机身前面板上的付款接收器(10、11),

商品分配模块,其在机身前面板上具有托盘(14),且其配备有分配模块,该分配模块配备有卷帘门(14b),以及在该卷帘门(14b)上配备有对应的监视摄像机,

零钱和收据分配模块,其在机身前面板上具有托盘(13),且其配备有监视摄像机,

退货模块和文件存储模块,该退货模块在机身的侧面板上具有托盘(15),该文件存储模块在机身的侧面板上具有托盘(16),相应地,退货模块和文件存储模块配备有受控制的卷帘门(15b)和(16b)以及对应退货和文件分配的监视摄像机,此处

多个板(10a、11a、13a、14a、15a)置于所述付款接收器(10、11)、零钱和收据分配模块的托盘(13)、商品分配模块的托盘(14)以及退货模块的托盘(15)的位置点附近,其中该多个板(10a、11a、13a、14a、15a)具有盲文类型形式的指示的图形指示器。

2. 根据权利要求1所述的自动售货机,其中

商品单元模块配备有保持温度和湿度条件的装置。

3. 根据权利要求1所述的自动售货机,其中授权文件阅读器配备有带监视摄像机的容器,以用于在销售处方药期间的处方单的接收。

4. 根据权利要求2所述的自动售货机,其中

商品付款的机构配置为现金付款模块和/或信用卡付款模块的形式。

5. 根据权利要求2所述的自动售货机,其中

营业专员站的工作站点为营业药剂师或者营业商贩的工作站点。

6. 一种远程销售受管制商品的方法,其使用根据权利要求1的远程销售受管制商品的自动售货机,该方法包括

通过由购买者利用屏幕上显示的购买者界面接触触屏,或者通过按下自动售货机前面板上的呼叫按钮,来从待机模式进行自动售货机的启动,

由购买者通过接触购买者界面上的图标“呼叫”或者按下自动售货机前面板上的呼叫按钮,经过有线或无线通信单元,来建立自动售货机和营业专员站之间的通信,

确定有空的营业专员且上传已激活的自动售货机的数据至营业专员的电脑工作站点,在营业专员的工作站点的屏幕上显示控制自动售货机功能装置和模块的操作界面,由营业专员启动自动售货机音频和视频单元的操作模式,

在自动售货机触屏上显示商品清单,由购买者选择要获取的商品,同时使用自动售货机扫描仪提交指定商品类型的授权文件,进一步在营业专员站的屏幕上显示选定商品的清单,

在自动售货机触屏上显示购买总量,或者以营业专员语音信息的形式告知商品数量和价格,

通过在购买者界面上接触选定商品确认图标,或者通过按下自动售货机前面板上的呼叫按钮,进行选定商品的确认,

由营业专员解锁自动售货机的付款模块,

通过选定付款模块接收器进行付款,使用商品分配模块及零钱和收据分配模块的托盘的监视摄像机,由营业专员来进一步控制商品分配模块及零钱和收据分配模块的解锁,

一旦自动售货机未被购买者使用一段时间后,由营业专员或者自动地将自动售货机置为待机模式。

7. 根据权利要求6所述的方法,其中在商品选择期间,营业专员通过文件存放模块的托盘向购买者提供商品文件的访问,由营业专员使用所述托盘的监视摄像机进一步控制文件的退回。

8. 根据权利要求6所述的方法,其中

通过退货托盘来进行商品的退回,该退货托盘由营业专员使用商品退货托盘的监视摄像机来控制。

9. 根据权利要求1的一种远程销售预定的受管制商品的方法,其使用用于远程销售的自动售货机,该方法包括

由购买者接收有关自动售货机地址和编号的信息、订购的商品被发送至自动售货机的时间以及唯一的购买密码,

通过由购买者利用屏幕上显示的购买者界面接触触屏,或者通过按下自动售货机前面板上的呼叫按钮,来从待机模式进行自动售货机的启动,

由购买者通过接触购买者界面上的图标“呼叫”或者按下自动售货机前面板上的呼叫按钮,经过有线或无线通信单元,来建立自动售货机和营业专员站之间的通信,

通过自动售货机屏幕上的购买者界面来输入唯一的密码,或者由营业专员基于购买者通过自动售货机音频和视频单元的麦克风所发送的语音信息来输入唯一的密码,

在自动售货机触屏上显示购买总量,或者以营业专员语音信息的形式告知商品数量和价格,

通过在购买者界面上接触订单确认图标,或者通过按下自动售货机前面板上的呼叫按钮,进行订单的确认,

由营业专员通过购买者界面或者通过语音信息来告知商品模块单元的容器编号,

由购买者通过选定付款模块接收器为订单付款,使用零钱和收据分配模块的托盘的监

视摄像机,由营业专员来进一步控制具有商品单元的模块的容器门以及零钱和收据分配模块的解锁,

使用所述容器的门9的监视摄像机17,由营业专员来控制适当容器中的药品的取得,

一旦自动售货机未被购买者使用一段时间后,由营业专员或者自动地将自动售货机置为待机模式。

## 用于远程销售受管制商品的自动售货机及方法

### 技术领域

[0001] 本发明涉及自动远程销售的设备和方法,尤其涉及用于商品销售的自动售货机,该商品的购买要求授权或受年龄限制。

### 背景技术

[0002] 自动售货机已广泛用于各种单件商品的销售,其涉及日常消费品尺寸的商品,并且就可达性、小占用面积和低维持费来看其比销售网点和场所具有优势。自动售货机也用于受年龄限制的商品,例如烟草和酒精和受管制的商品,包括药品的销售。销售处方药的自动售货机已经变得越来越广泛,产生了具有主动销售控制方法和营业专员参与的自动售货机的需求。

[0003] 众所周知,存在有需要购买者本人身份证明的商品销售机器,请参考俄罗斯联邦2008年10月5日公布的RU73106,U1[1]号实用新型专利,其包括机身、具有商品样品的显示盒(订购单元)、存储和分配商品的装置(订货分配模块)、具有活动屏幕(触屏)的显示屏形式的数据显示装置、支付工具,该支付工具为现金接收装置形式(现金接收模块),尤其是带有找零和收据打印机(打印收据和找零的模块)功能的现金接收器。如果需要,自动售货机可以配备有用于扫描身份证件扫描的装置,以及与营业专员视频电话的装置。

[0004] 使用这种自动售货机的销售方法,为通过自动售货机本身完成所有的销售业务,来执行一种或几种商品的销售。该方法还包括销售过程中断的选项,或者商品的销售要求购买者身份证明,通过网络摄像头发送购买者的面部图像来联系呼叫中心的营业专员,以及通过扫描装置的方式来识别,根据购买者年龄是否符合年龄限制的视觉检测结果,决定是否可以由自动售货机执行下一步操作。

[0005] 类似的方案在2009年5月11日公布的US2009/0276088[2]号申请中提出。该方案涉及销售受年龄限制的管制商品的方法以及所用的自动售货机,且该方案包括在营业专员对购买者证件的目视检查之后,对自动售货机功能的解锁。

[0006] 用于受管制商品销售的上述自动售货机[1,2]和方法,,基本上仅提供根据购买者年龄识别的结果与购买者在没有营业专员参与的情况下采取的进一步行动,对自动售货机功能的受控解锁,。然而,为了确保受管制商品按预期授权销售,在商品销售要求通过自动售货机提交授权文件,例如医学处方的情况下,从购物开始的时刻直到购物完成,整个销售过程将通过营业专员的义务参与而不是通过自动售货机本身得到控制。

[0007] 有一种通过自动售货机销售包括处方药的药品的方法,其中购买者将处方插入读取装置然后使用现金插槽(现金接收器或者硬币接收器)或者使用卡插槽通过信用卡的方式为购物付款;请参考此网址的电子资源:<http://www.1000ideas.ru/article/biznes/moda-krasota-zdorove/biznes-ideya-1886-avtomat-dlya-prodazhi-tabletok/>[3]为例。付款之后,购买者获得收据和用药方案打印条。在药品购买过程中,购买者可以联系商贩,商贩将核对医药处方并就用药方案提供咨询。该方法在自动售货机中实施,该自动售货机包括机身、医学处方接口、支付模块接口、商品出货托盘、收据和用药方案打印模块以及

与商贩音频/视频交流的装置。从购物过程开始直到购物终止的所有操作均由自动售货机在无营业专员参与的情况下执行。

[0008] 针对解决受管制商品销售的问题,考虑到从商品选择起到商品出货为止,期间商品购物按序检验和控制的装置的缺乏,该自动售货机没有为预期授权销售处方药确保安全。这种自动售货机的功能仅限于销售不需考虑因购买者错误操作而需要退货以及退款的商品。

[0009] 另外,相关技术中的自动售货机已限制了某些类别的残疾人的使用,尤其是视力差的人,并且相关技术中的自动售货机不能确保购买者身份担保识别,这增加了计划之外销售处方药的风险。另外,如果有需要,相关领域中的药品自动售货机不便于购买者获取药品证书,因为从屏幕上读取证书操作不便,且视力差的人基本上无法操作。

### 发明内容

[0010] 本发明的目的在于开发一种由营业专员参与的受管制商品的远程销售的综合设施和受管制商品的销售方法,其商品的销售受有关法律法规管制,特别是用于依照基本法律法规、由营业药剂师或销售员控制的处方药销售的综合设施、自动售货机和方法。

[0011] 所提出的用于远程销售受管制商品的远程控制自动售货机和和方法能够达到这样的技术效果:通过可直接熟悉药品证书的营业药剂师或营业销售员连续控制销售流程,安全、便捷地向获得授权的人销售管制商品的过程,以及能够为残障人士,特别是视力低下人士使用自动售货机提供便利的流程。使用自动售货机,不仅能够通过降低营业场所租金与工资开销来降低药价,还能够通过大范围的药品自动销售机网络,排除地理障碍,使得药品更加易于获得。

[0012] 药物自动售货机移动性强,占地面积小,可以设置于旅游路线、加油站,使机动车使用者获取药品变得更加便利。

[0013] 所述技术效果通过远程控制的自动售货机达到,该自动售货机包含:

[0014] 用于远程销售受管制商品的该自动售货机,其包括机身以及安装在机身内的以下物件:

[0015] 通信单元、软件和硬件单元、数据库以及数据存储管理服务器,该通信单元提供与远程营业专员站建立通信的可能性,此处营业专员站包括至少一个受管制商品的营业专员的电脑工作站点,该软件和硬件单元用于数据收集和远程销售受管制商品的自动售货机的控制。

[0016] 用于控制的软件和硬件单元,该软件和硬件单元指挥:自动售货机的接受和解读、相关自动售货机的功能特性,以及订单的接收、支付和出货;该软件和硬件单元包含音频和视频单元,该音频和视频单元包括显示装置、视频摄像机、扬声器和麦克风以及营业专员呼叫按钮,其中数据显示单元为具有购买者界面的触屏的形式,该触屏被安装在机身的前面板上,视频摄像机位于触屏的上方,营业专员呼叫按钮配备有带盲文类型形式指定的图形指示点的板,该板位于前面板上,且

[0017] 以下由营业专员控制,

[0018] 商品单元模块,其由前面板上具有门的容器充当,该前面板具有门监视摄像机,

[0019] 授权文件读取装置,该授权文件读取装置为扫描仪的形式,至少一个付款模块,该

付款模块具有位于机身前面板上的付款接收器，

[0020] 商品分配模块，其在机身前面板上具有托盘，该商品分配模块配备有出货监视摄像机，商品分配由卷帘门控制，

[0021] 零钱和收据出纳模块，该出纳模块具有托盘，托盘位于机身前面板上，并配备有监视摄像机，

[0022] 退货模块和文件存储模块，该退货模块在机身的侧面板上，该文件存储模块在机身的侧面板上，并具有托盘，相应地，退货模块和文件存储模块配备有受控制的卷帘门和以及退货和文件出纳的监视摄像机，此处

[0023] 在所述付款接收器、零钱与收据出纳模块、货物出货模块和退货模块的附近设置有带有盲文类型指示的图形指示的多个板

[0024] 营业专员的工作站点为营业药剂师或者营业商贩的工作站点。

[0025] 商品单元模块优选地配备有保持容器温度和湿度条件的装置。

[0026] 商品付款的方式可以以现金付款模块和/或信用卡付款模块的形式来进行。

[0027] 如果需要，在销售要求授权文件的商品的情况下，授权文件读取装置可以配备有带有监视摄像机的容器，用于授权文件（例如，处方单）的接收。

[0028] 根据权利要求1的远程销售受管制商品的方法，其可以使用根据权利要求1的用于远程销售的自动售货机来实施，该方法包括

[0029] 通过有线或无线链接，连接一个或多个用于远程销售受管制商品的自动售货机至营业专员站，该营业专员站包括至少一个受管制商品的营业专员的电脑工作站、软件和硬件单元、数据库和数据存储管理服务器，该软件和硬件单元用于数据收集和远程销售受管制商品的自动售货机的控制。

[0030] 通过购买者接触屏幕上显示购买者界面触屏，或者通过按下自动售货机前面板上的呼叫按钮，来从待机模式进行自动售货机的启动。

[0031] 购买者通过接触购买者界面上的图标“呼叫”或者按下自动售货机前面板上的呼叫按钮，来建立自动售货机和营业专员站之间的有线或无线通信，

[0032] 确定可用的营业专员且上传已激活的自动售货机的数据至营业专员的电脑工作站，在营业专员的工作站点的显示器上显示控制自动售货机功能装置和模块的操作界面，由营业专员启动自动售货机音频和视频单元的操作模式，

[0033] 在自动售货机触屏上显示购买者要求订购的商品清单，使用自动售货机扫描仪提交特定类型的商品的授权文件，进一步在营业专员站的屏幕上显示选定商品的清单，

[0034] 在自动售货机触屏上显示购买总量，或者以营业专员语音信息的形式告知商品数量和价格，

[0035] 通过在购买者界面上接触选定商品确认图标，或者通过按下自动售货机前面板上的呼叫按钮，进行选定商品的确认。

[0036] 在指定顾客付款选项（现金/信用卡）之后，解锁自动售货机付款模块。

[0037] 对选定商品的支付，是通过支付模块接收器，由营业专员使用商品出货模块的托盘的监控摄像机进一步解锁商品出货模块和零钱与收据出纳模块完成的。

[0038] 一旦自动售货机未被购买者使用一段时间后，由营业专员或者自动地将自动售货机置为待机模式。

[0039] 在商品选择期间,营业专员按购买者的要求可以通过文件存放模块的托盘给他/她提供商品文件,由营业专员使用所述托盘的监视摄像机进一步控制文件的退回。

[0040] 该方法还通过商品退货托盘为退货提供可能,该商品退货托盘由营业专员使用商品退货托盘的监视摄像机来控制。

[0041] 提出的用于远程销售的自动售货机还提供销售预定的受管制商品的方法,该方法包括:

[0042] 由购买者接收有关自动售货机地址和编号的信息、订购的商品被发送至自动售货机的时间以及唯一的购买密码,

[0043] 通过屏幕上显示购买者界面由购买者接触触屏,或者通过按下自动售货机前面板上的呼叫按钮,来从待机模式进行自动售货机的启动。

[0044] 由购买者通过接触购买者界面上的图标“呼叫”或者按下自动售货机前面板上的呼叫按钮,经过有线或无线通信单元,来建立自动售货机和营业专员站之间的通信,

[0045] 通过自动售货机屏幕上的购买者界面来输入唯一的密码,或者由营业专员基于购买者通过自动售货机音频和视频单元的发送的语音信息来输入唯一的密码,

[0046] 在自动售货机触屏上显示购买总量,或者以营业专员语音信息的形式告知商品数量和价格,

[0047] 通过在购买者界面上接触订单确认图标,或者通过按下自动售货机前面板上的呼叫按钮,进行订单的确认。

[0048] 由营业专员通过购买者界面或者通过语音信息来告知带商品单元的模块的容器编号。

[0049] 由购买者通过选定付款模块接收器为订单付款,由营业专员使用零钱和收据分配模块的托盘的监视摄像机来进一步控制解锁具有商品模块的单元的容器门以及零钱和收据分配模块,

[0050] 由营业专员使用所述容器的门9的监视摄像机17,来控制正确容器中药品的取得,

[0051] 一旦自动售货机未被购买者使用一段时间后,由营业专员或者自动地将自动售货机置为待机模式。

#### 附图说明

[0052] 提出的发明在附图中进行解释,其中:

[0053] 图1表示了根据本发明远程销售受管制商品的远程受控的自动售货机的总体视图。

[0054] 图2表示了使用远程销售的自动售货机的流程图,其对远程销售受管制商品的方法进行了解释。

#### 具体实施方式

[0055] 图1为远程销售受管制商品的远程受控的自动售货机的总体视图的示意图。

[0056] 自动售货机包含机身3,其中设有用于放置,存储和销售商品的设备和功能模块。机身作为支撑框架,该支撑框架用前面板和侧面板以及后面板封装起来,通常,后面板表现为门的形式以便于触及自动售货机的装置和功能模块。机身还包括通信单元、硬件和软件



单元,通信单元用于与远程站的营业专员通信,硬件和软件单元提供收据和控制指令的说明,例如,该控制指令由受管制商品的营业专员生成。

[0057] 该自动售货机配置有音频和视频系统,该音频和视频系统包括触屏4形式的显示装置、摄像机5、电动扬声器6a和6b形式的扬声器装置,以及麦克风7。摄像机5安装为可以捕捉购买者区域的图像以及由视力差的人提交的文档和其他文本材料的图像。

[0058] 电动扬声器设在便于无噪声收听语音信息的位置,例如,数据显示装置的上方。摄像机5设在便于提供对购买者区域可能的最广泛的捕获的位置,例如,如图2所示,它可以位于扬声器之间的触摸屏4上方的中部。麦克风7和营业专员呼叫按钮8位于触屏4的下方,

[0059] 呼叫按钮8表面上安装有盲文类型指示的带有图形指示器的板,用于告知视力差的人按钮的类型。触屏与眼睛水平,其高度根据人的平均身高数据而决定。

[0060] 音频和视频系统用于购买者和营业专员之间的视频会议、商品购买过程期间的咨询以及购物者商品申购过程期间的咨询。另外,显示装置和扬声器装置用于熟悉通过该自动售货机销售的商品。例如,购买者在小册子模式下可以浏览各种商品的宣传页。具体地,在药品销售期间,购买者可以熟悉商品描述和使用指导,例如,关于药品,当自动售货机处于待机模式时,购买者可以浏览和收听可能被演示的各种商品的广告。

[0061] 为了执行预定、支付和配货的过程,自动售货机配置有作为日常消费品尺寸的商品(例如,药品)容器的多个商品销售模块,包括授权文件读取装置、至少一个付款接收模块,特别是现金接收模块和/或信用卡接收模块,找零和收据出纳模块和付款货物出货模块。

[0062] 用于待售的日常消费品尺寸的商品的单元模块位于机身里面(不可见)。模块单元充当的可以容纳标准范围的商品以及标准范围外的商品的容器。如果提供标准范围外的商品,则通过容器的门9取得商品,该容器位于自动售货机的前面板上触屏4的左侧。针对视力低下者,门9带有编号且包含托盘9a,托盘9a带有容器编号标记、盲文形式的的图形标记。

[0063] 可出售商品模块的容器配置有保持商品存储的温度和湿度条件的装置。例如,药物自动售货机的预定商品模块的容器装满了药品自动售货机的标准范围之外的药品,这些药品已经由购买者早先订购了,例如通过公司的网站订购或通过类似的药品自动售货机的预购订单,或通过远程集中处方部门和通过预订订单制造的药品。

[0064] 通过现金(硬币或钞票)接收模块的接收器10或信用卡模块的接受器11来执行支付模块的工作,该支付模块位于触屏4的右侧,两个接收器一个在上,一个在下。

[0065] 扫描仪的窗口12位于信用卡接收器的下方,该窗口用于输入和读取购买者的授权文件或身份证件。用于接收不可退回的授权文件(例如,处方空白页)的容器提供在扫描仪附近的盒子里,并配置有授权文件(例如,医疗处方)的监视摄像头(未示出)。找零和收据出纳模块的托盘13位于扫描仪下方,该找零和收据分配模块装有摄像机(未示出),该摄像头由营业专员用来控制找零收据或退款。在错误出货(例如,药物)的情况下,窗口13用于退钱。

[0066] 商品分配模块的托盘14位于前面板的中间区域,用于根据订单分配货物。商品分配模板在购买期间使用。模块的托盘14配置有卷帘门14b,该卷帘门14b由营业专员和监视视频摄像机(未示出)控制,在配货期间视频摄像机中的图像被发送至营业专员的屏幕。因此,营业专员控制那些特定商品的分配,例如客户订购和支付的药品。

[0067] 窗口12和托盘13、14位于文件扫描、取货、收据和找零期间便于手动操作的高度。在商品错误分配的情况下,例如药物,托盘13也用于退钱。

[0068] 具有盲文类型标识的图形指示器10a、11a、13a和14a的板位于现金/信用卡接收器、商品分配托盘和收据以及零钱分配窗口附近,以便于视力差的人使用自动售货机分别付款和收货以及取回零钱和收据。

[0069] 退货模块的托盘15位于自动售货机机身的右侧面板上,该托盘15具有可锁定卷帘门15b,在其附近设置有板和文件存储模块的托盘16,该板具有盲文类型形式的图形指示器15a,该托盘16具有可锁定卷帘门16b。

[0070] 退货模块的托盘15和文档存储模块的托盘16由营业专员控制。卷帘门15b和16b由营业专员远程控制。退货模块的托盘用于,由于营业专员或后勤员工失误,导致向存储模块的错误单元错误分配商品(例如药品)的情况。文档存储模块用于自动售货机中的商品(例如,药品)的证书副本的存储。根据购买者的要求,托盘16的卷帘门16b由营业专员远程控制,并由摄像机控制。

[0071] 用于为夜问题字、自动售货机模组的托盘和按钮栏提供照明的照明灯可以安装在自动售货机机身上。

[0072] 为防止服务人员触电,当打开自动售货机的装置和功能模块的检修门时,锁定开关切断电路。

[0073] 每台自动售货机还配备有警报器,万一如果有任何入侵企图,该警报器向最近的警察部门的服务台上报,连接该自动售货机的所有视频摄像机,并且开始记录在自动售货机里面和外面正在发生的事件的图像,同时激活声音警报(警笛声)。另外,自动售货机连接到任何可用的营业专员,让他在实时解决、观察情况的情况下作出额外决定。之后,是否需要派遣自动售货机的值班修理人员前往自动售货机的决定将被做出。

[0074] 另外,具有额外访问权限的营业专员可以连接到任何自动售货机并检查其特性、商品库存并测试其本身的功能。

[0075] 如果用于调节单元舱的温度和湿度的装置发生故障,则会有另一个对温度敏感的警报器,并向营业专员站上报故障。

[0076] 使用根据本发明的上述远程控制自动售货机所提出的远程销售方法适用于远程销售药品,并且下文中的自动售货机将称为药物自动售货机。

[0077] 使用远程销售受管制商品的自动售货机以远程销售受管制商品的方法提供了一台或多台自动售货机的控制。如图2中的流程图所说明的那样,用于远程销售受控商品的一个或多个自动售货机通过有线或无线通信单元连接到营业专员站点(2)。

[0078] 使用基于双绞铜导线(双绞线)的电缆线、具有铜导线的同轴电缆以及光纤电缆可以用作有线通信线路。固定无线通信可以用作无线通信网络,该固定无线通信是基于无线频带中进行数据传输的多点无线通信信道。每个自动贩卖机和营业专员站都配备了发射和接收天线以及用于数据准备和传输的必要设备。

[0079] 自动售货机配备有硬件和软件单元,以提供自动售货机功能特性和模块的控制命令的接收和解译、自动售货机上数据发送到营业专员站的准备、来自营业专员站的控制信号的解译。

[0080] 营业专员站配备有电脑工作站点、带数据库的硬件和软件单元以及数据存储控制

服务器。营业专员站的硬件和软件单元提供数据收集的过程,以及自动售货机远程销售受管制商品的操作控制信号的准备和传输。当自动售货机被用作药物自动售货机时,营业专员为药剂师和商贩。

[0081] 购买者到达药物自动售货机时,自动售货机的触屏4可能正处于广告回放模式或者自动售货机正处于待机模式,并且通过触摸触屏来从广告回放模式或待机模式中完成自动售货机初始化,在购买者接触初触屏之后,将出现“呼叫”图标。视力差的人通过按药物自动售货机前面板上的呼叫按钮8使自动售货机进入准备就绪模式,该药物自动售货机配备有盲文类型形式的“呼叫”按钮指示的图形指示器。

[0082] 在按下触屏4上的“呼叫”图标或“呼叫”按钮8之后,药物自动售货机1连接到营业专员站2。在呼入的情况下,营业专员站的硬件和软件单元将药物自动售货机连接到第一个可服务的的营业专员的电脑工作站点。因此,连接到营业专员的所需时间将首先显示在药物自动售货机的触屏4上,或者如果营业专员可提供服务,则营业专员的视频图像将立即出现,并且从视频摄像机5中获取的购买者图像将出现在营业专员站的屏幕上,因此,语音通信也被连接,然后开始营业专员和购买者之间的对话。营业专员和购买者的对话被记录到营业专员站的数据存储服务器中,并在那里存储一段时间,以便当存在非标准或与购买者发生冲突时进行可能的调查,以及产生购买者的视像记录。

[0083] 在营业专员的计算机连接到药物自动售货机后,操作界面将出现在营业专员站的屏幕上,该操作界面具有药物自动售货机的各种功能模块和装置(扫描仪、支付模块、视频摄像机、文件存储托盘16的卷帘门的锁定装置以及退货模块托盘15的卷帘门)的所有控制功能。另外,软件(库存软件)还会加载已连接的药物自动售货机上的数据,即其地理位置、自动售货机中所含药品的数量和名称以及物理参数(自动售货机各个部分的温度和湿度)。之后,营业专员将自动售货机的音频和视频单元置为操作模式,并在触屏上显示药品列表并说明其价格。

[0084] 在与营业专员对话期间,购买者说出想要的商品(例如,药品)然后营业专员从仓库数据库中选择购买者请求的药品,并且选择结果以药品名称、数量和价格以及“总”数的说明清单的形式显示在自动售货机的触屏4上。如有需要,根据购买者的要求,营业专员使用药物自动售货机的音频和视频单元对药品和订购程序给出咨询。在需要提交授权文件(例如医疗处方)的情况下,营业专员解锁扫描仪且购买者扫描医疗处方。订单完成后,将会激活药物自动售货机购买界面上的图标“确认订单”。购买者通过按下图标“确认订单”或者通过按下自动售货机的“呼叫”按钮8来确认订单,并且订单确认信息将出现在营业专员计算机的屏幕上。之后,营业专员激活现金和信用卡接收模块的操作,然后购买者可以使用接收器10或接收器11中的一个。

[0085] 如果药物自动售货机由视力差的人使用,则使用购买者与营业专员之间对话的语音对话模式来执行药品选择过程。营业专员告知购买者可售药品的信息,并生成选定药品的清单,然后用声音告知购买者选择总量和总价。由购买者按下“呼叫”按钮8进行订单确认。如果使用信用卡进行支付,则带有盲文类型形式指示的图形指示器的板11a位于信用卡插槽附近,以助于找到该插槽。如果购买者支付现金,他/她则使用现金接收器(10),在现金接收器(10)附近他/她也可以找到带有盲文类型(10a)形式指示的图形指示器的板。在这两种情况下,营业专员通过视频通信的方式控制视力差的购买者所执行的所有动作,帮助他

找到模块。

[0086] 只要一插入所需数量的金额或完成了信用卡账户上的交易,其会显示在营业专员的屏幕上,则按照营业专员的指令与购买者进行结算:分配货品(例如药品),并且如果需要的话找零。使用商品分配托盘14和零钱及收据分配托盘13的视频摄像机,营业专员启动和控制商品分配和找零的过程。

[0087] 视力差的人使用带有盲文形式托盘指定的图形指示器14a和13a的板找到托盘,必要时由营业专员参与。

[0088] 当订购多于一种药品时,药物自动售货机依次分配药品,此处是从较大的数量到较小的数量,这简化了由营业专员对药品分配的视觉控制,因为从顶部进入托盘的药品包装不太可能覆盖底部包装。之后,零钱和收据被发放至零钱分配托盘。

[0089] 如果购买者需要处方药,营业专员会要求购买者提交药品处方。处方药的配药如下:专员要求购买者将处方单插入扫描仪,扫描的图像会显示在专员的屏幕上,在专员确认处方是正确和有效的以及在确认有药品之后,就运行像非处方药购买的步骤,然后专员通过位于容器内的视频摄像机控制具有处方单的处方进入容器。如果在药物自动售货机中没有该药品,并且没有类似药品或该类似药品不适合购买者,则将处方单从扫描仪处退回给购买者。

[0090] 如果购买者想要浏览位于药物自动售货机中的药品的文件,则专员解锁文件存储模块的托盘16的卷帘门16b,购买者可以打开卷帘门并拿出具有药品证书副本的文件夹,该药品证书按字母顺序放置以方面搜索。通过位于托盘内的视频摄像机来控制文件夹的退回。之后,营业专员锁定托盘的门,或者营业专员控制卷帘门的关闭和锁定以防自动锁定。

[0091] 在由于技术错误将错误的药品分配给购买者的情况下,该情况由营业专员使用商品分配托盘14的视频摄像机来控制,营业专员要求购买者将错误分配的药品放入退货托盘15。步骤如下:营业专员解锁退货托盘的卷帘门15b,购买者打开卷帘门并在那放置商品,例如药品包装。在托盘的卷帘门被打开后,位于托盘15中的视频摄像机自动开启,并且专员控制药品包装的返回及其完整性。已确认货物被退回,在关闭托盘的卷帘门15b之后,营业专员核对商品是否在退货托盘15中。之后,要么给购买者提供所需的药品,要么通过收据和零钱出纳托盘13来退钱,该收据和零钱出纳托盘13位于药物自动售货机的前面板上。

[0092] 在购买过程完成之后,一旦自动售货机未被购买者使用一段时间后,自动售货机由营业专员置为待机模式或者自动置为待机模式。

[0093] 根据本发明,所提出的发明还提供了销售受管制商品,其中该受管制商品通过远程销售的自动售货机进行了预定。实施这种销售是针对商品的远程销售,且该商品处于自动售货机销售的标准商品清单以外。例如,它可以涉及根据预订单来销售中央处方部门生产的药品。

[0094] 具有商品单元的模块的容器用于执行此类销售,其中预定的商品位于该单元中。在订单被放入容器中之后,向购买者报告容器的编号,通过打开对应的容器的门9来进行这种容器中的商品的获取。该门配备有电子锁合装置,在付款之后控制配货时,该电子锁合装置由营业专员控制。通过保持温度和湿度条件的装置,在容器中保持必要的储存温度和湿度。

[0095] 使用商品模块的容器进行的商品销售以如下方式实施:

[0096] 如果购物者需要标准清单以外的药品,他/她可以通过访问公司的网页随后选择取货点(药物自动售货机的地址)来执行订购,或者通过自动售货机与营业专员通讯来订购商品。在后者的情况下,购买者呼叫营业专员并通知他要订购的商品。如果有必要,购买者提交授权文件,例如,以文件的扫描图像的形式。

[0097] 在准备订购之后,通过电子邮件或短信告知购买者自动售货机的唯一的购买密码、地址。

[0098] 之后,已抵达自动售货机处的购买者通过接触触屏6或者按下呼叫按钮8来启动自动售货机,触屏上即显示购买者界面。接触购买者界面上的图标“呼叫”,购买者就通过自动售货机通信单元建立起与营业专员站的通信,并从购买者界面输入购买密码。对于视力差的人,通过重复按下呼叫按钮8建立起与营业专员站的通信,并通过自动售货机音频和视频单元的麦克风7发送购买者的语音信息,由营业专员来输入唯一的购买密码。营业专员使自动售货机的屏幕4上显示关于购买的数量和价格的数据,以及具有商品单元的容器的编号,并通过语音信息告知购买者。在通过购买者界面上对应的确认图标或购买者的语音消息确认购买之后,营业专员解锁支付模块,以允许使用支付模块的现金或信用卡接收器。

[0099] 在通过可用于购买者付款的接收器付款之后,营业专员解锁合适号码的容器的门9及收据与零钱分配模块。购买者打开门9,在营业专员的控制下取走商品,其中营业专员使用监视摄像机1,该监视摄像机1位于具有商品单元的模块的容器的门9上。在营业专员的控制下也进行零钱和收据的出具,其中营业专员使用托盘13的监视摄像机,类似于标准范围商品购买期间所执行的步骤。

[0100] 在销售预定商品期间,例如,该商品使用自动售货机的商品模块的药品单元,则购买者被告知单元中商品存放的有限时间。如果在指定时间内购买者没有从单元中取走商品(例如,药品),则该商品被派往中心办公室存放,通过选定通信方式(邮件/电话)来告知购买者。随后购买者将必须从指定地点取走商品。

[0101] 应该注意到本说明书中指定的用于销售商品,尤其是药品的自动售货机和方法,在所附权利要求书的框架内,其并不限制在本发明范围和本质内使用相关技术的方案的可能变形和修改。

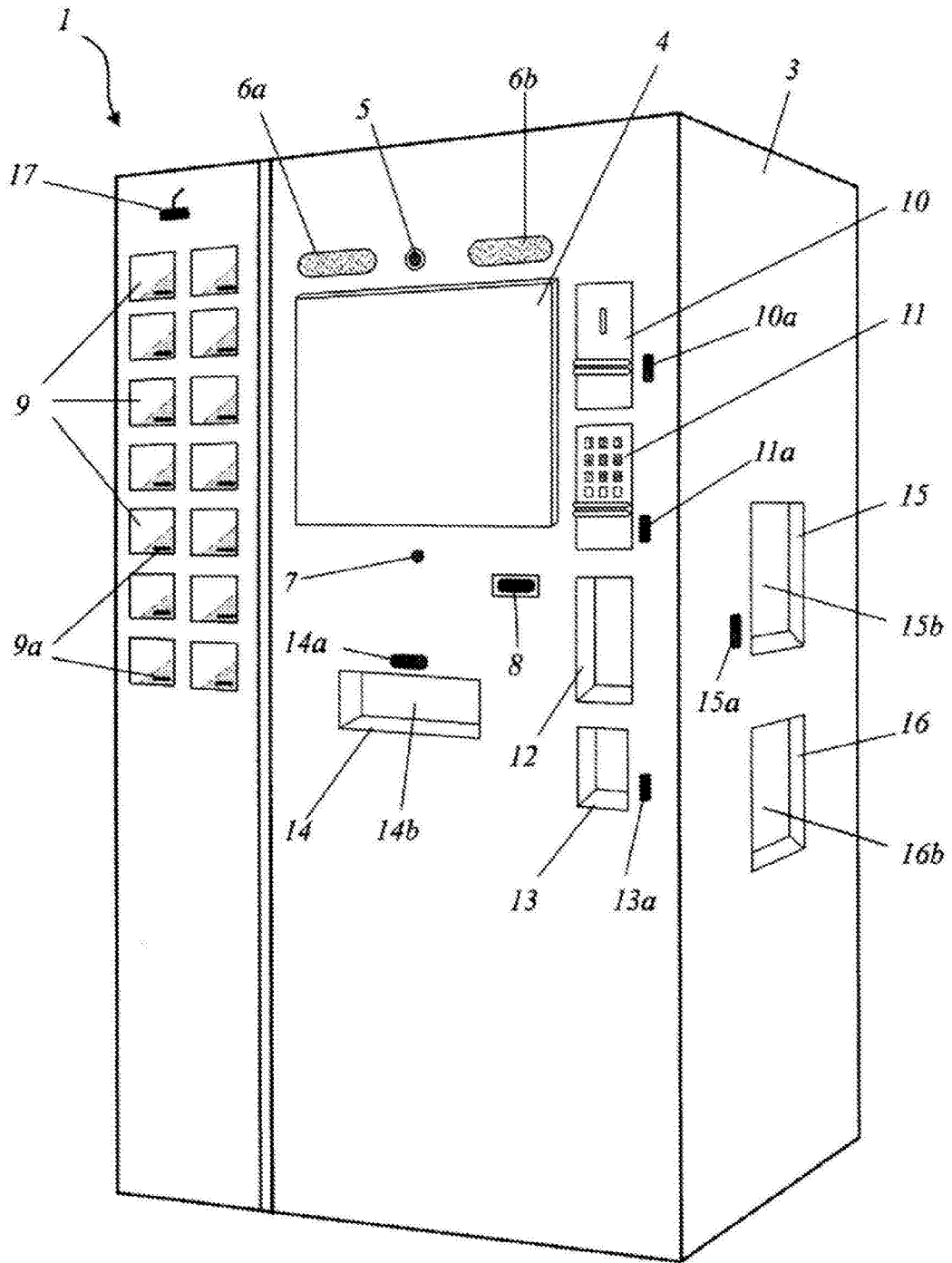


图1

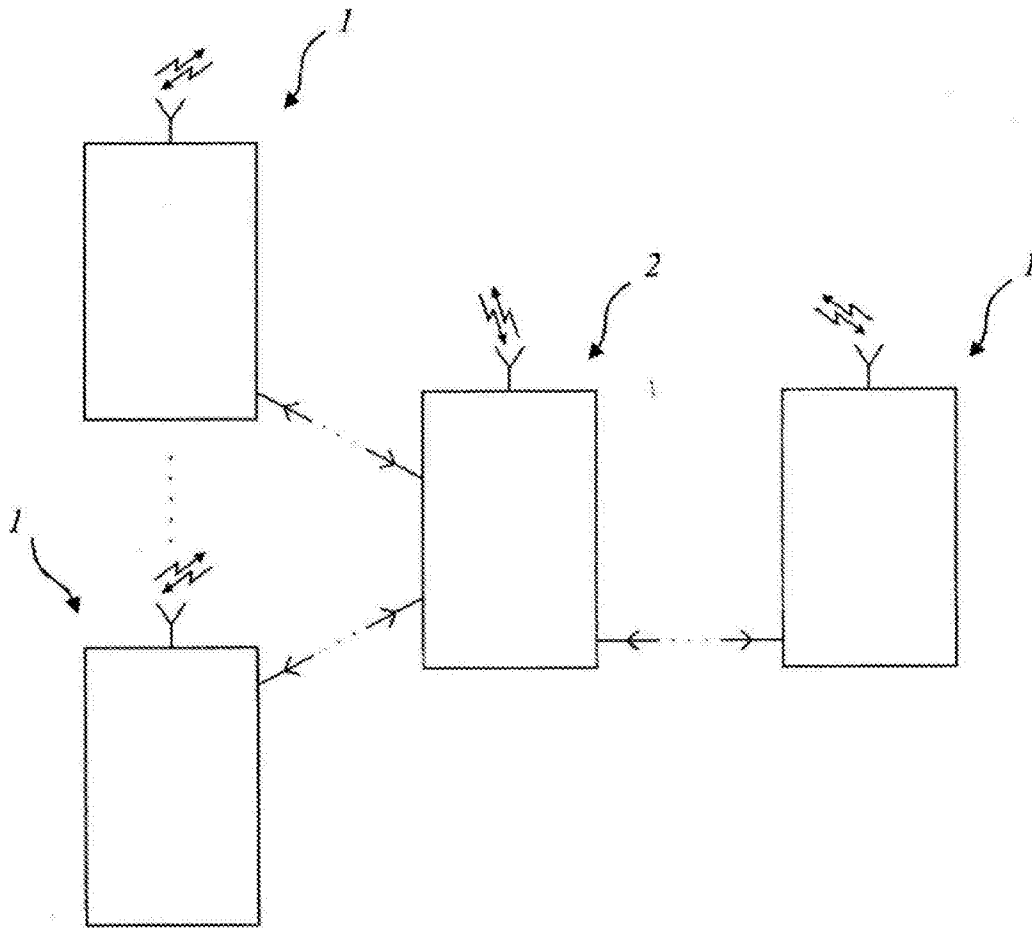


图2

# EIC 3600 Search Report

<b>Requester</b>	Name: <u>Holly John H</u> Organization: <b>TC 3600</b> Art Unit: <b>3696</b> Employee Number: <b>84035</b> Office Location: <b>KNX-2D65</b>
<b>Case Serial Number:</b>	17983311
<b>Access Search Log Number:</b>	704483

<b>Searcher:</b>	Sylvia Keys
<b>Location:</b>	EIC 3600, Knox 4B68
<b>Phone:</b>	571-272-3534
<b>Email:</b>	sylvia.keys@uspto.gov
<b>Date Completed:</b>	6/12/2023

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- **Search Histories**

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Only on-topic results are included in the search report. On-topic results include all references found that are related to the art area being searched. These references may not necessarily be useful for a rejection or other office action, but are included for the Examiner's review. Off-topic, unrelated, or irrelevant search results ("false drops" or "false hits") were removed by the Searcher. Off-topic results include all references that are unrelated to the art area being searched.

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Thank you for using the EIC, and we look forward to your next search!



# Potential References of Interest

• □ 2

## SPEED QUEEN

**American Coin-Op 41.2:** 18. Crain Communications, Inc. (Feb 2000)

... offer easy activation with push-to-**start** controls, the company says.

With ... and cycle selections while auditing **machine** operation. When purchased with the ... with factory-installed card readers for **cashless operation**. The CardMate Plus System ...

• □ 5

## Multihousing equipment gets added technology. (Product News)

**American Coin-Op 42.12:** 8(1). Crain Communications, Inc. (Dec 2001)

... NetMaster(TM) System, offering customer convenience, **cashless operation** and collection control to multihousing ... money is not used to **start** the **machines**. Cards increase customer loyalty ...

□ 12

## Cash Now **initiates** new program that can boost revenues at small businesses

**PR Newswire:** 1. New York: PR Newswire Association LLC. (Sep 14, 2005)

... Since it is an entirely **cashless operation**, there is no need ... be used at any ATM **machine** or at any store that ...

# Dialog – NPL and Inventor(s)

## • Search Strategy

- **Databases:** ABI/INFORM® Professional Advanced, Abstracts in New Technology & Engineering, AdisInsight: Drugs, AdisInsight: Trials, Adis Pharmacoeconomics & Outcomes News, AGRICOLA, AGRIS, Allied & Complementary Medicine™, Analytical Abstracts, APA PsycInfo®, Aqualine, Aquatic Science & Fisheries Abstracts (ASFA), Australian Education Index, BIOSIS® Toxicology, BIOSIS Previews®, British Library Inside Conferences, British Nursing Index, Business & Industry, CAB ABSTRACTS, Chemical Business Newsbase, Chemical Engineering & Biotechnology Abstracts, Chemical Safety Newsbase, Civil Engineering Abstracts, Current Contents® Search, DH-DATA: Health Administration, Medical Toxicology & Environmental Health, DIOGENES® FDA Regulatory Updates, Drug Information Fulltext, Earthquake Engineering Abstracts, Ei Compendex®, Embase®, Embase® French Local Literature, EMCare®, ESPICOM Pharmaceutical & Medical Device News, FDAnews, FLUIDEX (Fluid Engineering Abstracts), Foodline®: MARKET, Foodline®: PRODUCT, Foodline®: SCIENCE, FSTA®, Gale Group Computer Database™, Gale Group Health Periodicals Database, Gale Group New Product Announcements / Plus®, Gale Group Newsletter Database™, Gale Group PharmaBiomed Business Journals, Gale Group PROMT®, Gale Group Trade & Industry Database™, GEOBASE™, GeoRef, HSELINE: Health and Safety, ICONDA - International Construction Database, IMS Company Profiles, IMS New Product Focus, IMS Pharma Trademarks, IMS R&D Focus, IMS R&D Focus Drug News, Inspec®, International Pharmaceutical Abstracts, Jane's Defense & Aerospace News, King's Fund,

KOSMET: Cosmetic Science, Lancet Titles, Mechanical & Transportation Engineering Abstracts, MEDLINE®, Meteorological & Geostrophysical Abstracts, New England Journal of Medicine, NTIS: National Technical Information Service, Oceanic Abstracts, PAIS International, Paperbase, PAPERCHEM, ProQuest Advanced Tech & Aerospace Professional, ProQuest Biological & Health Science Professional, ProQuest Environmental Science Professional, ProQuest Materials Research Professional, ProQuest Newsstand Professional, ProQuest Technology Research Professional, Prouis Science Daily Essentials, Prouis Science Drug Data Report, Prouis Science Drugs Of The Future™, Registry of Toxic Effects of Chemical Substances (RTECS®), SciSearch®: a Cited Reference Science Database, Social SciSearch®, ToxFile®, Transport Research International Documentation, TULSA™ (Petroleum Abstracts), UBM Computer Full Text, Weldasearch®, Zoological Record

Set#	Searched for	Results
S1	machine\$1 or "vending machine\$1"	25387792*
S2	"parking meter\$1" or "parking metre\$1" or "toll booth\$1" or "video gaming console\$1" or "offline payment operated machine\$1"	204435*
S3	(s1 or s2) and unattended	47167*
S4	(s1 or s2) and cashless	46105*
S5	"coin receiving switch\$2"	3°
S6	"electric pulse\$1"	44569*
S7	"pulse information" or "pulse data"	8783*
S8	(s6 or s7) and (provide\$1 or providing)	20347*
S9	(s6 or s7) and (determin* or assess*)	15398*
S10	option\$1 or choice\$1	67674018*
S11	s10 and (remote\$4 or faraway or distant or far or "far off") and (configuration or configured)	875137*
S12	"analog signal\$1"	104007*
S13	s12 and (emulat\$4 or imitate\$1 or mimic or mirror)	5508*
S14	("signal sequenc\$3") and (count or amplitude or shape or interval)	13779*
S15	s14 and ("pulse information")	7°
S16	s14 and (issue\$1 or issuing or issuance)	3347°
S17	"cashless operation"	193°
S18	s17 and (initiate\$1 or initiating or initiation or start\$1 or starting)	80°
S19	au((patel))	953493*
S20	payrange*	413°
S21	(s3 or s4) and s5	0°
S22	(s3 or s4) and ("coin switch**")	0°
S23	(s3 or s4) and (s8 or s9)	25°
S24	s23 and s11	12°
S25	s24 and (s13 or s15 or s16 or s18)	0°
S26	(s3 or s4) and s13	35°
S27	s26 and (s15 or s16)	0°

S28	s26 and s18	0°
S29	s1 and s13	1772°
S30	s29 and (s15 or s16)	1°
S31	s29 and s18	0°
S32	s1 and s18	25°
S33	(s19 or s20) and s29	1°

□ 5

Shorter cycle times and better surface finishes

Jordan, John M; Bradbury, Johanna L. **Modern Machine Shop** 70.11: 274. Cincinnati: Gardner Business Media Inc. (Apr 1998)

... to the U-Series wire EDM **machines**, the U53K, relies on ...  
 temperature spark. These high frequency **electric pulses** can be more efficiently delivered ... amounts of material.  
 The K-generator **provides** precise voltage control, eliminating residual ...

□ 12

MPD-Model: A Distributed Multipreference-Driven Data Fusion Model and Its Application in a WSNs-Based Healthcare Monitoring System

Gong, Jibing; Cui, Li; Xiao, Kejiang; Wang, Rui. **International Journal of Distributed Sensor Networks** Abingdon: Sage Publications Ltd. (2012)

... implement feature extraction of wrist-pulse data, we propose FEA, a ...

... and reproduction in any medium, **provided** the original work is properly ...  
 large-scale historical sensed data into **machine** learning for data fusion, treats ...

□ 1

Are they too smart by half? The little shopping cards that can encode all the details of our lives. [Late Edition]

Barker, Garry. **The Age**: 6. Melbourne, Vic.: Fairfax Digital. (Sep 26, 1998)

... Asia-Pacific, believe that once we **start** using smartcards adoption will be ...  
 transactions: recharge at Automatic Teller **machines** and later through secure Internet ...  
 Clubs want to move to **cashless operation** in their bars.  
 \* Reciprocity ...

□ 2

SPEED QUEEN

**American Coin-Op** 41.2: 18. Crain Communications, Inc. (Feb 2000)

... offer easy activation with push-to-**start** controls, the company says.  
 With ... and cycle selections while auditing **machine** operation. When purchased with the ...  
 with factory-installed card readers for **cashless operation**. The CardMate Plus System ...

□ 4

Top-load washers

**American Coin-Op** 42.2: 4. Crain Communications, Inc. (Feb 2001)

... out-of-balance system ensures that the **machine** completes wash cycles without interruption. ... laundry units. This equipment provides **cashless operation**, increasing customer safety and ... maintain its lustrous appearance. The **machine's** automatic balance system) is ...

• □ 5

### Multihousing equipment gets added technology. (Product News)

**American Coin-Op** 42.12: 8(1). Crain Communications, Inc. (Dec 2001)

... NetMaster(TM) System, offering customer convenience, **cashless operation** and collection control to multihousing ... money is not used to **start** the **machines**. Cards increase customer loyalty ...

□ 7

### Top-load washers still popular with today's coin laundry users: today's **machines** designed to push efficiency to the limit. (Equipment Review)

**American Coin-Op** 44.6: 20(3). Crain Communications, Inc. (Jun 2003)

... electronic display control equipment provides **cashless operation**, increasing customer safety and ... and cycle selections while auditing **machine** operation, simply by using the MicroWand IIIE TM] the **machine** control pad or their computer ...

□ 10

### Making the cashless case: going cashless means clearing several hurdles

Partyka, Paul. **American Coin-Op** 45.10: 22(6). Crain Communications, Inc. (Oct 2004)

... if your laundry isn't a **cashless operation** you can probably name a ...

...

... if your laundry isn't a **cashless operation** you can probably name a ... time remaining in cycle or **machine** in use. "We now offer ...

□ 12

### Cash Now initiates new program that can boost revenues at small businesses

**PR Newswire**: 1. New York: PR Newswire Association LLC. (Sep 14, 2005)

... Since it is an entirely **cashless operation**, there is no need ... be used at any ATM **machine** or at any store that ...

□ 18

### Seeing both sides of the coin: operator has a mixture of coin/cashless stores

Partyka, Paul. **American Coin-Op** 51.7: 8(2). Crain Communications, Inc. (Jul 2010)

... his coin stores to a **cashless operation**. Weiboldt's reply: "Are you ... at least twice a week, **starting** out daily at 3 a.m. ...

...

... his coin stores to a **cashless operation**. Weiboldt's reply: "Are you ...



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**Report Information from Dialog**

July 14 2023 11:33

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## **Are mobile payments the smart cards of the aughts?**

**Author:** Jacob, Katy

**Publication info:** Chicago Fed Letter 240: 1-4. Federal Reserve Bank of Chicago. (Jul 2007)

[ProQuest document link](#)

**Abstract (summary):** During the 1990s, payment industry analysts, policymakers, and academics predicted an eminent "smart card revolution" as providers began to use closed-loop trials and focus groups to test different types of cards. In the current decade, a new payment revolution is being hyped that combines two subsets of mobile commerce -- mobile payments and mobile banking. Today, smart cards and mobile payments are gaining popularity simultaneously as payment providers seek to capitalize on the information-sharing capabilities of mobile and chip-based payments that are not available in paper or magnetic stripe payments. Due to the many ways that mobile phones are integrated into consumers' daily lives, there is potential to avoid the pitfalls of the past experience with smart cards in developing a robust business model around mobile payments. It is important to note that while the mobile phone might be the most obvious initial channel for large-scale adoption of a new payments infrastructure, it need not be the only channel.

**Links:** [Check USPTO-STIC for Availability](#)

### **Full text:**

#### **Headnote**

This article compares the much anticipated but ultimately stalled smart card revolution of the 1990s with the current expansion of mobile payment platforms, and asks how mobile payments fit into the larger payment system.

In the past few years, payment networks and banks have begun to follow in the footsteps of start-up companies and offer mobile platforms, meaning in-person or remote payments via a mobile phone or other mobile device. Is this just another overhyped trend (like smart cards in the 1990s), a real payments revolution, or something in between? In short, are mobile payments the smart cards of this decade?

During the 1990s, payments industry analysts, policymakers, and academics predicted an eminent "smart card revolution" as providers began to use closed-loop trials and focus groups to test different types of cards. Smart cards look like credit cards but utilize a microchip to store identification and transaction information. The most famous smart card trial was the 1996 Olympic Games, when Visa developed a smart card for use at 1,500 merchants inside Atlanta's Olympic stadium. Consumers were not inclined to embrace smart cards, given the other payment options available, especially because they were accepted in only a limited number of locations. Smart cards never took off in the general marketplace during the 1990s, and they remained in the trial phase because of ongoing challenges related to infrastructure, marketing, standardization, and profitability.

A decade later, we are just beginning to see the adoption of contactless chip cards using radio frequency identification (RFID) technology. All of the major card networks and many large financial institutions have rolled out contactless products. Some very large merchants, such as McDonald's and Wal-Mart, have invested in RFID infrastructure. More than 40,000 U.S. merchant locations accept contactless payments. Analysts estimate that there are 27 million contactless cards in the U.S. today.<sup>1</sup> Eleven years after the first major trial, smart cards finally seem to be gaining some traction.

In the current decade, a new payments revolution is being hyped that combines two subsets of mobile commerce—mobile payments and mobile banking. Mobile payments are defined as "any payment where a mobile device is used to activate and/or confirm the payment."<sup>2</sup> A variety of solution providers, payments processors, and other institutions can offer mobile payments. Mobile banking, on the other hand, remains the exclusive domain of financial institutions that have a deposit relationship with a consumer. While mobile banking

services can enable mobile payments, the reverse is not true.

Each subset of mobile commerce is predicted to grow exponentially in the marketplace. Some analysts predict that, globally, mobile payments will be worth \$55 billion in 2008.<sup>3</sup> But as with smart cards, while mobile payments have gained ground in Asia and Europe, they have not in the U.S. There are a number of reasons for this, including regulatory, market, technological, and cultural differences. First of all, the existing electronic payments infrastructure in the U.S. is expensive to replace, especially for merchants. In some cases, countries with less developed electronic payment systems have been able to move more quickly into mobile payments. Moreover, in some developing economies, such as those in the Caribbean and South Africa, the lack of telephone land lines brought more consumers into the mobile market faster.

At the same time, the U.S. wireless market is fairly atypical in the world in its complexity. There is no one set of standards for the high number of firms and networks involved in the wireless market, which can impede innovation and interoperability in different areas of the country. In Japan, on the other hand, NTT DoCoMo is dominant in the mobile market and was able to use its very large market share to influence merchants and financial services companies. Further, this telecommunications company also directly owns its own payment platforms to facilitate commerce, which would generally be a more difficult proposition within the regulatory environment in the U.S. In addition, largely because of legacy pricing structures, American consumers have been slower to adopt short messaging service (SMS) communication (mobile phone text messaging) than their counterparts overseas, and SMS is a critical part of many mobile payment systems.

How do mobile payments work?

There are two ways to think about mobile payments. One involves the phone as a chip carrier, wherein a computer chip using near field communication (NFC) technology is built into the phone.<sup>4</sup> The other option integrates payments into the phone's software, enabling a consumer to use the phone as a virtual "mobile wallet." For in-person or proximity payments, consumers use the phone to make a purchase at a point-of-sale terminal that is equipped to handle the payment. Remote payments utilize SMS, wireless application protocol (WAP),<sup>9</sup> or a proprietary solution integrated into the phone's software to initiate payments that do not require a point-of-sale terminal.

Many mobile trials in the U.S. have focused on remote payments, and some financial services companies have begun to relay financial information to customers using SMS. Some trials have utilized a chip-based model. In order to provide banking functionality, such as account balance checks, consumer alerts, and payment verification, most providers use an Internet-browser-based solution or proprietary software to connect to the bank's network. Depending on the structure, both proximity and remote payments might require a consumer to be connected to the financial system in some way, through a deposit account, credit card account, or debit card account. The advent of prepaid cards, however, enables some consumers to access these types of mobile payments without having bank accounts or credit histories.<sup>6</sup>

The promise of mobile payments

The number one reason given for the predicted rise of mobile payments is the prevalence of mobile phones coupled with consumers' willingness to adopt new mobile functionality. Globally, there are over 2.5 billion mobile phone users, surpassing Internet or personal computer users. In the U.S., there are more than 230 million wireless subscribers, and there are high users of mobile phones across all income levels.

To be successful, any new payment form needs a large customer base and a high volume of transactions. The mere prevalence of mobile phones does not necessarily mean that enough consumers will embrace them as payment instruments. Mobile payments are in their infancy, and while consumers currently see their potential value, it is difficult to gauge their inherent value. Research suggests that consumers need more exposure to mobile payments possibilities before we can understand the factors driving adoption. Because of its high mobile phone usage, the youth market has been touted as the cohort that will catapult mobile payments into the financial mainstream. One survey found that, in the past year, more than 10% of respondents made a purchase



with a mobile phone, while a slightly higher number made a person-to-person (P2P) payment with a mobile device. The same survey found that those aged under 25 purchase digital content for their phones, while those aged 25-34 are more likely to use phones to transfer funds.<sup>7</sup>

Importantly, although mobile payments represent another payment choice for consumers—who are estimated to make 58 individual payment choices each month—these payments often rely on traditional funding and settlement systems.<sup>8</sup> In fact, many current U.S. mobile payment trials, especially those focused on proximity payments, are dependent on the existing magnetic-stripe-card-based infrastructure. In these cases, the mobile phone becomes a device through which consumers access payment card accounts, and arguably, no real payment substitution takes place. On the other hand, at some point in the future, a chip placed in a phone or another device could become the primary way that consumers access credit or prepaid accounts, eliminating the need for a physical card.

#### Payment trials and tribulations

There is a parallel between today's mobile payment trials and the smart card trials of the 1990s. Analysts agree that our legacy payments infrastructure represents one of the biggest obstacles to mobile payments. Because these new payment systems have had limited exposure, there is a lack of large-scale data sets to facilitate comparisons with other payment forms. It is also difficult to infer U.S. usage from international experience because of market differences, as discussed earlier. Understandably, companies involved in limited trials are unwilling to make significant infrastructure investments when it is not clear how consumers will react. Payment providers also typically assume that merchants will bear the costs of the new infrastructure, while merchants need to be convinced of the benefits accruing to them before making such investments.

Ironically, it is in part due to the ways that the smart card and mobile payment trials have been developed that it is difficult to gauge consumers' adoption of the new payment methods. Most of these trials have occurred in closed-loop or limited-scope systems and, by definition, test only one distribution method (phone or card) rather than several simultaneously. When consumers are out of the "trial zone" or away from areas that allow remote payment functionality, they are not able to use the payment devices. In the 1990s, limited consumer appetite, infrastructure costs, and uncertainty over issues such as standards, security, and customer relationships kept companies from moving forward with their smart card plans.

There is now a synergy between the mobile and chip worlds. As multiple mobile payment trials are in process, there are also an increasing number of chip-based card trials among major firms. Thus, mobile payments are not rising up in a vacuum—RFID/NFC chip platforms are simultaneously gaining ground as the networks and large financial institutions tentatively accept the possibility of moving to chip-based payments. For example, Wal-Mart's decision to require its top suppliers to put RFID tags on shipping crates has been influential, even though some suppliers balked at the \$0.25 to \$0.30 cost per tag. Further, the existing RFID infrastructure at the merchant level, while small, reduces a key initial hurdle for mobile payments adoption.

Multiple industries are needed to make a new mobile payments infrastructure a reality. Obviously, telecommunications firms have a significant role to play, as do software and hardware companies, banks, merchants, and networks. Because of the large number of players, analysts question who will be "in charge" of mobile payments in the future: Who will deal directly with the customer, absorb the risk, pay for the infrastructure, and foster innovation? And how will revenues be divided to ensure that the cost to the consumer is sufficiently attractive?

Some analysts argue that banks play the most crucial role in the equation and that mobile payments will never truly take off without an effective mobile banking platform. But this is one payment form that banks can't exclusively dominate. They need the cooperation of phone companies that are looking for new ways to differentiate themselves in a crowded market. As banks compete with each other for similar customers, so do phone companies. However, they are not necessarily vying for the same set of customers. Mobile companies have high penetration rates among unbanked and lower-income households whom banks find hard to reach,

while phone companies might be able to lure higher-income customers who would be willing to switch from Internet payments to mobile payments.

Is there a "killer" mobile application?

Mobile holds a significant advantage over contactless cards in the area of paperless two-way communication. Card-based models do not allow for the sending, receiving, and presenting of information, as mobile devices do. Internet payments made via personal computer are most similar to mobile payments in this regard, but currently require more cumbersome hardware. As we enter the age of the Apple iPhone and similar devices, it becomes clear that mobile phones now have the ability to operate as small-scale computers. Some mobile payment platforms involve specific downloaded software, and NFC chips can carry a substantial amount of data. Moreover, as technology advances with innovations such as WIMAX,<sup>9</sup> Internet connections through mobile devices will become faster and more readily available.

Because of the efficient electronic payment mechanisms in the U.S., mainstream consumers might be interested in mobile payments for reasons beyond payments per se. It is not always necessary to be able to pay for anything from anywhere anytime, but consumers might find great utility in being able to send and receive financial information from the same device that they use to make payments. As behavioral economists are quick to point out, many consumers like to budget their purchases. One of the benefits of using mobile payments is that it facilitates recordkeeping to help consumers stay within budget. For example, some prepaid card companies have begun offering a text message service to consumers who would like to be notified of each transaction. This type of real-time account recordkeeping can be especially beneficial for consumers with low balances or those who are sharing accounts with family members.<sup>10</sup> Moreover, merchants can derive value from the information exchange made possible through the mobile phone or device by developing loyalty programs and targeted marketing campaigns.

It is this interconnected functionality that makes mobile payments unique. A mobile payments platform can integrate payments, banking, and real-time two-way data transmission. The same cannot be said of cash, checks, or cards. However, most mobile trials have been siloed into remote payment pilots that direct consumers through existing payment networks and utilize SMS to relate information or chip-based trials that enable proximity payments. A "killer" application might allow consumers to use both, as well as provide recordkeeping software for budgeting purposes and other appealing features that consumers would embrace. Unfortunately, the very aspect of mobile payments that makes them appealing carries risk. While firms can use two-way authentication and other security measures, consumers and merchants might be wary of mobile payments in a system where data are broadcast over airwaves and are at risk of interception. Surveys show that consumers would prefer to receive mobile payment offers from banks rather than third party processors or phone carriers, perhaps because of security concerns or familiarity.<sup>11</sup> The incorporation of successful security measures that are not burdensome will be important to mobile payment business models. Companies that can capitalize on a "trusted source" reputation might ultimately be more successful in this space.

#### Conclusion

Today, smart cards, which debuted unsuccessfully in the 1990s, and mobile payments are gaining popularity simultaneously as payment providers seek to capitalize on the information-sharing capabilities of mobile and chip-based payments that are not available in paper or magnetic stripe payments. Due to the many ways that mobile phones are integrated into consumers' daily lives, there is potential to avoid the pitfalls of the past experience with smart cards in developing a robust business model around mobile payments.

It is important to note that while the mobile phone might be the most obvious initial channel for large-scale adoption of a new payments infrastructure, it need not be the only channel-unless the infrastructure that is eventually built is specific to one form of payment. In the future, we may look back and see that the specific focus on mobile phones or smart cards was limited in scope. A new payments evolution may be realized by a nexus of networks, financial institutions, and technology providers that can ensure a safe, reliable, convenient,

and ubiquitous chip-based payment platform-be it via a mobile phone, RFID tag, contactless card, or another, as yet unforeseen, payment instrument.

#### **Sidebar**

Mobile commerce is predicted to grow exponentially in the marketplace. Some analysts predict that, globally mobile payments will be worth \$55 billion in 2008.

#### **Sidebar**

Research suggests that consumers need more exposure to mobile payments possibilities before we can understand the factors driving adoption.

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### PERSONAL MARKETING SYSTEM AND METHOD USING MOBILE COUPON AND ONLINE SHOPPING

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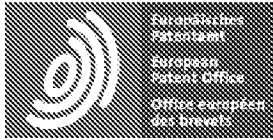
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### Abstract of KR20130138637 (A)

The present invention relates to a personal marketing system using a mobile coupon and online shopping and a method thereof. The personal marketing system according to the present invention includes a coupon service providing server, a coupon issuing member terminal, and a coupon receiving member terminal. [Reference numerals] (AA) Coupon issuing member terminal;(BB) Coupon service providing server;(CC) Coupon receiving member terminal;(S110) Transmit an authenticocode;(S120) Authentication;(S130) Authentication approval;(S140) Set a receiver;(S145) Set a target;(S150) Set a reward;(S157) Temporary payment;(S160) Request to issue a coupon;(S170,S240) Verification;(S180) Approve coupon issuing;(S190) Store coupon-related information;(S200) Issue the coupon;(S210) Transmit the coupon-related information;(S220) Perform a target;(S230) Request the reward;(S235) Payment;(S250) Receive compensation;(S260) Not perform the target;(S267) Refunds



# Patent Translate

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## DESCRIPTION KR20130138637A

<sup>11</sup> Personal marketing system and method using mobile coupon and online shopping  
{Personal marketing system and method using mobile coupon and online shopping}

### [0001]

<sup>16</sup> The present invention relates to a personal marketing system and method for managing individual customers by using mobile accumulation coupons (points, points, stamps, etc.) and online shopping. More specifically, the present invention provides a function of providing a mobile coupon to a mobile communication terminal of a customer who is registered as a member of a coupon service provider, and by utilizing this function, the member provides a mobile accumulated coupon and reward to other members using the service. , compensation), the service user issues a mobile accumulation coupon through the provided function, issues it, and designates a corresponding reward (online product or product exchange voucher) in an online shopping mall when a specific target number is reached at the same time , A personal marketing system and method using a mobile accumulation coupon and online shopping in which, when a user who receives a coupon reaches a certain number through a specific activity, the corresponding accumulation coupon is automatically changed to a pre-specified reward.

### [0002]

<sup>33</sup> Nowadays, in the era of personal brands, one-person companies and personal brands are emerging, and marketing is no longer limited to companies and stores. As people communicate through SNS and smartphones, individual name values, social positions, relationships, and personal connections are becoming more and more important.

[0003]

40 In particular, the use of mobile coupons has increased in proportion to the rapid spread of mobile terminals, and culturally, they are becoming established as a form of payment method that is easy to carry and convenient to use.

[0004]

46 In the past, in existing marketing that required a lot of infrastructure, marketing by one- person companies and individuals was difficult, but now, marketing by one- person companies and individuals has become easier through mobile apps, and in particular, the emergence of various services through mobile apps Using mobile advertisements and coupons, easier and more effective marketing activities have become possible.

52 Accordingly, a simpler and more convenient personal marketing method using a smartphone has been demanded.

[0005]

57 Accordingly, the present invention proposes a personal marketing system and method for managing individual customers using mobile coupons (points, points, stamps, etc.) and online shopping.

[0006]

63 The present invention provides a function of providing a mobile coupon to a mobile communication terminal of a customer who has registered as a member of a coupon service provider, and by utilizing this function, a member provides a mobile accumulation coupon and a reward to other members using the corresponding service.

67 In the present invention, the service user issues a mobile accumulation coupon through the provided function, issues it, and at the same time, when a specific target number is reached, a corresponding reward (online product or product voucher) is designated within the designated online shopping mall or service, and the coupon is redeemed. The provided user reaches a specific number through specific activities, and the corresponding accumulation coupon is automatically changed to a pre- specified reward.

[ ]

77 The problem to be solved by the present invention is to provide a function of providing a mobile coupon to a mobile communication terminal of a customer who is registered as a member of a coupon service provider, and by utilizing this function, a



member can redeem a mobile accumulated coupon and reward to other members who use the service. To provide a personal marketing system and method for managing individual customers using mobile coupons (points, points, stamps, etc.) and online shopping, which provide

84 Another problem to be solved by the present invention is that the service user issues a mobile accumulation coupon through the provided function, and at the same time, when a specific target number is reached, a corresponding reward (online product or product exchange voucher) is provided to an online shopping mall or service. When a user who receives a coupon reaches a certain number through a specific activity, the coupon is automatically changed to a pre-specified reward. To provide a personal marketing system and method for managing individual customers using shopping.

91 In order to solve the above problems, in the personal marketing method using a mobile accumulated coupon and online shopping according to the first embodiment of the present invention, a coupon issuing member terminal installed by receiving a service program provided by a coupon service provider, coupons a receipt condition storage step of temporarily storing coupon recipient information including recipient member terminal information and target information for receiving a reward; After the receipt condition storage step, the coupon issuing member terminal temporarily stores the set reward, the reward storage step; After the reward storage step, a payment step of making a payment for the set reward in the coupon issuing member terminal; After the payment step, the coupon issuing member terminal transmits the issued coupon to the coupon receiving member terminal, and at the same time, the set goal and reward information is also transmitted to the coupon receiving member terminal; One of the coupon service provider server or coupon issuing member terminal receives the target performance result from the coupon receiving member terminal and, when it is determined that the target performance is complete, provides a reward (compensation) to the coupon receiving member terminal; a reward receiving step; It is characterized by comprising.

108 In the personal marketing method using a mobile accumulated coupon and online shopping according to a second embodiment of the present invention, a coupon issuing member terminal installed by receiving a service program provided by a coupon service provider includes coupon receiving member terminal information a receipt condition storage step of temporarily storing coupon recipient information and target information for receiving a reward (compensation); After the receipt condition storage step, the coupon issuing member terminal temporarily stores the set reward, the reward storage step; After the reward storage step, a temporary payment step of making a temporary payment for the set reward in the coupon issuing member terminal; After the provisional payment step, the coupon issuing member terminal transmits the issued coupon to the coupon receiving member terminal, and at the same time, the set goal and reward information is also transmitted to the coupon receiving member terminal; After the coupon receiving step, if one of the coupon service provider server or the coupon issuing member

terminal receives the target performance result from the coupon receiving member terminal and determines that the target performance is complete, in the provisional payment step, automatically pays the paid reward and providing a reward (compensation) to the coupon receiving member terminal; after the coupon receiving step, either the coupon service provider server or the coupon issuing member terminal receives the target performance result from the coupon receiving member terminal, If it is determined that the target performance has not been completed, in the temporary payment step, a reward refund step of refunding the paid reward.

130 Prior to the receiving condition storage step, the coupon issuing member terminal transmits one or more of the authentication code or ID and password or personal barcodes previously issued by the coupon issuing member to the coupon service provider server to perform authentication. ; more includes

134 Rewards are online products, coupons, gift certificates, or stamps. In particular, rewards are online products, coupons, or gift certificates of online shopping malls of member companies affiliated with coupon service providers, or online shopping malls of member companies affiliated with coupon service providers. or a stamp.

138 In the coupon receiving step, the issued coupon requesting issuance of the coupon from the coupon issuing member terminal to the coupon service provider server; The coupon service provider server verifies whether or not the requested coupon is issued, transmits a coupon issuance approval signal to the coupon issuing member terminal, and stores coupon- related information; The coupon issuance member terminal issuing a coupon;

144 In the coupon receiving step, the issued coupon may be a cumulative coupon including points and stamps.

146 In the first embodiment, in the reward receiving step, if one of the coupon service provider server or coupon issuing member terminal receives a target performance result from the coupon receiving member terminal, but determines that the target performance is not completed, the payment step It further includes a reward refund step in which the reward paid in is refunded.

151 In the present invention, the coupon issuing member terminal may be a parent's terminal, and the coupon receiving member terminal may be a child's terminal.

153 In the present invention, the coupon issuing member terminal is a terminal of a single entrepreneur, and the coupon receiving member terminal may be a terminal of a customer of the single entrepreneur.

156 In the present invention, the coupon issuing member terminal may be the same as the coupon receiving member terminal.

158 In addition, the personal marketing system using mobile accumulated coupons and online shopping of the present invention provides a service program (app program) for issuing mobile coupons to members, and coupons for managing coupons and rewards (compensation) issued by members service provider servers; Using the service program, a coupon issuing member terminal in which coupon recipients, receipt conditions, rewards (compensation) are set, and mobile accumulation

coupons are issued; and a coupon receiving member terminal which receives coupons, receipt condition information, and reward information from the coupon issuing member terminal, and receives a reward (compensation) when the goal included in the receipt condition information is completed.

- 168 The coupon issuing member terminal is configured to make a payment for the set reward, and one of the coupon service provider server or coupon issuing member terminal receives the target performance result from the coupon receiving member terminal, but determines that the target performance is not completed. In this case, the reward paid in the payment step is automatically refunded.
- 173 The coupon issuing member terminal is configured to make a provisional payment when a reward is set.
- 175 One of the coupon service provider server or coupon issuing member terminal receives the target performance result from the coupon receiving member terminal and when it is determined that the target performance is complete, the coupon issuing member terminal automatically pays for the paid reward, and rewards (compensation ) is provided to the coupon receiving member terminal.
- 180 If one of the coupon service provider server or the coupon issuing member terminal receives the target performance result from the coupon receiving member terminal, but determines that the target performance is not completed, the coupon issuing member terminal refunds the paid reward.
- 184 According to the personal marketing system and method for managing individual customers using mobile accumulation coupons (points, points, stamps, etc.) and online shopping of the present invention, mobile coupons are provided to mobile communication terminals of customers who are registered as members of coupon service providers. It provides a function to provide, and by utilizing this, members provide mobile accumulation coupons and rewards to other members who use the service.
- 191 In addition, in the present invention, the service user issues a mobile accumulation coupon through the provided function, and at the same time as issuing it, when a specific target number is reached, a corresponding reward (online product or product exchange voucher) is designated in the online shopping mall, and the coupon When a user who has been provided with a certain number reaches a certain number through a specific activity, the corresponding accumulation coupon is automatically changed to a pre- specified reward.
- 198 The present invention can be used for educational purposes in one- person companies and relationships between parents and children.
- 200 For example, a parent may present a predetermined target value as a reward while issuing a mobile coupon to a child, and the child may receive a reward by achieving the predetermined target value.
- 203 As another example, a single entrepreneur can issue coupons to his or her customers and use them for customer marketing.

[0029]

- 208 1 is an explanatory diagram schematically illustrating a personal marketing system using a mobile accumulated coupon and online shopping according to an embodiment of the present invention.
- 211 2 is an explanatory diagram for briefly explaining the structure of a service in a personal marketing method using a mobile accumulated coupon and online shopping according to an embodiment of the present invention.
- 214 Figure 3 is a flowchart schematically illustrating a personal marketing method using a mobile accumulated coupon and online shopping according to an embodiment of the present invention.
- 217 Figure 4 is a flowchart schematically illustrating a personal marketing method using a mobile accumulated coupon and online shopping according to another embodiment of the present invention.
- 220 5 is a flowchart schematically illustrating a personal marketing method using a mobile accumulated coupon and online shopping according to another embodiment of the present invention.
- 223 6 is a flowchart for explaining reward payment and delivery according to an embodiment of the present invention.
- 225 7 is a flowchart for explaining reward payment and delivery according to another embodiment of the present invention.
- 227 8 is an explanatory diagram illustrating a case of issuing a coupon through a coupon issuing member terminal in the present invention.
- 229 9 is an explanatory diagram illustrating a case of issuing a coupon in a recipient terminal in the present invention.
- 231 10 is a flowchart of an embodiment of an issuer authentication method when directly issuing a coupon from a recipient terminal in the present invention.
- 233 11 is a flowchart of another embodiment of an issuer authentication method when directly issuing a coupon from a recipient terminal in the present invention.
- 235 11 is an issuer authentication method through a mobile authenticator.
- 236 12 is an example of issuing a coupon using a recipient terminal in the personal marketing system of the present invention.
- 238 13 is another example of issuing a coupon using a recipient terminal in the personal marketing system of the present invention.
- 240 14 is an example of screens showing coupon creation and reward reception in the personal marketing system of the present invention.

[0030]

- 245 Hereinafter, a personal marketing system and method using a mobile accumulated coupon and online shopping according to the present invention will be described in detail with reference to the accompanying drawings.

[0031]

257 1 is an explanatory diagram schematically illustrating a personal marketing system using a mobile accumulated coupon and online shopping according to an embodiment of the present invention.

[0032]

257 The coupon service provider server 100 provides a service program (app program) having a function of providing mobile coupons to the mobile communication terminals of members registered through authentication, that is, the member terminals 210 and 250, Coupons issued by the member terminals 210 and 250 are managed.

[0033]

264 The member terminal 210 provides mobile accumulation coupons and rewards to other member terminals 250 using the service program.

266 The member issues a mobile accumulation coupon through the provided function of the service program in the member terminal 210, and at the same time designates a corresponding reward provided when a specific target number is reached in the online shopping mall.

270 The reward may be an online product or a product voucher.

[0034]

274 When a certain number is reached through a specific activity in another member terminal 250 provided with a coupon, the corresponding accumulation coupon is automatically changed to a previously designated reward.

277 Here, whether or not a specific target value is reached may be checked through the coupon service provider server.

[0035]

282 The service in the personal marketing system of the present invention is a method of directly selecting a reward for a accumulated coupon by linking it with online shopping by issuing a coupon through a mobile device.

285 When a user reaches a certain target value, the coupon is automatically changed into a gift certificate that can be exchanged for a reward product or product set by the coupon issuer in advance.

[0036]

<sup>291</sup> Here, the terms used in the present invention are explained as follows.

[0037]

<sup>295</sup> Issuance of a coupon refers to the creation of a coupon of the corresponding issuer in the terminal of the coupon recipient through the input of a specific authentication code or the issuer's related information. When the coupon is issued, the coupon information (ie coupon issuance date, expiration date, type of coupon (stamp or point, etc.), goal (mission) and reward, and member information (phone number, name or ID or terminal identification code) are delivered.

<sup>301</sup> In particular, in the present invention, coupons are basically issued directly by members to other members, but approval from coupon service providers may be required for certain rules such as coupon rules.

[0038]

<sup>307</sup> The target number is reaching a certain number, and may be, for example, the number of stamps, the number of points, the number of store visits, or the number of meetings with the issuer.

[0039]

<sup>313</sup> In the present invention, the number of issued coupons and the number of rewards must always match.

[0040]

<sup>318</sup> Reward setting refers to selecting a related product or online product from a shopping mall built directly within the service by the corresponding coupon service company or from another service vendor (easily explained, an online shopping mall) of the affiliated company and making payment.

[0041]

<sup>325</sup> In general, there are two ways to set up rewards.

[0042]

<sup>329</sup> The first is a case in which the issuer designates coupon rules in advance, but sets (purchases) a reward when designating coupon rules. Coupons are subsequently issued and used according to preset coupon rules within the set rewards.

332 In this case, the equation of issuer = coupon rule holds, and if the rewards of coupons issued by the issuer are all the same, the number of rewards and the number of coupons that can be issued are the same (the number of rewards = the number of coupons that can be issued).

336 For example, if 5 rewards are purchased, the issuer can only issue 5 coupons.

#### [0043]

340 Second, in the case where the issuer designates coupon rules for each coupon issuance, the issuer must pay the reward each time the coupon is issued.

342 In this case, the equation of recipient = coupon rule holds, and the issuer can make a different coupon each time it issues a coupon after selecting a recipient on the coupon recipient terminal or online (remote issuance). Each time it is issued, coupon rules are created, and in this case, rewards can be designated differently for each recipient.

#### [0044]

350 In addition, if the reward remains after paying or refunding the reward in advance, the reward can be set in the reward list without separate payment.

#### [0045]

355 The set goal performance is regarded as goal performance when the recipient of the coupon reaches the goal within the period set by the issuer (for example, if the goal is to stamp 10 stamps, stamping all 10 stamps is called goal performance).

#### [0046]

361 Non-performance of the set goal is regarded as non-performance if the target is not reached within the specified period or if the target is reached but the period has elapsed, and even if the recipient deletes the coupon or deletes the service program.

#### [0047]

367 In the present invention, the performance of the target can be judged by two things.

#### [0048]

371 The first is numerical comparison, in which the server compares the recipient's numerical value and the number of target values over a certain period of time and checks the validity period to determine the mission performance.

[0049]

377 Second, if the target completes the numerical value within the specified period, a button such as 'Get Reward' or 'Mission Complete' is activated or created on the recipient's coupon (through the server check process of the first numerical comparison), and the recipient clicks this button. If so, the server checks the relevant information and if there is no abnormality, the mission is deemed completed and a reward is provided (the corresponding coupon is deleted and replaced with a reward).

[0050]

387 Thirdly, regardless of the number (the server does not check it separately), when the 'Mission Complete' or 'Get Reward' button is put in the coupon and the button is clicked, the server proceeds with the first numerical comparison process, and when the information is matched, the mission In case of completion or information inconsistency, it is confirmed as mission failure.

[0051]

395 In the present invention, the role of the coupon service provider server can be largely referred to as information transmission and reception, and information generation.

398 Information transmission and reception here is, firstly, interlocking coupon information of the issuer and recipient of the coupon, secondly, transmission and execution of rules defined in advance when coupon rules are created in advance, and thirdly, transmission and reception of authentication information of the issuer and determining whether or not they match.

403 The generation of information here refers to the creation and linkage of coupon information between the issuer and the receiver.

[0052]

408 2 is an explanatory diagram for briefly explaining the structure of a service in a personal marketing method using a mobile accumulated coupon and online shopping according to an embodiment of the present invention.

[0053]

414 As an execution step, this service program is installed and executed (S10).

415 Execution of the service of the present invention includes all mobile devices capable



of executing apps, including smart phones, and online.

[0054]

420 As a sign- up step, member sign- up is performed through the installed service program (S20).

[0055]

425 As a recipient selection step, a member who wishes to issue a coupon sets a recipient to receive the coupon in the coupon issuing member terminal (S140).

427 In selecting the recipient of the coupon, the recipient can be selected from the terminal (device) of the member issuing the coupon, and in some cases, the coupon can be directly issued from the terminal of the recipient.

430 When issued directly from the recipient's terminal, a separate recipient selection step is not required.

[0056]

435 As a condition input step, a target of a specific activity is set in the coupon issuing member terminal (S145).

437 That is, the coupon information (rule) is transmitted from the coupon issuing member terminal to the coupon service provider server, and the coupon service provider server receives it.

[0057]

443 In the reward selection step, a reward is set in the coupon issuing member terminal (S150).

445 Accordingly, the coupon service provider server makes a payment request to the coupon issuing member terminal for the set reward.

[0058]

450 As a payment step, payment for the set reward is performed (S155).

451 That is, the member purchases a reward by transmitting payment information through the coupon issuing member terminal, and the coupon service provider server confirms the payment.

[0059]

457 In the coupon issuance step, the coupon issuing member terminal 210 issues a

coupon either through the coupon service provider server 100 or directly (S200).  
459 It is issued directly from the terminal 250 of the recipient.

[0060]

463 Here, when a member requests a coupon service provider server to issue a coupon and the coupon service provider server issues a coupon to another member, the member (issuer) inputs the coupon rules (i.e., the contents of the coupon) to the coupon service provider server (website or program), and the coupon service provider server reviews and approves the contents.

468 In addition, when a member directly issues a coupon to another member, there may be two methods.

470 One is when a coupon is issued remotely by searching for a member online (website or program). This is the case of issuing the creation.

[0061]

475 In the coupon receiving step, the issued coupon is transmitted from the coupon service provider server 100 or the coupon issuing member terminal to the coupon receiving member terminal (S210).

[0062]

481 In the target performance step, the coupon receiving member who has received the coupon performs the target performance through the coupon receiving member terminal (S220).

[0063]

487 In the reward receiving step, when the target performance is completed in the target performing step, a reward (compensation) is provided to the coupon receiving member terminal (S250), and consequently, the coupon is changed to a reward.

490 That is, when the coupon service provider server determines that the final performance target value of another member and the issuer's set target value are the same for the related target value (in principle, the coupon service provider server confirms), the reward is transmitted.

[0064]

497 In the present invention, rewards are provided to other members by a coupon service provider.

499 When a reward is purchased, the coupon service company holds the reward

temporarily and delivers it when the goal is fulfilled.

[0065]

*504* Figure 3 is a flow chart schematically illustrating a personal marketing method using a mobile accumulated coupon and online shopping according to an embodiment of the present invention.

[0066]

*510* The member 210 subscribes to the mobile coupon issuance service, and stores the service program provided by the mobile coupon issuance service in the user's terminal.

[0067]

*516* In the authentication step, the member 210 who has subscribed to the mobile coupon issuance service provides the coupon service by using the authentication code or ID and password or personal barcode issued in advance through the coupon issuing member terminal, which is his or her online or mobile terminal. Authentication is requested while transmitting to the provider server 100 (S110), the coupon service provider server 100 performs authentication (S120), and transmits an approval signal to the coupon issuing member terminal (S130).

[0068]

*526* As a recipient setting step, a recipient is set in the coupon issuing member terminal to issue a coupon (S140).

[0069]

*537* As a condition input step, a target of a specific activity is set in the coupon issuing member terminal (S145).

[0070]

*536* As a reward setting step, the coupon issuing member terminal sets a reward (S150).

[0071]

*540* As a payment step, payment for the set reward is performed (S155).

[0072]

*544* In the coupon issuance step, the coupon issuing member terminal requests coupon issuance to the coupon service provider server 100 (S160), and the coupon service provider server 100 verifies whether or not the coupon issuance requested by the coupon issuing member terminal. (S170), transmits a coupon issuance approval signal (S180), stores coupon- related information (S190), and issues a coupon (S200).

[0073]

*553* In some cases, the coupon service provider server 100 requests coupon issuance (S160), and the coupon service provider server 100 verifies whether or not the coupon is issued requested by the coupon issuing member terminal (S170), and issues the coupon. The transmission of the approval signal of (S180) may be omitted, and the coupon may be issued directly from the coupon issuing member terminal.

[0074]

*562* In the coupon receiving step, the issued coupon is transmitted from the coupon service provider server 100 or the coupon issuing member terminal to the coupon receiving member terminal, and at the same time, coupon- related information is also transmitted (S210).

*566* The coupons issued here may be accumulation- type coupons such as points or stamps.

[0075]

*571* In the target performance step, the coupon receiving member who has received the coupon and coupon- related information performs the target performance through the coupon receiving member terminal (S220).

[0076]

*577* In the reward receiving step, a reward request is made to the coupon service provider server 100 (S230), the coupon service provider server 100 verifies the reward request received from the coupon receiving member terminal (S240), and rewards the coupon It is provided to the receiving member terminal (S250).

[0077]

584 In some cases, a request for a reward is made to the coupon service provider server 100 (S230), and the coupon service provider server 100 omits the verification of the reward request received from the coupon receiving member terminal (S240), and the coupon The issuing member terminal or the coupon service provider server 100 may directly provide rewards to the coupon receiving member terminal.

#### [0078]

592 In FIG. 3, the payment for the reward set in the payment step is unconditionally carried out (S155), and if the coupon receiving member does not complete the goal through the coupon receiving member terminal, no refund is made.

595 Rewards will be refunded to the member issuing the coupon as it was purchased.

596 In this case, the purchased reward must be exhausted, and there is no refund.

#### [0079]

600 Figure 4 is a flowchart schematically illustrating a personal marketing method using a mobile accumulated coupon and online shopping according to another embodiment of the present invention.

#### [0080]

606 Instead of the payment step of FIG. 3, FIG. 4 has a provisional payment step, that is, in the provisional payment step of FIG. 4, a provisional payment is made for the set reward (S157).

#### [0081]

612 In addition, in FIG. 4, prior to providing the reward to the coupon receiving member terminal (S250) during the reward receiving step, there is a payment step of automatically paying for the set reward (S157).

#### [0082]

618 If the coupon receiving member who has received the coupon and coupon-related information fails to complete the goal through the coupon receiving member terminal (S260), the provisional payment for the set reward (S157) is automatically refunded (S267), and the refund Certain fees may apply.

622 Other than this, the personal marketing method of FIG. 4 is the same as the personal marketing method of FIG. 3 .

[0083]

627 5 is a flowchart schematically illustrating a personal marketing method using a mobile accumulated coupon and online shopping according to another embodiment of the present invention.

[0084]

633 In FIG. 5 , when the coupon receiving member who has received the coupon and coupon- related information fails to complete the goal through the coupon receiving member terminal (S260), the set reward (S155) is automatically refunded (S267).

636 Other than this, the personal marketing method of FIG. 5 is the same as the personal marketing method of FIG. 3 .

638 In case of refund, certain fees may be incurred.

[0085]

642 That is, in the case of FIG. 3, when payment is made for the set reward (S155), the purchased reward is not refundable regardless of whether the coupon receiving member performs the goal, whereas in the case of FIG. 5, after the set reward is paid (S155) S155), the purchased reward is refunded when the coupon receiving member fails to fulfill the goal (S267).

[0086]

650 In other words, the service of the present invention is a method of issuing a coupon through a mobile device and directly selecting a reward for an accumulation coupon by linking it with online shopping. is changed to a gift certificate that can be exchanged for a reward product or product specified by the coupon issuer, which is summarized as follows.

[0087]

658 First, to summarize the mobile coupon issuance service, the user who has subscribed to the mobile coupon issuance service issues a mobile coupon to a third party through an authentication code or ID and password or personal barcode issued in advance through online and mobile devices this is possible

662 The coupon to be issued is an accumulation type coupon such as a point or a stamp. When the coupon is issued, a certain target value is set, and when the target value of the corresponding coupon is reached, the reward provided is designated by selecting a product or gift certificate from a shopping mall provided by the service or a related shopping mall.

667 The designated product or gift certificate is automatically changed or purchased

when the user who has been issued the coupon completes the target.

669 (Mission Complete)

[0088]

673 Second, to summarize the reward (reward), in the present invention, the reward (reward) in the corresponding service includes real or online products, coupons, gift certificates, stamps, etc. that require payment.

676 The user issuing the coupon must pay for the reward product at the issuance stage when the coupon is issued.

678 Payment is not necessarily an act of paying an amount, but includes a payment step.

679 The online product referred to here refers to the real thing that can be used online, and gift certificates include coupons or gift certificates that can be used in online services, or gift certificates that can be exchanged for goods that can be used for offline payment.

683 Coupons in compensation refer to various discount coupons and event coupons.

684 A stamp in compensation literally means a stamp.

[0089]

688 For example, a person named A, while issuing a coupon named A' , purchases and selects 4 stamps of a popular cafe named B in Hongik University as a coupon reward.

[0090]

694 When user C receives coupon A' and completes the target, if user C holds stamp coupon B' of cafe B within the service, 4 stamps are added from stamp coupon B' , and stamp coupon B If you don't have one, you will receive a stamp coupon B with 4 stamps.

698 In the case of this user, if he is supposed to receive a cup of Americano as a reward when he stamps all 8 stamp coupons B', he can drink Americano by stamping 4 more stamps.

701 Stamp coupon B is a mobile stamp coupon provided by cafe B, and the coupon may be a coupon provided within the service or provided by another mobile coupon service, and in the latter case, the service is linked.

[0091]

707 Payment in the present invention may have three cases.

708 After payment, if the user completes the target within the period, the payment is made and if the target is not completed, it is refunded. Certain fees may apply.

710 The other one is when the payment is unconditional and non- refundable, and the purchased reward must be exhausted.

712 There may be no refund action.

#### [0092]

716 Here, if payment is made unconditionally and refund is not made, if the purchased reward remains with the member who purchased the reward, the member can check related information on his or her device (coupon issuing member terminal) or on the web. You can also log in and check your personal information online, such as on the site, and the remaining rewards can be used when issuing other coupons.

721 In other words, if there is a reward, a list of available rewards is displayed at the payment stage and a selection can be made.

#### [0093]

726 Third, if the receipt of mobile coupons is summarized, coupons can be issued from users who use the service after subscribing to the corresponding service for receiving mobile coupons.

729 When the user who receives the coupon reaches the target value within the period suggested by the coupon, the corresponding accumulation coupon can automatically receive a predetermined online gift certificate, point, or physical reward.

732 To put it more simply, the accumulated coupon is automatically changed to a reward.

#### [0094]

736 Fourth, if the service utilization using the present invention is explained, the service can be used for educational purposes in the relationship between a single- person company and parents and children.

#### [0095]

742 For example, a parent with a child in the first grade of elementary school issues a mobile stamp coupon for the child's education.

744 The coupon is valid for one month, and if you run errands 10 times within that period, you will receive a 5,000 won online cultural gift certificate.

746 When the child runs 10 errands, the mobile coupon is automatically changed to an online cultural gift certificate.

#### [0096]

751 As another example, Mr. A, an insurance solicitor, issues coupons to 100 customers



he manages due to the nature of his work in which he has to meet and treat many customers.

754 Set a rule of 1 stamp for each meeting and 5 stamps for customer recommendation, and when 10 stamps are filled, XX Coffee Shop Americano Gift Corn is sent to that customer.

#### [0097]

760 In addition, in the present invention, it is possible to utilize the service utilization stamp as a new marketing method as a reward.

762 For example, cafe A provides stamps from their stamp coupons to insurance solicitor C, B, at a low price, so cafe A can expand its customer base and insurance solicitor C can do personal marketing at low cost. .

#### [0098]

768 Fifth, when explaining the structure of the service, execution of the service of the present invention includes all mobile devices capable of executing apps, including smart phones, and online.

#### [0099]

774 Members must sign up through the service program, and sign- up is done in a simple sign- up step.

#### [0100]

779 In selecting the recipient of the coupon, the recipient can be selected from the terminal (device) of the member issuing the coupon, and in some cases, the coupon can be directly issued from the terminal of the recipient.

782 When issued directly from the recipient's terminal, a separate recipient selection step is not required.

784 Also available online.

#### [0101]

788 In selecting a reward, the reward is set by shopping for a product in a shopping mall affiliated with or belonging to the corresponding service, just like shopping in an online shopping mall.

791 That is, the selection of a reward is possible with a plurality of products fixed in the service program, or a product can be selected from an actual online shopping mall.

793 When selecting a product from an existing online shopping mall, it proceeds through

linkage with the corresponding service.

[0102]

*798* Here, the shopping mall linked to or belonging to the service means a shopping mall within the service, in which a coupon provider creates a shopping mall on its own and provides a service within the service or within a program (direct service), and an existing online shopping mall. Including linked shopping malls, which is a case of consignment service by interlocking in a service or program.

[0103]

*806* 6 is a flowchart for explaining reward payment and delivery according to an embodiment of the present invention.

*808* 6 is a case in which a coupon provider itself provides a reward.

[0104]

*812* In the reward setting step, the issuer sets the reward through an online shopping mall or the like in the coupon issuing member terminal (S150).

[0105]

*817* In the payment request step, the coupon issuing member terminal sends a payment request along with transmission of payment information to the coupon service provider, that is, the coupon service provider server (S151- 1), and the coupon service provider receives the coupon from the coupon issuing member terminal. The received payment information is transmitted to the payment agency, that is, the payment agency server, and a payment request is made to the payment agency server (S151- 2).

[0106]

*827* In the approval step, the payment agency server makes a payment approval request to the coupon issuing member terminal of the issuer (S152- 1), the issuer approves through the coupon issuing member terminal, and the approval result is sent to the payment agency server. is transmitted (S152- 2).

[0107]

*834* In the payment step, after being approved in the approval step, the payment agency server makes a payment and completes the payment (S154), and the payment

agency server transmits payment information (ie, paid information) to the coupon service provider server, (S156- 1), the coupon service provider server transmits the received payment information to the coupon issuing member terminal of the issuer to confirm the payment information (S156- 2).

[0108]

*843* In the payment step, the payment agency pays the price to the coupon service provider (S157- 1), and the coupon service provider receives the payment from the payment agency (S157- 2).

[0109]

*849* The following describes the flow of providing a reward (ie, product/gift certificate) according to goal performance after a coupon is issued by the coupon service provider server and transmitted to the recipient.

[0110]

*855* In the target performance step, the coupon receiving member who has received the coupon performs the target performance through the coupon receiving member terminal (S220).

[0111]

*861* In the information receiving step, when the receiver completes the goal performance in the goal performance step, information indicating that the goal has been completed is transmitted to the coupon service provider server through the coupon receiving member terminal (S232).

[0112]

*868* In the reward receiving step, the coupon service provider server delivers a reward (compensation) composed of product/gift certificate to the recipient (S247), and the recipient receives the reward (compensation) composed of product/gift certificate (S250).

[0113]

*875* 7 is a flowchart for explaining reward payment and delivery according to another embodiment of the present invention.

*877* 7 is a case in which a reward is provided by an external shopping company.

[0114]

887 Reward setting step (S150) to payment step (S154, S156- 1, S156- 2) of FIG. 7 are the same as those of FIG.

883 Therefore, the description thereof is omitted.

[0115]

887 The payment step after the payment step (S154, S156- 1, S156- 2) is as follows.

[0116]

891 In the payment step, the payment agency pays the coupon service provider or (external) shopping company (S157- 1), and the coupon service provider or (external) shopping company receives the payment from the payment agency (S157- 1). S157- 2).

[0117]

898 The following describes the flow of providing rewards (ie, exchange vouchers/products) according to goal performance after coupons are issued by the coupon service provider server and transmitted to the recipients.

[0118]

904 In the step of delivering the product exchange voucher to the coupon service provider, the (external) shopping company delivers the product exchange voucher that can be exchanged for a reward product to the coupon service provider (S212), and the coupon service provider receives the product exchange voucher (S212). S214).

[0119]

912 In the target performance step, the coupon receiving member (receiver) who has received the coupon performs the target performance through the coupon receiving member terminal (S220).

[0120]

918 In the information receiving step, when the receiver completes the goal performance in the goal performance step, information indicating that the goal has been completed

is transmitted to the coupon service provider server through the coupon receiving member terminal (S232).

[0121]

<sup>925</sup> In the step of delivering the product exchange voucher to the coupon receiving member, the coupon service provider server delivers the product exchange voucher to the coupon receiving member (receiver) (S243), and the coupon receiving member (receiver) receives the product exchange voucher (S244).

[0122]

<sup>932</sup> The coupon receiving member is in the product receiving stage, and the coupon receiving member (recipient) exchanges or applies for the product (S246), and accordingly, the (external) shopping company delivers the product (S247), resulting in the coupon receiving member (recipient) receives the goods

[0123]

<sup>939</sup> 8 is an explanatory diagram illustrating a case of issuing a coupon through a coupon issuing member terminal in the present invention.

[0124]

<sup>944</sup> The coupon issuing member (issuer) connects online to the coupon issuing member terminal (issuer's terminal), selects a recipient (S140), and issues a coupon (S200).

[0125]

<sup>949</sup> The coupon service provider server receives coupon- related information from the coupon issuing member terminal, and delivers the coupon and coupon- related information to the recipient terminal.

[0126]

<sup>955</sup> The recipient receives the coupon and coupon- related information transmitted from the coupon service provider server through the recipient terminal (212).

<sup>957</sup> In this way, a coupon is created in the recipient's terminal.

[0127]

<sup>961</sup> Here, "online" refers to an environment in which access is made through a website or

program execution, and an Internet connection is provided.

963 Also, coupon generation on the recipient's terminal is executed through a program installed in the recipient's terminal.

### [0128]

968 9 is an explanatory diagram illustrating a case of issuing a coupon in a recipient terminal in the present invention.

970 This is a case where the issuer issues a coupon using the recipient's terminal.

### [0129]

974 First, a program (service) distributed by a coupon service provider is executed in the recipient's terminal, an issuer (coupon issuing member) is set using the recipient's terminal, and coupon issuance is selected from selection buttons (or selection keys).

### [0130]

981 Next, issuer authentication is performed through the recipient terminal (S120), and upon authentication, information necessary for authentication is transmitted to the coupon service provider server, and the coupon service provider server receives it.

984 That is, authentication is requested while transmitting the authentication code or ID and password or personal barcode issued by the issuer in advance to the coupon service provider server 100, and the coupon service provider server authenticates it and approves it to the recipient terminal. transmit a signal

### [0131]

991 Next, the issuer sets a goal for a specific activity through the recipient terminal, sets a reward and pays for the set reward, requests the issuance of a coupon from the recipient terminal to the coupon service provider server, and the coupon service provider server The recipient's terminal verifies whether the requested coupon is issued, transmits a coupon issuance approval signal to the recipient's terminal, and the coupon is created in the recipient's terminal.

997 In addition, the coupon service provider server stores coupon- related information on its own and transmits coupon- related information to the issuer terminal at the same time.

### [0132]

1003 In the present invention, when a coupon is issued directly from a recipient's

terminal, there are largely two methods for authenticating the issuer.

1005 The first method is when a separate authentication code or identification code is given after signing up as an existing online service (a kind of ID), and the second method is the issuer authentication method through a mobile authenticator, which is a kind of mobile OTP method. It is a method of implementing OTP as a mobile app or program and then executing it to enter the authentication code.

### [0133]

1013 10 is a flowchart of an embodiment of an issuer authentication method when directly issuing a coupon from a recipient terminal in the present invention.

1015 10 shows a case in which a separate authentication code or identification code (a kind of ID) is given after signing up as a member of an existing online service.

### [0134]

1020 10 is a case of issuing a coupon from a recipient terminal as shown in FIG. 9. For authentication used here, the issuer registers as a member of a coupon service provider in advance, but transmits information necessary for membership to the coupon service provider, After receiving this, the coupon service provider assigns an authentication code and transmits it to the issuer, and the issuer receives the authentication code.

### [0135]

1029 Then, as shown in FIG. 9, the issuer executes the program (service) distributed by the coupon service provider on the recipient's terminal, sets the issuer (coupon issuing member) using the recipient's terminal, and selects a selection button (or selection key). ), select coupon issuance.

### [0136]

1036 Then, the issuer authentication is performed through the recipient terminal, and upon authentication, an authentication code is input and the authentication code is transmitted to the coupon service provider server, and the coupon service provider server receives it.

1040 The coupon service provider server performs authentication using this and transmits an approval signal to the recipient's terminal.

### [0137]

1045 Next, the issuer sets a goal for a specific activity through the recipient terminal,

sets a reward and pays for the set reward, requests the issuance of a coupon from the recipient terminal to the coupon service provider server, and the coupon service provider server The recipient's terminal verifies whether the requested coupon is issued, transmits a coupon issuance approval signal to the recipient's terminal, and the coupon is created in the recipient's terminal.

1057 In addition, the coupon service provider server stores coupon- related information on its own, and at the same time transmits coupon- related information to the issuer terminal to create and manage a customer DB.

### [0138]

1057 11 is a flowchart of another embodiment of an issuer authentication method when directly issuing a coupon from a recipient terminal in the present invention.

1059 11 is an issuer authentication method through a mobile authenticator.

### [0139]

1063 In FIG. 11, a mobile authenticator, a program for mobile devices provided by a coupon service provider, is downloaded, executed, an identification code is checked, the identification code is registered, it is transmitted to the coupon service provider server, and the coupon service The provider server receives and stores and manages it.

### [0140]

1071 Then, as shown in FIG. 9, the issuer executes the program (service) distributed by the coupon service provider on the recipient's terminal, sets the issuer (coupon issuing member) using the recipient's terminal, and selects a selection button (or selection key). ), select coupon issuance.

### [0141]

1078 Then, issuer authentication is performed through the recipient terminal, and upon authentication, an identification code (ie, authentication code) is input and the identification code (authentication code) is transmitted to the coupon service provider server, and the coupon service provider server is the recipient terminal Receives an identification code (authentication code) from the mobile authenticator, executes the mobile authenticator, receives the authentication code, performs authentication, and transmits an approval signal to the recipient's terminal.

### [0142]



1088 Next, the issuer sets a goal for a specific activity through the recipient terminal, sets a reward and pays for the set reward, requests the issuance of a coupon from the recipient terminal to the coupon service provider server, and the coupon service provider server The recipient's terminal verifies whether the requested coupon is issued, transmits a coupon issuance approval signal to the recipient's terminal, and the coupon is created in the recipient's terminal.

[0143]

1097 12 is an example of issuing a coupon using a recipient terminal in the personal marketing system of the present invention.

[0144]

1102 12 shows an example of an execution screen when an issuer directly creates a coupon in a coupon recipient terminal.

1104 In this case, issuance information is previously stored on the corresponding screen.

[0145]

1108 12(a) shows a screen for selecting a coupon issuance selection key to request coupon issuance to a coupon service provider server, and FIG. 12(b) shows a screen for inputting an authentication code for authentication. 12(c) shows a screen when a coupon is issued, and FIG. 12(d) shows a screen where a coupon is created in a recipient terminal.

[0146]

1116 13 is another example of issuing a coupon using a recipient terminal in the personal marketing system of the present invention.

1118 In this case, issuance information is directly input, and issuance information is not stored in advance.

[0147]

1123 13(a) shows a screen for inputting an authentication code for authentication, and FIG. 13(b) shows a screen for setting goals of a specific activity, that is, mission type, target number, expiration date, etc., through the recipient's terminal. am.

[0148]

1129 13(c) is a screen for setting rewards. In the screen of FIG. 13(c), multiple rewards

can be purchased, and the remaining rewards are stored and can be selected for shopping when the next coupon is issued.

*1132* 13 (b) to (c) may be fixed and registered in advance, and the corresponding step may be skipped when the coupon is issued next time.

[0149]

*1137* 13(d) is a screen for making a payment for a set reward.

[0150]

*1141* 14 is an example of screens showing coupon generation and reward reception in the personal marketing system of the present invention.

[0151]

*1146* FIG. 14(a) shows a screen on which a coupon is received in the recipient's terminal, and FIG. 14(b) shows a screen on which a gift certificate is received as a reward (compensation) after the recipient completes the goal.

*1149* 14(b) shows that the stamp coupon of FIG. 14(a) is converted into an online gift certificate by completing the goal (mission) that the corresponding coupon must reach a predetermined number.

*1152* The stamp coupon shown in (a) of FIG. 14 is automatically deleted when the goal (mission) is completed.

[0152]

*1157* 14(c) shows a screen in which a stamp is provided as a reward (compensation) when the recipient completes the goal, and FIG. 14(d) shows a stamp by pressing the 'confirm' button in This is the screen that shows the accumulated status.

[0153]

*1163* That is, the screen of FIG. 14 (b) shows a case in which a general (online) gift certificate is paid as a reward, and the screen in FIG. 14 (c) shows a case in which a stamp of another coupon within the same service is provided as a reward.

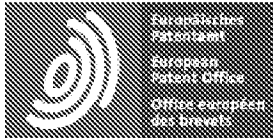
[0154]

*1169* As described above, the present invention has been described by the limited embodiments and drawings, but the present invention is not limited to the above embodiments, and those skilled in the art in the field to which the present invention

belongs can make various modifications and transformation is possible  
1173 Therefore, the spirit of the present invention should be grasped only by the claims  
described below, and all equivalent or equivalent modifications thereof will be said  
to belong to the scope of the spirit of the present invention.

[0155]

1179 100: Coupon service provider server 210, 250: member terminal



## Notice

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## CLAIMS KR20130138637A

1.

<sup>14</sup> The coupon issuing member terminal installed by receiving the service program provided by the coupon service provider stores coupon recipient information including coupon receiving member terminal information and target information for receiving a reward (compensation), temporarily storing receipt conditions. After the receipt condition storage step, the coupon issuing member terminal stores the set reward temporarily, the reward storage step; After the reward storage step, the coupon issuing member terminal performs payment for the set reward; Payment step; After the payment step, A coupon receiving step in which the issued coupon is transmitted from the coupon issuing member terminal to the coupon receiving member terminal, and at the same time, the set goal and reward information is also transmitted to the coupon receiving member terminal; either the coupon service provider server or the coupon issuing member terminal Reward receiving step of receiving the target performance result from the coupon receiving member terminal and providing a reward (compensation) to the coupon receiving member terminal when it is determined that the target performance is complete; Personal marketing method using shopping.

2.

<sup>33</sup> The coupon issuing member terminal installed by receiving the service program provided by the coupon service provider stores coupon recipient information including coupon receiving member terminal information and target information for receiving a reward (compensation), temporarily storing receipt conditions. After the receipt condition storage step, the coupon issuing member terminal stores the set reward

temporarily; after the reward storage step, the coupon issuing member terminal performs a provisional payment for the set reward, a provisional payment step; provisional payment After the step, the coupon issuing member terminal transmits the issued coupon to the coupon receiving member terminal, and at the same time, the set goal and reward information is transmitted to the coupon receiving member terminal. Coupon receiving step; After the coupon receiving step, the coupon service provider If one of the server or the coupon issuing member terminal receives the target performance result from the coupon receiving member terminal and determines that the target performance is complete, in the provisional payment step, automatically pays the paid reward and receives the reward (compensation) as a coupon Reward receiving step provided to the member terminal; After the coupon receiving step, if one of the coupon service provider server or the coupon issuing member terminal receives the target performance result from the coupon receiving member terminal, but determines that the target performance is not completed , In the temporary payment step, a reward refund step in which the paid reward is refunded; personal marketing method using a mobile accumulated coupon and online shopping, characterized in that it is made including.

3.

<sup>58</sup> The method according to any one of claims 1 or 2, wherein at the previous stage of the receipt condition storage step, the coupon issuing member terminal has one or more of authentication codes or IDs and passwords or personal barcodes issued by coupon issuing members in advance. Authentication step of transmitting to the coupon service provider server to perform authentication; Personal marketing method using mobile coupons and online shopping characterized in that it further comprises.

4.

<sup>67</sup> According to any one of claims 1 or 2, The reward is a personal marketing method using a mobile accumulated coupon and online shopping, characterized in that the online product or coupon or gift certificate or stamp.

5.

<sup>73</sup> The mobile according to claim 4, wherein the reward is an online product or coupon, gift certificate or stamp of an online shopping mall of a member company affiliated with a coupon service provider or an online shopping mall of a member company affiliated with a coupon service provider. Personal marketing method using coupons and online shopping.

6.

*87* The method according to any one of claims 1 or 2, wherein in the coupon receiving step, the issued coupon is: requesting coupon issuance from the coupon issuing member terminal to the coupon service provider server; Verifying whether or not the issued coupon is issued, transmitting an approval signal for issuing the coupon to the coupon issuing member terminal, and storing coupon- related information; Personal marketing method using coupons and online shopping.

7.

*90* According to any one of claims 1 or 2, In the coupon receiving step, the issued coupon, points, personal marketing method using a mobile accumulated coupon and online shopping, characterized in that the accumulated coupon containing a stamp.

8.

*96* The payment step of claim 1, if, in the reward receiving step, one of the coupon service provider server or the coupon issuing member terminal receives the target performance result from the coupon receiving member terminal, but determines that the target performance is not completed. Personal marketing method using a mobile accumulated coupon and online shopping, characterized in that it further comprises a; reward refund step in which the reward paid in is refunded.

9.

*105* According to any one of claims 1 or 2, The coupon issuing member terminal is a parent's terminal, Coupon receiving member terminal is a personal marketing method using a mobile accumulated coupon and online shopping, characterized in that the terminal of the child.

10.

*112* The method of claim 1 or 2, wherein the coupon issuing member terminal is a terminal of a single entrepreneur, and the coupon receiving member terminal is a terminal of a customer of the single entrepreneur. Personal marketing method using .

11.

*118* According to any one of claims 1 or 2, The coupon issuing member terminal is a personal marketing method using a mobile accumulated coupon and online shopping, characterized in that the same as the coupon receiving member terminal.

12.

<sup>124</sup> A coupon service provider server that provides a service program (app program) for issuing mobile coupons to members and manages coupons and rewards (compensation) issued by members; Using the service program, coupon recipients, receipt conditions, A coupon issuing member terminal in which a reward (compensation) is set and a mobile accumulation coupon is issued; a coupon, receipt condition information, and reward information are received from the coupon issuing member terminal, and a reward (compensation) is issued when the goal included in the receipt condition information is completed. A personal marketing system using a mobile accumulated coupon and online shopping, characterized in that made by including; a coupon receiving member terminal to be received.

13.

<sup>137</sup> According to claim 12, Coupon issuing member terminal personal marketing system using a mobile accumulated coupon and online shopping, characterized in that made to make a payment for the set reward.

14.

<sup>143</sup> The method of claim 13, If one of the coupon service provider server or the coupon issuing member terminal receives the target performance result from the coupon receiving member terminal, but determines that the target performance is not completed, the reward paid in the payment step is A personal marketing system using mobile savings coupons and online shopping, characterized in that they are automatically refunded.

15.

<sup>152</sup> The personal marketing system of claim 13, wherein the coupon issuing member terminal is configured to make provisional payment when a reward is set.

16.

<sup>157</sup> The method of claim 15, wherein one of the coupon service provider server or the coupon issuing member terminal receives the target performance result from the coupon receiving member terminal and automatically pays the reward paid in the coupon issuing member terminal when it is determined that the target performance is complete. And a personal marketing system using a mobile accumulated coupon and online shopping, characterized in that for providing a reward (compensation) to the coupon receiving member terminal.

17.

<sup>167</sup> The method of claim 15, wherein one of the coupon service provider server or the coupon issuing member terminal receives the target performance result from the coupon receiving member terminal, but when it is determined that the target performance is not completed, the coupon issuing member terminal is paid. A personal marketing system using mobile savings coupons and online shopping, characterized in that rewards are refunded.

18.

<sup>176</sup> The method according to any one of claims 12 to 17, wherein the coupon issuing member terminal transmits one or more of the authentication code or ID and password or personal barcode issued by the coupon issuing member in advance to the coupon service provider. Personal marketing system using a mobile accumulated coupon and online shopping, characterized in that transmitted to the server to perform authentication.

19.

<sup>185</sup> According to any one of claims 12 to 17, The reward is a personal marketing system using a mobile accumulated coupon and online shopping, characterized in that the online product or coupon or gift certificate or stamp.

20.

<sup>191</sup> The method of claim 19, wherein the reward is an online shopping mall of a member company affiliated with a coupon service provider, or an online product or coupon, gift certificate, or stamp of a member company affiliated with a coupon service provider. Personal marketing system using coupons and online shopping.

21.

<sup>198</sup> According to any one of claims 12 to 17, The coupon issued by the coupon- issuing member terminal is a personal marketing system using a mobile accumulation coupon and online shopping, characterized in that the coupon is an accumulation- type coupon including points and stamps.

22.

<sup>205</sup> According to any one of claims 12 to 17, The coupon issuing member terminal is a



parent's terminal, Coupon receiving member terminal is a personal marketing system using mobile accumulated coupons and online shopping, characterized in that the terminal of the child.

23.

<sup>212</sup> According to any one of claims 12 to 17, The coupon issuing member terminal is a terminal of a single entrepreneur, and the coupon receiving member terminal is a terminal of a customer of the single entrepreneur. Personal marketing system using .



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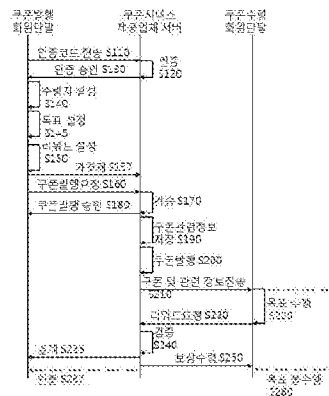
(54) 발명의 명칭 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템 및 그 방법

(57) 요약

본 발명은 쿠폰서비스 제공업체에 회원 가입된 고객이 다른 회원에게 모바일 적립쿠폰 및 리워드를 제공하는 방법으로, 서비스 이용자는 제공된 기능을 통해 모바일 적립쿠폰을 발행하고 이를 발행함과 동시에 특정 목표 수치에 도달 시 이에 상응하는 리워드(온라인 상품 혹은 상품 교환권)를 온라인 쇼핑몰에서 지정하고, 쿠폰을 제공받은 유저는 특정 활동을 통해 특정 수치에 도달하면, 해당 적립쿠폰은 자동적으로 미리 지정되어 있던 리워드로 변경되는, 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템 및 그 방법에 관한 것이다.

본 발명의 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법은, 쿠폰서비스 제공업체로부터 제공하는 서비스프로그램을 수신하여 설치된, 쿠폰 발행 회원단말기는, 쿠폰수령 회원단말기 정보를 포함하는 쿠폰 수령자 정보와, 리워드(보상)을 받기 위한 목표 정보를 임시저장하는, 수령조건 저장단계; 수령조건 저장단계 후, 쿠폰 발행 회원단말기는 설정된 리워드가 임시저장되는, 리워드 저장단계; 리워드 저장단계 후, 쿠폰발행 회원 단말기에서, 설정된 리워드에 대한 가결제를 행하는, 가결제단계; 가결제단계 후, 쿠폰 발행 회원단말기에서, 발행된 쿠폰을, 쿠폰수령 회원단말기로 전송하며, 동시에 설정된 목표 및 리워드의 정보도 쿠폰수령 회원단말기로 전송되는 쿠폰 수령단계; 쿠폰 수령단계 후, 쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하고 목표수행 완료로 판단되면, 상기 가결제단계에서, 가 결제된 리워드를 자동 결제하고, 리워드(보상)를 쿠폰수령 회원 단말기로 제공하는, 리워드 수령단계; 쿠폰 수령단계 후, 쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하였으나, 목표수행이 완료되지 않은 것으로 판단되면, 상기 가결제단계에서, 가 결제된 리워드가 환불되는, 리워드 환불단계;를 포함하여 이루어진 것을 특징으로 한다.

도 1은 - 도4



**특허청구의 범위**

**청구항 1**

쿠폰서비스 제공업체로부터 제공하는 서비스프로그램을 수신하여 설치된, 쿠폰 발행 회원단말기는, 쿠폰수령 회원단말기 정보를 포함하는 쿠폰 수령자 정보와, 리워드(보상)을 받기 위한 목표 정보를 임시저장하는, 수령조건 저장단계;

수령조건 저장단계 후, 쿠폰 발행 회원단말기는 설정된 리워드가 임시저장되는, 리워드 저장단계;

리워드 저장단계 후, 쿠폰발행 회원 단말기에서, 설정된 리워드에 대한 결제를 행하는, 결제단계;

결제단계 후, 쿠폰 발행 회원단말기에서, 발행된 쿠폰을, 쿠폰수령 회원단말기로 전송하며, 동시에 설정된 목표 및 리워드의 정보도 쿠폰수령 회원단말기로 전송되는 쿠폰 수령단계;

쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하고 목표수행 완료로 판단되면, 리워드(보상)를 쿠폰수령 회원 단말기로 제공하는, 리워드 수령단계;

를 포함하여 이루어진 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법.

**청구항 2**

쿠폰서비스 제공업체로부터 제공하는 서비스프로그램을 수신하여 설치된, 쿠폰 발행 회원단말기는, 쿠폰수령 회원단말기 정보를 포함하는 쿠폰 수령자 정보와, 리워드(보상)을 받기 위한 목표 정보를 임시저장하는, 수령조건 저장단계;

수령조건 저장단계 후, 쿠폰 발행 회원단말기는 설정된 리워드가 임시저장되는, 리워드 저장단계;

리워드 저장단계 후, 쿠폰발행 회원 단말기에서, 설정된 리워드에 대한 가결제를 행하는, 가결제단계;

가결제단계 후, 쿠폰 발행 회원단말기에서, 발행된 쿠폰을, 쿠폰수령 회원단말기로 전송하며, 동시에 설정된 목표 및 리워드의 정보도 쿠폰수령 회원단말기로 전송되는 쿠폰 수령단계;

쿠폰 수령단계 후, 쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하고 목표수행 완료로 판단되면, 상기 가결제단계에서, 가 결제된 리워드를 자동 결제하고, 리워드(보상)를 쿠폰수령 회원 단말기로 제공하는, 리워드 수령단계;

쿠폰 수령단계 후, 쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하였으나, 목표수행이 완료되지 않은 것으로 판단되면, 상기 가결제단계에서, 가 결제된 리워드가 환불되는, 리워드 환불단계;

를 포함하여 이루어진 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법.

**청구항 3**

제1항 또는 제2항 중 어느 한 항에 있어서,

수령조건 저장단계의 전 단계, 쿠폰발행 회원 단말기는, 쿠폰 발행 회원이 사전에 발급받은 인증코드 혹은 아이디와 암호 또는 개인 바코드 들 중의 하나 이상을 쿠폰서비스 제공업체 서버로 전송하여 인증을 행하는 인증단계; 를 더 포함하는 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법.

**청구항 4**

제1항 또는 제2항 중 어느 한 항에 있어서,

리워드는 온라인 상품 또는 쿠폰 또는 상품권 또는 스탬프인 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법.

**청구항 5**

제4항에 있어서,

리워드는, 쿠폰서비스 제공업체에 가입된 회원사의 온라인 쇼핑물, 또는 쿠폰서비스 제공업체와 제휴를 맺은 회원사의 온라인 쇼핑물의, 온라인 상품 또는 쿠폰 또는 상품권 또는 스탬프인 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법.

#### 청구항 6

제1항 또는 제2항 중 어느 한 항에 있어서,

쿠폰 수령단계에서, 발행된 쿠폰은,

쿠폰발행 회원 단말기에서, 쿠폰서비스 제공업체 서버로 쿠폰 발행을 요청하는 단계;

쿠폰서비스 제공업체 서버는 요청된 쿠폰발행 여부를 검증하고 쿠폰발행의 승인 신호를 쿠폰발행 회원 단말기로 전송하고, 쿠폰관련정보를 저장하는 단계;

쿠폰발행 회원 단말기는 쿠폰을 발행하는 단계;

를 포함하여 이루어진 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법.

#### 청구항 7

제1항 또는 제2항 중 어느 한 항에 있어서,

쿠폰 수령단계에서, 발행된 쿠폰은,

포인트, 스탬프를 포함하는 적립식의 쿠폰인 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법.

#### 청구항 8

제1항에 있어서,

리워드 수령단계에서, 쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하였으나, 목표수행이 완료되지 않은 것으로 판단되면, 상기 결제단계에서 결제한 리워드가 환불이 되는 리워드 환불단계;

를 더 포함하는 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법.

#### 청구항 9

제1항 또는 제2항 중 어느 한 항에 있어서,

쿠폰 발행 회원단말기는 부모의 단말기이며,

쿠폰수령 회원 단말기는 자녀의 단말기인 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법.

#### 청구항 10

제1항 또는 제2항 중 어느 한 항에 있어서,

쿠폰 발행 회원단말기는 1인 기업인의 단말기이며,

쿠폰수령 회원 단말기는 상기 1인 기업인의 고객의 단말기인 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법.

#### 청구항 11

제1항 또는 제2항 중 어느 한 항에 있어서,

쿠폰 발행 회원단말기는 쿠폰수령 회원 단말기와 동일한 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법.

**청구항 12**

회원들에게 모바일 쿠폰을 발행하는 서비스 프로그램(앱 프로그램)을 제공하고, 회원이 발행한 쿠폰 및 리워드(보상)를 관리하는 쿠폰서비스 제공업체 서버;

상기 서비스 프로그램을 이용하여, 쿠폰수령자, 수령조건, 리워드(보상)가 설정되고, 모바일 적립쿠폰이 발행되는 쿠폰 발행 회원단말기;

쿠폰 발행 회원단말기로부터 쿠폰, 수령조건 정보, 리워드 정보를 수신하고, 수령조건 정보에 포함된 목표가 완료되면 리워드(보상)를 수신하게 되는 쿠폰수령 회원 단말기;

를 포함하여 이루어진 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템.

**청구항 13**

제12항에 있어서,

쿠폰 발행 회원단말기는 설정된 리워드에 대한 결제를 행하도록 이루어진 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템.

**청구항 14**

제13항에 있어서,

쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하였으나, 목표수행이 완료되지 않은 것으로 판단되면, 상기 결제단계에서 결제한 리워드가 자동으로 환불되는 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템.

**청구항 15**

제13항에 있어서,

쿠폰발행 회원 단말기는 리워드가 설정되면 가결제를 행하도록 이루어진 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템.

**청구항 16**

제15항에 있어서,

쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하고 목표수행 완료로 판단되면, 쿠폰발행 회원 단말기에서 가 결제된 리워드를 자동 결제하고, 리워드(보상)를 쿠폰수령 회원 단말기로 제공하는 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템.

**청구항 17**

제15항에 있어서,

쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하였으나, 목표수행이 완료되지 않은 것으로 판단되면, 쿠폰발행 회원 단말기에서 가 결제된 리워드가 환불되는 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템.

**청구항 18**

제12항 내지 제17항 중 어느 한 항에 있어서,

쿠폰발행 회원 단말기는, 쿠폰발행전에, 쿠폰 발행 회원이 사전에 발급받은 인증코드 혹은 아이디와 암호 또는 개인 바코드 들 중의 하나 이상을 쿠폰서비스 제공업체 서버로 전송하여 인증을 행하도록 이루어진 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템.

**청구항 19**

제12항 내지 제17항 중 어느 한 항에 있어서,

리워드는 온라인 상품 또는 쿠폰 또는 상품권 또는 스탬프인 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템.

**청구항 20**

제19항에 있어서,

리워드는, 쿠폰서비스 제공업체에 가입된 회원사의 온라인 쇼핑물, 또는 쿠폰서비스 제공업체와 제휴를 맺은 회원사의 온라인 쇼핑물의, 온라인 상품 또는 쿠폰 또는 상품권 또는 스탬프인 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템.

**청구항 21**

제12항 내지 제17항 중 어느 한 항에 있어서,

쿠폰발행 회원 단말기에서 발행된 쿠폰은,

포인트, 스탬프를 포함하는 적립식의 쿠폰인 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템.

**청구항 22**

제12항 내지 제17항 중 어느 한 항에 있어서,

쿠폰 발행 회원단말기는 부모의 단말기이며,

쿠폰수령 회원 단말기는 자녀의 단말기인 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템.

**청구항 23**

제12항 내지 제17항 중 어느 한 항에 있어서,

쿠폰 발행 회원단말기는 1인 기업인의 단말기이며,

쿠폰수령 회원 단말기는 상기 1인 기업인의 고객의 단말기인 것을 특징으로 하는 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템.

**명세서**

**기술분야**

[0001] 본 발명은 모바일 적립쿠폰(적립금, 적립 포인트, 스탬프 등)과 온라인 쇼핑을 이용하여 개인별 고객관리하는 퍼스널 마케팅 시스템 및 그 방법에 관한 것이다. 보다 상세하게는 본 발명은, 쿠폰서비스 제공업체에 회원 가입된 고객의 이동통신단말기에 모바일 쿠폰을 제공하는 기능을 제공하고 이를 활용하여 회원은 해당 서비스를 이용하는 다른 회원에게 모바일 적립쿠폰 및 리워드(reward, 보상)를 제공하는 방법으로, 서비스 이용자는 제공된 기능을 통해 모바일 적립쿠폰을 발행하고 이를 발행함과 동시에 특정 목표 수치에 도달 시 이에 상응하는 리워드(온라인 상품 혹은 상품 교환권)를 온라인 쇼핑물에서 지정하고, 쿠폰을 제공받은 유저는 특정 활동을 통해 특정 수치에 도달하면, 해당 적립쿠폰은 자동적으로 미리 지정되어 있던 리워드로 변경되는, 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템 및 그 방법에 관한 것이다.

**배경기술**

[0002] 현대는 퍼스널 브랜드 시대로, 1인 기업 및 개인 브랜드가 부각되고 있으며, 마케팅은 더 이상 기업과 상점에 한한 활동이 아니다. SNS와 스마트폰으로 소통함에 따라 개개인의 네임밸류와 사회적 위치, 관계, 인맥 등은 더욱더 중요해지고 있다.

[0003] 특히, 모바일단말기의 비약적인 보급과 비례하여 모바일 쿠폰의 사용이 증가되었으며 문화적으로도 휴대가 간편하고 사용이 편리한 지불수단의 한가지 형태로 자리 잡혀 가고 있다.

[0004] 종래에, 수많은 인프라가 필요한 기존 마케팅에서는, 1인 기업, 개개인의 마케팅이 어려웠던 것에 비해, 현재는 모바일 앱을 통해 1인 기업, 개개인의 마케팅이 손쉬워 졌으며, 특히, 모바일 앱을 통한 여러 서비스의 출현과 모바일 광고, 쿠폰 등을 이용하여, 보다 쉽고 효과적인 마케팅 활동이 가능하게 되었다. 이에 따라 스마트폰을 활용하여 보다 간단하고 편리한 퍼스널 마케팅 방법이 요망되었다.

[0005] 따라서, 본 발명은 모바일 적립쿠폰(적립금, 적립 포인트, 스탬프 등)과 온라인 쇼핑을 이용하여 개인별 고객관리하는 퍼스널 마케팅 시스템 및 그 방법을 제안한다.

[0006] 본 발명은 쿠폰서비스 제공업체에 회원 가입된 고객의 이동통신단말기에 모바일 쿠폰을 제공하는 기능을 제공하고, 이를 활용하여 회원은 해당 서비스를 이용하는 다른 회원에게 모바일 적립쿠폰 및 리워드를 제공하는 방법이다. 본 발명에서 서비스 이용자는 제공된 기능을 통해 모바일 적립쿠폰을 발행하고 이를 발행함과 동시에 특정 목표 수치에 도달 시 이에 상응하는 리워드(온라인 상품 혹은 상품 교환권)를 지정한 온라인 쇼핑물 혹은 서비스 내에서 지정, 쿠폰을 제공받은 유저는 특정 활동을 통해 특정 수치에 도달, 해당 적립쿠폰은 자동적으로 미리 지정되어 있던 리워드로 변경된다.

*발명의 내용*

*해결하려는 과제*

[0007] 본 발명이 해결하고자 하는 과제는, 쿠폰서비스 제공업체에 회원 가입된 고객의 이동통신단말기에 모바일 쿠폰을 제공하는 기능을 제공하고, 이를 활용하여 회원은 해당 서비스를 이용하는 다른 회원에게 모바일 적립쿠폰 및 리워드를 제공하는, 모바일 적립쿠폰(적립금, 적립 포인트, 스탬프 등)과 온라인 쇼핑을 이용하여 개인별 고객관리하는 퍼스널 마케팅 시스템 및 그 방법을 제공하는 것이다.

[0008] 본 발명이 해결하고자 하는 다른 과제는, 서비스 이용자는 제공된 기능을 통해 모바일 적립쿠폰을 발행하고 이를 발행함과 동시에 특정 목표 수치에 도달 시 이에 상응하는 리워드(온라인 상품 혹은 상품 교환권)를 온라인 쇼핑물 혹은 서비스 내에서 지정하며, 쿠폰을 제공받은 유저는 특정 활동을 통해 특정 수치에 도달하면, 해당 적립쿠폰은 자동적으로 미리 지정되어 있던 리워드로 변경되는, 모바일 적립쿠폰(적립금, 적립 포인트, 스탬프 등)과 온라인 쇼핑을 이용하여 개인별 고객관리하는 퍼스널 마케팅 시스템 및 그 방법을 제공하는 것이다.

*과제의 해결 수단*

[0009] 상기 과제를 해결하기 위해, 본 발명의 제1실시에에 의한 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법은, 쿠폰서비스 제공업체로부터 제공하는 서비스프로그램을 수신하여 설치된, 쿠폰 발행 회원단말기는, 쿠폰수령 회원단말기 정보를 포함하는 쿠폰 수령자 정보와, 리워드(보상)을 받기 위한 목표 정보를 임시저장하는, 수령조건 저장단계; 수령조건 저장단계 후, 쿠폰 발행 회원단말기는 설정된 리워드가 임시저장되는, 리워드 저장단계; 리워드 저장단계 후, 쿠폰발행 회원 단말기에서, 설정된 리워드에 대한 결제를 행하는, 결제단계; 결제단계 후, 쿠폰 발행 회원단말기에서, 발행된 쿠폰을, 쿠폰수령 회원단말기로 전송하며, 동시에 설정된 목표 및 리워드의 정보도 쿠폰수령 회원단말기로 전송되는 쿠폰 수령단계; 쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하고 목표수행 완료로 판단되면, 리워드(보상)를 쿠폰수령 회원 단말기로 제공하는, 리워드 수령단계;를 포함하여 이루어진 것을 특징으로 한다.

[0010] 본 발명의 제2실시에에 의한 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법은, 쿠폰서비스 제공업체로부터 제공하는 서비스프로그램을 수신하여 설치된, 쿠폰 발행 회원단말기는, 쿠폰수령 회원단말기 정보를 포함하는 쿠폰 수령자 정보와, 리워드(보상)을 받기 위한 목표 정보를 임시저장하는, 수령조건 저장단계; 수령조건 저장단계 후, 쿠폰 발행 회원단말기는 설정된 리워드가 임시저장되는, 리워드 저장단계; 리워드 저장단계 후, 쿠폰발행 회원 단말기에서, 설정된 리워드에 대한 가결제를 행하는, 가결제단계; 가결제단계 후, 쿠폰 발행 회원단말기에서, 발행된 쿠폰을, 쿠폰수령 회원단말기로 전송하며, 동시에 설정된 목표 및 리워드의 정보도 쿠폰수령 회원단말기로 전송되는 쿠폰 수령단계; 쿠폰 수령단계 후, 쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하고 목표수행 완료로 판단되면, 상기 가결제단계에서, 가 결제된 리워드를 자동 결제하고, 리워드(보상)를 쿠폰수령 회원 단말기로 제공하는, 리워드 수령단계;쿠폰 수령단계 후, 쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원 단말기로부터 목표수행 결과를 수신하였으나, 목표수행이 완료되지 않은 것으로 판단되면, 상기 가결제단계에서, 가 결제된 리워드가 환불되는, 리워드 환불단계;를 포함하여 이루어진 것을 특징으로 한다.

- [0011] 수령조건 저장단계의 전 단계, 쿠폰발행 회원 단말기는, 쿠폰 발행 회원이 사전에 발급받은 인증코드 혹은 아이디와 암호 또는 개인 바코드 들 중의 하나 이상을 쿠폰서비스 제공업체 서버로 전송하여 인증을 행하는 인증단계; 를 더 포함한다.
- [0012] 리워드는 온라인 상품 또는 쿠폰 또는 상품권 또는 스탬프이며, 특히, 리워드는, 쿠폰서비스 제공업체에 가입된 회원사의 온라인 쇼핑물, 또는 쿠폰서비스 제공업체와 제휴를 맺은 회원사의 온라인 쇼핑물의, 온라인 상품 또는 쿠폰 또는 상품권 또는 스탬프일 수 있다.
- [0013] 쿠폰 수령단계에서, 발행된 쿠폰은, 쿠폰발행 회원 단말기에서, 쿠폰서비스 제공업체 서버로 쿠폰 발행을 요청하는 단계; 쿠폰서비스 제공업체 서버는 요청된 쿠폰발행 여부를 검증하고 쿠폰발행의 승인 신호를 쿠폰발행 회원 단말기로 전송하고, 쿠폰관련정보를 저장하는 단계; 쿠폰발행 회원 단말기는 쿠폰을 발행하는 단계;를 포함하여 이루어진다.
- [0014] 쿠폰 수령단계에서, 발행된 쿠폰은, 포인트, 스탬프를 포함하는 적립식의 쿠폰일 수 있다.
- [0015] 제1실시예는, 리워드 수령단계에서, 쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하였으나, 목표수행이 완료되지 않은 것으로 판단되면, 상기 결제단계에서 결제한 리워드가 환불이 되는 리워드 환불단계;를 더 포함한다.
- [0016] 본 발명에서 쿠폰 발행 회원단말기는 부모의 단말기이며, 쿠폰수령 회원 단말기는 자녀의 단말기일 수 있다.
- [0017] 본 발명에서 쿠폰 발행 회원단말기는 1인 기업인의 단말기이며, 쿠폰수령 회원 단말기는 상기 1인 기업인의 고객의 단말기일 수 있다.
- [0018] 본 발명에서 쿠폰 발행 회원단말기는 쿠폰수령 회원 단말기와 동일할 수 있다.
- [0019] 또한, 본 발명의 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템은, 회원들에게 모바일 쿠폰을 발행하는 서비스 프로그램(앱 프로그램)을 제공하고, 회원이 발행한 쿠폰 및 리워드(보상)를 관리하는 쿠폰서비스 제공업체 서버; 상기 서비스 프로그램을 이용하여, 쿠폰수령자, 수령조건, 리워드(보상)가 설정되고, 모바일 적립쿠폰이 발행되는 쿠폰 발행 회원단말기; 쿠폰 발행 회원단말기로부터 쿠폰, 수령조건 정보, 리워드 정보를 수신하고, 수령조건 정보에 포함된 목표가 완료되면 리워드(보상)를 수신하게 되는 쿠폰수령 회원 단말기;를 포함하여 이루어진 것을 특징으로 한다.
- [0020] 쿠폰 발행 회원단말기는 설정된 리워드에 대한 결제를 행하도록 이루어지며, 쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하였으나, 목표수행이 완료되지 않은 것으로 판단되면, 상기 결제단계에서 결제한 리워드가 자동으로 환불된다.
- [0021] 쿠폰발행 회원 단말기는 리워드가 설정되면 가결제를 행하도록 이루어진다.
- [0022] 쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하고 목표수행 완료로 판단되면, 쿠폰발행 회원 단말기에서, 가 결제된 리워드를 자동 결제하고, 리워드(보상)를 쿠폰수령 회원 단말기로 제공한다.
- [0023] 쿠폰서비스 제공업체 서버 또는 쿠폰 발행 회원단말기 중의 하나는, 쿠폰수령 회원단말기로부터 목표수행 결과를 수신하였으나, 목표수행이 완료되지 않은 것으로 판단되면, 쿠폰발행 회원 단말기에서, 가 결제된 리워드가 환불된다.

**발명의 효과**

- [0024] 본 발명의 모바일 적립쿠폰(적립금, 적립 포인트, 스탬프 등)과 온라인 쇼핑을 이용하여 개인별 고객관리하는 퍼스널 마케팅 시스템 및 그 방법에 따르면, 쿠폰서비스 제공업체에 회원 가입된 고객의 이동통신단말기에 모바일 쿠폰을 제공하는 기능을 제공하고, 이를 활용하여 회원은 해당 서비스를 이용하는 다른 회원에게 모바일 적립쿠폰 및 리워드를 제공한다.
- [0025] 또한, 본 발명은, 서비스 이용자는 제공된 기능을 통해 모바일 적립쿠폰을 발행하고, 이를 발행함과 동시에 특정 목표 수치에 도달 시 이에 상응하는 리워드(온라인 상품 혹은 상품 교환권)를 온라인 쇼핑물에서 지정하고, 쿠폰을 제공받은 유저는 특정 활동을 통해 특정 수치에 도달하면, 해당 적립쿠폰은 자동적으로 미리 지정되어 있던 리워드로 변경된다.



- [0026] 본 발명은, 1인 기업과 부모와 자식간의 관계 등에서 교육적인 목표로 사용할 수 있다.
- [0027] 예를 들어 부모가 자녀에게 모바일 쿠폰을 발행하면서 소정 목표치를 리워드로 제시하고, 자녀는 소정 목표치를 달성함에 의해 리워드를 수령할 수 있다.
- [0028] 다른 예로서, 1인 기업인이 자신의 고객에게 쿠폰을 발행하여, 고객 마케팅에 이용할 수 있다.

*도면의 간단한 설명*

- [0029] 도 1은 본 발명의 일 실시예에 의한 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템을 개략적으로 설명하는 설명도이다.
- 도 2는 본 발명의 일 실시예에 의한 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법에서의 서비스의 구조를 구조를 간략히 설명하기 위한 설명도이다.
- 도 3는 본 발명의 일 실시예에 의한 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법을 개략적으로 설명하는 흐름도이다.
- 도 4은 본 발명의 다른 일 실시예에 의한 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법을 개략적으로 설명하는 흐름도이다.
- 도 5는 본 발명의 또 다른 일 실시예에 의한 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법을 개략적으로 설명하는 흐름도이다.
- 도 6은 본 발명의 일 실시예에 의한 리워드 결제 및 전달을 설명하기위한 흐름도이다.
- 도 7은 본 발명의 다른 일 실시예에 의한 리워드 결제 및 전달을 설명하기위한 흐름도이다.
- 도 8은 본 발명에서 쿠폰발행 회원 단말기를 통해 쿠폰을 발행하는 경우를 설명하는 설명도이다.
- 도 9는 본 발명에서 수령자 단말기에서 쿠폰을 발행하는 경우를 설명하는 설명도이다.
- 도 10은 본 발명에서 수령자 단말기에서 직접 쿠폰 발행 시 발행자 인증방법의 일 실시예의 흐름도이다.
- 도 11은 본 발명에서 수령자 단말기에서 직접 쿠폰 발행 시 발행자 인증방법의 다른 실시예의 흐름도이다. 도 11은 모바일 인증기를 통한 발행자 인증방법이다.
- 도 12는 본 발명의 퍼스널 마케팅 시스템에서 수령자 단말기를 이용하여 쿠폰 발행시의 일예이다.
- 도 13은 본 발명의 퍼스널 마케팅 시스템에서 수령자 단말기를 이용하여 쿠폰 발행시의 다른 일예이다.
- 도 14는 본 발명의 퍼스널 마케팅 시스템에서 쿠폰의 생성 및 리워드 수신을 나타내는 화면들의 예이다.

*발명을 실시하기 위한 구체적인 내용*

- [0030] 이하, 본 발명의 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템 및 그 방법을 첨부된 도면을 참조하여 상세히 설명한다.
- [0031] 도 1은 본 발명의 일 실시예에 의한 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 시스템을 개략적으로 설명하는 설명도이다.
- [0032] 쿠폰서비스 제공업체 서버(100)는, 인증 등을 통해 가입된 회원들의 이동통신단말기, 즉, 회원 단말기(210, 250)로 모바일 쿠폰을 제공하는 기능을 가진 서비스 프로그램(앱 프로그램)을 제공하고, 회원 단말기(210, 250)들에서 발행한 쿠폰을 관리한다.
- [0033] 회원 단말기(210)는 상기 서비스 프로그램을 이용하여, 다른 회원 단말기(250)로 모바일 적립쿠폰 및 리워드를 제공한다. 회원은 회원 단말기(210)에서 상기 서비스 프로그램의 제공된 기능을 통해 모바일 적립쿠폰이 발행하고, 이와 동시에 특정 목표 수치에 도달 시 제공되는 이에 상응하는 리워드를 온라인 쇼핑물에서 지칭한다. 리워드는 온라인 상품 혹은 상품 교환권일 수 있다.
- [0034] 쿠폰을 제공받은 다른 회원 단말기(250)에서 특정 활동을 통해 특정 수치에 도달하면, 해당 적립쿠폰은 자동적으로 미리 지칭되어 있던 리워드로 변경된다. 여기서, 특정 목표 수치에 도달하는 여부는 쿠폰서비스 제공업체 서버를 통해서 체크될 수 있다.

- [0035] 본 발명의 퍼스널 마케팅 시스템에서의 서비스는, 모바일 기기를 통한 쿠폰발행으로, 이를 온라인 쇼핑과 연계하여 적립쿠폰의 리워드를 직접 선택하는 방법이다. 모바일 적립쿠폰은 이용자가 일정 목표치에 도달하면 해당 쿠폰이 자동적으로 사전에 쿠폰 발행자가 지정한 리워드 상품 혹은 상품과 교환할 수 있는 상품권으로 변경된다.
- [0036] 여기서, 본 발명에서 사용되는 용어를 설명하면 다음과 같다.
- [0037] 쿠폰의 발행이란 특정한 인증코드나 발행자의 관련 정보 입력등을 통해 쿠폰 수신자의 단말기에 해당 발행자의 쿠폰이 생성된 것을 말하며, 쿠폰의 발행시 회원의 단말기로부터 제공업체의 서버로 쿠폰정보(즉, 쿠폰의 발행 시기, 유효기간, 쿠폰의 종류(스탬프 또는 포인트 등), 목표(미션)와 리워드, 회원정보(전화번호, 이름 혹은 아이디 혹은 단말기 식별코드)를 전달한다. 특히, 본 발명에서는 쿠폰의 발행은 기본적으로 회원이 직접 타 회원에게 발행하는 것을 원칙으로 하며, 다만 쿠폰의 규칙 같은 일정한 룰에 대해서는 쿠폰 서비스 제공업체의 승인이 필요할 수도 있다.
- [0038] 목표수치는 어떤 일정한 수치에 도달하는 것으로써, 예를 들면 스탬프의 수나 포인트의 수치, 혹은 매장 방문의 횟수, 발행자와의 만남의 수 등이 될 수도 있다.
- [0039] 본 발명에서는 쿠폰의 발행수와 리워드 수는 항상 일치해야 한다.
- [0040] 리워드의 설정이란, 해당 쿠폰 서비스 업체가 직접 서비스 내 구축한 쇼핑물이나 혹은 연계한 업체의 타 서비스 판매처(쉽게 설명하면 온라인 쇼핑물)에서 관련 물품 혹은 온라인 물품을 선택하여 결제를 하는 것을 말한다.
- [0041] 일반적으로 리워드를 설정할 때는 두 가지 방법이 있다.
- [0042] 그 첫번째는 발행자가 사전에 쿠폰의 규칙을 지정하되, 쿠폰규칙 지정시에 리워드를 선정(구매)하는 경우로, 차후 설정된 리워드의 내에서 기설정된 쿠폰규칙에 따라 쿠폰을 발행하여 사용한다. 이 경우는 발행자=쿠폰규칙의 등식이 성립하며, 발행자가 발행하는 쿠폰의 리워드가 모두 동일하다면, 리워드 수와 쿠폰 발행 가능 수는 같다(리워드 수= 쿠폰 발행 가능 수). 예를들어, 리워드를 5개 구매한 경우 발행자는 5장의 쿠폰만 발행할 수 있다.
- [0043] 두번째로, 발행자가 쿠폰의 발행마다 쿠폰의 규칙을 지정하는 경우로, 발행자는 리워드를 쿠폰 발행 시마다 결제해야 한다. 이 경우는 수신자=쿠폰규칙의 등식이 성립하는 경우로, 발행자가 쿠폰 수신자 단말기에 혹은 온라인으로 수신자 선택 후(원격발행) 쿠폰을 발행할 때마다 쿠폰을 다르게 만들어 줄 수 있는 것으로 해당 경우에는 쿠폰을 발행할 때마다 쿠폰의 규칙을 생성하게 되고 이 경우 리워드는 수신자마다 다르게 지정될 수 있다.
- [0044] 또한, 기존에 리워드를 미리 결제하거나 환불하여 남아있는 경우 별도 결제 없이 자신의 리워드 목록에서 리워드를 설정할 수 있다.
- [0045] 설정된 목표수행이란, 쿠폰의 수신자가, 발행자가 정한 기간 내에 목표에 도달하면(예를 들면 스탬프 10개를 찍는 것이 목표라면 10개를 다 찍는 것을 목표 수행이라 한다) 목표 수행으로 본다.
- [0046] 설정된 목표 불 수행은 정해진 기간 내에 목표에 도달하지 못하거나 목표에 도달했어도 기간이 지난 경우에는 목표에 불 수행이라고 보며 수신자가 쿠폰을 직접 사제하거나 해당 서비스 프로그램을 사제한 경우에도 불 수행이라고 본다.
- [0047] 본 발명에서 목표의 수행판단은 두 가지에 의해 판단할 수 있다.
- [0048] 그, 첫번째가 수치대조로써, 일정한 기간을 두고 서버가 수신자의 수치와 목표치의 수를 대조하고 유효기간을 체크하여 미션의 수행을 판단하는 경우이다.
- [0049] 두번째로, 정해진 기간 내에 목표가 수치를 완료하면 수신자의 쿠폰에 '리워드 받기' 혹은 '미션완료' 등의 버튼이 활성화 혹은 생성되고(첫번째의 수치대조의 서버체크 프로세스 통해), 수신자가 이 버튼을 클릭하면 서버가 관련 정보를 체크하여 이상이 없는 경우 미션을 완료하는 것으로 보고 리워드를 제공(해당 쿠폰이 삭제되고 리워드로 교체)하는 경우다.
- [0050] 세번째로, 수치와 상관없이(서버가 별도 체크하지 않음) 쿠폰에 '미션완료' 혹은 '리워드 받기' 버튼을 넣고 해당 버튼을 클릭했을 때 첫번째의 수치대조의 프로세스를 서버가 진행하고 정보일치시 미션완료, 정보 불일치시 미션 불이행으로 확인한다.
- [0051] 본 발명에서 쿠폰서비스 제공업체 서버의 역할은, 크게 정보송신 및 수신, 그리고 정보 생성이라 할 수 있다. 여기서의 정보송신 및 수신은, 첫째로, 쿠폰의 발행자와 수신자의 쿠폰 정보 연동, 둘째로, 쿠폰의 규칙이 미리 생성 시 사전에 정의된 규칙 전송 및 실행, 셋째로, 발행자의 인증정보 전송, 수신 및 일치여부 판단을 행하는

것이다. 여기서의 정보 생성은 발행자와 수신자의 쿠폰 정보 생성 및 연봉을 행하는 것을 말한다.

- [0052] 도 2는 본 발명의 일 실시예에 의한 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법에서의 서비스의 구조를 구조를 간략히 설명하기 위한 설명도이다.
- [0053] 실행단계로, 본 서비스프로그램을 설치하여 실행한다(S10).본 발명의 서비스의 실행은 스마트폰을 포함하여 앱을 실행할 수 있는 모든 모바일 기기, 온라인을 포함한다.
- [0054] 가입단계로, 설치된 서비스 프로그램을 통하여 회원 가입을 한다(S20).
- [0055] 수령자선택단계로, 쿠폰을 발행하고자 하는 회원은, 쿠폰발행 회원 단말기 에서, 쿠폰을 받을 수령자를 설정한다(S140). 쿠폰 수령자 선택에 있어서, 쿠폰을 발행하는 회원의 단말기(디바이스)에서 수령자 선택이 가능하며, 경우에 따라서 수령자의 단말기에서 직접 쿠폰 발행도 가능하다. 수령자의 단말기에서 직접 발행 시 별도의 수령자 선택 단계는 필요 없다.
- [0056] 조건입력단계로, 쿠폰발행 회원 단말기에서, 특정활동의 목표를 설정한다(S145). 즉, 쿠폰발행 회원 단말기로부터 쿠폰정보(규칙)을 쿠폰서비스 제공업체 서버로 전송하고, 쿠폰서비스 제공업체 서버는 이를 수신한다.
- [0057] 리워드 선택단계로, 쿠폰발행 회원 단말기에서, 리워드를 설정한다(S150). 따라서, 쿠폰서비스 제공업체 서버는 설정된 리워드에 대해 쿠폰발행 회원 단말기로 결제요청을 행한다.
- [0058] 결제단계로, 설정된 리워드에 대한 결제를 행한다(S155). 즉, 회원은 쿠폰발행 회원 단말기를 통해 결제정보를 전송하여 리워드를 구매하며, 쿠폰서비스 제공업체 서버는 결제를 확인한다.
- [0059] 쿠폰발행 단계로, 쿠폰발행 회원 단말기(210)에서, 쿠폰서비스 제공업체 서버(100)를 통하거나 아니면, 직접 쿠폰을 발행한다(S200). 수령자의 단말기(250)에서 직접 발행한다.
- [0060] 여기서, 회원이 쿠폰서비스 제공업체 서버에 쿠폰발행을 요청하고 쿠폰서비스 제공업체 서버가 타회원에게 발행하는 경우, 회원(발행자)이 쿠폰의 규칙(즉 쿠폰의 내용)을 입력하여 쿠폰서비스 제공업체 서버에 온라인으로 접수하고(해당 웹사이트 혹은 해당 프로그램) 이에 대한 내용을 쿠폰서비스 제공업체 서버가 검토하여 승인할 수 있다. 또한, 쿠폰을 회원이 타회원에게 직접 발행하는 것일 경우, 두 가지 방법이 있을 수 있다. 하나는, 온라인(웹사이트 혹은 프로그램)으로 회원을 검색하여 쿠폰을 원격으로 발행하는 경우이고, 다른 하나는, 수신하는 회원의 단말기에 특정 버튼을 눌러 인증코드나 발행자만의 특정 정보를 입력하여 쿠폰을 생성 발행하는 경우이다.
- [0061] 쿠폰 수령단계로, 쿠폰서비스 제공업체 서버(100) 또는 쿠폰발행 회원 단말기에서 쿠폰수령 회원 단말기로, 발행된 쿠폰이 전송된다(S210).
- [0062] 목표수행 단계로, 쿠폰을 수신한 쿠폰수령 회원은 쿠폰수령 회원 단말기를 통해 목표 수행을 행한다(S220).
- [0063] 보상수령단계로, 목표수행 단계에서 목표 수행을 완료하면, 리워드(보상)을 쿠폰수령 회원 단말기로 제공하여(S250), 결과적으로 쿠폰을 리워드로 변경한다. 즉, 쿠폰 서비스 제공업체 서버가 관련 목표치에 대해 타회원의 최종수행 목표수치와 발행자의 설정 목표수치가 동일할 경우라고 판단하면(쿠폰 서비스 제공업체 서버에서 확인이 원칙) 리워드가 전송된다.
- [0064] 본 발명에서, 리워드는 쿠폰서비스 제공업체가 타회원에게 제공한다. 리워드를 구매하면 그 리워드를 쿠폰서비스 업체가 임시로 보유하고 있다가 목표 수행시 전달하는 개념이다.
- [0065] 도 3는 본 발명의 일 실시예에 의한 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법을 개략적으로 설명하는 흐름도이다.
- [0066] 회원(210)은 모바일 쿠폰발행 해당 서비스에 가입하고, 모바일 쿠폰발행 해당 서비스에서 제공한 서비스 프로그램을 본인 단말기에 저장한다.
- [0067] 인증단계로, 모바일 쿠폰발행 해당 서비스에 가입한 회원(210)이, 자신의 온라인 또는 모바일 단말기인, 쿠폰발행 회원 단말기를 통해, 사전에 발급받은 인증코드 혹은 아이디와 암호 또는 개인 바코드 등을 쿠폰서비스 제공업체 서버(100)로 전송하면서 인증을 요청하고(S110), 쿠폰서비스 제공업체 서버(100)는 인증을 행하고(S120), 쿠폰발행 회원 단말기로 승인신호를 전송한다(S130).
- [0068] 수령자 설정단계로, 쿠폰발행 회원 단말기에서, 쿠폰을 발행하기 위해, 수령자를 설정한다(S140).

- [0069] 조건입력단계로, 쿠폰발행 회원 단말기에서, 특정활동의 목표를 설정한다(S145).
- [0070] 리워드 설정단계로, 쿠폰발행 회원 단말기에서, 리워드를 설정한다(S150).
- [0071] 결제단계로, 설정된 리워드에 대한 결제를 행한다(S155).
- [0072] 쿠폰발행 단계로, 쿠폰발행 회원 단말기에서, 쿠폰서비스 제공업체 서버(100)로 쿠폰 발행을 요청하고(S160), 쿠폰서비스 제공업체 서버(100)는 쿠폰발행 회원 단말기에서 요청된 쿠폰발행 여부를 검증하여(S170), 쿠폰발행의 승인 신호를 전송하고(S180), 쿠폰관련정보를 저장하고(S190), 쿠폰을 발행한다(S200).
- [0073] 경우에 따라서는 쿠폰서비스 제공업체 서버(100)로 쿠폰 발행을 요청하고(S160), 쿠폰서비스 제공업체 서버(100)는 쿠폰발행 회원 단말기에서 요청된 쿠폰발행 여부를 검증하여(S170), 쿠폰발행의 승인 신호를 전송하는(S180) 것을 생략하고, 쿠폰발행 회원 단말기에서 쿠폰을 바로 발행할 수 있다.
- [0074] 쿠폰 수령단계로, 쿠폰서비스 제공업체 서버(100) 또는 쿠폰발행 회원 단말기에서 쿠폰수령 회원 단말기로 발행된 쿠폰이 전송되며, 동시에 쿠폰관련정보도 전송된다(S210). 여기서 발행하는 쿠폰은 포인트나 스탬프 등 적립식의 쿠폰일 수 있다.
- [0075] 목표수행 단계로, 쿠폰과 쿠폰관련정보를 수신한 쿠폰수령 회원은 쿠폰수령 회원 단말기를 통해 목표 수행을 행한다(S220).
- [0076] 보상수령단계로, 쿠폰서비스 제공업체 서버(100)로 리워드요청을 행하고(S230), 쿠폰서비스 제공업체 서버(100)는 쿠폰수령 회원 단말기에서 수신된 리워드 요청을 검증하여(S240), 보상을 쿠폰수령 회원 단말기로 제공한다(S250).
- [0077] 경우에 따라서, 쿠폰서비스 제공업체 서버(100)로 리워드요청을 행하고(S230), 쿠폰서비스 제공업체 서버(100)는 쿠폰수령 회원 단말기에서 수신된 리워드 요청을 검증하는(S240) 것을 생략하고, 쿠폰 발행 회원단말기 또는 쿠폰서비스 제공업체 서버(100)에서 바로 보상을 쿠폰수령 회원 단말기로 제공할 수 있다.
- [0078] 도 3에서는 결제단계에서 설정된 리워드에 대한 결제를 무조건 진행하고(S155), 추후 쿠폰수령 회원은 쿠폰수령 회원 단말기를 통해 목표 수행을 다하지 못하였을 경우에, 환불이 되지 않는다. 쿠폰발행 회원에게 구매한 리워드 그대로 환불이 된다. 이 경우는 구매한 리워드는 반드시 소진을 해야 하며, 환불 행위가 없다.
- [0079] 도 4은 본 발명의 다른 일 실시예에 의한 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법을 개략적으로 설명하는 흐름도이다.
- [0080] 도 3의 결제단계 대신에, 도 4에서는 가결제 단계를 가지며, 즉 도 4의 가결제 단계에서는 설정된 리워드에 대한 가결제를 행한다(S157).
- [0081] 또한, 도 4에서는 보상 수령 단계 중, 보상을 쿠폰수령 회원 단말기로 제공하는(S250) 것에 앞서서, 설정된 리워드에 대해 가결제 되었던 것(S157)을 자동 결제하는 결제 단계를 가진다.
- [0082] 만약 쿠폰과 쿠폰관련정보를 수신한 쿠폰수령 회원이 쿠폰수령 회원 단말기를 통해 목표 수행을 다하지 못하였을 경우(S260)에는 설정된 리워드에 대해 가결제 되었던 것(S157)을 자동 환불하며(S267), 환불 시에는 일정 수수료가 발생될 수 있다. 이 외에는 도 4의 퍼스널 마케팅 방법은 도 3의 퍼스널 마케팅 방법과 같다.
- [0083] 도 5는 본 발명의 또 다른 일 실시예에 의한 모바일 적립 쿠폰과 온라인 쇼핑을 이용한 퍼스널 마케팅 방법을 개략적으로 설명하는 흐름도이다.
- [0084] 도 5에서는 쿠폰과 쿠폰관련정보를 수신한 쿠폰수령 회원이 쿠폰수령 회원 단말기를 통해 목표 수행을 다하지 못하였을 경우(S260)에는 설정된 리워드에 대해 결제되었던 것(S155)을 자동 환불한다(S267). 이 외에는 도 5의 퍼스널 마케팅 방법은 도 3의 퍼스널 마케팅 방법과 같다. 환불 시에는 일정 수수료가 발생될 수 있다.
- [0085] 즉, 도 3의 경우는 설정된 리워드에 대해 결제되면(S155), 쿠폰수령 회원의 목표 수행 여부와 상관없이 구매한 리워드는 환불이 되지 않는 반면, 도 5의 경우는 설정된 리워드에 대해 결제된후(S155), 쿠폰수령 회원의 목표 불수행시에는 구매한 리워드가 환불이 된다(S267).
- [0086] 다시 정리하면, 본 발명의 서비스는 모바일 기기를 통한 쿠폰발행, 이를 온라인 쇼핑과 연계하여 적립쿠폰의 리워드를 직접 선택하는 방법으로, 모바일 적립쿠폰은 이용자가 일정 목표치에 도달하면 해당 쿠폰이 자동적으로 사전에 쿠폰 발행자가 정한 리워드 상품 혹은 상품과 교환할 수 있는 상품권으로 변경되는 데, 이를 정리하면

다음과 같다.

- [0087] 첫째, 모바일 쿠폰 발행 서비스에 대해서 정리하면, 모바일 쿠폰발행 해당 서비스에 가입한 유저가 온라인 및 모바일 기기를 통해 사전에 발급받은 인증코드 혹은 아이디와 암호 또는 개인 바코드 등을 통해 제 3자에게 모바일 쿠폰발행이 가능하다. 발행하는 쿠폰은 포인트나 스탬프 등 적립식의 쿠폰이며 해당 쿠폰 발행 시 일정 목표치를 정한 후 해당 쿠폰의 목표치에 도달하면 제공하는 리워드를 서비스에서 제공하는 쇼핑몰 혹은 연계한 쇼핑몰에서 상품이나 상품권을 선택하여 지정한다. 지정한 상품이나 상품권은 쿠폰을 발급받은 유저가 목표치를 완료하면 자동적으로 변경하거나 구매가 된다. (미션완료)
- [0088] 둘째, 보상(리워드)에 대해서 정리하면, 본 발명에서 보상(리워드) 해당 서비스에서의 리워드란 결제가 필요한 실물이나 온라인 상품, 쿠폰, 상품권, 스탬프 등을 포함한다. 쿠폰을 발급하는 유저는 쿠폰 발행 시 보상 상품을 발행 단계에서 결제를 해야 한다. 결제는 반드시 금액이 지불되는 행위는 아니나 결제단계는 포함한다. 여기서 말하는 온라인 상품이란 온라인에서 사용할 수 있는 실물을 말하며 상품권은 온라인서비스에서 사용할 수 있는 쿠폰이나 상품권, 혹은 오프라인에서 결제 시 사용할 수 있는 실물교환 상품권도 포함한다. 보상에서의 쿠폰이란 각종 할인 쿠폰 및 이벤트 쿠폰 등을 말한다. 보상에서의 스탬프란 말 그대로 스탬프를 의미한다.
- [0089] 예를 들어 A라는 사람이 A' 라는 쿠폰을 발행하면서 쿠폰 리워드인 홍대 주변에서 인기 있는 B라는 카페의 스탬프 4개를 구매하여 선정한다.
- [0090] C라는 유저가 A' 라는 쿠폰을 발급받고 목표치를 완료했을 경우 C라는 유저가 B라는 카페의 스탬프 쿠폰B' 을 해당 서비스 내에서 소지하고 있다면 스탬프 쿠폰 B' 에서 스탬프 4개가 추가되고, 스탬프 쿠폰 B' 가 없다면 4개가 찍혀진 스탬프 쿠폰B' 을 받게 된다. 이 유저의 경우 스탬프 쿠폰B' 가 8개를 다 찍었을 때 아메리카노 1잔을 리워드인 받게 되어 있다면, 4개만 스탬프를 더 찍으면 아메리카노를 나실 수 있게 된다. 스탬프 쿠폰 B는 B라는 카페에서 제공하는 모바일 스탬프 쿠폰이며 해당 쿠폰은 해당 서비스 내에서 제공하고 있거나 타 모바일 쿠폰 서비스에서 제공하는 쿠폰일 수 있으며 후자의 경우 서비스 연계를 한 경우이다.
- [0091] 본 발명에서의 결제는 3가지 경우가 있을 수 있다. 가 결제 후 유저가 해당 기간 내 목표치를 완수하면 결제가 되고 목표치를 완료하지 못하면 도로 환불이 되는 경우, 처음부터 무조건 결제가 되고 유저가 해당 기간 내 목표치를 완료하지 못하면 환불이 되는 경우이며 환불 시에는 일정 수수료가 발생될 수 있다. 다른 또 하나는 무조건 결제가 진행되고 환불이 되지 않는 경우이며 구매한 리워드는 반드시 소진을 해야 한다. 환불 행위가 없을 수도 있다.
- [0092] 여기서, 무조건 결제가 진행되고 환불이 되지 않는 경우에, 구매한 리워드는, 리워드를 구매한 회원에게 남아 있을 경우, 그 회원은 자신의 디바이스(쿠폰발행 회원 단말기)에서 관련 정보를 확인할 수 있고 혹은 웹사이트 등 온라인에서 개인정보 로그인 후 확인할 수도 있으며, 남아 있는 리워드는 그대로 다른 쿠폰 발행을 할 때 이용할 수 있다. 즉 리워드가 있는 경우에는 결제 단계에서 사용할 수 있는 리워드 목록을 보여주고 선택을 할 수 있게 한다.
- [0093] 셋째, 모바일 쿠폰 수령에 대해 정리하면, 모바일 쿠폰 수령 해당 서비스에 가입 후 해당 서비스를 이용하는 유저에게서 쿠폰을 발급받을 수 있다. 쿠폰을 수령한 유저는 해당 쿠폰에서 제시한 기간 내에 목표치에 도달하면 해당 적립쿠폰은 자동적으로 정해진 온라인 상품권이나 포인트, 실물 등 리워드를 수령할 수 있다. 좀 더 쉽게 말하면 적립 쿠폰이 자동적으로 리워드인 변경되는 것이다.
- [0094] 넷째, 본 발명을 이용한 서비스활용에 대해 설명하면, 서비스의 활용 1인 기업과 부모와 자식간의 관계 등에서 교육적인 목표 등으로 사용할 수 있다.
- [0095] 예를 들어 초등학교 1학년인 자녀를 둔 학부모가 아이의 교육지원에서 모바일 스탬프 쿠폰을 발행한다. 쿠폰의 유효기간은 한 달이며 해당 기간 내에 심부름을 열 번하면 온라인 문화상품권 5,000원을 지급한다. 해당 자녀가 열 번의 심부름을 하게 되면 해당 모바일 적립쿠폰은 자동적으로 온라인 문화상품권으로 변경된다.
- [0096] 다른 예로서, 보험설계사인 A씨는 많은 고객을 만나고 대접해야 하는 업무의 특성상 자신이 관리하는 100명의 고객들에게 쿠폰을 발행한다. 만날 때마다 스탬프 1개, 고객 추천 시 스탬프 5개로 규칙을 정하고 스탬프 10개가 채워지면 XX 커피전문점의 아메리카노 기프트권이 해당 고객에게 전송된다.
- [0097] 또한, 본 발명에서 서비스의 활용 스탬프를 리워드인 새로운 마케팅으로의 활용도 가능하다. 예를 들어 A라는 카페가 자신들의 스탬프 쿠폰에서 찍어주는 스탬프를 B라는 보험설계사 C에게 저렴한 가격으로 스탬프를 제공함으로써 A라는 카페는 고객층 확대가 가능하고 보험설계사 C는 저렴한 비용으로 퍼스널 마케팅이

가능하다.

- [0098] 다섯째, 서비스의 구조에 대해서 설명하던, 본 발명의 서비스의 실행은 스마트폰을 포함하여 앱을 실행할 수 있는 모든 모바일 기기, 온라인을 포함한다.
- [0099] 회원은 서비스 프로그램을 통하여 가입을 하여야 하며, 가입은 간단한 가입단계로 이루어진다.
- [0100] 쿠폰 수령자 선택에 있어서, 쿠폰을 발행하는 회원의 단말기(디바이스)에서 수령자 선택이 가능하며, 경우에 따라서 수령자의 단말기에서 직접 쿠폰 발행도 가능하다. 수령자의 단말기에서 직접 발행 시 별도의 수령자 선택 단계는 필요 없다. 온라인도 가능하다.
- [0101] 리워드 선택에 있어서 보상은 온라인 쇼핑물에서 쇼핑을 하듯 해당 서비스 내 연계된 혹은 속해있는 쇼핑물에서 상품을 쇼핑하여 설정한다. 즉, 리워드 선택은, 서비스 프로그램 내에 고정된 다수개의 상품도 가능하고 실제 기존 온라인 쇼핑물에서 상품을 선택할 수도 있다. 기존 온라인 쇼핑물에서 상품을 선택하는 경우 해당 서비스와의 연계를 통해 진행한다.
- [0102] 여기서, 서비스 내 연계된 혹은 속해있는 쇼핑물이란, 즉, 쿠폰제공업체에서 자체적으로 쇼핑물을 제작하여 서비스 내 혹은 프로그램 내 서비스 하는 경우 (직접 서비스)인, 서비스 내 쇼핑물과, 기존에 구축되어 있는 온라인 쇼핑물을 서비스 혹은 프로그램 내에 연동시켜 위탁서비스를 하는 경우인, 연계된 쇼핑물을 포함한다.
- [0103] 도 6은 본 발명의 일실시예에 의한 리워드 결제 및 전달을 설명하기 위한 흐름도이다. 도 6은 쿠폰 제공업체 자체에서 리워드 제공하는 경우이다.
- [0104] 리워드 설정단계로, 발행자는 쿠폰발행 회원단말기에서 온라인 쇼핑물 등을 통해 리워드설정한다(S150).
- [0105] 결제요청 단계로, 쿠폰발행 회원단말기에서 쿠폰서비스 제공업체, 즉, 쿠폰서비스 제공업체 서버로 결제정보의 전송과 함께 결제요청을 하며(S151-1), 쿠폰서비스 제공업체는 쿠폰발행 회원단말기에서 수신된 결제정보를 결제대행업체, 즉, 결제대행업체 서버로 전송함과 함께, 결제대행업체 서버로 결제요청을 행한다(S151-2).
- [0106] 승인단계로, 결제대행업체 서버는 발행자의 쿠폰발행 회원단말기로 결제에 따른 승인요청을 행하고(S152-1), 발행자는 쿠폰발행 회원단말기를 통해 승인을 행하고, 그 승인결과는 결제대행업체 서버로 전송된다(S152-2).
- [0107] 결제단계로, 승인단계에서 승인된 후, 결제대행업체 서버는 결제를 행하여 결제를 완료하고(S154), 결제대행업체 서버는 결제정보(즉, 결제된 정보)를 쿠폰서비스 제공업체 서버로 전송하고(S156-1), 쿠폰서비스 제공업체 서버는 수신된 결제정보를 발행자의 쿠폰발행 회원단말기로 전송하여 결제정보를 확인하게 한다(S156-2).
- [0108] 대금지급단계로, 결제대행업체는 쿠폰서비스 제공업체로 대금을 지급하고(S157-1), 쿠폰서비스 제공업체는 결제대행업체로부터 대금을 수신한다(S157-2).
- [0109] 다음은 쿠폰서비스 제공업체서버에서 쿠폰이 발행되어 수신자에게 전송된 후 목표수행에 따라 리워드(즉, 상품/상품권)를 제공하는 흐름을 설명한다.
- [0110] 목표수행 단계로, 쿠폰을 수신한 쿠폰수령 회원은 쿠폰수령 회원 단말기를 통해 목표 수행을 행한다(S220).
- [0111] 정보수신단계로, 목표수행 단계에서 수신자가 목표 수행을 완료하면, 목표 수행을 완료하였다는 정보를 쿠폰수령 회원단말기를 통해 쿠폰서비스 제공업체 서버로 전송한다(S232).
- [0112] 보상수령단계로, 쿠폰서비스 제공업체 서버는 상품/상품권으로 이루어진 리워드(보상)을 수신자에게 전달되어 (S247), 수신자는 상품/상품권으로 이루어진 리워드(보상)를 수령한다(S250).
- [0113] 도 7은 본 발명의 다른 일실시예에 의한 리워드 결제 및 전달을 설명하기 위한 흐름도이다. 도 7은 외부쇼핑업체에서 리워드를 제공하는 경우이다.
- [0114] 도 7의 리워드 설정단계(S150) 내지 결제단계(S154, S156-1, S156-2)은 도 6의 그것과 동일하다. 따라서 이에 대한 설명은 생략한다.
- [0115] 결제단계(S154, S156-1, S156-2) 후의 대금지급단계는 다음과 같다.
- [0116] 대금지급단계로, 결제대행업체는 쿠폰서비스 제공업체 또는 (외부)쇼핑업체로 대금을 지급하고(S157-1), 쿠폰서비스 제공업체 또는 (외부)쇼핑업체는 결제대행업체로부터 대금을 수신한다(S157-2).
- [0117] 다음은 쿠폰서비스 제공업체서버에서 쿠폰이 발행되어 수신자에게 전송된 후 목표수행에 따라 리워드(즉, 교환

권/상품)를 제공하는 흐름을 설명한다.

- [0118] 쿠폰서비스 제공업체로 상품 교환권전달 단계로, (외부)쇼핑업체는 리워드인 상품으로 교환할 수 있는 상품 교환권을 쿠폰서비스 제공업체로 전달하며(S212), 쿠폰서비스 제공업체는 상품 교환권을 수신한다(S214).
- [0119] 목표수행 단계로, 쿠폰을 수신한 쿠폰수령 회원(수신자)은 쿠폰수령 회원 단말기를 통해 목표 수행을 행한다(S220).
- [0120] 정보수신단계로, 목표수행 단계에서 수신자가 목표 수행을 완료하면, 목표 수행을 완료하였다는 정보를 쿠폰수령 회원단말기를 통해 쿠폰서비스 제공업체 서버로 전송한다(S232).
- [0121] 쿠폰수령 회원에게로 상품 교환권전달 단계로, 쿠폰서비스 제공업체 서버는 상품 교환권을 쿠폰수령 회원(수신자)에게 전달하여(S243), 쿠폰수령 회원(수신자)은 상품 교환권을 수신한다(S244).
- [0122] 쿠폰수령 회원이 상품수령 단계로, 쿠폰수령 회원(수신자)은 상품교환 또는 신청을 행하며(S246), 이에 따라 (외부)쇼핑업체는 상품을 전달하여(S247), 결과적으로 쿠폰수령 회원(수신자)가 상품을 수령한다.
- [0123] 도 8은 본 발명에서 쿠폰발행 회원 단말기를 통해 쿠폰을 발행하는 경우를 설명하는 설명도이다.
- [0124] 쿠폰발행 회원(발행자)은 쿠폰발행 회원 단말기(발행자의 단말기)로 온라인접속을 하여, 수령자를 선택하고(S140), 쿠폰을 발행한다(S200).
- [0125] 쿠폰서비스 제공업체 서버는 쿠폰관련정보를 쿠폰발행 회원 단말기로부터 수신하고, 쿠폰 및 쿠폰관련 정보를 수령자 단말기로 전달한다.
- [0126] 수령자는 수령자 단말기를 통해 쿠폰서비스 제공업체 서버로부터 전송되는 쿠폰 및 쿠폰관련 정보를 수신한다(212). 이렇게 하여, 수령자 단말기에 쿠폰이 생성된다.
- [0127] 여기서, 온라인이라 함은 웹사이트나 프로그램 실행을 통해 접속을 하는 형태며 인터넷 접속이 되는 환경을 말한다. 또한, 수령자 단말기상의 쿠폰생성은 수령자 단말기에 설치된 프로그램을 통해 실행된다.
- [0128] 도 9는 본 발명에서 수령자 단말기에서 쿠폰을 발행하는 경우를 설명하는 설명도이다. 이는 발행자가 수령자 단말기를 이용하여 쿠폰을 발행하는 경우이다.
- [0129] 우선 수령자 단말기에 쿠폰서비스 제공업체에서 배포한 프로그램(서비스)을 실행시키고, 수령자 단말기를 사용하여 발행자(쿠폰발행 회원)를 설정하고, 선택버튼(또는 선택키) 중 쿠폰발행을 선택한다.
- [0130] 다음에 수령자 단말기를 통해 발행자 인증을 행하며(S120), 인증시, 쿠폰서비스 제공업체 서버로 인증에 필요한 정보를 전송하게 되며, 쿠폰서비스 제공업체 서버는 이를 수신하게 된다. 즉, 사전에 발행자가 발급받은 인증코드 혹은 아이디와 암호 또는 개인 바코드 등을 쿠폰서비스 제공업체 서버(100)로 전송하면서 인증을 요청하고, 쿠폰서비스 제공업체 서버는 이를 인증을 행하고, 수령자 단말기로 승인신호를 전송한다.
- [0131] 다음에 발행자는 수령자 단말기를 통해 특정활동의 목표를 설정하고, 디워드를 설정하고 설정된 디워드에 대한 결제를 행하고, 수령자 단말기에서, 쿠폰서비스 제공업체 서버로 쿠폰 발행을 요청하고, 쿠폰서비스 제공업체 서버는 수령자 단말기에서 요청된 쿠폰발행 여부를 검증하여 쿠폰발행의 승인 신호를 수령자 단말기로 전송하여, 수령자 단말기에 쿠폰이 생성된다. 또한, 쿠폰서비스 제공업체 서버는 자체적으로 쿠폰관련정보를 저장하며, 동시에 쿠폰관련정보 등을 발행자 단말기로 전송한다.
- [0132] 본 발명에서 수령자 단말기에서 직접 쿠폰 발행 시 발행자 인증방법에는 크게 2가지가 있다. 첫 번째 방법은 기존의 온라인 서비스처럼 회원가입 후 별도의 인증코드 혹은 식별코드를 부여 받는 경우(일종의 아이디)이고, 두 번째는 모바일 인증기를 통한 발행자 인증방법으로, 모바일 인증기는 일종의 모바일 otp방식으로 해당 otp를 모바일 앱 혹은 프로그램으로 구현 후 실행하여 인증코드를 입력하는 방식이다
- [0133] 도 10은 본 발명에서 수령자 단말기에서 직접 쿠폰 발행 시 발행자 인증방법의 일실시예의 흐름도이다. 도 10은 기존의 온라인 서비스처럼 회원가입 후 별도의 인증코드 혹은 식별코드(일종의 아이디)를 부여 받는 경우이다.
- [0134] 도 10은 도 9와 같이 수령자 단말기에서 쿠폰을 발행하는 경우로, 여기서 사용하는 인증을 위해, 사전에 발행자는 쿠폰서비스 제공업체에 회원가입하되, 회원가입에 필요한 정보를 쿠폰서비스 제공업체에 전송하고, 쿠폰서비스 제공업체는 이를 수신한 후, 인증코드를 부여하여 발행자에게 전송하고, 발행자는 인증코드를 수신한다.
- [0135] 그 다음에, 도 9와 같이, 발행자는 수령자 단말기에 쿠폰서비스 제공업체에서 배포한 프로그램(서비스)을 실행

시키고, 수령자 단말기를 사용하여 발행자(쿠폰발행 회원)를 설정하고, 선택버튼(또는 선택키) 중 쿠폰발행을 선택한다.

- [0136] 그리고 수령자 단말기를 통해 발행자 인증을 행하며, 인증시, 인증코드를 입력하여, 쿠폰서비스 제공업체 서버로 인증코드를 전송하게 되며, 쿠폰서비스 제공업체 서버는 이를 수신하게 된다. 쿠폰서비스 제공업체 서버는 이를 이용하여 인증을 행하고, 수령자 단말기로 승인신호를 전송한다.
- [0137] 다음에 발행자는 수령자 단말기를 통해 특정활동의 목표를 설정하고, 리워드를 설정하고 설정된 리워드에 대한 결제를 행하고, 수령자 단말기에서, 쿠폰서비스 제공업체 서버로 쿠폰 발행을 요청하고, 쿠폰서비스 제공업체 서버는 수령자 단말기에서 요청된 쿠폰발행 여부를 검증하여 쿠폰발행의 승인 신호를 수령자 단말기로 전송하여, 수령자 단말기에 쿠폰이 생성된다. 또한, 쿠폰서비스 제공업체 서버는 자체적으로 쿠폰관련정보를 저장하며, 동시에 쿠폰관련정보 등을 발행자 단말기로 전송하여, 고객 DB를 생성관리한다.
- [0138] 도 11은 본 발명에서 수령자 단말기에서 직접 쿠폰 발행 시 발행자 인증방법의 다른 실시예의 흐름도이다. 도 11은 모바일 인증기를 통한 발행자 인증방법이다.
- [0139] 도 11에서는, 쿠폰서비스 제공업체에서 제공한 모바일 디바이스용 프로그램인, 모바일 인증기를 다운로드하여, 실행시키고, 식별코드를 확인하고, 식별코드를 등록하고, 쿠폰서비스 제공업체 서버에 이를 전송하고, 쿠폰서비스 제공업체 서버는 이를 수신하여 저장관리한다.
- [0140] 그 다음에, 도 9와 같이, 발행자는 수령자 단말기에 쿠폰서비스 제공업체에서 배포한 프로그램(서비스)을 실행시키고, 수령자 단말기를 사용하여 발행자(쿠폰발행 회원)를 설정하고, 선택버튼(또는 선택키) 중 쿠폰발행을 선택한다.
- [0141] 그리고 수령자 단말기를 통해 발행자 인증을 행하며, 인증시, 식별코드(즉, 인증코드)를 입력하여, 쿠폰서비스 제공업체 서버로 식별코드(인증코드)를 전송하게 되며, 쿠폰서비스 제공업체 서버는 수령자 단말기로부터 식별코드(인증코드)를 수신하고, 또한 모바일 인증기를 실행하여 인증코드를 수신하여 인증을 행하고, 수령자 단말기로 승인신호를 전송한다.
- [0142] 다음에 발행자는 수령자 단말기를 통해 특정활동의 목표를 설정하고, 리워드를 설정하고 설정된 리워드에 대한 결제를 행하고, 수령자 단말기에서, 쿠폰서비스 제공업체 서버로 쿠폰 발행을 요청하고, 쿠폰서비스 제공업체 서버는 수령자 단말기에서 요청된 쿠폰발행 여부를 검증하여 쿠폰발행의 승인 신호를 수령자 단말기로 전송하여, 수령자 단말기에 쿠폰이 생성된다.
- [0143] 도 12는 본 발명의 퍼스널 마케팅 시스템에서 수령자 단말기를 이용하여 쿠폰 발행시의 일예이다.
- [0144] 도 12는 발행자가 직접 쿠폰 수령자 단말기에서 쿠폰생성을 하는 경우의 실행화면의 예를 나타낸다. 이 경우는 해당 화면에 사전에 발행정보가 미리 저장되어 있는 경우이다.
- [0145] 도 12의 (a)는 쿠폰서비스 제공업체 서버로 쿠폰 발행을 요청하기 위해, 쿠폰발행 선택키를 선택하는 화면을 나타내며, 도 12의 (b)는 인증을 위해 인증코드를 입력하기위한 화면을 나타내며, 도 12의 (c)는 쿠폰이 발행되었을 때의 화면을 나타내며, 도 12의 (d)는 수령자 단말기에 쿠폰이 생성된 화면을 나타낸다.
- [0146] 도 13은 본 발명의 퍼스널 마케팅 시스템에서 수령자 단말기를 이용하여 쿠폰 발행시의 다른 일예이다. 이 경우는 직접적으로 발행정보를 입력하는 경우로, 사전에 발행정보가 저장되어 있지 않은 경우이다.
- [0147] 도 13의 (a)는 인증을 위해 인증코드를 입력하기위한 화면을 나타내며, 도 13의 (b)는 수령자 단말기를 통해 특정활동의 목표, 즉 미션타입, 목표개수, 유효기간 등을 설정하는 화면이다.
- [0148] 도 13의 (c)는 리워드를 설정하는 화면으로, 도 13의 (c)의 화면에서 리워드는 여러 개 구매가 가능하며 남은 리워드는 저장되어 다음 쿠폰 발행 때 쇼핑에서 선택할 수 있다. 도 13의 (b)~(c)는 사전에 고정하여 등록하고, 다음 번의 쿠폰 발행 때는 해당 단계는 건너뛰게 할 수 있다.
- [0149] 도 13의 (d)는 설정된 리워드에 대해 결제를 행하는 화면이다.
- [0150] 도 14는 본 발명의 퍼스널 마케팅 시스템에서 쿠폰의 생성 및 리워드 수신을 나타내는 화면들의 예이다.
- [0151] 도 14의 (a)는 수령자 단말기에 쿠폰이 수신된 화면을 나타내며, 도 14의 (b)는 수령자가 목표 수행을 완료하여 리워드(보상)로서 상품권이 수신된 화면을 나타낸다. 도 14의 (b)는 해당 쿠폰이 소정 개수를 도달해야 한다는 목표(미션)을 완료하여, 도 14의 (a)의 스탬프 쿠폰이 온라인 상품권으로 바뀐 것을 나타낸다. 도 14의 (a)의



스탬프 쿠폰은 목표(미션) 완료 시 자동으로 삭제된다.

[0152] 도 14의 (c)는 수령자가 목표 수행을 완료하여 리워드(보상)로서 스탬프가 지급된 화면을 나타내며, 도 14의 (d)는 도 14의 (c)의 '확인하기' 버튼을 눌러 스탬프가 적립된 상태를 나타내는 화면이다.

[0153] 즉, 도 14의 (b)의 화면은 일반 (온라인) 상품권을 보상으로 지급한 경우, 도 14의 (c)의 화면은 같은 서비스 내 다른 쿠폰의 스탬프를 보상으로 지급한 경우이다.

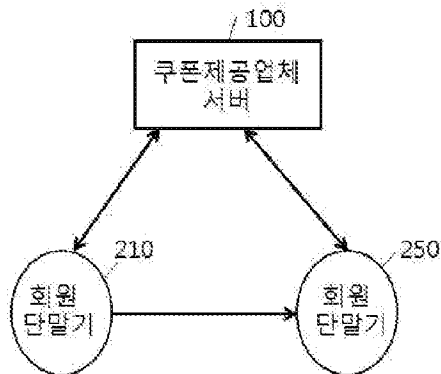
[0154] 이상과 같이 본 발명은 비록 한정된 실시예와 도면에 의해 설명되었으나, 본 발명은 상기의 실시예에 한정되는 것은 아니며, 이는 본 발명이 속하는 분야에서 통상의 지식을 가진 자라면 이러한 기재로부터 다양한 수정 및 변형이 가능하다. 따라서, 본 발명의 사상은 아래에 기재된 특허청구범위에 의해서만 파악되어야 하고, 이의 균등 또는 등가적 변형 모두는 본 발명 사상의 범주에 속한다고 할 것이다.

부호의 설명

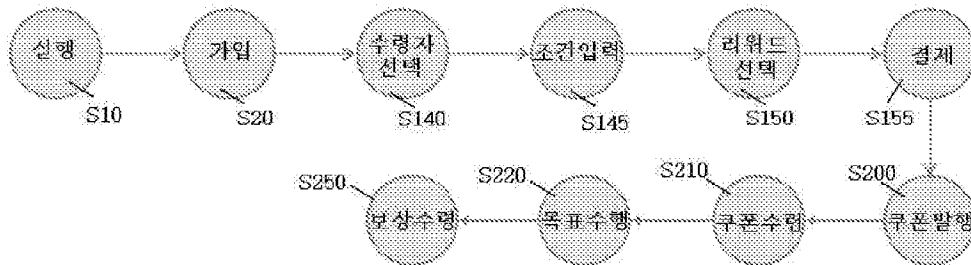
[0155] 100: 쿠폰제공업체 서버  
210, 250: 회원 단말기

도면

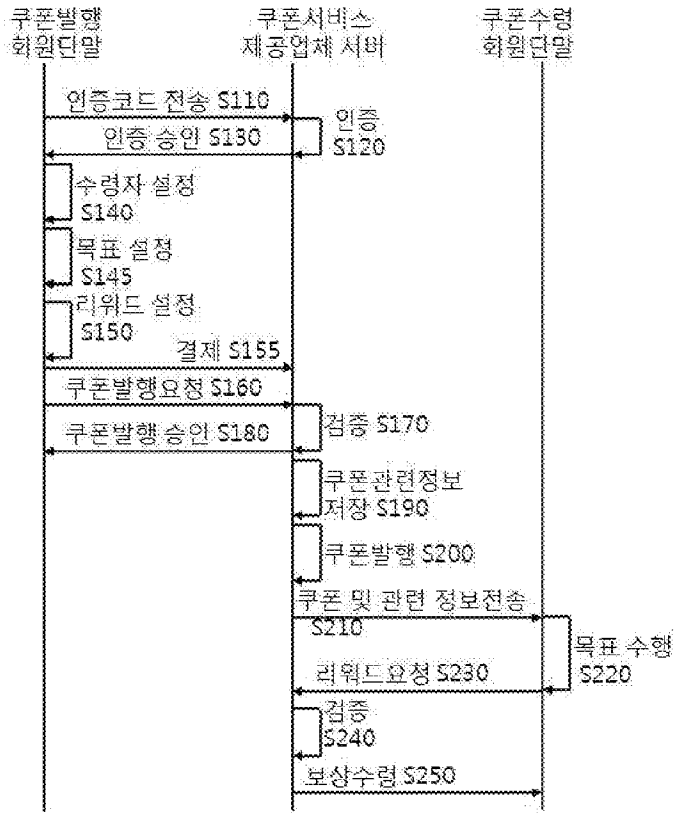
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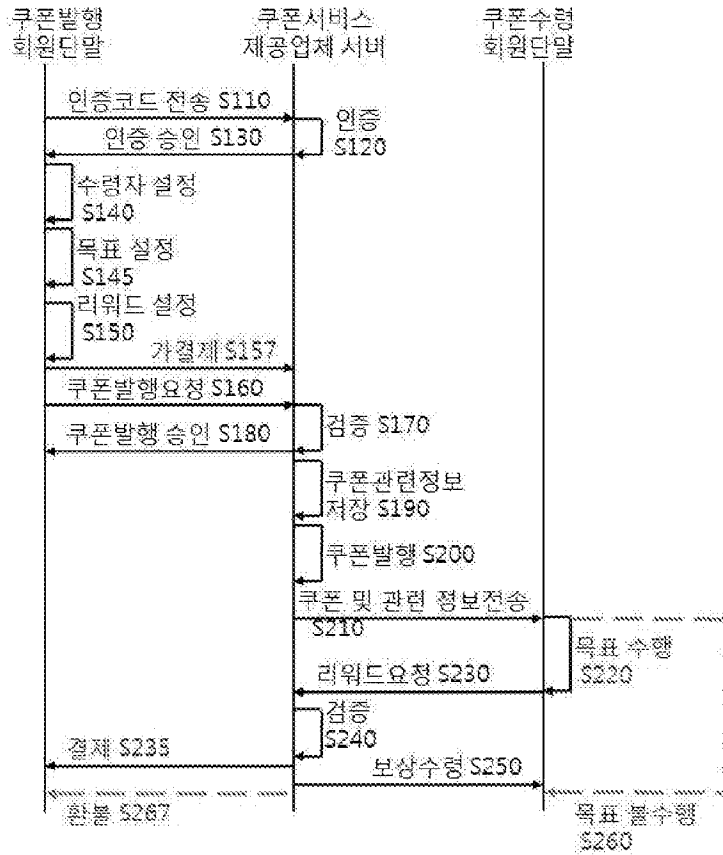
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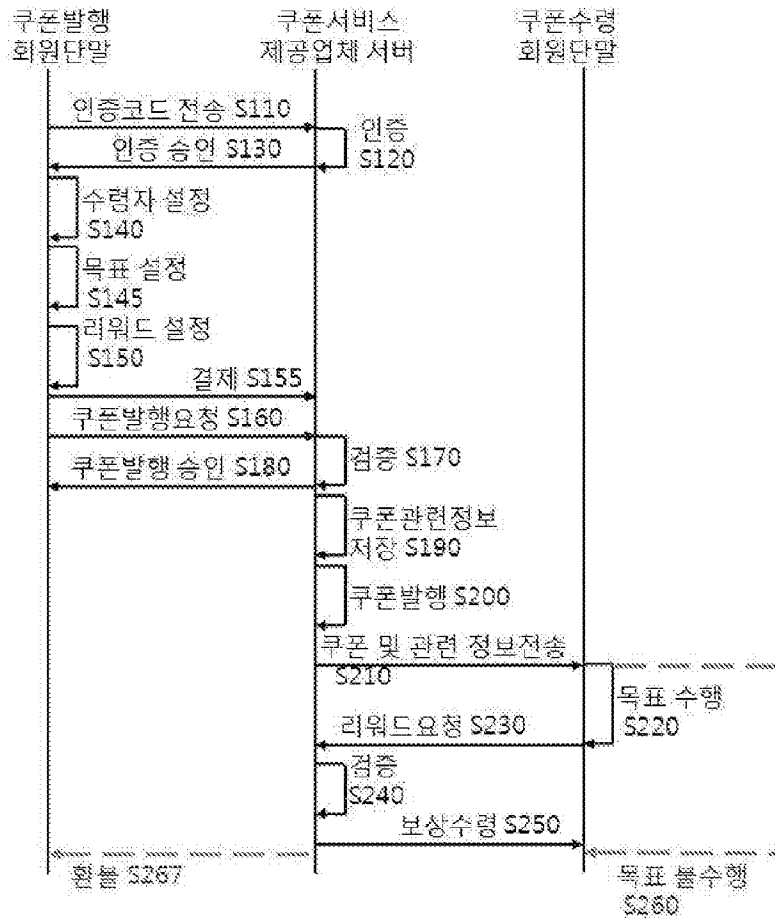
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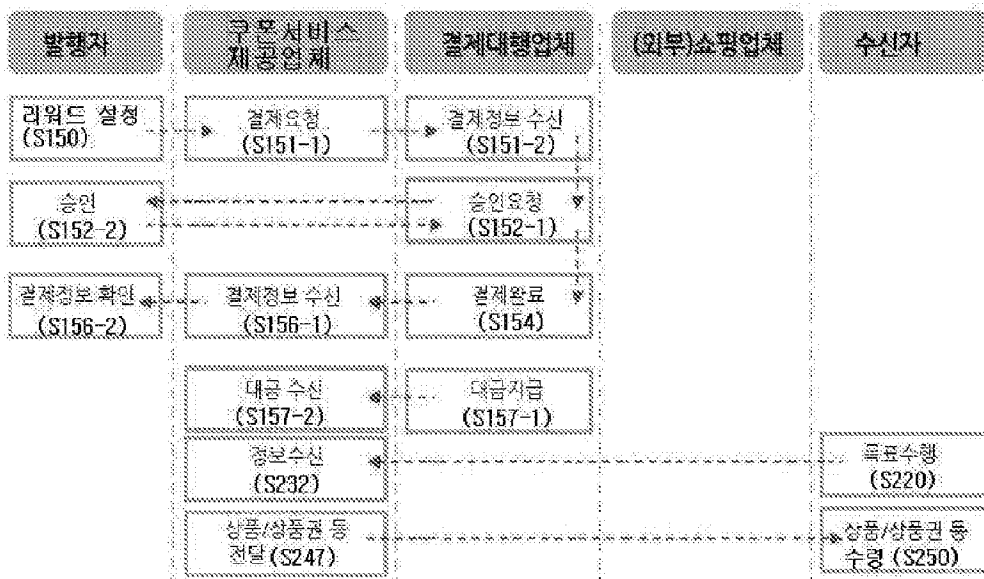
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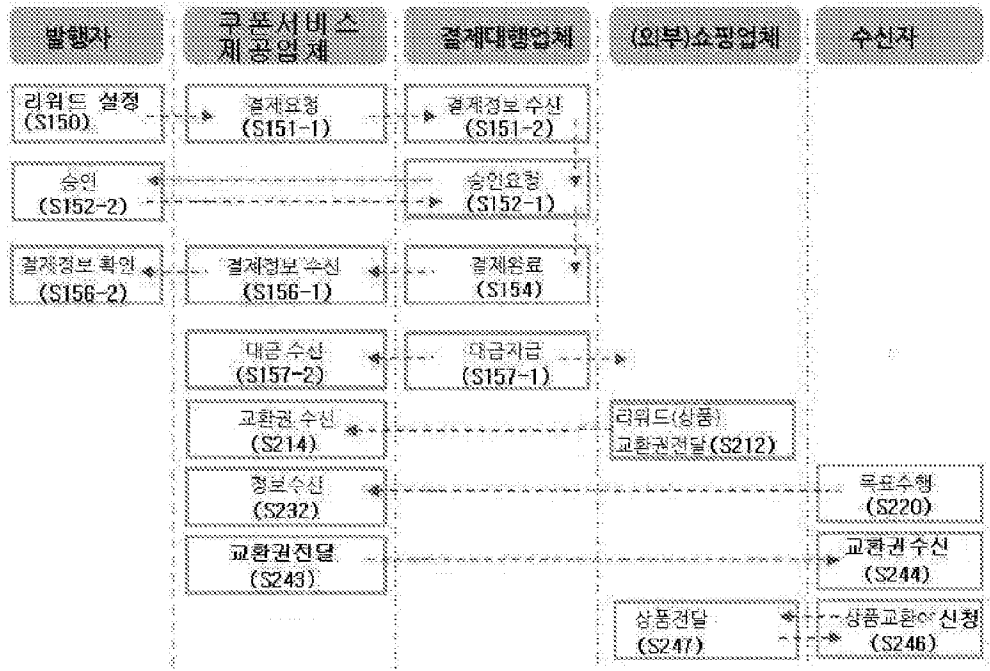
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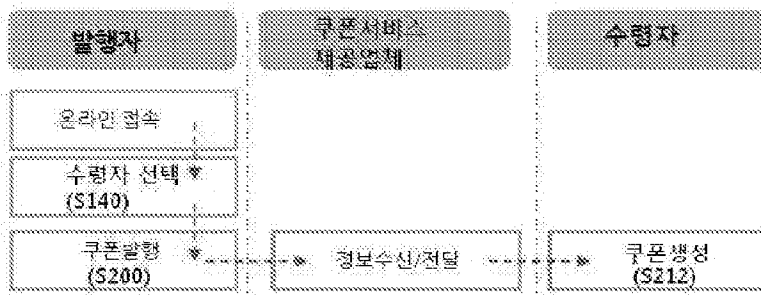
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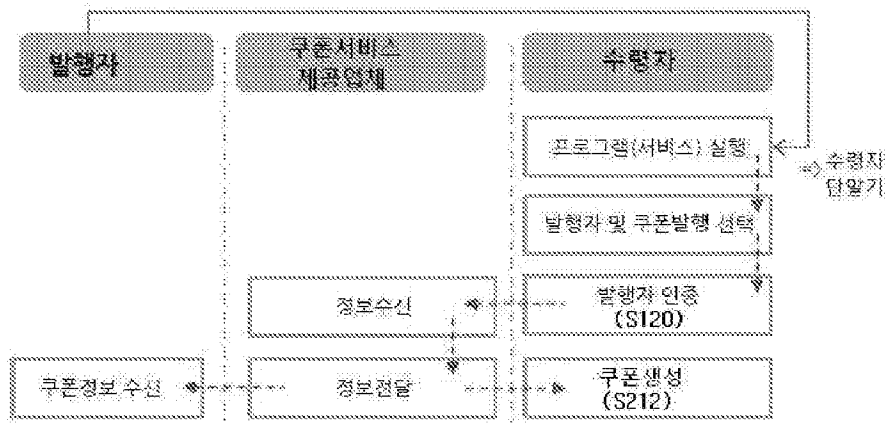
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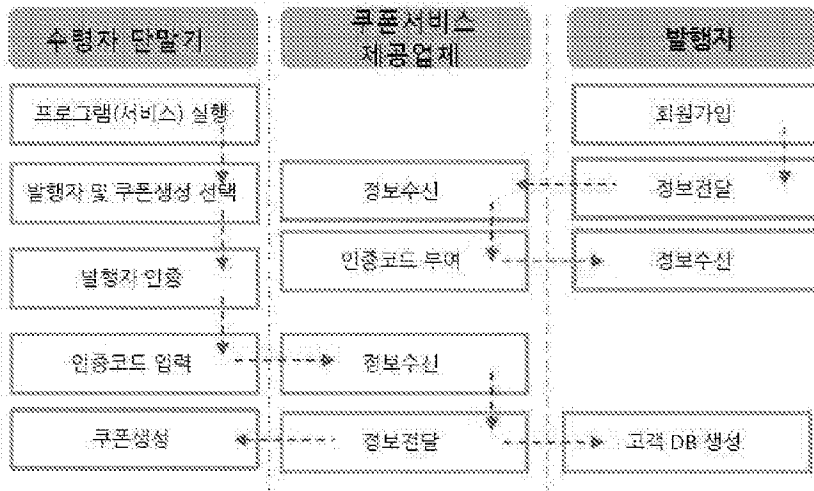
도면8



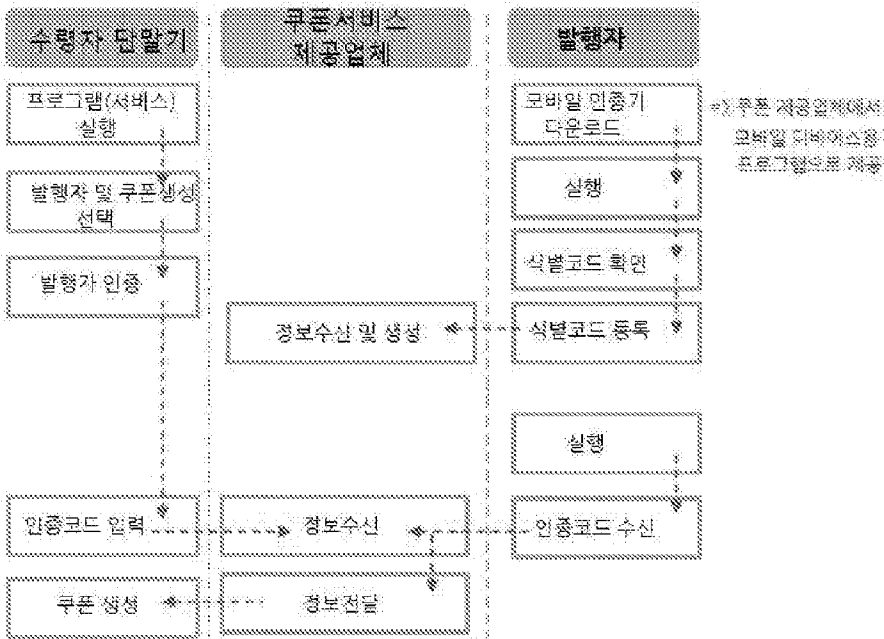
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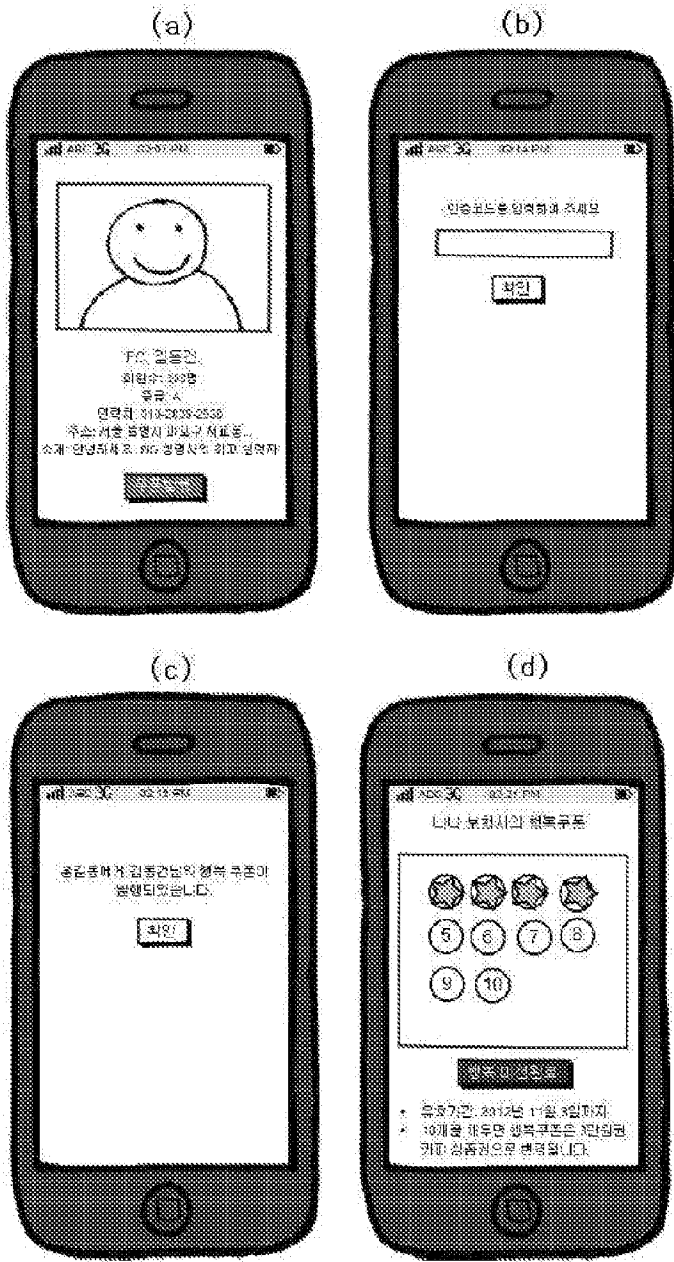
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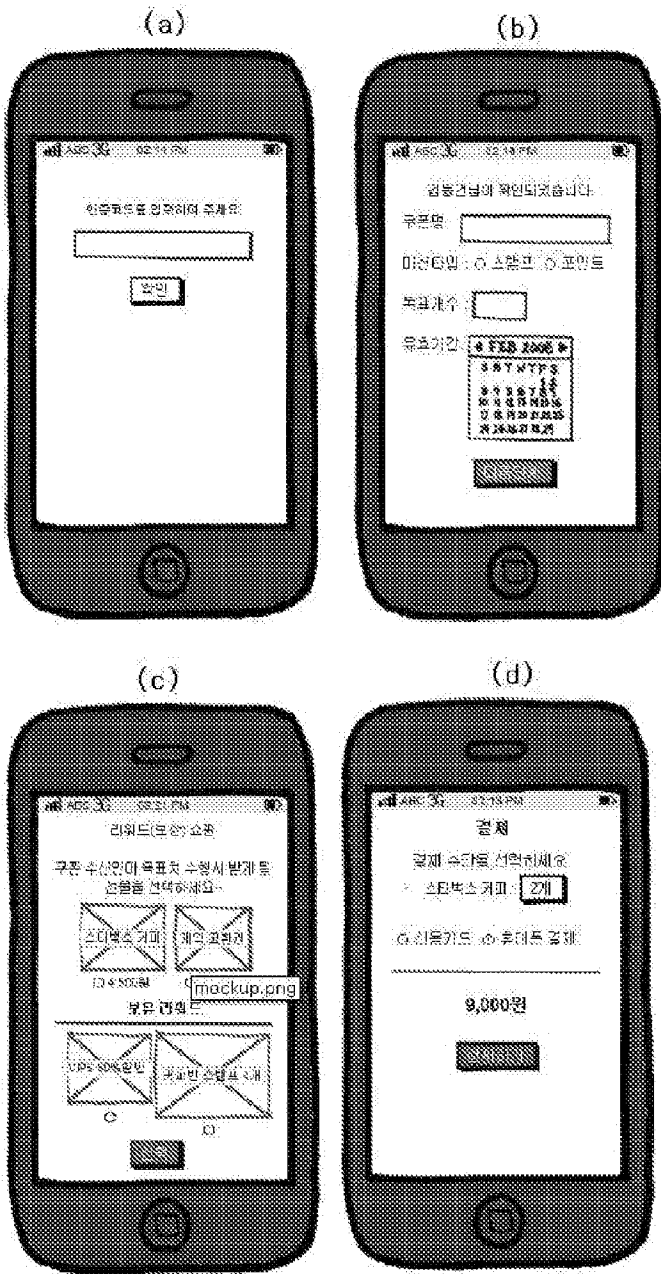
도면 11



도면 12

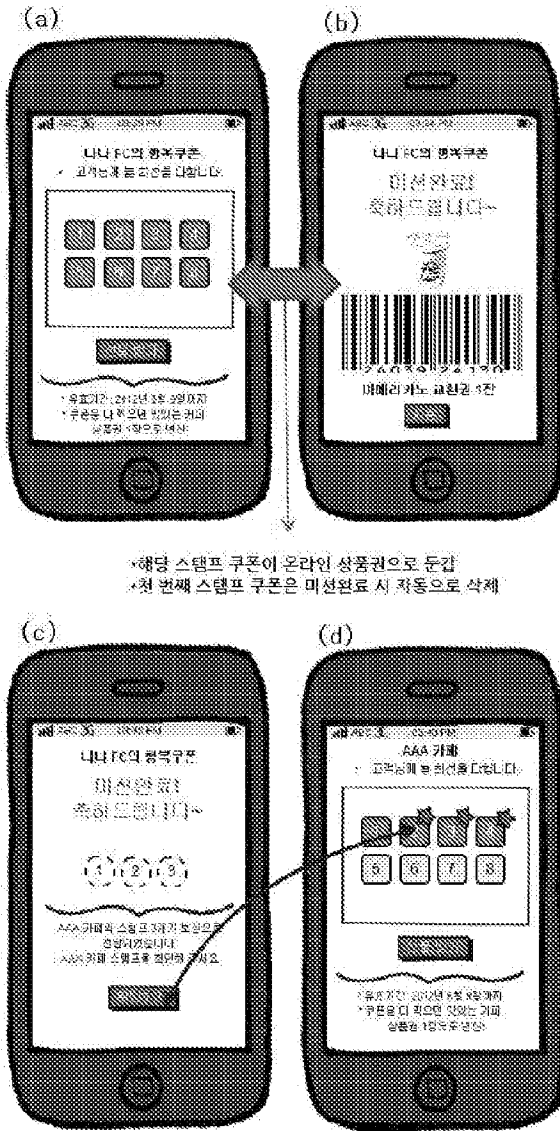


도면 13





도면 14





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### PAYMENT SYSTEM, PAYMENT DEVICE, PROGRAM, AND PAYMENT METHOD

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 - **cooperative:** G06F18/22 (EP, US); G06Q20/18 (EP, US);  
G06Q20/20 (EP, US); G06Q20/4014 (US);  
G06Q20/40145 (EP, US); G06V10/40 (EP, US);  
G06V10/761 (EP, US); G06V20/30 (US);  
G06V40/161 (EP, US); G07G1/0036 (EP, US);  
G07G1/12 (US); G07G1/14 (EP, US)

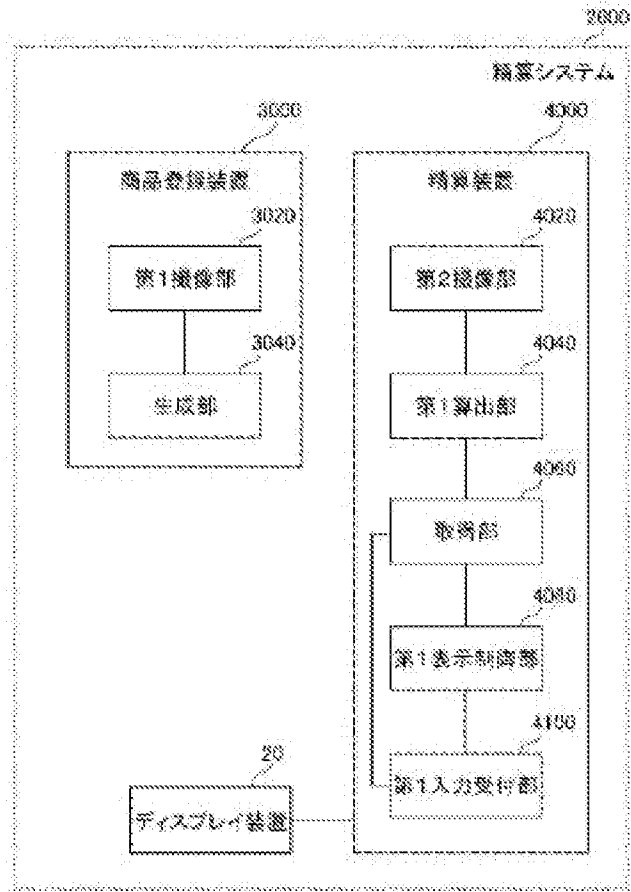
**Application number:** WO2016JP59621 20160325 Global Dossier

**Priority number(s):** JP20150072035 20150331

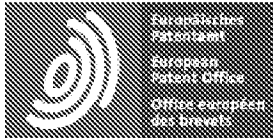
**Also published as:** JP2016192087 (A) JP6686290 (B2) US10878419 (B2)  
US2018096353 (A1)

### Abstract of WO2016158748 (A1)

A first image capture unit (3020) generates first customer images. A generating unit (3040) generates association information which associates the first customer images with payment information. A second image capture unit (4020) generates second customer images. A first computation unit (4040) computes first degrees of similarity between the customers who appear in the first customer images and the customers who appear in the second customer images. If a first customer image is present in which the first degree of similarity is greater than or equal to a first threshold, an acquisition unit (4060) acquires the payment information which is associated with the first customer image. If no first customer image is present in which the first degree of similarity is greater than or equal to the first threshold, a first display control unit (4080) displays candidate images upon a display device (20). A first input acceptance unit (4100) accepts an input which selects among the candidate images. The acquisition unit (4060) acquires the payment information which is associated with the selected candidate image.



- 20 Display device
- 2000 Payment system
- 3000 Product registration device
- 3020 First image capture unit
- 3040 Generating unit
- 4000 Payment device
- 4020 Second image capture unit
- 4040 First computation unit
- 4060 Acquisition unit
- 4080 First display control unit
- 4100 First input acceptance unit



# Patent Translate

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### DESCRIPTION WO2016158748A1

- 10 Settlement system, settlement device, program, and settlement method The present invention relates to a settlement system, a settlement device, a program, and a settlement method.
- 12 Cash register terminals in stores such as supermarkets perform (1) processing to register products to be settled (such as reading barcodes) and (2) processing to settle the registered products (such as receiving payment and returning change). Two processes are performed.
- 15 Then, there is an operation method in which the functions of such a cash register terminal are separated into two devices, and the processing (1) and the processing (2) are performed by different devices. For example, Patent Document 1 discloses a self-POS system in which a registration device used for processing (1) and an accounting device used for processing (2) are provided separately. The store clerk registers the product using the registration device. The registration device captures an image of the customer with the imaging unit. A store clerk who operates the registration device selects a customer image to be associated with the accounting data (data relating to the registered product) from among the customer images captured by the imaging unit. As a result, the registration device associates the customer's image with the accounting data. After that, the customer makes a payment using the accounting device. The checkout device captures an image of the customer and acquires checkout data associated with the generated customer image and the highly consistent customer image. The customer then uses the accounting device to make an accounting based on this accounting data.
- 29 A customer in the image generated by the registration device may not match the same customer in the image generated by the checkout device. For example, if a customer removes a mask or hat that they wore when using the registration device before using the accounting device, the customer in the image generated by the registration device and the image generated by the accounting device The matching with the customer in the image that is displayed is reduced.
- 35 Patent Document 1 does not mention the case where the matching between the customer appearing in the image generated by the registration device and the same customer appearing in the image generated by the checkout device is reduced.

38 The present invention has been made in view of the above problems. SUMMARY OF THE INVENTION An object of the present invention is to provide a technology that enables a customer to reliably settle the account for merchandise.

41 The settlement system of the present invention has a product registration device and a settlement device. The product registration device includes first imaging means for generating a first customer image including the customer, and generating means for generating association information in which the first customer image is associated with settlement information used for product settlement. have. The settlement device includes a second imaging means for generating a second customer image including the customer, and a candidate image as a candidate for the first customer image in which the same customer as the customer appearing in the second customer image is captured, and a first display control means for displaying on a display device viewable by a customer.

50 The settlement device of the present invention is the settlement device of the settlement system of the present invention.

52 A program of the present invention is a program that causes a computer to operate as the settlement apparatus of the present invention.

54 A settlement method of the present invention is a settlement method executed in a settlement system having a product registration device and a settlement device. The settlement method includes a first imaging step in which the product registration device generates a first customer image including the customer, and the product registration device associates settlement information used for product settlement with the first customer image. a generation step of generating associated information, a second imaging step of generating a second customer image including the customer, and a first image capturing step of generating a second customer image including the customer; and a first display control step of displaying a candidate image, which is a candidate for the customer image, on a display device that can be viewed by the customer.

64 ADVANTAGE OF THE INVENTION According to this invention, the technique which enables a customer to carry out the checkout of goods reliably is provided.

66 The above objectives, as well as other objectives, features and advantages, will become further apparent from the preferred embodiments described below and the accompanying drawings below.

69 It is a figure which illustrates arrangement|positioning of the goods registration apparatus which a settlement system has, and a settlement apparatus. 1 is a block diagram illustrating a settlement system according to Embodiment 1; FIG. 4 is a flowchart illustrating processing executed by the product registration device of the first embodiment; 4 is a flow chart illustrating the flow of processing executed by the settlement device of the first embodiment; 3 is a diagram illustrating the hardware configuration of a computer that implements the product registration device of the first embodiment; FIG. 2 is a diagram illustrating the hardware configuration of a computer that implements the settlement apparatus of Embodiment 1; FIG. It is a figure which illustrates settlement information in a table format. It is a figure which illustrates the structure of association information in a table format. FIG. 4 is a diagram illustrating a display on a display device; It is a block diagram which illustrates the

settlement device which has a judgment part. FIG. 11 is a block diagram illustrating a settlement system of Embodiment 2; FIG. FIG. 10 is a diagram illustrating association information in the second embodiment; FIG. 9 is a flowchart illustrating the flow of processing executed by the warning device of Embodiment 2; It is a figure which illustrates the operation environment of the settlement system of Embodiment 2. FIG.

- 85 BEST MODE FOR CARRYING OUT THE INVENTION Hereinafter, embodiments of the present invention will be described with reference to the drawings. In addition, in all the drawings, the same constituent elements are denoted by the same reference numerals, and the description thereof will be omitted as appropriate.
- 89 [Embodiment 1] FIG. 1 is a diagram illustrating the arrangement of the commodity registration device 3000 and the settlement device 4000 that the settlement system 2000 has. The settlement system 2000 has a commodity registration device 3000 and a settlement device 4000 . As shown in FIG. 1, the product registration device 3000 and the settlement device 4000 are provided as independent devices. In a store that uses the settlement system 2000 , commodity registration device 3000 and settlement device 4000 are used to make settlements for commodities. Here, the installed number of the product registration device 3000 and the settlement device 4000 is one or more.
- 97 The commodity registration device 3000 is used for processing of registering a commodity as an object of payment. A customer who wants to purchase a product goes to the product registration device 3000 with the product. A store clerk who operates the product registration device 3000 receives a product from a customer and registers the product as an object of payment. Here, various known techniques can be used for the method of registering the product as the object of payment. For example, a store clerk causes a reader of the product registration device 3000 to read a barcode or the like attached to each product. Along with product registration, the product registration device 3000 generates settlement information. The settlement information is information relating to the settlement processing of the product registered as the settlement object.
- 107 The settlement device 4000 is used for settlement of goods registered as settlement objects (such as receipt of payment). After completing product registration, the customer moves to any checkout device 4000 . The settlement device 4000 acquires settlement information related to the product purchased by the customer, and performs settlement processing based on the settlement information. More specifically, the settlement device 4000 presents the price to the customer, counts the price paid by the customer, refunds the customer change, issues a receipt, and the like.
- 114 <Configuration of product registration device 3000 and settlement device 4000> FIG. 2 is a block diagram illustrating the settlement system 2000 according to the first embodiment. In FIG. 2, each block does not represent the configuration in units of hardware, but the configuration in units of functions.
- 118 The product registration device 3000 has a first imaging section 3020 and a generation section 3040 . The first imaging unit 3020 generates an image including the customer. The image generated by the first imaging unit 3020 is hereinafter referred to as the first customer image. The generation unit 3040 generates association information. The

association information is information that associates the first customer image and the payment information.

- 124 The settlement device 4000 has a second imaging section 4020 , a first calculation section 4040 , an acquisition section 4060 , a first display control section 4080 and a first input reception section 4100 . The second imaging unit 4020 generates an image including the customer. The image generated by the second imaging unit 4020 is hereinafter referred to as a second customer image.
- 129 The first calculation unit 4040 calculates the customer appearing in each image (first customer image) captured by the first imaging unit 3020 and the customer appearing in the image (second customer image) captured by the second imaging unit 4020. Calculate the similarity with the customer who is Hereinafter, this degree of similarity is referred to as the first degree of similarity.
- 134 Acquisition unit 4060 determines whether or not there is a first customer image that satisfies the matching condition. The matching condition is that "the first similarity between the customer appearing in the first customer image and the customer appearing in the second customer image is greater than or equal to the first threshold". Then, when there is a first customer image that satisfies the matching condition, the acquisition unit 4060 acquires settlement information associated with the first customer image. As described above, the settlement information and the first customer image are associated by the association information.
- 142 The first display control unit 4080 displays candidate images on the display device 20 when there is no first customer image that satisfies the matching condition. The candidate image is a candidate for the first customer image in which the same customer as the customer appearing in the second customer image is shown. Here, the display device 20 on which the candidate image is displayed by the first display control unit 4080 is a display device that can be viewed by the customer using the settlement device 4000 .
- 148 The first input reception unit 4100 receives input for selecting a candidate image. When first input reception unit 4100 receives selection of a candidate image, acquisition unit 4060 acquires settlement information associated with the candidate image (first customer image) selected in the association information.
- 152 <Action/Effect> The degree of similarity between the customer shown in the first customer image and the same customer shown in the second customer image may be low. Such a situation occurs, for example, when the customer wears different items depending on whether the product registration device 3000 is used or the checkout device 4000 is used. Specifically, there may be a case where the customer removes the mask worn when using the product registration device 3000 before using the settlement device 4000 .
- 158 Therefore, the settlement device 4000 of the present embodiment, when there is no first customer image showing a customer who has a high degree of similarity with the customer who uses the settlement device 4000 (the first similarity is equal to or greater than the first threshold), Candidates for the first customer image showing the same customer as the customer using the settlement device 4000 are displayed, and the customer is made to select the candidate. Therefore, even if the degree of similarity between the customer shown in the

first customer image and the same customer shown in the second customer image is low, the settlement device 4000 can detect the first customer selected by the customer. The settlement process can be performed by acquiring the settlement information associated with the image. Therefore, according to the checkout system 2000 of the present embodiment, the customer can reliably checkout the product.

169 The present embodiment will be described in further detail below.

170 <Flow of Processing> FIG. 3 is a flowchart illustrating processing executed by the product registration device 3000 of the first embodiment. The first imaging unit 3020 generates a first customer image (S102). The generation unit 3040 generates association information by associating the first customer image with the settlement information (S104).

174 FIG. 4 is a flowchart illustrating the flow of processing executed by the settlement device 4000 of the first embodiment. The second imaging unit 4020 generates a second customer image (S202). The first calculator 4040 calculates the first similarity between the customer appearing in each first customer image and the customer appearing in the second customer image (S204). The acquisition unit 4060 determines whether or not there is a first customer image whose first similarity is greater than or equal to the first threshold (S206). If there is a first customer image whose first similarity is greater than or equal to the first threshold (S206: YES), the process of FIG. 4 proceeds to S208. On the other hand, when there is no first customer image whose first similarity is equal to or higher than the first threshold (S206: NO), the process of FIG. 4 proceeds to S210.

184 In S208, the acquisition unit 4060 acquires settlement information associated with the first customer image whose first similarity is greater than or equal to the first threshold.

186 In S210, the first display control unit 4080 displays the candidate images on the display device when there is no first customer image with the first similarity equal to or higher than the first threshold. The first input accepting unit 4100 accepts selection of a candidate image (S212). The obtaining unit 4060 obtains the settlement information associated with the selected candidate image (S214).

191 <Example of hardware that implements the product registration device 3000> Each functional component of the product registration device 3000 and the settlement device 4000 is implemented by hardware that implements each functional component (eg, hardwired electronic circuits, etc.) Alternatively, it may be realized by a combination of hardware and software (for example, a combination of an electronic circuit and a program for controlling it).

197 FIG. 5 is a diagram illustrating the hardware configuration of the computer 1000 that implements the product registration device 3000 of the first embodiment. This computer 1000 may be implemented using a dedicated device such as a cash register terminal, or may be implemented using a general-purpose device such as a PC (Personal Computer) or a mobile terminal.

202 Computer 1000 has bus 1020 , processor 1040 , memory 1060 , storage 1080 , input/output interface 1100 and network interface 1120 . Bus 1020 is a data transmission path for processor 1040, memory 1060, storage 1080, input/output interface 1100, and network interface 1120 to mutually transmit and receive data. However, the method of connecting



processors 1040 and the like to each other is not limited to bus connection. The processor 1040 is, for example, an arithmetic processing unit such as a CPU (Central Processing Unit) or a GPU (Graphics Processing Unit). The memory 1060 is memory such as RAM (Random Access Memory) or ROM (Read Only Memory), for example. The storage 1080 is a storage device such as a hard disk, SSD (Solid State Drive), or memory card. Also, the storage 1080 may be a memory such as RAM or ROM.

212 The input/output interface 1100 is an interface for connecting the computer 1000 and input/output devices. Input/output devices are, for example, keyboards and mice.

214 The network interface 1120 is an interface for communicably connecting the computer 1000 to an external device. The network interface 1120 may be a network interface for connecting with a wired line or a network interface for connecting with a wireless line. For example, a computer 1000 realizing a product registration device 3000 is connected to a computer 6000 realizing a settlement device 4000 via a network.

219 The storage 1080 stores program modules that implement the functions of the first imaging unit 3020 and the generating unit 3040, respectively. The processor 1040 implements the function of each corresponding functional component by executing each program module. Here, when executing each module, the processor 1040 may execute these modules after reading them onto the memory 1060, or may execute them without reading them onto the memory 1060.

225 The hardware configuration of computer 1000 is not limited to the configuration shown in FIG. For example, each program module may be stored in memory 1060. In this case, the computer 1000 may not have the storage 1080.

228 Input/output devices connected to the input/output interface 1100 include a reader 40 that recognizes products to be registered. A specific implementation method of the reader 40 differs depending on the method of recognizing the product. For example, the reader 40 reads product information symbols attached to products. The product information symbol is a symbol attached to a product, and is a symbol representing information specifying the product (ID (identifier) of product information, etc.). The symbol is a bar code, a two-dimensional code (QR code (registered trademark), etc.), a character string symbol, or the like. Note that the character string here also includes a numeric string. The product information symbol is a barcode or the like in which information specifying product information is encoded, or a character string symbol representing information specifying product information.

239 For example, if the product information symbol is a bar code, the reader 40 is a bar code reader. Further, for example, when the product information symbol is a two-dimensional code, the reader 40 is a two-dimensional code reader. Further, for example, when the product information symbol is a character string symbol, the reader 40 has an imaging device that captures an image of the character string and a processing unit that analyzes the imaged character string symbol to determine the ID of the product. Various known techniques for character string analysis can be used to analyze character string symbols. A description of these known techniques is omitted.

247 Note that when multiple types of symbols are used as product information symbols, multiple

types of readers are connected to the input/output interface 1100 . For example, when a bar code and a two-dimensional code are used as product information symbols, the input/output interface 1100 is connected to a bar code reader and a two-dimensional code reader.

257 Alternatively, the reader 40 may capture an image of a product to generate an image, and perform object recognition on the product shown in the image to recognize the product.

253 <<Hardware Configuration of First Imaging Unit 3020>> The first imaging unit 3020 has an imaging element that records the results of imaging. For example, the first imaging unit 3020 is configured using a camera having this imaging device. The first imaging unit 3020 may capture still images or may capture moving images. In the latter case, the first customer image is each frame that constitutes the moving image.

258 The first imaging unit 3020 is installed at a position where it can capture an image of a customer using the product registration device 3000 . The first imaging unit 3020 may be provided integrally with the product registration device 3000, or may be provided separately. In the latter case, for example, as shown in FIG.

262 <Example of hardware realizing settlement device 4000> FIG. 6 is a diagram illustrating the hardware configuration of a computer 6000 that implements the settlement device 4000 of the first embodiment. This computer 6000 may be implemented using a dedicated device such as a cash register terminal, or may be implemented using a general-purpose device such as a PC (Personal Computer) or a mobile terminal. Note that the configuration of the computer 6000 is the same as that of the computer 1000 .

268 The storage 6080 stores program modules for realizing the functions of the second imaging unit 4020, the first calculation unit 4040, and the acquisition unit 4060, respectively. The processor 6040 implements the function of each corresponding functional component by executing each program module. Here, when executing each module, the processor 6040 may execute these modules after reading them onto the memory 6060 or may execute them without reading them onto the memory 6060 .

274 The hardware configuration of computer 6000 is not limited to the configuration shown in FIG. For example, each program module may be stored in memory 6060 . In this case, the computer 6000 may not have the storage 6080 .

277 Input/output devices connected to input/output interface 6100 include display device 20 controlled by first display control section 4080 . The display device 20 is installed facing the customer so that the customer using the checkout device 4000 can view it. This display device may be provided integrally with the settlement device 4000, or may be provided separately.

282 Input/output devices connected to input/output interface 6100 include an input device for realizing the function of first input reception unit 4100 . For example, this input device is the touch panel 22 built into the display device 20 . Also, for example, this input device may be a keyboard, a mouse, or the like.

286 Further, input/output devices connected to the input/output interface 6100 include devices for customers to deposit money, devices for refunding change, and devices for issuing receipts (not shown) .

289 <Registration processing of product by product registration device 3000> As described above,

the product registration device 3000 generates settlement information related to products registered as settlement targets. The product registration device 3000 stores the generated settlement information in a storage unit inside or outside the product registration device 3000 .

294 A plurality of commodities can be included in the settlement objects in one settlement process. For example, the product registration device 3000 registers one or a plurality of registered products after receiving an operation instructing the start of the registration processing of the settlement object and before accepting an operation instructing the end of the registration processing of the settlement object. , is registered as a settlement object in one settlement process. Settlement information related to a certain settlement process indicates the ID of each product registered as the target of the settlement process. The settlement information may also indicate the transaction number, the price of each product, the total price, and the like.

303 FIG. 7 is a diagram illustrating settlement information in a table format. The settlement information shown in FIG. 7 is referred to as settlement information 200 . The settlement information 200 has two columns, a settlement information ID 202 and a product list 204 . The product list 204 is a list of product IDs registered as payment targets. The product ID 206 is the ID of the product registered as the payment target.

308 Since various known techniques can be used as a specific method for generating settlement information for products recognized by a reader or the like, description of this method will be omitted.

311 <Details of Processing Performed by First Imaging Unit 3020> The first imaging unit 3020 generates a first customer image (S102). There are various timings at which the first imaging unit 3020 performs imaging. For example, the first image capturing unit 3020 always repeatedly captures images while the product registration device 3000 is in operation. The frequency at which the first imaging unit 3020 performs repeated imaging is, for example, 1/30 second, which is the same as the frame rate of general moving images.

317 Further, for example, the first imaging unit 3020 may detect that the customer is near the product registration device 3000 and may perform imaging according to the detection. For example, an infrared sensor or the like for detecting a person is provided near the first imaging unit 3020 . The first imaging unit 3020 can recognize that the customer is near the first imaging unit 3020 by receiving the notification from the infrared sensor. Therefore, for example, the first imaging unit 3020 takes an image of the customer when the infrared sensor detects that the customer is in the vicinity of the first imaging unit 3020, and generates a first customer image.

325 Note that the first imaging unit 3020 may repeatedly image the customer for a predetermined period from the time the detection is performed. For example, the first imaging unit 3020 repeatedly images the customer for a predetermined period of time after the detection. Also, for example, the first image capturing unit 3020 may repeatedly capture images of the customer from the time the above detection is performed until the registration of the product purchased by the customer is completed (until the settlement information is generated). .

331 The above-mentioned “predetermined time” may be set in advance in the first imaging

section 3020 or may be stored in a storage section provided inside or outside the product registration device 3000 . In the latter case, the first imaging unit 3020 acquires and uses the predetermined time from this storage unit. Unless otherwise specified, various predetermined values (predetermined threshold value, predetermined time, etc.) used by each functional configuration unit described previously or hereinafter are also set in the functional configuration unit. , or obtained from the storage unit and used.

338 Also, the first imaging unit 3020 may be operated by a store clerk who operates the product registration device 3000 . For example, the store clerk guides the customer so that the customer's face is within the imaging range of the first imaging unit 3020 by calling out to the customer. After confirming that the customer's face is within the imaging range of the first imaging unit 3020, the store clerk causes the first imaging unit 3020 to capture the customer's image.

344 Also, the guidance may be performed by the first imaging unit 3020 . For example, the product registration device 3000 is provided with a display device that displays an image captured by the imaging element of the first imaging unit 3020 . The display device is installed facing the customer so that the customer can view it. The first imaging unit 3020 guides the customer by displaying guidance in text on the display device or providing guidance by voice so that the customer's face is captured by the first imaging unit 3020 .

350 When the first imaging unit 3020 captures the customer multiple times, multiple images of the customer are generated. Therefore, the first imaging unit 3020 treats one or more of these multiple images as the first customer image. There are various ways to determine which image to treat as the first customer image. For example, the first imaging unit 3020 sets the image in which the customer looks good as the first customer image. The "image in which the customer appears well" is an image in which the customer appears large or an image with little blurring. Known techniques can be used to calculate the size of the object (customer) appearing in the image and to calculate the amount of blurring. Therefore, descriptions of these methods are omitted.

359 Note that the first imaging unit 3020 may set one image in which the customer is best captured as the first customer image, or may set a plurality of images in which the customer's appearance is equal to or higher than a predetermined standard as the first customer images.

363 Further, the first imaging unit 3020 may use all generated images as the first customer image.

365 <Details of Processing Performed by Generation Unit 3040> The generation unit 3040 generates association information (S104). FIG. 8 is a diagram illustrating the configuration of association information in a table format. The association information shown in FIG. 8 is referred to as association information 300. As shown in FIG. The association information 300 has two columns of first customer image 302 and checkout information ID 304 . A first customer image 302 indicates an image file in which the first customer image is recorded. The settlement information ID 304 indicates the ID of settlement information. When multiple first customer images are generated for the same customer, multiple different first customer images 302 are associated with one settlement information ID 304 .

- 374 The generation unit 3040 associates the first customer image with the settlement information related to the product purchased by the customer shown in the customer image. Specifically, the generating unit 3040 associates the settlement information generated by the registration process with the first customer image generated during the period from the start of the product registration process to the end of the registration process. .
- 379 Here, when associating the first customer image with the settlement information, the generation unit 3040 may confirm with the clerk whether or not the association is correct. Specifically, the generation unit 3040 presents the first customer image to be associated with the settlement information on the display device viewed by the store clerk who operates the product registration device 3000 . The store clerk confirms whether or not the presented first customer image is an image of the customer currently using the product registration device 3000 . Then, if the presented first customer image is correct, the clerk uses the touch panel, keyboard, or the like to input that the first customer image is correct. Upon receiving the result of the input, generation section 3040 generates association information.
- 388 On the other hand, if the presented first customer image is not correct, the clerk performs processing for associating the correct customer image with the payment information. For example, the store clerk operates the first imaging unit 3020 to capture an image of the customer and generate the first customer image again. Then, the generation unit 3040 generates association information by associating the first customer image generated by this operation with the settlement information.
- 394 Generation unit 3040 stores the association information in a storage unit accessible from each settlement device 4000 . This storage unit may be inside the product registration device 3000 or may be outside. The storage unit outside the product registration device 3000 is, for example, a database server accessible from the product registration device 3000 and the settlement device 4000 .
- 399 <Regarding settlement processing by the settlement device 4000> The settlement device 4000 acquires settlement information and performs settlement processing based on the settlement information. A known technique can be used as a method for performing settlement processing based on information (settlement information) used by the settlement device 4000 for settlement processing of products. Details of this known technique are omitted.
- 405 <Details of Processing Performed by Second Imaging Unit 4020> The second imaging unit 4020 generates a second customer image (S202). The process by which the second imaging section 4020 generates the second customer image is the same as the process by which the first imaging section 3020 generates the first customer image.
- 409 <Details of Processing Performed by First Calculation Unit 4040> The first calculation unit 4040 calculates the customer in the first customer image captured by the first imaging unit 3020 and the second customer image captured by the second imaging unit 4020. A first degree of similarity is calculated with respect to the customer appearing in the customer image (S204). The first customer image for which the first calculation unit 4040 calculates the degree of similarity is the first customer image associated with the payment information in any of the association information. Hereinafter, the similarity calculation is also referred to

as "matching between the first customer image and the second customer image".

417 There are various methods for the first calculation unit 4040 to calculate the first similarity. For example, the first calculation unit 4040 calculates feature amounts of customers in the first customer image and the second customer image, respectively. The first calculator 4040 then calculates the similarity of these customer feature amounts as the first similarity. Here, various known methods used for object matching can be used for the method of extracting the feature amount of the object from the image and the method of calculating the similarity of the feature amount. Also, the method of calculating the first similarity is not limited to the method using the feature amount. Various known methods for calculating the similarity of objects in an image can be used to calculate the first similarity.

426 <<Method for determining first similarity calculation target>> The first calculation unit 4040 may calculate the first similarity for all the first customer images associated with the payment information, or The first similarity may be calculated only for the first customer image. In the latter case, there are various methods for determining the first customer image for which the first similarity is to be calculated. The method will be described below.

431 For example, the first calculation unit 4040 determines the first customer image to be calculated for the first similarity by using the imaging time points of the first customer image and the second customer image. Normally, it takes a short time from when the commodity registration device 3000 registers an item to be settled to when the settlement device 4000 performs the settlement process. For example, this time is within 5 minutes. Therefore, the first calculation unit 4040 selects only the first customer images captured within a predetermined period of time before the generation of the second customer image to be calculated for the first similarity as the calculation target for the first similarity. and For example, this predetermined time is 5 minutes.

440 Further, for example, the first calculation unit 4040 may determine the first customer image to be calculated for the first similarity based on the arrangement of the product registration device 3000 and the settlement device 4000 . For example, as shown in FIG. 1, in a store where the checkout system 2000 is installed, a plurality of product registration devices 3000 and checkout devices 4000 are installed. After completing product registration in the product registration device 3000, the customer appropriately selects the settlement device 4000 to be used. In such an operation environment of the settlement system 2000, it is considered that customers often select the settlement device 4000 that is close to the commodity registration device 3000 used.

449 Therefore, the settlement system 2000 stores in advance information that associates the product registration device 3000 with the settlement device 4000 close to the product registration device 3000 in a storage device accessible from the settlement device 4000 . Then, the first calculator 4040 calculates the first similarity only for the first customer image generated by the product registration device 3000 associated with the settlement device 4000 having the first calculator 4040 .

455 For example, in the case of the example of FIG. Information associated with the settlement device 4000-4 is stored in advance. Then, the first calculator 4040 uses this information to determine the first customer image to be calculated for the first degree of similarity. For

example, in this example, the first calculation unit 4040 included in the settlement devices 4000-1 and 4000-2 selects only the first customer image generated by the product registration device 3000-1 as the first similarity calculation target. and On the other hand, the first calculation units 4040 included in the settlement devices 4000-3 and 4000-4 use only the first customer image generated by the product registration device 3000-2 as the object of calculation of the first similarity.

464 <<Method for Determining Area in which Customer is Captured>> The first calculation unit 4040 extracts an area representing the customer using the product registration device 3000 from the first customer image. Similarly, the first calculator 4040 extracts a region representing the customer using the settlement device 4000 from the second customer image. A variety of existing object recognition techniques can be used as a method of extracting a person appearing in an image in this way. Details of this existing technique are omitted.

471 Here, a plurality of customers may be present at the store. In this case, the imaging range of the first imaging unit 3020 may include customers other than the customer using the product registration device 3000 . As a result, multiple customers may appear in the first customer image.

475 Therefore, the first calculation unit 4040 identifies the customer who used the product registration device 3000 from among the customers appearing in the first customer image, and calculates the first similarity for this customer. The "customer using the product registration device 3000" here means a customer who purchases the product indicated by the settlement information associated with the first customer image.

480 There are various methods of specifying a customer using the product registration device 3000 . For example, the first calculation unit 4040 determines that the customer appearing in the largest image among the customers appearing in the first customer image is the customer who used the product registration device 3000 . Further, for example, the first calculation unit 4040 determines that the customer who appears closest to the center of the first customer image among the customers appearing in the first customer image is the customer using the product registration device 3000. do. Here, a known technique can be used as a method for comparing the sizes of the customers appearing in the images and comparing the positions of the customers appearing in the images. Therefore, descriptions of these methods are omitted.

490 Note that the first customer image may be generated by the first imaging unit 3020 as an image showing only the customer who uses the product registration device 3000 . In this case, the first imaging unit 3020 identifies the customer who used the product registration device 3000 by the same method as the first calculation unit 4040, for example. Then, the first imaging unit 3020 generates a first customer image using only the area representing the customer who used the product registration device 3000 in the image recorded in the imaging device.

497 Further, for example, when the first customer image is generated, the store clerk operating the product registration device 3000 may specify the area in which the customer is shown. In this case, the first imaging unit 3020 displays the entire image recorded by the imaging

device on the display device viewed by the store clerk who operates the product registration device 3000 . Then, the store clerk performs an input designating an area in which the customer using the product registration device 3000 is shown in the image displayed on the display device. For example, if the display device has a touch panel, the store clerk designates the area where the customer is shown by enclosing the area where the customer is shown by tracing the area with a finger. Then, the first imaging unit 3020 generates an image representing the area specified by the store clerk as the first customer image. Note that when the customer is imaged multiple times, for example, the first imaging unit 3020 displays the image with the least blur among the images recorded in the imaging element on the display device.

510 Similarly, a plurality of customers may appear in the second customer image as well. In this case, for example, the first calculation unit 4040 extracts customers using the settlement device 4000 by performing the same processing as that for the first customer image. Also, the second customer image may be generated by the second imaging unit 4020 as an image of the customer using the settlement device 4000 extracted. The generation method is the same as the method by which the first imaging unit 3020 generates the first customer image showing only the customer who used the product registration device 3000 . In addition, the settlement device 4000 uses the same method as the product registration device 3000 to allow the store clerk to designate a customer. may be allowed to

519 <Details of the processing performed by the acquisition unit 4060> If there is a first customer image that satisfies the matching condition (the first similarity is equal to or greater than the first threshold) (S206: YES), the acquisition unit 4060 determines that the first customer is present (S206: YES). Accounting information associated with the image is obtained (S208). Specifically, the obtaining unit 4060 determines a first customer image whose first similarity is equal to or greater than a first threshold, from among the first customer images for which the first similarity has been calculated. Then, using the association information, the acquisition unit 4060 acquires the settlement information associated with the determined first customer image. Specifically, the acquisition unit 4060 accesses the storage unit in which the generation unit 3040 stores the association information, and acquires the settlement information indicated by the association information indicating the determined customer image.

537 Note that there may be a plurality of first customer images whose first similarity is equal to or higher than the first threshold. For example, in this case, the acquisition unit 4060 acquires settlement information associated with the first customer image having the highest first similarity. Further, in this case, the settlement device 4000 may display the first customer images whose first similarity is equal to or higher than the first threshold on the display device 20 and allow the customer to select one of them. Acquisition unit 4060 acquires settlement information associated with the first customer image selected by the customer. By these methods, even if there are a plurality of first customer images that satisfy the matching condition, it is possible to uniquely determine and acquire the settlement information related to the product purchased by the customer using the settlement device 4000 .

541 Here, the method of displaying the first customer image whose first similarity is equal to or



higher than the first threshold on the display device 20 and the method of accepting the selection of the displayed first customer image are performed by the first display control unit 4080 as a candidate. The process of displaying an image on the display device 20 and the method of receiving selection of the displayed candidate image by the first input receiving unit 4100 are the same. A detailed description of the process by which the first display control unit 4080 displays the candidate images on the display device 20 and the method by which the first input reception unit 4100 receives selection of the displayed candidate images will be described later.

550 <Details of processing performed by the first display control unit 4080> The first display control unit 4080 sets the first similarity with the customer (customer using the settlement device 4000) shown in the second customer image to the If there is no first customer image in which the customer with the number equal to or greater than 1 threshold is present, the display device is controlled (S210). Specifically, the first display control unit 4080 selects candidates (candidate images) for the first customer image in which the same customer as the customer appearing in the second customer image is displayed among the first customer images on the display device. 20.

558 FIG. 9 is a diagram illustrating a display on the display device 20. As shown in FIG. In FIG. 9A, the first display control unit 4080 displays one candidate image 50 on the touch panel 22 of the display device 20. On the other hand, in FIG. 9B, the first display control unit 4080 displays three candidate images 50 on the touch panel 22 of the display device 20. Note that when there are many customers imaged by the first imaging unit 3020, the first display control unit 4080 displays the button 70 on the touch panel 22. When the customer presses the button 70, the first display control section 4080 displays the candidate image 50 not currently displayed on the touch panel 22.

566 <<Method for Determining Candidate Image>> As described above, the candidate image is a candidate for the first customer image in which the same customer as the customer shown in the second customer image is shown. To display the candidate images, the first display control unit 4080 determines which first customer image is the candidate image. There are various methods for this method. The method will be specifically exemplified below.

571 For example, the first display control unit 4080 determines candidate images using a predetermined second threshold that is smaller than the first threshold. Specifically, when it is necessary to display the candidate image (when there is no first customer image that satisfies the matching condition), the first display control unit 4080 first similarity with the customer appearing in the second customer image. A first customer image having a degree greater than or equal to the second threshold is set as a candidate image. Since the second threshold is smaller than the first threshold, according to this method, the first customer image whose first similarity is greater than or equal to the second threshold and less than the first threshold is determined as the candidate image.

580 Also, for example, the first display control unit 4080 determines candidate images using a second similarity calculated by a method different from that for the first similarity. Specifically, when it is necessary to display the candidate images (when there is no first customer image that satisfies the matching condition), the first calculation unit 4040 uses a

method different from the method of calculating the first similarity. Then, a second similarity between the second customer image and the first customer image is calculated. Then, the first display control unit 4080 sets each first customer image having the calculated second similarity equal to or higher than the first threshold as a candidate image.

588 Here, when the second similarity is greater than or equal to the first threshold, the second similarity is a value greater than the first similarity. This is because the first similarity is smaller than the first threshold when the second similarity is calculated. Therefore, as the algorithm for calculating the second degree of similarity, it is preferable to use an algorithm for calculating a higher degree of similarity than the algorithm for calculating the first degree of similarity. Here, there are various algorithms for calculating the degree of similarity between objects in an image, and the magnitude of the degree of similarity calculated differs from one to another. Therefore, for example, an algorithm for calculating the first similarity and an algorithm for calculating the second similarity are appropriately adopted from these known algorithms so that the second similarity is greater than the first similarity.

598 Note that the first display control unit 4080 may display all of the candidate images determined by the methods described above, or may display only some of them. In the latter case, for example, the first display control unit 4080 uses the association between the product registration device 3000 and the settlement device 4000 described above. Specifically, the first display control unit 4080 displays only the candidate images generated by the settlement information associated with the settlement device 4000 having the first display control unit 4080 among the candidate images.

605 Further, the first display control unit 4080 may determine the display order of the candidate images using the association between the product registration device 3000 and the settlement device 4000 described above. Specifically, the first display control unit 4080 selects the candidate images generated by the product registration device 3000 associated with the settlement device 4000 having the first display control unit 4080 as the settlement device 4000 associated with the settlement device 4000. The candidate image generated by the product registration device 3000 that does not exist is displayed before the candidate image.

613 <Details of Processing Performed by First Input Reception Unit 4100> The first input reception unit 4100 receives input for selecting one of the displayed candidate images (S212). As a method for accepting selection of candidate images, various known techniques for accepting selection of images, buttons, etc. displayed on the display can be used. When the display device has a touch panel and the first input reception unit 4100 displays candidate images on the touch panel, for example, the first input reception unit 4100 detects that the candidate image displayed on the touch panel has been pressed. , the selection of the candidate image is accepted. In the case of FIG. 9, the customer selects the candidate image 50 by pressing one of the candidate images 50 . Further, for example, the first input receiving unit 4100 may receive selection of a candidate image using an input device such as a keyboard.

624 When the first input reception unit 4100 receives the selection of the candidate image, the acquisition unit 4060 uses the association information to acquire the settlement information

associated with the selected candidate image (first customer image) (S214 ). The method of obtaining the settlement information associated with the first customer image is as described above.

629 <About other functions> The settlement device 4000 may further have a determination unit 4120 . FIG. 10 is a block diagram illustrating the settlement device 4000 having the determination unit 4120. As shown in FIG. When the first input receiving unit 4100 does not receive the selection operation of the candidate image (when the customer does not select the candidate image), the determination unit 4120 determines whether the customer who is the same as the customer shown in the second customer image is shown. It is determined that there is no first customer image that is For example, in the example of FIG. 9, the determination unit 4120 determines that the first input reception unit 4100 receives the selection of the candidate image when the customer presses the button 60 or does not press the candidate image 50 or each button for a predetermined time. determined that it was not. Further, even when there is no candidate image displayed by the first display control unit 4080, the determination unit 4120 determines that there is no first customer image showing the same customer as the customer shown in the second customer image. . Here, the case where there is no candidate image displayed by the first display control unit 4080 means, for example, when there is no first customer image whose second similarity is equal to or higher than the first threshold in the above-described method of determining the candidate image. Alternatively, there is no first customer image whose first similarity is equal to or higher than the second threshold.

647 When the determining unit 4120 determines that "there is no first customer image in which the same customer as the second customer image is shown", the settlement device 4000 performs various processes. For example, the first display control unit 4080 displays a message or the like to the effect that there is no settlement information corresponding to the customer on the display device. Further, for example, the settlement device 4000 may redo the second customer image and the like. That is, the settlement device 4000 executes the process of FIG. 4 again. As a result, similarity calculation and the like are performed using the second customer image generated by newly imaging the customer. By doing so, the customer will be able to checkout more reliably.

656 [Embodiment 2] FIG. 11 is a block diagram illustrating a settlement system 2000 of Embodiment 2. As shown in FIG. In FIG. 11, each block does not represent the configuration in units of hardware, but the configuration in units of functions.

659 The settlement system 2000 of the second embodiment has a function of issuing a warning when a customer who is about to leave the area where the settlement device 4000 is installed has not completed the settlement process. Therefore, the settlement system 2000 of the second embodiment is configured as follows.

663 The related information generated by the generation unit 3040 of the second embodiment further indicates a completion flag. The completion flag indicates whether the settlement using the settlement information indicated by the relevant information has been completed. That is, the generation unit 3040 of the second embodiment generates related information that associates the first customer image, the payment information, and the completion flag.

Hereinafter, it is assumed that the value of the completion flag indicating that the payment has been completed is "payment completed", and the value of the completion flag indicating that the payment has not been completed is "not yet completed". FIG. 12 is a diagram illustrating association information 300 according to the second embodiment. The association information 300 further has a completion flag 306 in addition to the first customer image 302 and settlement information ID 304 .

674 The settlement system 2000 of Embodiment 2 further has a warning device 5000 . The warning device 5000 has a third imaging section 5020 , a warning section 5040 , a second calculation section 5060 , a second display control section 5080 and a second input reception section 5100 . The third imaging unit 5020 performs imaging to generate an image including the customer at the exit (hereinafter also simply referred to as "exit" ) of the area where the settlement device 4000 is installed. The image generated by the third imaging unit 5020 is hereinafter referred to as the third customer image.

681 The warning unit 5040 performs warning processing when a warning condition is satisfied. The warning condition is that "the completion flag associated with the first customer image in which the same customer as the customer in the third customer image is shown indicates that the payment has not been completed". The warning unit 5040 determines whether or not the warning condition is satisfied based on the result of processing by the second calculation unit 5060, the second display control unit 5080, and the second input reception unit 5100.

688 The second calculator 5060 calculates the third similarity between the customer appearing in the third customer image and the customer appearing in each first customer image. When there is a first customer image showing a customer whose third similarity is equal to or higher than a predetermined third threshold, the warning unit 5040 sets the first customer image to the same customer as the customer shown in the third customer image. is taken as the first customer image. Therefore, the warning unit 5040 determines that the warning condition is satisfied when the completion flag associated with the first customer image indicates that payment has not been completed. The value of the third threshold may be the same as the value of the first threshold or the value of the second threshold, or may be a value different therefrom.

698 The second display control unit 5080 displays the second candidate image on the display device 110 that can be viewed by the store clerk when there is no first customer image showing a customer whose third similarity is equal to or higher than the third threshold. The second candidate image is a candidate for the first customer image in which the same customer as the customer appearing in the third customer image is shown.

703 A second input accepting unit 5100 accepts an input for selecting a second candidate image. Warning unit 5040 sets the second candidate image selected via second input reception unit 5100 as the first customer image in which the same customer as the customer appearing in the third customer image is shown. Therefore, the warning unit 5040 determines that the warning condition is satisfied when the completion flag associated with the first customer image indicates that payment has not been completed.

709 <Flow of Processing> FIG. 13 is a flowchart illustrating the flow of processing executed by the

warning device 5000 of the second embodiment. The third imaging unit 5020 images the customer at the exit and generates a third customer image (S302). The second calculator 5060 calculates the third similarity for each first customer image (S304). The warning unit 5040 determines whether or not there is a first customer image showing a customer whose third similarity is equal to or higher than the third threshold (S306). If there is a first customer image showing a customer whose third similarity is equal to or higher than the third threshold (S306: YES), the process of FIG. 13 proceeds to S308. On the other hand, when there is no first customer image showing a customer whose third similarity is equal to or higher than the third threshold (S306: NO), the process of FIG. 13 proceeds to S312.

719 In S308, the warning unit 5040 determines whether "whether the completion flag associated with the first customer image showing the customer whose third similarity is equal to or higher than the third threshold indicates that payment has not been completed (warning condition is satisfied)". If this warning condition is satisfied (S308: YES), the warning unit 5040 performs warning processing (S310). If this warning condition is not satisfied (S308: NO), the process of FIG. 13 ends.

725 In S312, the second display control unit 5080 displays the second candidate image on the display device 110. The second input accepting unit 5100 accepts an input for selecting a second candidate image (S314).

728 The warning unit 5040 determines "whether or not the completion flag associated with the selected second candidate image indicates that the payment has not been completed (whether or not the warning condition is satisfied)" (S316). If this warning condition is satisfied (S316: YES), the process of FIG. 13 proceeds to S310. On the other hand, if this warning condition is not satisfied (S316: NO), the process of FIG. 13 ends.

733 <Hardware configuration example> For example, the warning device 5000 is implemented by a computer having the same hardware configuration as the computer that implements the product registration device 3000 and the settlement device 4000. The input/output interface of this computer is connected to hardware (such as a camera) that constitutes the third imaging unit 5020. The third imaging unit 5020 is provided near the exit. For example, the third imaging unit 5020 is provided on the ceiling near this exit. Also, for example, if there is a gate through which customers pass through this exit, the third imaging unit 5020 may be provided at this gate. However, the third imaging unit 5020 only needs to be able to capture an image of the customer at the exit, and its installation location is not limited to the above example. As for other points, the third imaging unit 5020 is implemented in the same manner as the first imaging unit 3020 and the second imaging unit 4020.

744 A display device 110 is connected to the input/output interface of the computer that implements the warning device 5000. A display device 110 is provided near the exit. In addition, the display device 110 is installed so that it can be viewed by the store clerk.

747 An input device for realizing the second input reception unit 5100 is connected to the input/output interface of the computer that realizes the warning device 5000. For example, this input device is a touch panel built into the display device 110. Also, for example, this input device may be a keyboard, a mouse, or the like.

751 The computer storage that implements the warning device 5000 has program modules that

implement the third imaging unit 5020 , the warning unit 5040 , the second calculation unit 5060 , the second display control unit 5080 , and the second input reception unit 5100 . The processor of the computer that implements the warning device 5000 implements the functions of these functional components by executing this program module.

- 756 <Details of processing performed by the second calculation unit 5060> The second calculation unit 5060 calculates the third similarity between the customer shown in each first customer image and the customer shown in the third customer image (S304 ). The algorithm used for calculating the third degree of similarity may be the same as or different from the algorithm for calculating the first degree of similarity or the second degree of similarity.
- 762 The first customer image for which the third degree of similarity is to be calculated is the first customer image associated with the payment information in any of the related information. The second calculation unit 5060 acquires each first customer image by the same method as the method by which the first calculation unit 4040 acquires each first customer image associated with the settlement information in the related information.
- 767 <Details of processing performed by the second display control unit 5080> If there is no first customer image whose third similarity is equal to or higher than the third threshold (S306: NO), the second display control unit 5080 5080 displays the second candidate image (the first customer image representing the customer candidate appearing in the third customer image) on the display device 110 that can be viewed by the store clerk (S312). Here, the method for determining which first customer image is to be the second candidate image is the same as the method for determining candidate images in the first embodiment. This method will be specifically described below.
- 775 For example, the second calculation unit 5060 calculates the fourth similarity between the customer appearing in the first customer image and the customer appearing in the third customer image using a method different from the method for calculating the third similarity. do. Then, the second display control unit 5080 displays the first customer image whose fourth similarity is equal to or higher than the third threshold as the second candidate image.
- 780 Here, for the same reason that it is preferable that the algorithm for calculating the second similarity calculates a higher degree of similarity than the algorithm for calculating the first similarity, the algorithm for calculating the fourth similarity is the third similarity. It is preferable to calculate a degree of similarity that is greater than the algorithm that calculates the degree. For example, the second calculation unit 5060 uses the same algorithm as the algorithm for calculating the first similarity as the algorithm for calculating the third similarity, and calculates the second similarity as the algorithm for calculating the fourth similarity. Use the same algorithm as the algorithm.
- 788 Further, for example, the second display control unit 5080 may display the first customer image whose third similarity is equal to or higher than the fourth threshold as the second candidate image. The fourth threshold is a value smaller than the third threshold.
- 791 <Details of Processing Performed by Second Input Receiving Unit 5100> The second input receiving unit 5100 receives processing for selecting a second candidate image (S314). The selection of the second candidate image is made by the store clerk. The method by which

second input reception unit 5100 receives the selection of the second candidate image is the same as the method by which first input reception unit 4100 receives the selection of the candidate image.

797 <Details of processing performed by the warning unit 5040> The warning unit 5040 performs warning processing when the warning conditions are satisfied (S310). As described above, the warning condition is that "the completion flag associated with the first customer image showing the same customer as the third customer image indicates that payment has not been completed." Here, the warning unit 5040 categorizes 1) the first customer image whose third similarity is equal to or higher than the third threshold or 2) the second candidate image selected by the customer as "a customer appearing in the third customer image" . "first customer image in which the same customer as the customer is shown". 1) and 2) are as described above.

806 The warning unit 5040 accesses the storage unit in which the related information is stored, and acquires the completion flag associated with "the first customer image showing the same customer as the customer shown in the third customer image". do. Then, warning unit 5040 determines whether or not the value of the completion flag indicates that payment has not been completed.

811 <<Details of warning processing>> There are various types of warning processing performed by the warning unit 5040. For example, the warning unit 5040 outputs an alarm sound at a place where the customer captured by the first imaging unit 3020, the store clerk, or the security guard can hear. For example, this place is near the exit, near the product registration device 3000, or a security room. In this case, a speaker or the like for outputting the alarm sound is installed at the place where the alarm sound is output.

817 Also, for example, the warning unit 5040 displays a warning message to the effect that the payment has not been completed in a place where the customer captured by the third imaging unit 5020, the store clerk, or the security guard can be seen. Specifically, the warning unit 5040 displays a warning message on the display device 110 provided at the exit, the display device 20 provided in each product registration device 3000, or the display device provided in the guard room. indicate.

823 Moreover, when a gate is installed at the exit, the warning unit 5040 may perform processing for closing the gate when the warning condition is satisfied. By doing so, the customer is prevented from exiting the exit, and thus it is possible to prevent the customer who has not made the payment from leaving by mistake.

827 Moreover, when a membership system is introduced in the store that operates the settlement system 2000, the warning unit 5040 may issue a warning using member information. Specifically, it is assumed that the member's image (face photo, etc.) and the member's contact information (e-mail address, etc.) are registered in advance as member information. If the warning condition is satisfied, the warning unit 5040 accesses a database or the like in which member information is stored, and searches for images of members in which the same customer as the third customer image is shown. Then, when there is such an image, the warning unit 5040 sends a warning message to the contact of the customer indicated by the member information indicated by the image. For example, the warning unit 5040 sends an e-

mail containing a warning message to the customer's e-mail address. By using the member information, it is possible to send a warning message directly to the customer. Therefore, even if the customer mistakenly forgets to pay the bill and leaves the exit, the customer can be warned so that other people do not know about it. Therefore, the customer's privacy can be protected.

847 <Specific example> The operation of the settlement system 2000 of the second embodiment will be specifically illustrated. FIG. 14 is a diagram illustrating an operational environment of the settlement system 2000 of the second embodiment. In FIG. 14, the settlement device 4000 is installed in the area 80 . Exit 90 is the exit of area 80 . Gate 100 is the gate through which customers exit exit 90 . In FIG. 14, the third imaging section 5020 is provided in this gate 100 .

847 Normally, after using the commodity registration device 3000, the customer uses the settlement device 4000 to make a settlement. The settlement device 4000 changes the value of the completion flag associated with the first customer image selected by the customer via the input reception unit 4100 to "completion of settlement" when the settlement of the customer is completed.

852 When the customer passes through the gate 100, the third imaging unit 5020 images the customer and generates a third customer image. Then, the warning unit 5040 determines whether or not the completion flag associated with the first customer image showing the same customer as the customer shown in the third customer image indicates "incomplete payment". As described above, if the customer has completed payment, the completion flag indicates "payment completed". Therefore, the warning unit 5040 does not perform warning processing.

859 On the other hand, if the customer has not completed the payment, the completion flag associated with the first customer image showing the same customer as the customer shown in the third customer image indicates "incomplete payment". In this case, the warning unit 5040 performs warning processing. For example, the warning unit 5040 closes the gate 100 and displays a warning message on the display device provided at the gate 100 .

864 <Action/Effect> The settlement system 2000 of the present embodiment can be used when the completion flag associated with the "first customer image showing the same customer as the customer depicted in the third customer image" indicates that settlement has not been completed. , perform warning processing. This means that the customer will be warned if they attempt to (or exit) the exit before checking out for their purchases. Therefore, according to the checkout system 2000 of the present embodiment, it is possible to prevent the customer from forgetting to pay the checkout and go home, thereby preventing troubles between the customer and the store. .

872 In addition, when there is no first customer image whose third similarity is equal to or higher than the third threshold, the warning device 5000 displays the second candidate image and prompts the salesclerk browsing the display device 110 to select the second candidate image. . For example, what the customer is wearing may be different depending on when the product registration device 3000 is used and when the customer leaves the exit. Specifically, it is conceivable that the customer removes the mask worn when using the product



registration device 3000 before leaving the exit. In such a case, although there is actually a first customer image showing the same customer as the customer shown in the third customer image, the third similarity between them will be low. Therefore, even if a customer who has not completed payment exits the exit, no warning will be issued.

882 According to the warning device 5000 of this embodiment, the second candidate image is displayed when there is no first customer image whose third similarity is equal to or higher than the third threshold. It is possible to visually determine whether or not there is a second candidate image in which the same customer is shown. Then, when there is a second candidate image in which the same customer as the customer who is about to leave the exit is present in the clerk's eyes, the clerk selects the second candidate image, and the warning device 5000 It is determined whether or not payment based on the payment information associated with the second candidate image has been completed. Then, the warning device 5000 performs warning processing when the settlement is not completed. Therefore, the warning device 5000 of the present embodiment can more reliably prevent the customer from forgetting to pay the bill and going home by using the judgment by the person.

883 Although the embodiments of the present invention have been described above with reference to the drawings, these are examples of the present invention, and combinations of the above embodiments or various configurations other than those described above can also be adopted.

897 Examples of reference forms are added below. 1. A checkout system having a product registration device and a checkout device, wherein the product registration device includes first imaging means for generating a first customer image including the customer, and checkout for the first customer image used for product checkout and generating means for generating association information that associates information, and the settlement device includes: second imaging means for generating a second customer image including a customer; a first display control means for displaying a candidate image, which is a candidate for the first customer image in which the customer is shown, on a display device that can be viewed by the customer. 2. a first calculating means for calculating a first degree of similarity between the customer appearing in the second customer image and the customer appearing in each of the first customer images; acquisition means for acquiring the settlement information associated with the first customer image when there is a first customer image showing a customer whose degree of similarity is equal to or higher than a first threshold; Display control means displays the candidate image when there is no first customer image showing a customer whose first similarity to the customer shown in the second customer image is equal to or greater than a first threshold; . payment system described in . 3. 2. The settlement device has input reception means for receiving a selection operation on the candidate image, and the acquisition means acquires the settlement information associated with the selected candidate image; payment system described in . 4. The settlement device has determination means for determining that there is no first customer image in which the same customer as the customer in the second customer image is present when the candidate image is not selected. 3. payment system described in . 5. The first calculation means calculates the first similarity when there is no first customer image showing a customer

whose first similarity to the customer shown in the second customer image is equal to or greater than a first threshold. Using a method different from the method, the second similarity between the customer appearing in the second customer image and the customer appearing in each of the first customer images is calculated, and the first display control means performs the 1. displaying, as the candidate image, a first customer image showing a customer whose second similarity to the customer shown in the second customer image is equal to or greater than the first threshold; to 4. The settlement system according to any one of the preceding claims. 6. If there is no first customer image showing a customer whose first similarity to the customer shown in the second customer image is equal to or greater than a first threshold, the first display control means displays 2. Displaying as the candidate image a first customer image in which a customer whose first similarity with the customer in the image is equal to or greater than a second threshold smaller than the first threshold is displayed;

933 to 4. The settlement system according to any one of the preceding claims. 7. The settlement system has a plurality of the commodity registration devices and a plurality of settlement devices, and the first display control means is generated by the commodity registration device associated with the settlement device having the first display control means 1. displaying the obtained first customer image as the candidate image; to 4. The settlement system according to any one of the preceding claims. 8. The generating means generates the association information further indicating the imaging time point of the first customer image, and the first calculating means calculates the difference between the imaging time point and the current time for the first customer image within a predetermined time. 2. Calculate similarity. to 6. The settlement system according to any one of the preceding claims. 9. The generating means further associates, in the association information, a completion flag indicating whether the settlement using the settlement information indicated by the association information has been completed, and the settlement system is equipped with the settlement device a third imaging means for generating a third customer image including the customer at the exit of the area; and the completion flag associated with the first customer image in which the same customer as the customer appearing in the third customer image is captured indicates that settlement using the settlement information has not been completed, warning means for performing warning processing;1. to 8. The settlement system according to any one of the preceding claims. 10. The warning device has a second calculation means for calculating a third degree of similarity between the customer appearing in the third customer image and the customer appearing in each of the first customer images; When there is a first customer image showing a customer whose third similarity is equal to or higher than the third threshold, the first customer image is transferred to the first customer image showing the same customer as the customer shown in the third customer image. If there is no first customer image showing a customer whose third similarity is equal to or higher than the third threshold, the warning device will second display control means for displaying a second candidate image, which is a candidate for the first customer image, on the display device provided at the exit; and second input reception means for receiving an input for selecting the second candidate image and, if there is no first customer image

showing a customer whose third similarity is equal to or higher than the third threshold, the warning means has the second 9. The candidate image is the first customer image in which the same customer as the customer in the third customer image is shown;

965 payment system described in . 11. If there is no first customer image showing a customer whose third similarity is equal to or higher than the third threshold, the second calculation means uses a method different from the method for calculating the third similarity , calculating a fourth degree of similarity between the customer appearing in the third customer image and the customer appearing in each of the first customer images; 10. displaying the first customer image in which the customer whose number is equal to or higher than the threshold is shown as the second candidate image; payment system described in . 12. 10. The second display control means displays, as the second candidate image, a first customer image showing a customer whose third similarity is smaller than the third threshold and equal to or greater than a fourth threshold; The information processing system according to . 1 3 . 1 . 12. A settlement device included in any one of the information processing systems. 1 4 . コンピュータを 1 3 . A program that operates as the settlement device described in . 15. A settlement method executed in a settlement system having a commodity registration device and a settlement device, wherein the commodity registration device generates a first customer image including the customer in a first imaging step; A generation step of generating association information in which settlement information used for settlement of goods is associated with one customer image; a second imaging step of the settlement device generating a second customer image including the customer; and a first display control step of displaying a candidate image, which is a candidate for the first customer image in which the same customer as the customer in the second customer image is shown, on a display device that can be viewed by the customer. . 16. a first calculation step in which the settlement device calculates a first degree of similarity between the customer depicted in the second customer image and the customer depicted in each of the first customer images; Acquisition for acquiring the settlement information associated with the first customer image when there is a first customer image showing a customer whose first similarity to the customer shown in the customer image is equal to or higher than a first threshold and the first display control step is performed when there is no first customer image showing a customer whose first similarity to the customer shown in the second customer image is equal to or higher than the first threshold 15. displaying said candidate image; Settlement method described in . 17. 16. The settlement device has an input reception step of receiving a selection operation on the candidate image, and the acquisition step acquires the settlement information associated with the selected candidate image;

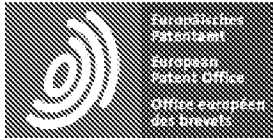
998 Settlement method described in . 18. 17. The settlement device has a determination step of determining that there is no first customer image in which the same customer as the customer appearing in the second customer image is present when the candidate image is not selected; Settlement method described in . 19. The first calculating step calculates a first similarity when there is no first customer image showing a customer whose first similarity to the customer shown in the second customer image is equal to or greater than a first

threshold. calculating a second similarity between the customer appearing in the second customer image and the customer appearing in each of the first customer images using a method different from the method, and the first display control step includes: 16. Display as the candidate image a first customer image in which a customer whose second similarity to the customer in the second customer image is equal to or greater than the first threshold is displayed; to 18. The settlement method described in any one. 20. In the first display control step, when there is no first customer image showing a customer whose first similarity to the customer shown in the second customer image is equal to or higher than a first threshold, 15. Displaying as the candidate image a first customer image in which a customer whose first similarity with the captured customer is equal to or greater than a second threshold smaller than the first threshold is displayed; to 18. The settlement method described in any one. 21. The settlement method includes a plurality of the product registration devices and a plurality of the settlement devices, and the first display control step is performed by the product registration device associated with the settlement device that executes the first display control step 15. displaying the generated first customer image as the candidate image; to 18. The settlement method described in any one. 22. The generating step generates the association information that further indicates the imaging time point of the first customer image, and the first calculating step is performed on the first customer image in which the difference between the imaging time point and the current time is within a predetermined time. Calculate similarity 16. 20. The settlement method described in any one. 23. The generating step further associates, in the association information, a completion flag indicating whether or not the settlement using the settlement information indicated by the association information has been completed, the settlement system further has a warning device, and the The settlement system comprises a third imaging step in which the warning device generates a third customer image including a customer at the exit of the area where the settlement device is installed; a warning step of performing a warning process when the completion flag associated with the first customer image in which the same customer as the customer who is present indicates that the settlement using the settlement information has not been completed; , 15.

1033 22. The settlement method described in any one. 24. The warning device has a second calculation step of calculating a third degree of similarity between the customer appearing in the third customer image and the customer appearing in each of the first customer images, and the warning step comprises the When there is a first customer image showing a customer whose third similarity is equal to or higher than the third threshold, the first customer image is transferred to the first customer image showing the same customer as the customer shown in the third customer image. If there is no first customer image in which the customer whose third similarity is equal to or higher than the third threshold is present, the customer image is the same as the customer in the third customer image. a second display control step of displaying a second candidate image, which is a candidate for the first customer image, on the display device provided at the exit; and the warning device receives an input for selecting the second candidate image and a second input receiving step, wherein if there is no first customer image showing a customer whose third similarity

is equal to or higher than the third threshold, the warning step is performed through the second input receiving step 23. The selected second candidate image is the first customer image showing the same customer as the customer shown in the third customer image; Settlement method described in . 25. In the second calculation step, if there is no first customer image showing a customer whose third similarity is equal to or higher than the third threshold, a method different from the method for calculating the third similarity is used, Calculate a fourth degree of similarity between the customer appearing in the third customer image and the customer appearing in each of the first customer images; 24. displaying the first customer image in which the above customer is shown as the second candidate image; Settlement method described in . 26. 24. The second display control step displays, as the second candidate image, a first customer image including a customer whose third similarity is smaller than the third threshold and equal to or greater than a fourth threshold; Settlement method described in .

<sup>1059</sup> This application claims priority based on Japanese Patent Application No. 2015-072035 filed on March 31, 2015, and the entire disclosure thereof is incorporated herein.



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## CLAIMS WO2016158748A1

1.

<sup>13</sup> A checkout system having a product registration device and a checkout device, wherein the product registration device includes first imaging means for generating a first customer image including the customer, and checkout for the first customer image used for product checkout and generating means for generating association information that associates information, and the settlement device includes: second imaging means for generating a second customer image including a customer; a first display control means for displaying a candidate image, which is a candidate for the first customer image in which the customer is shown, on a display device that can be viewed by the customer.

2.

<sup>24</sup> a first calculating means for calculating a first degree of similarity between the customer appearing in the second customer image and the customer appearing in each of the first customer images; acquisition means for acquiring the settlement information associated with the first customer image when there is a first customer image showing a customer whose degree of similarity is equal to or higher than a first threshold; The display control means displays the candidate image when there is no first customer image showing a customer whose first similarity to the customer shown in the second customer image is equal to or higher than a first threshold. Item 1. The settlement system according to Item 1.

3.

<sup>35</sup> 3. The settlement according to claim 2, wherein the settlement device has input reception means for receiving a selection operation on the candidate image, and the acquisition means acquires the settlement information associated with the selected candidate image. system.

4.

<sup>47</sup> 4. The settlement device has determination means for determining that there is no first customer image in which the same customer as the customer appearing in the second customer image is present when the candidate image is not selected. Payment system as described.

5.

<sup>48</sup> The first calculation means calculates the first similarity when there is no first customer image showing a customer whose first similarity to the customer shown in the second customer image is equal to or greater than a first threshold. Using a method different from the method, the second similarity between the customer appearing in the second customer image and the customer appearing in each of the first customer images is calculated, and the first display control means performs the 5. Any one of claims 2 to 4, wherein a first customer image showing a customer whose second similarity to the customer shown in the second customer image is equal to or higher than the first threshold is displayed as the candidate image. payment system described in .

6.

<sup>60</sup> If there is no first customer image showing a customer whose first similarity to the customer shown in the second customer image is equal to or greater than a first threshold, the first display control means displays 5. A first customer image in which a customer whose first similarity to the customer in the image is a second threshold value smaller than the first threshold value is displayed as the candidate image. payment system as set forth in paragraph.

7.

<sup>68</sup> The settlement system has a plurality of the commodity registration devices and a plurality of settlement devices, and the first display control means is generated by the commodity registration device associated with the settlement device having the first display control means 5. The settlement system according to any one of claims 1 to 4, wherein said first customer image thus obtained is displayed as said candidate image.

8.

<sup>76</sup> The generating means generates the association information further indicating the imaging time point of the first customer image, and the first calculating means calculates the difference between the imaging time point and the current time for the first customer image within a predetermined time. 7. The settlement system according to any one of claims 2 to 6, wherein

the degree of similarity is calculated.

9.

<sup>84</sup> The generating means further associates, in the association information, a completion flag indicating whether the settlement using the settlement information indicated by the association information has been completed, and the settlement system is equipped with the settlement device a third imaging means for generating a third customer image including the customer at the exit of the area; and the completion flag associated with the first customer image in which the same customer as the customer appearing in the third customer image is captured 9. The settlement system according to any one of claims 1 to 8, further comprising: a warning means for performing a warning process when indicates that the settlement using the settlement information has not been completed.

10.

<sup>96</sup> The warning device has a second calculation means for calculating a third degree of similarity between the customer appearing in the third customer image and the customer appearing in each of the first customer images; When there is a first customer image showing a customer whose third similarity is equal to or higher than the third threshold, the first customer image is transferred to the first customer image showing the same customer as the customer shown in the third customer image. If there is no first customer image showing a customer whose third similarity is equal to or higher than the third threshold, the warning device will second display control means for displaying a second candidate image, which is a candidate for the first customer image, on the display device provided at the exit; and second input reception means for receiving an input for selecting the second candidate image and, if there is no first customer image showing a customer whose third similarity is equal to or higher than the third threshold, the warning means has the second 10. The settlement system according to claim 9, wherein the candidate image is the first customer image showing the same customer as the customer shown in the third customer image.

11.

<sup>113</sup> The second calculation means uses a method different from the method for calculating the third similarity when there is no first customer image showing a customer whose third similarity is equal to or higher than the third threshold, A fourth degree of similarity between the customer appearing in the third customer image and the customer appearing in each of the first customer images is calculated, and the second display control means sets the fourth similarity to the third threshold value 11. The settlement system according to claim 10, wherein the first customer image including the above customer is displayed as the second candidate image.



12.

<sup>124</sup> 11. The second candidate image according to claim 10, wherein said second display control means displays, as said second candidate image, a first customer image including a customer whose third similarity is smaller than said third threshold and equal to or greater than a fourth threshold. information processing system.

13.

<sup>137</sup> A settlement device included in the information processing system according to any one of claims 1 to 12.

14.

<sup>136</sup> A program for operating a computer as the settlement apparatus according to claim 13.

15.

<sup>140</sup> A settlement method executed in a settlement system having a commodity registration device and a settlement device, wherein the commodity registration device generates a first customer image including the customer in a first imaging step; A generation step of generating association information in which settlement information used for settlement of goods is associated with one customer image; a second imaging step of the settlement device generating a second customer image including the customer; and a first display control step of displaying a candidate image, which is a candidate for the first customer image in which the same customer as the customer in the second customer image is shown, on a display device that can be viewed by the customer. .

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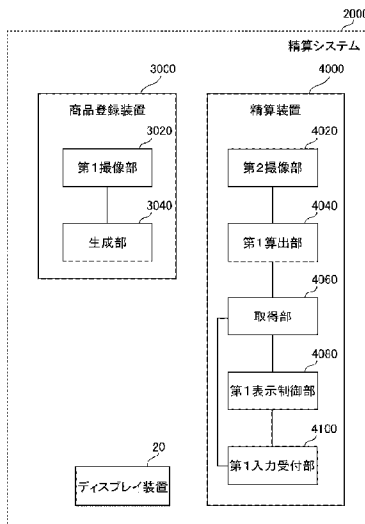
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FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC,

[続葉有]

(54) Title: PAYMENT SYSTEM, PAYMENT DEVICE, PROGRAM, AND PAYMENT METHOD

(54) 発明の名称: 精算システム、精算装置、プログラム、及び精算方法



- 20 Display device
- 2000 Payment system
- 3000 Product registration device
- 3020 First image capture unit
- 3040 Generating unit
- 4000 Payment device
- 4020 Second image capture unit
- 4040 First computation unit
- 4060 Acquisition unit
- 4080 First display control unit
- 4100 First input acceptance unit

(57) Abstract: A first image capture unit (3020) generates first customer images. A generating unit (3040) generates association information which associates the first customer images with payment information. A second image capture unit (4020) generates second customer images. A first computation unit (4040) computes first degrees of similarity between the customers who appear in the first customer images and the customers who appear in the second customer images. If a first customer image is present in which the first degree of similarity is greater than or equal to a first threshold, an acquisition unit (4060) acquires the payment information which is associated with the first customer image. If no first customer image is present in which the first degree of similarity is greater than or equal to the first threshold, a first display control unit (4080) displays candidate images upon a display device (20). A first input acceptance unit (4100) accepts an input which selects among the candidate images. The acquisition unit (4060) acquires the payment information which is associated with the selected candidate image.

(57) 要約: 第1撮像部(3020)は、第1顧客画像を生成する。生成部(3040)は、第1顧客画像と精算情報を関連付けた関連付け情報を生成する。第2撮像部(4020)は第2顧客画像を生成する。第1算出部(4040)は、第1顧客画像に写っている顧客と第2顧客画像に写っている顧客との第1類似度を算出する。取得部(4060)は、第1類似度が第1閾値以上である第1顧客画像がある場合、その第1顧客画像と関連付けられている精算情報を取得する。第1表示制御部(4080)は、第1類似度が第1閾値以上である第1顧客画像がない場合、候補画像をディスプレイ装置(20)に表示する。第1入力受付部(4100)は、候補画像を選択する入力を受け付ける。取得部(4060)は、選択された候補画像と関連付けられている精算情報を取得する。

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MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, 添付公開書類:  
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KM, ML, MR, NE, SN, TD, TG).

## 明 細 書

発明の名称：

精算システム、精算装置、プログラム、及び精算方法

技術分野

[0001] 本発明は、精算システム、精算装置、プログラム、及び精算方法に関する。

背景技術

[0002] スーパーマーケット等の店舗におけるレジ端末では、（１）精算対象の商品を登録する処理（バーコードの読み取りなど）及び（２）登録された商品の精算を行う処理（代金の受け取りやおつりの返却など）という２つの処理が行われる。

[0003] そして、このようなレジ端末の機能を２つの装置に分離し、（１）の処理と（２）の処理とを異なる装置で行うという運用方法がある。例えば特許文献１は、（１）の処理に用いられる登録装置と、（２）の処理に用いられる会計装置とが分離して設けられているセルフ POS システムを開示している。店員は、登録装置を用いて商品の登録を行う。登録装置は、撮像部で顧客を撮像する。登録装置を操作する店員は、撮像部によって撮像された顧客の画像の中から、会計データ（登録された商品に関するデータ）に関連付ける顧客の画像を選択する。その結果、登録装置は、顧客の画像と会計データとを関連付ける。その後、顧客は、会計装置を利用して会計を行う。会計装置は、顧客を撮像し、生成された顧客の画像と一致性の高い顧客の画像に関連付けられている会計データを取得する。そして、顧客は、会計装置を用いて、この会計データに基づく会計を行う。

先行技術文献

特許文献

[0004] 特許文献１：特開２０１２－２４８１６２号公報

発明の概要

## 発明が解決しようとする課題

- [0005] 登録装置で生成される画像に写っている顧客と会計装置で生成される画像に写っている同じ顧客との一致性が低くなることがある。例えば顧客が、登録装置を利用した時に身につけていたマスクや帽子などを、会計装置を利用する前に外した場合、登録装置で生成される画像に写っている顧客と、会計装置で生成される画像に写っているその顧客との一致性が小さくなってしまふ。
- [0006] 特許文献1は、このように登録装置で生成される画像に写っている顧客と会計装置で生成される画像に写っている同じ顧客との一致性が小さくなってしまふ場合について言及していない。
- [0007] 本発明は、上記の課題に鑑みてなされたものである。本発明の目的は、顧客が確実に商品の精算を行えるようにする技術を提供することである。

## 課題を解決するための手段

- [0008] 本発明の精算システムは、商品登録装置及び精算装置を有する。  
前記商品登録装置は、顧客を含む第1顧客画像を生成する第1撮像手段と、前記第1顧客画像に対して商品の精算に用いる精算情報を関連付けた関連付け情報を生成する生成手段と、を有する。  
前記精算装置は、顧客を含む第2顧客画像を生成する第2撮像手段と、前記第2顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像の候補である候補画像を、顧客が閲覧できるディスプレイ装置に表示する第1表示制御手段と、を有する。
- [0009] 本発明の精算装置は、本発明の精算システムが有する精算装置である。
- [0010] 本発明のプログラムは、コンピュータを本発明の精算装置として動作させるプログラムである。
- [0011] 本発明の精算方法は、商品登録装置及び精算装置を有する精算システムにおいて実行される精算方法である。当該精算方法は、前記商品登録装置が、顧客を含む第1顧客画像を生成する第1撮像ステップと、前記商品登録装置が、前記第1顧客画像に対して商品の精算に用いる精算情報を関連付けた関

連付け情報を生成する生成ステップと、前記精算装置が、顧客を含む第2顧客画像を生成する第2撮像ステップと、前記第2顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像の候補である候補画像を、顧客が閲覧できるディスプレイ装置に表示する第1表示制御ステップと、を有する。

### 発明の効果

[0012] 本発明によれば、顧客が確実に商品の精算を行えるようにする技術が提供される。

### 図面の簡単な説明

[0013] 上述した目的、およびその他の目的、特徴および利点は、以下に述べる好適な実施の形態、およびそれに付随する以下の図面によってさらに明らかになる。

[0014] [図1]精算システムが有する商品登録装置と精算装置の配置を例示する図である。

[図2]実施形態1に係る精算システムを例示するブロック図である。

[図3]実施形態1の商品登録装置によって実行される処理を例示するフローチャートである。

[図4]実施形態1の精算装置によって実行される処理の流れを例示するフローチャートである。

[図5]実施形態1の商品登録装置を実現する計算機のハードウェア構成を例示する図である。

[図6]実施形態1の精算装置を実現する計算機のハードウェア構成を例示する図である。

[図7]精算情報をテーブル形式で例示する図である。

[図8]関連付け情報の構成をテーブル形式で例示する図である。

[図9]ディスプレイ装置における表示を例示する図である。

[図10]判定部を有する精算装置を例示するブロック図である。

[図11]実施形態2の精算システムを例示するブロック図である。

[図12]実施形態2における関連付け情報を例示する図である。

[図13]実施形態2の警告装置によって実行される処理の流れを例示するフローチャートである。

[図14]実施形態2の精算システムの運用環境を例示する図である。

### 発明を実施するための形態

[0015] 以下、本発明の実施の形態について、図面を用いて説明する。尚、すべての図面において、同様な構成要素には同様の符号を付し、適宜説明を省略する。

[0016] [実施形態1]

図1は、精算システム2000が有する商品登録装置3000と精算装置4000の配置を例示する図である。精算システム2000は、商品登録装置3000及び精算装置4000を有する。図1に示すように、商品登録装置3000と精算装置4000は、独立した装置として設けられている。精算システム2000を利用する店舗では、商品登録装置3000及び精算装置4000を用いて商品の精算が行われる。ここで、商品登録装置3000及び精算装置4000の設置数はそれぞれ1以上である。

[0017] 商品登録装置3000は、商品を精算対象として登録する処理に用いられる。商品を購入したい顧客は、その商品を持って商品登録装置3000のところへ行く。商品登録装置3000を操作する店員は、顧客から商品を受け取り、その商品を精算対象として登録する。ここで、商品を精算対象として登録する方法には既知の様々な技術を利用できる。例えば店員は、各商品に付されているバーコード等を、商品登録装置3000が有するリーダに読み取らせる。商品の登録に伴い、商品登録装置3000は精算情報を生成する。精算情報は、精算対象として登録された商品の精算処理に関する情報である。

[0018] 精算装置4000は、精算対象として登録された商品の精算（代金の受け取りなど）に用いられる。商品の登録が終わった後、顧客は、任意の精算装置4000のところへ移動する。精算装置4000は、その顧客が購入する商品に関する精算情報を取得し、その精算情報に基づいて精算処理を行う。

具体的には、精算装置4000は、顧客に対する代金の提示、顧客によって投入された代金の数え上げ、顧客に対するおつりの払い戻し、レシートの発行などを行う。

[0019] <商品登録装置3000及び精算装置4000の構成>

図2は、実施形態1に係る精算システム2000を例示するブロック図である。図2において、各ブロックは、ハードウェア単位の構成ではなく、機能単位の構成を表している。

[0020] 商品登録装置3000は、第1撮像部3020及び生成部3040を有する。第1撮像部3020は、顧客を含む画像を生成する。以下、第1撮像部3020によって生成される画像を第1顧客画像と表記する。生成部3040は関連付け情報を生成する。関連付け情報は、第1顧客画像と精算情報を関連付けた情報である。

[0021] 精算装置4000は、第2撮像部4020、第1算出部4040、取得部4060、第1表示制御部4080、及び第1入力受付部4100を有する。第2撮像部4020は、顧客を含む画像を生成する。以下、第2撮像部4020によって生成される画像を、第2顧客画像と表記する。

[0022] 第1算出部4040は、第1撮像部3020によって撮像された各画像（第1顧客画像）に写っている顧客と、第2撮像部4020によって撮像された画像（第2顧客画像）に写っている顧客との類似度を算出する。以下、この類似度を第1類似度と表記する。

[0023] 取得部4060は、第1顧客画像の中にマッチング条件を満たすものがあるか否かを判定する。マッチング条件は、「その第1顧客画像に写っている顧客と第2顧客画像に写っている顧客との第1類似度が、第1閾値以上である」という条件である。そして、取得部4060は、マッチング条件を満たす第1顧客画像がある場合、その第1顧客画像と関連付けられている精算情報を取得する。前述したように、精算情報と第1顧客画像は、関連付け情報によって関連付けられている。

[0024] 第1表示制御部4080は、マッチング条件を満たす第1顧客画像がない



場合、候補画像をディスプレイ装置 20 に表示する。候補画像は、第 2 顧客画像に写っている顧客と同じ顧客が写っている第 1 顧客画像の候補である。ここで、第 1 表示制御部 4080 が候補画像の表示先とするディスプレイ装置 20 は、精算装置 4000 を利用する顧客によって閲覧できるディスプレイ装置である。

[0025] 第 1 入力受付部 4100 は、候補画像を選択する入力を受け付ける。第 1 入力受付部 4100 が候補画像の選択を受け付けた場合、取得部 4060 は、関連付け情報において選択された候補画像（第 1 顧客画像）と関連付けられている精算情報を取得する。

[0026] <作用・効果>

第 1 顧客画像に写っている顧客と第 2 顧客画像に写っている同じ顧客との類似度が低くなることもある。このような状況は、例えば、商品登録装置 3000 を利用する時と精算装置 4000 を利用する時で、顧客が身につけているものが変わる場合などに起こる。具体的には、顧客が、商品登録装置 3000 を利用した時に装着していたマスクを、精算装置 4000 を利用する前に外すケースなどが考えられる。

[0027] そこで本実施形態の精算装置 4000 は、その精算装置 4000 を利用する顧客との類似度が高い（第 1 類似度が第 1 閾値以上である）顧客が写っている第 1 顧客画像がない場合、その精算装置 4000 を利用する顧客と同じ顧客が写っている第 1 顧客画像の候補を表示し、顧客にその候補を選択させる。よって、第 1 顧客画像に写っている顧客と第 2 顧客画像に写っている同じ顧客との類似度が低くなってしまう場合であっても、精算装置 4000 は、顧客によって選択された第 1 顧客画像に関連付けられている精算情報を取得することで精算処理を行うことができる。よって、本実施形態の精算システム 2000 によれば、顧客は確実に商品の精算を行うことができる。

[0028] 以下、本実施形態についてさらに詳細を述べる。

[0029] <処理の流れ>

図 3 は、実施形態 1 の商品登録装置 3000 によって実行される処理を例

示するフローチャートである。第1撮像部3020は第1顧客画像を生成する(S102)。生成部3040は、第1顧客画像と精算情報とを関連付けて関連付け情報を生成する(S104)。

[0030] 図4は、実施形態1の精算装置4000によって実行される処理の流れを例示するフローチャートである。第2撮像部4020は第2顧客画像を生成する(S202)。第1算出部4040は、各第1顧客画像に写っている顧客について、第2顧客画像に写っている顧客との第1類似度を算出する(S204)。取得部4060は、第1類似度が第1閾値以上である第1顧客画像があるか否かを判定する(S206)。第1類似度が第1閾値以上である第1顧客画像がある場合(S206: YES)、図4の処理はS208に進む。一方、第1類似度が第1閾値以上である第1顧客画像がない場合(S206: NO)、図4の処理はS210に進む。

[0031] S208において、取得部4060は、第1類似度が第1閾値以上である第1顧客画像と関連付けられている精算情報を取得する。

[0032] S210において、第1表示制御部4080は、第1類似度が第1閾値以上である第1顧客画像がない場合、候補画像をディスプレイ装置に表示する。第1入力受付部4100は、候補画像の選択を受け付ける(S212)。取得部4060は、選択された候補画像と関連付けられている精算情報を取得する(S214)。

[0033] <商品登録装置3000を実現するハードウェアの例>

商品登録装置3000や精算装置4000の各機能構成部は、各機能構成部を実現するハードウェア(例:ハードワイヤードされた電子回路など)で実現されてもよいし、ハードウェアとソフトウェアとの組み合わせ(例:電子回路とそれを制御するプログラムの組み合わせなど)で実現されてもよい。

[0034] 図5は、実施形態1の商品登録装置3000を実現する計算機1000のハードウェア構成を例示する図である。この計算機1000は、レジ端末等の専用装置を用いて実装されてもよいし、PC(Personal Computer)や携帯端

末などの汎用装置を用いて実装されてもよい。

- [0035] 計算機1000は、バス1020、プロセッサ1040、メモリ1060、ストレージ1080、入出力インタフェース1100、及びネットワークインタフェース1120を有する。バス1020は、プロセッサ1040、メモリ1060、ストレージ1080、入出力インタフェース1100、及びネットワークインタフェース1120が、相互にデータを送受信するためのデータ伝送路である。ただし、プロセッサ1040などを互いに接続する方法は、バス接続に限定されない。プロセッサ1040は、例えばCPU (Central Processing Unit) やGPU (Graphics Processing Unit) などの演算処理装置である。メモリ1060は、例えばRAM (Random Access Memory) やROM (Read Only Memory) などのメモリである。ストレージ1080は、例えばハードディスク、SSD (Solid State Drive)、又はメモリカードなどの記憶装置である。また、ストレージ1080は、RAM やROM 等のメモリであってもよい。
- [0036] 入出力インタフェース1100は、計算機1000と入出力デバイスとを接続するためのインタフェースである。入出力デバイスは、例えばキーボードやマウスなどである。
- [0037] ネットワークインタフェース1120は、計算機1000を外部の装置と通信可能に接続するためのインタフェースである。ネットワークインタフェース1120は、有線回線と接続するためのネットワークインタフェースでもよいし、無線回線と接続するためのネットワークインタフェースでもよい。例えば商品登録装置3000を実現する計算機1000は、ネットワークを介して、精算装置4000を実現する計算機6000と接続されている。
- [0038] ストレージ1080は、第1撮像部3020及び生成部3040の機能をそれぞれ実現するプログラムモジュールを記憶している。プロセッサ1040は、これら各プログラムモジュールを実行することで、対応する各機能構成部の機能を実現する。ここでプロセッサ1040は、上記各モジュールを実行する際、これらのモジュールをメモリ1060上に読み出してから実行

してもよいし、メモリ1060上に読み出さずに実行してもよい。

- [0039] 計算機1000のハードウェア構成は図5に示した構成に限定されない。例えば、各プログラムモジュールはメモリ1060に格納されてもよい。この場合、計算機1000は、ストレージ1080を備えていなくてもよい。
- [0040] 入出力インタフェース1100に接続される入出力デバイスは、登録する商品を認識するリーダ40を含む。リーダ40の具体的な実装方法は、商品を認識する方法によって異なる。例えばリーダ40は、商品に付されている商品情報シンボルを読み取る。商品情報シンボルは、商品に付されているシンボルであり、商品を特定する情報（商品情報のID (Identifier) など）を表すシンボルである。シンボルは、バーコード、2次元コード（QRコード（登録商標）など）、又は文字列シンボルなどである。なお、ここでいう文字列には、数値列も含まれる。商品情報シンボルは、商品情報を特定する情報が符号化されたバーコード等、又は商品情報を特定する情報を表す文字列シンボルなどである。
- [0041] 例えば商品情報シンボルがバーコードである場合、リーダ40はバーコードリーダである。また例えば、商品情報シンボルが2次元コードである場合、リーダ40は、2次元コードリーダである。また例えば、商品情報シンボルが文字列シンボルである場合、リーダ40は、この文字列を撮像する撮像素子と、撮像された文字列シンボルを解析して商品のIDなどを割り出す処理部とを有する。なお、文字列シンボルの解析には、文字列解析に関する様々な既知の技術を用いることができる。これら既知の技術に関する説明は省略する。
- [0042] なお、商品情報シンボルとして複数の種類のシンボルが用いられる場合、入出力インタフェース1100には、複数種類のリーダが接続される。例えば、商品情報シンボルとしてバーコード及び2次元コードが用いられる場合、この入出力インタフェース1100には、バーコードリーダ及び2次元コードリーダが接続される。
- [0043] また、リーダ40は、商品を撮像して画像を生成し、その画像に写ってい

る商品に対してオブジェクト認識を行うことで、その商品を認識してもよい。

[0044] <<第1撮像部3020のハードウェア構成>>

第1撮像部3020は、撮像した結果を記録する撮像素子を有する。例えば第1撮像部3020は、この撮像素子を有するカメラを用いて構成される。第1撮像部3020は、静止画像を撮像してもよいし、動画を撮像してもよい。後者の場合、第1顧客画像は動画を構成する各フレームである。

[0045] 第1撮像部3020は、商品登録装置3000を利用する顧客を撮像できる位置に設置される。第1撮像部3020は、商品登録装置3000と一体に設けられていてもよいし、別体に設けられていてもよい。後者の場合、例えば図5に示すように、入出力インタフェース1100に対して、第1撮像部3020を実現するカメラ30が接続される。

[0046] <精算装置4000を実現するハードウェアの例>

図6は、実施形態1の精算装置4000を実現する計算機6000のハードウェア構成を例示する図である。この計算機6000は、レジ端末等の専用装置を用いて実装されてもよいし、PC (Personal Computer) や携帯端末などの汎用装置を用いて実装されてもよい。なお、計算機6000の構成は、計算機1000の構成と同様である。

[0047] ストレージ6080は、第2撮像部4020、第1算出部4040、及び取得部4060の機能をそれぞれ実現するためのプログラムモジュールを記憶している。プロセッサ6040は、これら各プログラムモジュールを実行することで、対応する各機能構成部の機能を実現する。ここでプロセッサ6040は、上記各モジュールを実行する際、これらのモジュールをメモリ6060上に読み出してから実行してもよいし、メモリ6060上に読み出さずに実行してもよい。

[0048] 計算機6000のハードウェア構成は図6に示した構成に限定されない。例えば、各プログラムモジュールはメモリ6060に格納されてもよい。この場合、計算機6000は、ストレージ6080を備えていなくてもよい。

- [0049] 入出力インタフェース6100に対して接続される入出力デバイスは、第1表示制御部4080によって制御されるディスプレイ装置20を含む。ディスプレイ装置20は、精算装置4000を利用する顧客が閲覧できるように、顧客の方に向けて設置される。このディスプレイ装置は、精算装置4000と一体に設けられていてもよいし、別体に設けられていてもよい。
- [0050] また、入出力インタフェース6100に対して接続される入出力デバイスは、第1入力受付部4100の機能を実現するための入力デバイスを含む。例えばこの入力デバイスは、ディスプレイ装置20に内蔵されるタッチパネル22である。また例えば、この入力デバイスは、キーボードやマウスなどであってもよい。
- [0051] さらに、入出力インタフェース6100に対して接続される入出力デバイスは、顧客が代金を投入するためのデバイス、おつりを返金するためのデバイス、及びレシートを発行するためのデバイスなどを含む（図示せず）。
- [0052] <商品登録装置3000による商品の登録処理>
- 前述したように商品登録装置3000は、精算対象として登録される商品に関する精算情報を生成する。商品登録装置3000は、生成した精算情報を、商品登録装置3000の内部又は外部の記憶部に記憶する。
- [0053] 1つの精算処理における精算対象には、複数の商品が含まれる。例えば商品登録装置3000は、精算対象の登録処理の開始を指示する操作を受け付けた後、精算対象の登録処理の終了を指示する操作を受け付けるまでの間に登録された1つ又は複数の商品を、1つの精算処理における精算対象として登録する。ある精算処理に関する精算情報は、その精算処理の対象として登録された各商品のIDなどを示す。また精算情報は、取引番号、各商品の金額、及び合計金額などをさらに示してもよい。
- [0054] 図7は、精算情報をテーブル形式で例示する図である。図7に示す精算情報を、精算情報200と表記する。精算情報200は、精算情報ID202及び商品リスト204という2つの列を有する。商品リスト204は、精算対象として登録された商品IDのリストである。商品ID206は、精算対

象として登録された商品のIDである。

[0055] なお、リーダ等で認識した商品について精算情報を生成する具体的な方法には様々な既知の技術を利用できるため、この方法に関する説明は省略する。

[0056] <第1撮像部3020が行う処理の詳細>

第1撮像部3020は第1顧客画像を生成する(S102)。第1撮像部3020が撮像を行うタイミングは様々である。例えば第1撮像部3020は、商品登録装置3000が稼働している間、常に繰り返し撮像を行う。第1撮像部3020が繰り返し撮像を行う頻度は、例えば一般的な動画のフレームレートと同じ1/30秒である。

[0057] また例えば第1撮像部3020は、顧客が商品登録装置3000の付近にいることを検出し、その検出に応じて撮像を行ってもよい。例えば第1撮像部3020の付近に、人の検出を行う赤外線センサなどを設ける。第1撮像部3020は、この赤外線センサからの通知を受けることで、第1撮像部3020の付近に顧客がいることを把握することができる。そこで例えば、第1撮像部3020は、この赤外線センサによって第1撮像部3020の付近に顧客がいることが検出された時に顧客の撮像を行い、第1顧客画像を生成する。

[0058] なお、第1撮像部3020は、上記検出が行われた時から所定の期間、顧客を繰り返し撮像してもよい。例えば第1撮像部3020は、上記検出が行われた時から所定時間、顧客を繰り返し撮像する。また例えば、第1撮像部3020は、上記検出が行われた時から、その顧客が購入する商品の登録が終わるまで(精算情報が生成されるまで)の間、顧客を繰り返し撮像してもよい。

[0059] 上述の「所定時間」は、予め第1撮像部3020に設定されていてもよいし、商品登録装置3000の内部又は外部に設けられた記憶部に記憶されてもよい。後者の場合、第1撮像部3020は、この記憶部から上記所定時間を取得して利用する。なお、特に説明しない限り、以前に説明した又は以降

で説明する各機能構成部が利用する各種所定の値（所定の閾値や所定の時間など）も同様に、その機能構成部に設定されるか、又は記憶部から取得して利用される。

[0060] また、第1撮像部3020は、商品登録装置3000を操作する店員によって操作されてもよい。例えば店員は、顧客に声をかけるなどの方法で、第1撮像部3020の撮像範囲に顧客の顔が入るように顧客を誘導する。そして、店員は、第1撮像部3020の撮像範囲に顧客の顔が入っていることを確認して、第1撮像部3020に、顧客画像の撮像を行わせる。

[0061] また、上記誘導は、第1撮像部3020によって行われてもよい。例えば商品登録装置3000に、第1撮像部3020の撮像素子に写っている画像を表示するディスプレイ装置を設ける。このディスプレイ装置は、顧客が閲覧できるように、顧客の方を向けて設置される。第1撮像部3020は、このディスプレイ装置に文字で案内を表示したり、音声で案内を行ったりすることで顧客を誘導し、顧客の顔が第1撮像部3020によって撮像されるようにする。

[0062] 第1撮像部3020が顧客を複数回撮像した場合、顧客が写った画像が複数生成される。そこで、第1撮像部3020は、これら複数の画像のうち、いずれか1つ以上を第1顧客画像として扱う。どの画像を第1顧客画像として扱うかを決定する方法は様々である。例えば第1撮像部3020は、顧客の写りがよい画像を第1顧客画像とする。「顧客の写りがよい画像」は、顧客が大きく写っている画像や、ブレが小さい画像である。ここで、画像に写っているオブジェクト（顧客）の大きさを算出したり、ブレの大きさを算出したりする方法には、既知の技術を利用できる。そのため、これらの方法に関する説明は省略する。

[0063] なお、第1撮像部3020は、顧客の写りが最もよい1つの画像を第1顧客画像としてもよいし、顧客の写りが所定の基準以上である複数の画像を第1顧客画像としてもよい。

[0064] また、第1撮像部3020は、生成した全ての画像を第1顧客画像として



もよい。

[0065] <生成部3040が行う処理の詳細>

生成部3040は関連付け情報を生成する(S104)。図8は、関連付け情報の構成をテーブル形式で例示する図である。図8に示す関連付け情報を、関連付け情報300と表記する。関連付け情報300は、第1顧客画像302及び精算情報ID304という2つの列を有する。第1顧客画像302は、第1顧客画像が記録された画像ファイルを示す。精算情報ID304は、精算情報のIDを示す。なお、同じ顧客に対して複数の第1顧客画像が生成された場合、1つの精算情報ID304に対して異なる複数の第1顧客画像302が関連付けられる。

[0066] 生成部3040は、第1顧客画像に対して、その顧客画像に写っている顧客が購入した商品に関する精算情報を関連付ける。具体的には、生成部3040は、商品の登録処理を始めた時からその登録処理を終えるまでの間に生成された第1顧客画像に対して、その登録処理によって生成された精算情報を関連付ける。

[0067] ここで、生成部3040は、精算情報に第1顧客画像を関連付ける際、その関連付けが正しいか否かを店員に確認してもよい。具体的には、生成部3040は、商品登録装置3000を操作する店員が閲覧するディスプレイ装置上に、精算情報に関連付けようとしている第1顧客画像を提示する。店員は、提示された第1顧客画像が、現在商品登録装置3000を利用している顧客を撮像したものであるか否かを確認する。そして、店員は、提示された第1顧客画像が正しいければ、タッチパネルやキーボードなどを用いて、第1顧客画像が正しい旨の入力を行う。その入力の結果を受け、生成部3040は、関連付け情報を生成する。

[0068] 一方、店員は、提示された第1顧客画像が正しくなければ、正しい顧客画像を精算情報に関連付けるための処理を行う。例えば店員は、第1撮像部3020を操作することで顧客を撮像して、再度第1顧客画像を生成する。そして、生成部3040は、この操作で生成された第1顧客画像と精算情報を

関連付けて、関連付け情報を生成する。

[0069] 生成部3040は、関連付け情報を、各精算装置4000からアクセス可能な記憶部に記憶する。この記憶部は、商品登録装置3000の内部にあってもよいし、外部にあってもよい。商品登録装置3000の外部にある記憶部は、例えば商品登録装置3000及び精算装置4000からアクセス可能なデータベースサーバなどである。

[0070] <精算装置4000による精算処理について>

精算装置4000は精算情報を取得し、その精算情報に基づいて精算処理を行う。精算装置4000が商品の精算処理に用いる情報（精算情報）に基づいて精算処理を行う方法には、既知の手法が利用できる。この既知の手法についての詳細は省略する。

[0071] <第2撮像部4020が行う処理の詳細>

第2撮像部4020は、第2顧客画像を生成する（S202）。第2撮像部4020が第2顧客画像を生成する処理は、第1撮像部3020が第1顧客画像を生成する処理と同様である。

[0072] <第1算出部4040が行う処理の詳細>

第1算出部4040は、第1撮像部3020によって撮像された第1顧客画像に写っている顧客と、第2撮像部4020によって撮像された第2顧客画像に写っている顧客とについて、第1類似度を算出する（S204）。第1算出部4040が類似度の算出対象とする第1顧客画像は、いずれかの関連付け情報において精算情報と関連付けられている第1顧客画像である。以下、この類似度の算出を、「第1顧客画像と第2顧客画像のマッチング」とも表記する。

[0073] 第1算出部4040が第1類似度を算出する方法は様々である。例えば第1算出部4040は、第1顧客画像と第2顧客画像それぞれについて、写っている顧客の特徴量を算出する。そして第1算出部4040は、これら顧客の特徴量の類似度を、第1類似度として算出する。ここで、画像からオブジェクトの特徴量を抽出する方法、及び特徴量の類似度を算出する方法には、

オブジェクトのマッチングに用いられる様々な既知の手法を利用できる。また、第1類似度を算出する方法は、特徴量を用いる方法に限定されない。第1類似度の算出には、画像に写っているオブジェクトの類似度を算出する既知の様々な方法が利用できる。

[0074] <<第1類似度の算出対象の決定方法>>

第1算出部4040は、精算情報と関連付けられている全ての第1顧客画像について第1類似度を算出してもよいし、一部の第1顧客画像のみについて第1類似度を算出してもよい。後者の場合に、第1類似度の算出の対象とする第1顧客画像を決定する方法は様々である。以下、その方法について説明する。

[0075] 例えば第1算出部4040は、第1顧客画像と第2顧客画像それぞれの撮像時点を用いて、第1類似度の算出対象とする第1顧客画像を決定する。通常、商品登録装置3000で精算対象の登録が行われてから精算装置4000で精算処理が行われるまでの時間は短い。例えばこの時間は5分以内などである。そこで第1算出部4040は、第1類似度の算出対象の第2顧客画像が生成された時点から所定時間前までの間に撮像された第1顧客画像のみを、第1類似度の算出対象とする。例えばこの所定時間は5分である。

[0076] また例えば、第1算出部4040は、商品登録装置3000と精算装置4000の配置に基づいて、第1類似度の算出対象とする第1顧客画像を決定してもよい。例えば図1に示したように、精算システム2000が導入される店舗では、商品登録装置3000及び精算装置4000が複数設置されている。顧客は、商品登録装置3000において商品の登録が終わったら、利用する精算装置4000を適宜選択する。このような精算システム2000の運用環境において、顧客は、利用した商品登録装置3000に近い精算装置4000を選択することが多いと考えられる。

[0077] そこで、精算システム2000は、精算装置4000からアクセス可能な記憶装置に、商品登録装置3000と、その商品登録装置3000に近い精算装置4000とを関連付けた情報を予め記憶しておく。そして、第1算出

部4040は、その第1算出部4040を有する精算装置4000と関連付けられている商品登録装置3000において生成された第1顧客画像のみを、第1類似度の算出対象とする。

[0078] 例えば図1の例の場合、精算システム2000は、商品登録装置3000-1を精算装置4000-1及び精算装置4000-2と関連付けた情報、及び商品登録装置3000-2を精算装置4000-3及び精算装置4000-4と関連付けた情報を予め記憶しておく。そして、第1算出部4040は、この情報を用いて、第1類似度の算出対象とする第1顧客画像を決定する。例えばこの例の場合、精算装置4000-1及び精算装置4000-2が有する第1算出部4040は、商品登録装置3000-1において生成された第1顧客画像のみを、第1類似度の算出対象とする。一方、精算装置4000-3及び精算装置4000-4が有する第1算出部4040は、商品登録装置3000-2において生成された第1顧客画像のみを、第1類似度の算出対象とする。

[0079] <<顧客が写っている領域を割り出す方法>>

第1算出部4040は、第1顧客画像から、商品登録装置3000を利用した顧客を表す領域を抽出する。同様に、第1算出部4040は、第2顧客画像から、精算装置4000を利用している顧客を表す領域を抽出する。このように画像に写っている人を抽出する方法には、既存の様々なオブジェクト認識の手法を利用することができる。この既存の手法についての詳細は省略する。

[0080] ここで、複数の顧客が店舗にいる場合がある。この場合、第1撮像部3020の撮像範囲に、商品登録装置3000を利用する顧客以外の顧客が入っていることがある。その結果、第1顧客画像に複数の顧客が写りうる。

[0081] そこで、第1算出部4040は、第1顧客画像に写っている顧客の中から、商品登録装置3000を利用した顧客を特定し、この顧客について第1類似度を算出する。ここでいう「商品登録装置3000を利用した顧客」とは、第1顧客画像に関連付けられている精算情報によって示されている商品を

購入する顧客を意味する。

[0082] 商品登録装置3000を利用した顧客を特定する方法は様々である。例えば第1算出部4040は、第1顧客画像に写っている顧客のうち、最も大きく写っている顧客が、商品登録装置3000を利用した顧客とする。また例えば、第1算出部4040は、第1顧客画像に写っている顧客の内、第1顧客画像の中心に最も近い位置に写っている顧客を、商品登録装置3000を利用している顧客とする。ここで、画像に写っている顧客の大きさを比較したり、画像に写っている顧客の位置を比較したりする方法には、既知の技術を利用できる。そのため、これらの方法に関する説明は省略する。

[0083] なお、第1顧客画像は、第1撮像部3020により、商品登録装置3000を利用した顧客のみを示す画像として生成されてもよい。この場合、第1撮像部3020は、例えば第1算出部4040と同様の方法で、商品登録装置3000を利用した顧客を特定する。そして、第1撮像部3020は、撮像素子に記録された画像のうち、商品登録装置3000を利用した顧客を表す領域のみを用いて、第1顧客画像を生成する。

[0084] また例えば、第1顧客画像が生成される際、商品登録装置3000を操作する店員が、顧客が写っている領域を指定してもよい。この場合、第1撮像部3020は、商品登録装置3000を操作する店員が閲覧するディスプレイ装置上に、撮像素子に記録された画像全体を表示する。そして、店員は、ディスプレイ装置に表示された画像に対して、商品登録装置3000を利用している顧客が写っている領域を指定する入力を行う。例えばディスプレイ装置がタッチパネルを有する場合、店員は、この顧客が写っている領域を指でなぞって囲むことで、この顧客が写っている領域を指定する。そして、第1撮像部3020は、店員によって指定された領域を表す画像を、第1顧客画像として生成する。なお、顧客が複数回撮像された場合、例えば第1撮像部3020は、撮像素子に記録された画像の内、最もブレが少ない画像を、上記ディスプレイ装置に表示する。

[0085] なお、同様にして、第2顧客画像にも複数の顧客が写る場合がある。この

場合、例えば第1算出部4040は、第1顧客画像に対する処理と同様の処理により、精算装置4000を利用している顧客を抽出する。また、第2顧客画像は、第2撮像部4020により、精算装置4000を利用した顧客を抽出した画像として生成されてもよい。その生成方法は、第1撮像部3020が商品登録装置3000を利用した顧客のみを示す第1顧客画像を生成する方法と同様の方法である。また、精算装置4000は、商品登録装置3000が店員に顧客を指定させる方法と同様の方法で、精算装置4000を利用している顧客に対し、精算装置4000を利用している顧客を指定する入力をさせてもよい。

[0086] <取得部4060によって行われる処理の詳細>

取得部4060は、マッチング条件を満たす（第1類似度が第1閾値以上である）第1顧客画像がある場合（S206：YES）、その第1顧客画像と関連付けられている精算情報を取得する（S208）。具体的には、取得部4060は、第1類似度が算出された第1顧客画像の中から、第1類似度が第1閾値以上である第1顧客画像を決定する。そして、取得部4060は、関連付け情報を用いて、上記決定された第1顧客画像に関連付けられている精算情報を取得する。具体的には、取得部4060は、生成部3040が関連付け情報を記憶した記憶部にアクセスし、上記決定された顧客画像が示されている関連付け情報が示す精算情報を取得する。

[0087] なお、第1類似度が第1閾値以上である第1顧客画像が、複数ある場合が考えられる。例えばこの場合、取得部4060は、第1類似度が最も高い第1顧客画像と関連付けられている精算情報を取得する。またこの場合、精算装置4000は、第1類似度が第1閾値以上である第1顧客画像をディスプレイ装置20に表示し、その内の1つを顧客に選択させてもよい。そして、取得部4060は、顧客によって選択された第1顧客画像と関連付けられている精算情報を取得する。これらの方法により、マッチング条件を満たす第1顧客画像が複数あった場合でも、精算装置4000を利用している顧客が購入する商品に関する精算情報を一意に決定して取得することができる。

[0088] ここで、第1類似度が第1閾値以上である第1顧客画像をディスプレイ装置20に表示する方法、及び表示された第1顧客画像の選択を受け付ける方法は、第1表示制御部4080が候補画像をディスプレイ装置20に表示する処理、及び第1入力受付部4100が表示された候補画像の選択を受け付ける方法と同様である。第1表示制御部4080が候補画像をディスプレイ装置20に表示する処理、及び第1入力受付部4100が表示された候補画像の選択を受け付ける方法についての詳細な説明は後述する。

[0089] <第1表示制御部4080によって行われる処理の詳細>

第1表示制御部4080は、第2顧客画像に写っている顧客（精算装置4000を利用している顧客）との第1類似度が第1閾値以上である顧客が写っている第1顧客画像がない場合に、ディスプレイ装置の制御を行う（S210）。具体的には、第1表示制御部4080は、第1顧客画像のうち、第2顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像の候補（候補画像）を、ディスプレイ装置20に表示する。

[0090] 図9は、ディスプレイ装置20における表示を例示する図である。図9（a）において、第1表示制御部4080は、ディスプレイ装置20のタッチパネル22に1つの候補画像50を表示している。一方、図9（b）において、第1表示制御部4080は、ディスプレイ装置20のタッチパネル22に3つの候補画像50を表示している。なお、第1撮像部3020によって撮像された顧客が多い場合、第1表示制御部4080は、タッチパネル22にボタン70を表示する。顧客がボタン70を押すと、第1表示制御部4080は、現在タッチパネル22に表示していない候補画像50を表示する。

[0091] <<候補画像を決定する方法>>

前述したように、候補画像は、第2顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像の候補である。候補画像を表示するために、第1表示制御部4080は、どの第1顧客画像を候補画像にするかを決定する。この方法には、様々な方法がある。以下、その方法を具体的に例示する。

[0092] 例えば第1表示制御部4080は、第1閾値よりも小さい所定の第2閾値

を用いて、候補画像を決定する。具体的には、第1表示制御部4080は、候補画像を表示する必要がある場合（マッチング条件を満たす第1顧客画像がない場合）、第2顧客画像に写っている顧客との第1類似度が第2閾値以上である第1顧客画像を、候補画像とする。第2閾値は第1閾値よりも小さいため、この方法によれば、第1類似度が第2閾値以上第1閾値未満である第1顧客画像が、候補画像として決定される。

[0093] また例えば第1表示制御部4080は、第1類似度とは異なる方法で算出される第2類似度を用いて、候補画像を決定する。具体的には、候補画像を表示する必要がある場合（マッチング条件を満たす第1顧客画像がない場合）、第1算出部4040が、第1類似度を算出する方法とは別の方法を用いて、第2顧客画像と第1顧客画像との第2類似度を算出する。そして、第1表示制御部4080は、算出された第2類似度が第1閾値以上である各第1顧客画像を、候補画像とする。

[0094] ここで、第2類似度が第1閾値以上となる場合、第2類似度は第1類似度より大きい値である。なぜなら、第2類似度が算出される場合、第1類似度は第1閾値より小さいためである。そこで、第2類似度を算出するアルゴリズムには、第1類似度を算出するアルゴリズムよりも大きい類似度を算出するアルゴリズムを利用することが好ましい。ここで、画像に写っているオブジェクトの類似度を算出するアルゴリズムには種々のアルゴリズムがあり、算出される類似度の大きさもそれぞれ異なる。そこで例えば、第2類似度が第1類似度よりも大きくなるように、これら既知のアルゴリズムの中から、第1類似度の算出するアルゴリズムと第2類似度を算出するアルゴリズムを適宜採用する。

[0095] なお、第1表示制御部4080は、前述の各方法で決定された候補画像の全てを表示してもよいし、一部のみを表示してもよい。後者の場合、例えば第1表示制御部4080は、前述した商品登録装置3000と精算装置4000との関連付けを利用する。具体的には、第1表示制御部4080は、候補画像のうち、その第1表示制御部4080を有する精算装置4000と関



連付けられている精算情報によって生成された候補画像のみを表示する。

[0096] また、第1表示制御部4080は、前述した商品登録装置3000と精算装置4000との関連付けを利用して、候補画像の表示順を決定してもよい。具体的には、第1表示制御部4080は、その第1表示制御部4080を有する精算装置4000と関連付けられている商品登録装置3000によって生成された候補画像を、その精算装置4000と関連付けられていない商品登録装置3000によって生成された候補画像より前に表示する。

[0097] <第1入力受付部4100によって行われる処理の詳細>

第1入力受付部4100は、表示した候補画像の内の1つを選択する入力を受け付ける(S212)。候補画像の選択を受け付ける方法には、ディスプレイ上に表示された画像やボタンなどの選択を受け付ける既知の様々な技術を利用できる。ディスプレイ装置がタッチパネルを有し、第1入力受付部4100がそのタッチパネルに候補画像を表示する場合、例えば第1入力受付部4100は、タッチパネルに表示された候補画像が押されたことを検出することで、その候補画像の選択を受け付ける。図9の場合、顧客は、いずれかの候補画像50を押すことで、その候補画像50を選択する。また例えば、第1入力受付部4100は、キーボードなどの入力デバイスによる候補画像の選択を受け付けてもよい。

[0098] 第1入力受付部4100が候補画像の選択を受け付けた場合、取得部4060は、関連付け情報を用いて、選択された候補画像(第1顧客画像)と関連付けられている精算情報を取得する(S214)。第1顧客画像と関連付けられている精算情報を取得する方法は、前述した通りである。

[0099] <その他の機能について>

精算装置4000は、判定部4120をさらに有していてもよい。図10は、判定部4120を有する精算装置4000を例示するブロック図である。判定部4120は、第1入力受付部4100が候補画像の選択操作を受け付けなかった場合(顧客が候補画像の選択を行わなかった場合)、第2顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像がないと判定す

る。例えば図9の例の場合、判定部4120は、顧客がボタン60を押したり、所定時間以上候補画像50や各ボタンを押さなかった場合に、第1入力受付部4100が候補画像の選択を受け付けなかったと判定する。また、判定部4120は、第1表示制御部4080によって表示される候補画像が無い場合にも、第2顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像がないと判定する。ここで、第1表示制御部4080によって表示される候補画像が無い場合とは、例えば前述した候補画像を決定する方法において、第2類似度が第1閾値以上である第1顧客画像がない場合や、第1類似度が第2閾値以上である第1顧客画像がない場合などである。

[0100] 判定部4120によって、「第2顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像がない」と判定された場合、精算装置4000は種々の処理を行う。例えば第1表示制御部4080が、ディスプレイ装置に、その顧客に対応する精算情報がない旨のメッセージなどを表示する。また例えば、精算装置4000は、再度第2顧客画像などをやり直してもよい。つまり、精算装置4000は、図4の処理を再度実行する。これにより、新たに顧客を撮像して生成された第2顧客画像を用いて、類似度の算出などが行われる。こうすることで、顧客がより確実に精算を行えるようになる。

[0101] [実施形態2]

図11は、実施形態2の精算システム2000を例示するブロック図である。図11において、各ブロックは、ハードウェア単位の構成ではなく、機能単位の構成を表している。

[0102] 実施形態2の精算システム2000は、精算装置4000が設置されているエリアを出ようとしている顧客が精算処理を終えていない場合に、警告処理を行う機能を有する。そのために、実施形態2の精算システム2000は、以下のように構成される。

[0103] 実施形態2の生成部3040が生成する関連情報は、完了フラグをさらに示す。完了フラグは、その関連情報によって示される精算情報を用いた精算が完了したか否かを示す。つまり、実施形態2の生成部3040は、第1顧

客画像、精算情報、及び完了フラグを関連付けた関連情報を生成する。以下、精算が完了していることを示す完了フラグの値は「精算完了」であり、精算が完了していないことを示す完了フラグの値は「精算未完了」であるとする。図12は、実施形態2における関連付け情報300を例示する図である。関連付け情報300は、第1顧客画像302と精算情報ID304に加え、完了フラグ306をさらに有する。

- [0104] 実施形態2の精算システム2000は警告装置5000をさらに有する。警告装置5000は、第3撮像部5020、警告部5040、第2算出部5060、第2表示制御部5080、及び第2入力受付部5100を有する。第3撮像部5020は、撮像を行って、精算装置4000が設置されているエリアの出口（以下、単に「出口」とも表記する）にいる顧客を含む画像を生成する。以下、第3撮像部5020によって生成される画像を第3顧客画像と表記する。
- [0105] 警告部5040は、警告条件が満たされた場合に警告処理を行う。警告条件は、「第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像に関連付けられている完了フラグが精算未完了を示していること」である。警告部5040は、第2算出部5060、第2表示制御部5080、及び第2入力受付部5100による処理の結果に基づいて、警告条件が満たされているか否かを判定する。
- [0106] 第2算出部5060は、第3顧客画像に写っている顧客と各第1顧客画像に写っている顧客との第3類似度を算出する。警告部5040は、第3類似度が所定の第3閾値以上である顧客が写っている第1顧客画像がある場合、この第1顧客画像を、第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像とする。そこで、警告部5040は、この第1顧客画像と関連付けられている完了フラグが精算未完了を示している場合、警告条件が満たされていると判定する。なお、第3閾値の値は、第1閾値の値又は第2閾値の値と同じであってもよいし、これらと異なる値であってもよい。
- [0107] 第2表示制御部5080は、第3類似度が第3閾値以上である顧客が写っ

ている第1顧客画像がない場合に、店員が閲覧できるディスプレイ装置110に、第2候補画像を表示する。第2候補画像は、第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像の候補である。

[0108] 第2入力受付部5100は、第2候補画像を選択する入力を受け付ける。警告部5040は、第2入力受付部5100を介して選択された第2候補画像を、第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像とする。そこで、警告部5040は、この第1顧客画像と関連付けられている完了フラグが精算未完了を示している場合、警告条件が満たされていると判定する。

[0109] <処理の流れ>

図13は、実施形態2の警告装置5000によって実行される処理の流れを例示するフローチャートである。第3撮像部5020は、出口にいる顧客を撮像して、第3顧客画像を生成する(S302)。第2算出部5060は、各第1顧客画像について第3類似度を算出する(S304)。警告部5040は、第3類似度が第3閾値以上である顧客が写っている第1顧客画像があるか否かを判定する(S306)。第3類似度が第3閾値以上である顧客が写っている第1顧客画像がある場合(S306: YES)、図13の処理はS308に進む。一方、第3類似度が第3閾値以上である顧客が写っていない第1顧客画像がない場合(S306: NO)、図13の処理はS312に進む。

[0110] S308において、警告部5040は、「第3類似度が第3閾値以上である顧客が写っている第1顧客画像と関連付けられている完了フラグが、精算未完了を示しているか否か(警告条件が満たされているか否か)」を判定する。この警告条件が満たされている場合(S308: YES)、警告部5040は警告処理を行う(S310)。この警告条件が満たされていない場合(S308: NO)、図13の処理は終了する。

[0111] S312において、第2表示制御部5080は、ディスプレイ装置110に第2候補画像を表示する。第2入力受付部5100は、第2候補画像を選

択する入力を受け付ける（S 3 1 4）。

[0112] 警告部 5 0 4 0 は、「選択された第 2 候補画像と関連付けられている完了フラグが精算未完了を示しているか否か（警告条件が満たされているか否か）」を判定する（S 3 1 6）。この警告条件が満たされている場合（S 3 1 6 : YES）、図 1 3 の処理は S 3 1 0 に進む。一方、この警告条件が満たされていない場合（S 3 1 6 : NO）、図 1 3 の処理は終了する。

[0113] <ハードウェア構成例>

例えば警告装置 5 0 0 0 は、商品登録装置 3 0 0 0 や精算装置 4 0 0 0 を実現する計算機と同様のハードウェア構成を有する計算機によって実現される。この計算機の入出力インタフェースには、第 3 撮像部 5 0 2 0 を構成するハードウェア（例えばカメラ）が接続される。第 3 撮像部 5 0 2 0 は、出口の付近に設けられる。例えば、第 3 撮像部 5 0 2 0 は、この出口付近の天井に設けられる。また例えば、この出口に顧客が通るゲートがある場合、第 3 撮像部 5 0 2 0 はこのゲートに設けられてもよい。ただし、第 3 撮像部 5 0 2 0 は、出口にいる顧客を撮像できればよく、その設置場所は上述の例に限定されない。その他の点については、第 3 撮像部 5 0 2 0 は、第 1 撮像部 3 0 2 0 や第 2 撮像部 4 0 2 0 と同様に実装される。

[0114] 警告装置 5 0 0 0 を実現する計算機の入出力インタフェースには、ディスプレイ装置 1 1 0 が接続される。ディスプレイ装置 1 1 0 は出口付近に設けられている。また、ディスプレイ装置 1 1 0 は、店員が閲覧できるように設置される。

[0115] 警告装置 5 0 0 0 を実現する計算機の入出力インタフェースには、第 2 入力受付部 5 1 0 0 を実現するための入力デバイスが接続される。例えばこの入力デバイスは、ディスプレイ装置 1 1 0 に内蔵されるタッチパネルである。また例えば、この入力デバイスは、キーボードやマウスなどであってもよい。

[0116] 警告装置 5 0 0 0 を実現する計算機のストレージは、第 3 撮像部 5 0 2 0 、警告部 5 0 4 0 、第 2 算出部 5 0 6 0 、第 2 表示制御部 5 0 8 0 、及び第

2入力受付部5100を実現するプログラムモジュールをそれぞれ有する。警告装置5000を実現する計算機のプロセッサは、このプログラムモジュールを実行することで、これらの機能構成部の機能を実現する。

[0117] <第2算出部5060が行う処理の詳細>

第2算出部5060は、各第1顧客画像に写っている顧客と第3顧客画像に写っている顧客との第3類似度を算出する(S304)。第3類似度の算出に用いるアルゴリズムは、第1類似度又は第2類似度を算出するアルゴリズムと同じであってもよいし、異なってもよい。

[0118] 第3類似度の算出対象である第1顧客画像は、いずれかの関連情報において精算情報と関連付けられている第1顧客画像である。第2算出部5060は、第1算出部4040が関連情報において精算情報と関連付けられている各第1顧客画像を取得する方法と同様の方法で、各第1顧客画像を取得する。

[0119] <第2表示制御部5080が行う処理の詳細>

第2表示制御部5080は、第3類似度が第3閾値以上である第1顧客画像がない場合(S306:NO)、第2表示制御部5080は、店員が閲覧できるディスプレイ装置110において、第2候補画像(第3顧客画像に写っている顧客の候補を表す第1顧客画像)を表示する(S312)。ここで、どの第1顧客画像を第2候補画像にするかを決定する方法は、実施形態1において候補画像を決定する方法と同様である。以下、この方法を具体的に説明する。

[0120] 例えば第2算出部5060が、第3類似度を算出する方法と異なる方法を用いて、第1顧客画像に写っている顧客と第3顧客画像に写っている顧客との第4類似度を算出する。そして、第2表示制御部5080は、第4類似度が第3閾値以上である第1顧客画像を、第2候補画像として表示する。

[0121] ここで、第2類似度を算出するアルゴリズムは第1類似度を算出するアルゴリズムよりも大きい類似度を算出することが好ましい理由と同様の理由により、第4類似度を算出するアルゴリズムは第3類似度を算出するアルゴリ

ズムよりも大きい類似度を算出することが好ましい。例えば第2算出部5060は、第3類似度を算出するアルゴリズムに、第1類似度を算出するアルゴリズムと同じアルゴリズムを利用し、第4類似度を算出するアルゴリズムに、第2類似度を算出するアルゴリズムと同じアルゴリズムを利用する。

[0122] また例えば、第2表示制御部5080は、第3類似度が第4閾値以上である第1顧客画像を、第2候補画像として表示してもよい。第4閾値は、第3閾値より小さい値である。

[0123] <第2入力受付部5100が行う処理の詳細>

第2入力受付部5100は、第2候補画像を選択する処理を受け付ける（S314）。第2候補画像の選択は、店員によって行われる。第2入力受付部5100が第2候補画像の選択を受け付ける方法は、第1入力受付部4100が候補画像の選択を受け付ける方法と同様である。

[0124] <警告部5040が行う処理の詳細>

警告部5040は、警告条件が満たされている場合に警告処理を行う（S310）。前述したように、警告条件は、「第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像に関連付けられている完了フラグが精算未完了を示していること」である。ここで、警告部5040は、1) 第3類似度が第3閾値以上である第1顧客画像、又は2) 顧客によって選択される第2候補画像を、「第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像」として扱う。1) 及び2) については、前述した通りである。

[0125] 警告部5040は、関連情報が記憶されている記憶部にアクセスして、「第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像」と関連付けられている完了フラグを取得する。そして、警告部5040は、完了フラグの値が精算未完了であるか否かを判定する。

[0126] <<警告処理の詳細>>

警告部5040が行う警告処理は様々である。例えば警告部5040は、第1撮像部3020によって撮像された顧客、又は店員や警備員などが聞く

ことができる場所で、アラーム音を出力する。例えばこの場所は、出口付近、商品登録装置3000の付近、又は警備室などである。この場合、アラーム音を出力する場所に、アラーム音を出力するスピーカなどが設置される。

[0127] また例えば、警告部5040は、第3撮像部5020によって撮像された顧客、又は店員や警備員などが見ることができる場所に、精算が完了していない旨の警告メッセージを表示する。具体的には、警告部5040は、出口に設けられているディスプレイ装置110、各商品登録装置3000に設けられているディスプレイ装置20、又は警備員室に設けられているディスプレイ装置などに警告メッセージを表示する。

[0128] また、出口にゲートが設置されている場合、警告部5040は、警告条件が満たされた場合に、そのゲートを閉じる処理を行ってもよい。こうすることで、顧客が出口から出られなくなるため、精算を行っていない顧客が誤って帰ってしまうことを防ぐことができる。

[0129] また、精算システム2000を運用する店舗において会員制度が導入されている場合、警告部5040は、会員情報を利用して警告を行ってもよい。具体的には、会員の画像（顔写真など）及び会員の連絡先（メールアドレスなど）が、会員情報として予め登録されているとする。警告条件が満たされている場合、警告部5040は、会員情報が記憶されているデータベース等にアクセスし、第3顧客画像に写っている顧客と同じ顧客が写っている会員の画像を検索する。そして、警告部5040は、このような画像があった場合、その画像が示されている会員情報が示す顧客の連絡先に、警告メッセージを送信する。例えば警告部5040は、顧客のメールアドレス宛に、警告メッセージを含むメールを送信する。会員情報を利用することで、顧客に対して直接的に警告メッセージを行うことができる。そのため、顧客が誤って精算を忘れて出口を出てしまった場合でも、そのことが他の人に分からないように、顧客に対して警告を行うことができる。よって、顧客のプライバシーを守ることができる。

[0130] <具体例>



実施形態2の精算システム2000の動作を具体的に例示する。図14は、実施形態2の精算システム2000の運用環境を例示する図である。図14において、精算装置4000は、エリア80の中に設置されている。出口90は、エリア80の出口である。ゲート100は、出口90を出る際に顧客が通過するゲートである。図14において、第3撮像部5020は、このゲート100に備えられている。

[0131] 通常、顧客は、商品登録装置3000を利用した後、精算装置4000を利用して精算を行う。精算装置4000は、その顧客の精算が完了した際、入力受付部4100を介して顧客が選択した第1顧客画像に関連付けられている完了フラグの値を「精算完了」に変更する。

[0132] 顧客がゲート100を通過する際、第3撮像部5020は、その顧客を撮像して第3顧客画像を生成する。そして、警告部5040は、第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像と関連付けられている完了フラグが「精算未完了」を示しているか否かを判定する。上述のように、顧客が精算を完了していれば、完了フラグは「精算完了」を示している。そのため、警告部5040は警告処理を行わない。

[0133] 一方、顧客が精算を行っていないと、第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像と関連付けられている完了フラグは「精算未完了」を示している。この場合、警告部5040は警告処理を行う。例えば警告部5040は、ゲート100を閉じ、ゲート100に設けられているディスプレイ装置に警告メッセージを表示する。

[0134] <作用・効果>

本実施形態の精算システム2000は、「第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像」と関連付けられている完了フラグが精算未完了である場合、警告処理を行う。これは、顧客が、購入する商品の精算を行う前に出口を出ようとした場合（又は出口を出た場合）に警告が行われることを意味する。よって、本実施形態の精算システム2000によれば、顧客が精算を忘れて帰ってしまうことを防止することができるため、顧

客と店舗との間でトラブルが発生することを未然に防ぐことができる。

[0135] また、警告装置 5000 は、第 3 類似度が第 3 閾値以上である第 1 顧客画像がない場合、第 2 候補画像を表示して、ディスプレイ装置 110 を閲覧する店員に第 2 候補画像を選択させる。例えば、商品登録装置 3000 を利用した時と出口を出る時とで、顧客が身につけているものが変わっている場合がある。具体的には、顧客が、商品登録装置 3000 を利用した時に装着していたマスクを、出口を出る前に外すことなどが考えられる。このような場合、実際には第 3 顧客画像に写っている顧客と同じ顧客が写っている第 1 顧客画像があるにも関わらず、これらの第 3 類似度が低くなってしまふ。よって、精算が完了していない顧客が出口を出ても、警告が行われなくなってしまう。

[0136] 本実施形態の警告装置 5000 によれば、第 3 類似度が第 3 閾値以上である第 1 顧客画像がない場合に第 2 候補画像が表示されるため、店員は、出口を出ようとしている顧客と同じ顧客が写っている第 2 候補画像があるか否かを、目で見て判断することができる。そして、店員の目から見て、出口から出ようとしている顧客と同じ顧客が写っている第 2 候補画像がある場合、店員がその第 2 候補画像を選択することで、警告装置 5000 は、その第 2 候補画像と関連付けられている精算情報に基づく精算が完了しているか否かを判定する。そして、警告装置 5000 は、精算が完了していない場合、警告処理を行う。よって、本実施形態の警告装置 5000 は、人による判断も利用することで、顧客が精算を忘れて帰ってしまうことをより確実に防止することができる。

[0137] 以上、図面を参照して本発明の実施形態について述べたが、これらは本発明の例示であり、上記各実施形態の組み合わせ、又は上記以外の様々な構成を採用することもできる。

[0138] 以下、参考形態の例を付記する。

1. 商品登録装置及び精算装置を有する精算システムであって、前記商品登録装置は、

- 顧客を含む第1顧客画像を生成する第1撮像手段と、  
前記第1顧客画像に対して商品の精算に用いる精算情報を関連付けた関連付け情報を生成する生成手段と、を有し、  
前記精算装置は、  
顧客を含む第2顧客画像を生成する第2撮像手段と、  
前記第2顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像の候補である候補画像を、顧客が閲覧できるディスプレイ装置に表示する第1表示制御手段と、を有する精算システム。
2. 前記第2顧客画像に写っている顧客と各前記第1顧客画像に写っている顧客との第1類似度を算出する第1算出手段と、  
前記第2顧客画像に写っている顧客との第1類似度が第1閾値以上である顧客が写っている第1顧客画像がある場合、その第1顧客画像と関連付けられている前記精算情報を取得する取得手段と、を有し、  
前記第1表示制御手段は、前記第2顧客画像に写っている顧客との第1類似度が第1閾値以上である顧客が写っている第1顧客画像がない場合に、前記候補画像を表示する、1.に記載の精算システム。
3. 前記精算装置は、前記候補画像に対する選択操作を受け付ける入力受付手段を有し、  
前記取得手段は、選択された前記候補画像と関連付けられている前記精算情報を取得する、2.に記載の精算システム。
4. 前記精算装置は、前記候補画像が選択されなかった場合、前記第2顧客画像に写っている顧客と同じ顧客が写っている前記第1顧客画像がないと判定する判定手段を有する3.に記載の精算システム。
5. 前記第1算出手段は、前記第2顧客画像に写っている顧客との第1類似度が第1閾値以上である顧客が写っている第1顧客画像がない場合、第1類似度を算出する方法とは異なる方法を用いて、前記第2顧客画像に写っている顧客と各前記第1顧客画像に写っている顧客との第2類似度を算出し、  
前記第1表示制御手段は、前記第2顧客画像に写っている顧客との第2類

似度が前記第 1 閾値以上である顧客が写っている第 1 顧客画像を、前記候補画像として表示する、2.乃至4.いずれか一つに記載の精算システム。

6. 前記第 1 表示制御手段は、前記第 2 顧客画像に写っている顧客との第 1 類似度が第 1 閾値以上である顧客が写っている第 1 顧客画像がない場合、前記第 2 顧客画像に写っている顧客との第 1 類似度が、前記第 1 閾値より小さい第 2 閾値以上である顧客が写っている第 1 顧客画像を、前記候補画像として表示する、2.乃至4.いずれか一つに記載の精算システム。

7. 当該精算システムは、複数の前記商品登録装置及び複数の前記精算装置を有し、

前記第 1 表示制御手段は、その第 1 表示制御手段を有する精算装置と関連付けられている前記商品登録装置によって生成された前記第 1 顧客画像を、前記候補画像として表示する、1.乃至4.いずれか一つに記載の精算システム。

8. 前記生成手段は、前記第 1 顧客画像の撮像時点をさらに示す前記関連付け情報を生成し、

前記第 1 算出手段は、撮像時点と現在時刻との差が所定時間以内である前記第 1 顧客画像について類似度を算出する2.乃至6.いずれか一つに記載の精算システム。

9. 前記生成手段は、前記関連付け情報において、その関連付け情報によって示される前記精算情報を用いた精算が完了したか否かを示す完了フラグをさらに関連付け、

前記精算システムは、

前記精算装置が設置されているエリアの出口にいる顧客を含む第 3 顧客画像を生成する第 3 撮像手段と、

前記第 3 顧客画像に写っている顧客と同じ顧客が写っている第 1 顧客画像に関連付けられている前記完了フラグが、前記精算情報を用いた精算が完了していないことを示している場合、警告処理を行う警告手段と、を有する警告装置を有する1.乃至8.いずれか一つに記載の精算システム。

10. 前記警告装置は、前記第3顧客画像に写っている顧客と各前記第1顧客画像に写っている顧客との第3類似度を算出する第2算出手段を有し、

前記警告手段は、前記第3類似度が第3閾値以上である顧客が写っている第1顧客画像がある場合、その第1顧客画像を、前記第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像とし、

前記警告装置は、

前記第3類似度が第3閾値以上である顧客が写っている第1顧客画像がない場合に、前記第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像の候補である第2候補画像を前記出口に設けられているディスプレイ装置に表示する第2表示制御手段と、

前記第2候補画像を選択する入力を受け付ける第2入力受付手段と、を有し、

前記警告手段は、前記第3類似度が第3閾値以上である顧客が写っている第1顧客画像がない場合、前記第2入力受付手段を介して選択された第2候補画像を、前記第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像とする、9.に記載の精算システム。

11 前記第2算出手段は、前記第3類似度が前記第3閾値以上である顧客が写っている第1顧客画像がない場合、前記第3類似度を算出する方法とは異なる方法を用いて、前記第3顧客画像に写っている顧客と各前記第1顧客画像に写っている顧客との第4類似度を算出し、

前記第2表示制御手段は、前記第4類似度が前記第3閾値以上である顧客が写っている第1顧客画像を、第2候補画像として表示する、10.に記載の精算システム。

12. 前記第2表示制御手段は、前記第3類似度が前記第3閾値より小さい第4閾値以上である顧客が写っている第1顧客画像を前記第2候補画像として表示する、10.に記載の情報処理システム。

13. 1.乃至12.いずれか一つに記載の情報処理システムが有する精算装置。

14. コンピュータを13.に記載の精算装置として動作させるプログラム。

15. 商品登録装置及び精算装置を有する精算システムにおいて実行される精算方法であって、

前記商品登録装置が、顧客を含む第1顧客画像を生成する第1撮像ステップと、

前記商品登録装置が、前記第1顧客画像に対して商品の精算に用いる精算情報を関連付けた関連付け情報を生成する生成ステップと、

前記精算装置が、顧客を含む第2顧客画像を生成する第2撮像ステップと、

前記精算装置が、前記第2顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像の候補である候補画像を、顧客が閲覧できるディスプレイ装置に表示する第1表示制御ステップと、を有する精算方法。

16. 前記精算装置が、前記第2顧客画像に写っている顧客と各前記第1顧客画像に写っている顧客との第1類似度を算出する第1算出ステップと、

前記精算装置が、前記第2顧客画像に写っている顧客との第1類似度が第1閾値以上である顧客が写っている第1顧客画像がある場合、その第1顧客画像と関連付けられている前記精算情報を取得する取得ステップと、を有し、

前記第1表示制御ステップは、前記第2顧客画像に写っている顧客との第1類似度が第1閾値以上である顧客が写っている第1顧客画像がない場合に、前記候補画像を表示する、15.に記載の精算方法。

17. 前記精算装置が、前記候補画像に対する選択操作を受け付ける入力受付ステップを有し、

前記取得ステップは、選択された前記候補画像と関連付けられている前記精算情報を取得する、16.に記載の精算方法。

18. 前記精算装置が、前記候補画像が選択されなかった場合、前記第2顧客画像に写っている顧客と同じ顧客が写っている前記第1顧客画像がない

と判定する判定ステップを有する、17.に記載の精算方法。

19. 前記第1算出ステップは、前記第2顧客画像に写っている顧客との第1類似度が第1閾値以上である顧客が写っている第1顧客画像がない場合、第1類似度を算出する方法とは異なる方法を用いて、前記第2顧客画像に写っている顧客と各前記第1顧客画像に写っている顧客との第2類似度を算出し、

前記第1表示制御ステップは、前記第2顧客画像に写っている顧客との第2類似度が前記第1閾値以上である顧客が写っている第1顧客画像を、前記候補画像として表示する16.乃至18.いずれか一つに記載の精算方法。

20. 前記第1表示制御ステップは、前記第2顧客画像に写っている顧客との第1類似度が第1閾値以上である顧客が写っている第1顧客画像がない場合、前記第2顧客画像に写っている顧客との第1類似度が、前記第1閾値より小さい第2閾値以上である顧客が写っている第1顧客画像を、前記候補画像として表示する、16.乃至18.いずれか一つに記載の精算方法。

21. 当該精算方法は、複数の前記商品登録装置及び複数の前記精算装置を有し、

前記第1表示制御ステップは、その第1表示制御ステップを実行する精算装置と関連付けられている前記商品登録装置によって生成された前記第1顧客画像を、前記候補画像として表示する、15.乃至18.いずれか一つに記載の精算方法。

22. 前記生成ステップは、前記第1顧客画像の撮像時点をさらに示す前記関連付け情報を生成し、

前記第1算出ステップは、撮像時点と現在時刻との差が所定時間以内である前記第1顧客画像について類似度を算出する16.乃至20.いずれか一つに記載の精算方法。

23. 前記生成ステップは、前記関連付け情報において、その関連付け情報によって示される前記精算情報を用いた精算が完了したか否かを示す完了フラグをさらに関連付け、

前記精算システムは、警告装置をさらに有し、

当該精算システムは、

前記警告装置が、前記精算装置が設置されているエリアの出口にいる顧客を含む第3顧客画像を生成する第3撮像ステップと、

前記警告装置が、前記第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像に関連付けられている前記完了フラグが、前記精算情報を用いた精算が完了していないことを示している場合、警告処理を行う警告ステップと、を有する15.乃至22.いずれか一つに記載の精算方法。

24. 前記警告装置が、前記第3顧客画像に写っている顧客と各前記第1顧客画像に写っている顧客との第3類似度を算出する第2算出ステップを有し、

前記警告ステップは、前記第3類似度が第3閾値以上である顧客が写っている第1顧客画像がある場合、その第1顧客画像を、前記第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像とし、

前記警告装置が、前記第3類似度が第3閾値以上である顧客が写っている第1顧客画像がない場合に、前記第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像の候補である第2候補画像を前記出口に設けられているディスプレイ装置に表示する第2表示制御ステップと、

前記警告装置が、前記第2候補画像を選択する入力を受け付ける第2入力受付ステップと、を有し、

前記警告ステップは、前記第3類似度が第3閾値以上である顧客が写っている第1顧客画像がない場合、前記第2入力受付ステップを介して選択された第2候補画像を、前記第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像とする、23.に記載の精算方法。

25. 前記第2算出ステップは、前記第3類似度が前記第3閾値以上である顧客が写っている第1顧客画像がない場合、前記第3類似度を算出する方法とは異なる方法を用いて、前記第3顧客画像に写っている顧客と各前記第1顧客画像に写っている顧客との第4類似度を算出し、



前記第2表示制御ステップは、前記第4類似度が前記第3閾値以上である顧客が写っている第1顧客画像を、第2候補画像として表示する、24.に記載の精算方法。

26. 前記第2表示制御ステップは、前記第3類似度が前記第3閾値より小さい第4閾値以上である顧客が写っている第1顧客画像を前記第2候補画像として表示する、24.に記載の精算方法。

[0139] この出願は、2015年3月31日に出願された日本出願特願2015-072035号を基礎とする優先権を主張し、その開示の全てをここに取り込む。

## 請求の範囲

- [請求項1] 商品登録装置及び精算装置を有する精算システムであって、  
前記商品登録装置は、  
顧客を含む第1顧客画像を生成する第1撮像手段と、  
前記第1顧客画像に対して商品の精算に用いる精算情報を関連付けた関連付け情報を生成する生成手段と、を有し、  
前記精算装置は、  
顧客を含む第2顧客画像を生成する第2撮像手段と、  
前記第2顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像の候補である候補画像を、顧客が閲覧できるディスプレイ装置に表示する第1表示制御手段と、を有する精算システム。
- [請求項2] 前記第2顧客画像に写っている顧客と各前記第1顧客画像に写っている顧客との第1類似度を算出する第1算出手段と、  
前記第2顧客画像に写っている顧客との第1類似度が第1閾値以上である顧客が写っている第1顧客画像がある場合、その第1顧客画像と関連付けられている前記精算情報を取得する取得手段と、を有し、  
前記第1表示制御手段は、前記第2顧客画像に写っている顧客との第1類似度が第1閾値以上である顧客が写っている第1顧客画像がない場合に、前記候補画像を表示する、請求項1に記載の精算システム。
- [請求項3] 前記精算装置は、前記候補画像に対する選択操作を受け付ける入力受付手段を有し、  
前記取得手段は、選択された前記候補画像と関連付けられている前記精算情報を取得する、請求項2に記載の精算システム。
- [請求項4] 前記精算装置は、前記候補画像が選択されなかった場合、前記第2顧客画像に写っている顧客と同じ顧客が写っている前記第1顧客画像がないと判定する判定手段を有する請求項3に記載の精算システム。
- [請求項5] 前記第1算出手段は、前記第2顧客画像に写っている顧客との第1

類似度が第1 閾値以上である顧客が写っている第1 顧客画像がない場合、第1 類似度を算出する方法とは異なる方法を用いて、前記第2 顧客画像に写っている顧客と各前記第1 顧客画像に写っている顧客との第2 類似度を算出し、

前記第1 表示制御手段は、前記第2 顧客画像に写っている顧客との第2 類似度が前記第1 閾値以上である顧客が写っている第1 顧客画像を、前記候補画像として表示する、請求項2 乃至4 いずれか一項に記載の精算システム。

[請求項6] 前記第1 表示制御手段は、前記第2 顧客画像に写っている顧客との第1 類似度が第1 閾値以上である顧客が写っている第1 顧客画像がない場合、前記第2 顧客画像に写っている顧客との第1 類似度が、前記第1 閾値より小さい第2 閾値以上である顧客が写っている第1 顧客画像を、前記候補画像として表示する、請求項2 乃至4 いずれか一項に記載の精算システム。

[請求項7] 当該精算システムは、複数の前記商品登録装置及び複数の前記精算装置を有し、

前記第1 表示制御手段は、その第1 表示制御手段を有する精算装置と関連付けられている前記商品登録装置によって生成された前記第1 顧客画像を、前記候補画像として表示する、請求項1 乃至4 いずれか一項に記載の精算システム。

[請求項8] 前記生成手段は、前記第1 顧客画像の撮像時点をさらに示す前記関連付け情報を生成し、

前記第1 算出手段は、撮像時点と現在時刻との差が所定時間以内である前記第1 顧客画像について類似度を算出する請求項2 乃至6 いずれか一項に記載の精算システム。

[請求項9] 前記生成手段は、前記関連付け情報において、その関連付け情報によって示される前記精算情報を用いた精算が完了したか否かを示す完了フラグをさらに関連付け、

前記精算システムは、

前記精算装置が設置されているエリアの出口にいる顧客を含む第3顧客画像を生成する第3撮像手段と、

前記第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像に関連付けられている前記完了フラグが、前記精算情報を用いた精算が完了していないことを示している場合、警告処理を行う警告手段と、を有する警告装置を有する請求項1乃至8いずれか一項に記載の精算システム。

[請求項10]

前記警告装置は、前記第3顧客画像に写っている顧客と各前記第1顧客画像に写っている顧客との第3類似度を算出する第2算出手段を有し、

前記警告手段は、前記第3類似度が第3閾値以上である顧客が写っている第1顧客画像がある場合、その第1顧客画像を、前記第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像とし、

前記警告装置は、

前記第3類似度が第3閾値以上である顧客が写っている第1顧客画像がない場合に、前記第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像の候補である第2候補画像を前記出口に設けられているディスプレイ装置に表示する第2表示制御手段と、

前記第2候補画像を選択する入力を受け付ける第2入力受付手段と、を有し、

前記警告手段は、前記第3類似度が第3閾値以上である顧客が写っている第1顧客画像がない場合、前記第2入力受付手段を介して選択された第2候補画像を、前記第3顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像とする、請求項9に記載の精算システム。

[請求項11]

前記第2算出手段は、前記第3類似度が前記第3閾値以上である顧客が写っている第1顧客画像がない場合、前記第3類似度を算出する

方法とは異なる方法を用いて、前記第3顧客画像に写っている顧客と各前記第1顧客画像に写っている顧客との第4類似度を算出し、

前記第2表示制御手段は、前記第4類似度が前記第3閾値以上である顧客が写っている第1顧客画像を、第2候補画像として表示する、請求項10に記載の精算システム。

[請求項12] 前記第2表示制御手段は、前記第3類似度が前記第3閾値より小さい第4閾値以上である顧客が写っている第1顧客画像を前記第2候補画像として表示する、請求項10に記載の情報処理システム。

[請求項13] 請求項1乃至12いずれか一項に記載の情報処理システムが有する精算装置。

[請求項14] コンピュータを請求項13に記載の精算装置として動作させるプログラム。

[請求項15] 商品登録装置及び精算装置を有する精算システムにおいて実行される精算方法であって、

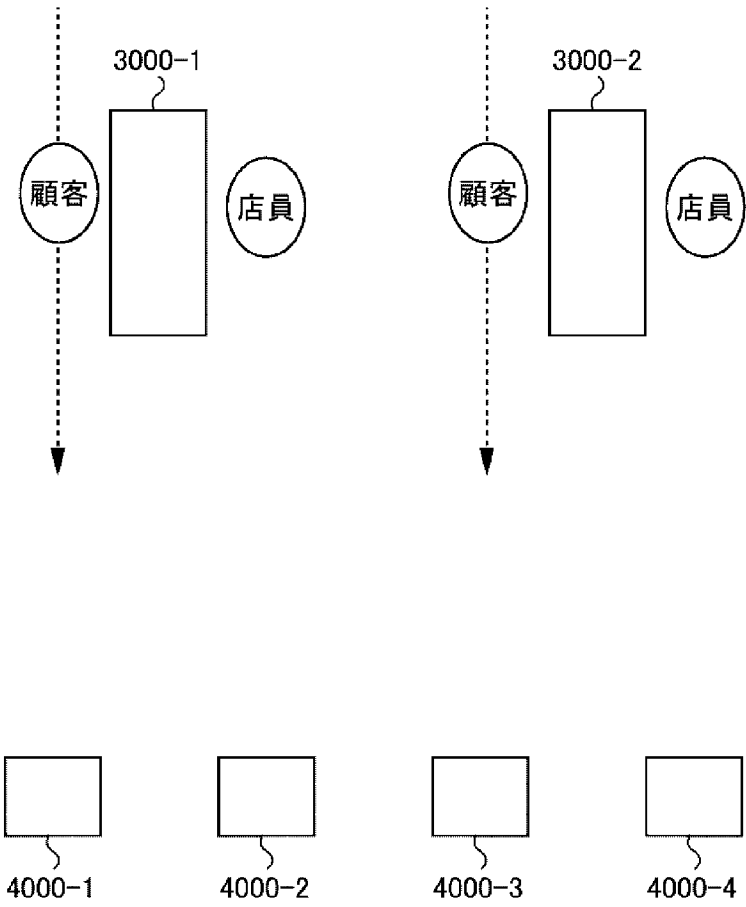
前記商品登録装置が、顧客を含む第1顧客画像を生成する第1撮像ステップと、

前記商品登録装置が、前記第1顧客画像に対して商品の精算に用いる精算情報を関連付けた関連付け情報を生成する生成ステップと、

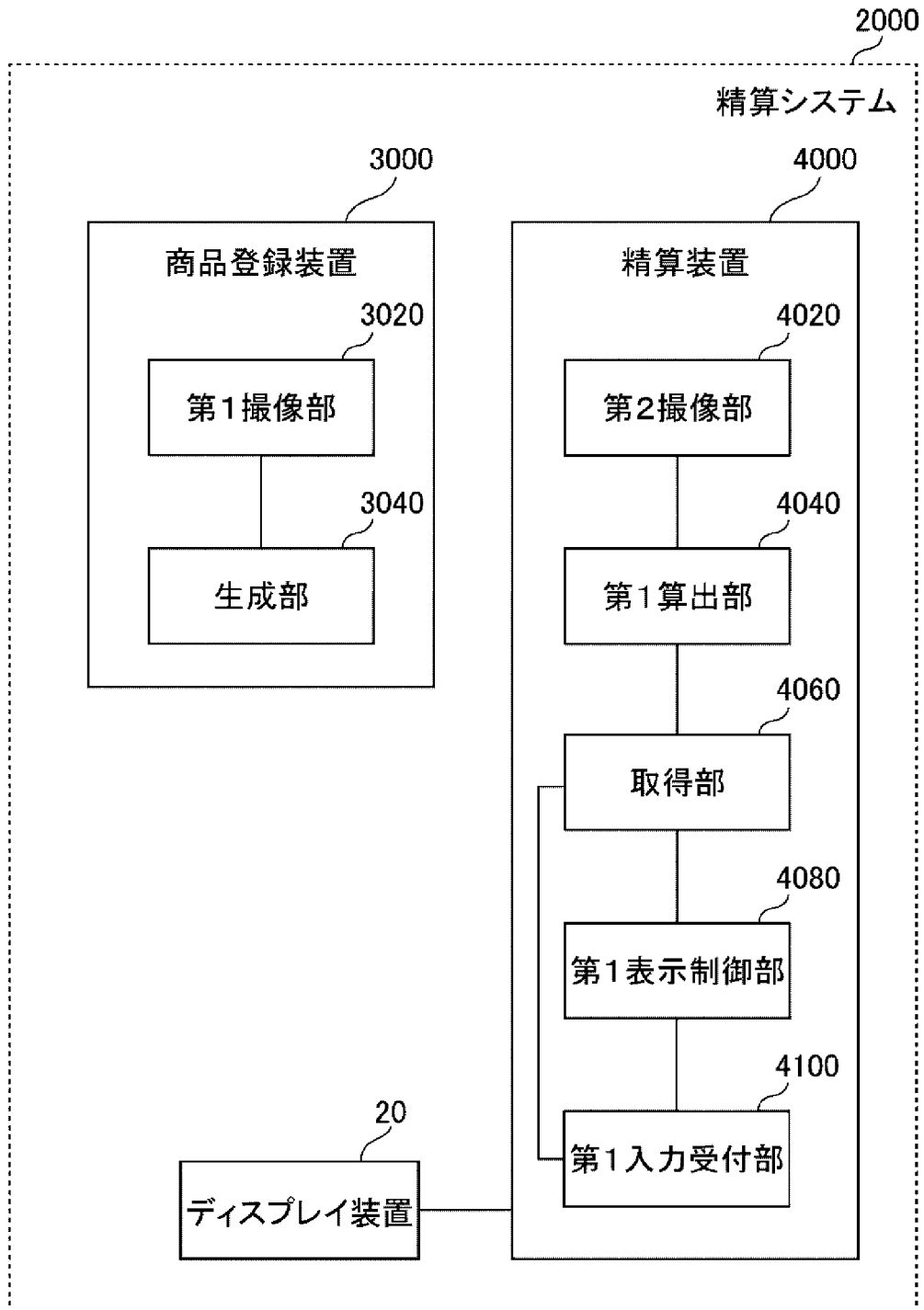
前記精算装置が、顧客を含む第2顧客画像を生成する第2撮像ステップと、

前記精算装置が、前記第2顧客画像に写っている顧客と同じ顧客が写っている第1顧客画像の候補である候補画像を、顧客が閲覧できるディスプレイ装置に表示する第1表示制御ステップと、を有する精算方法。

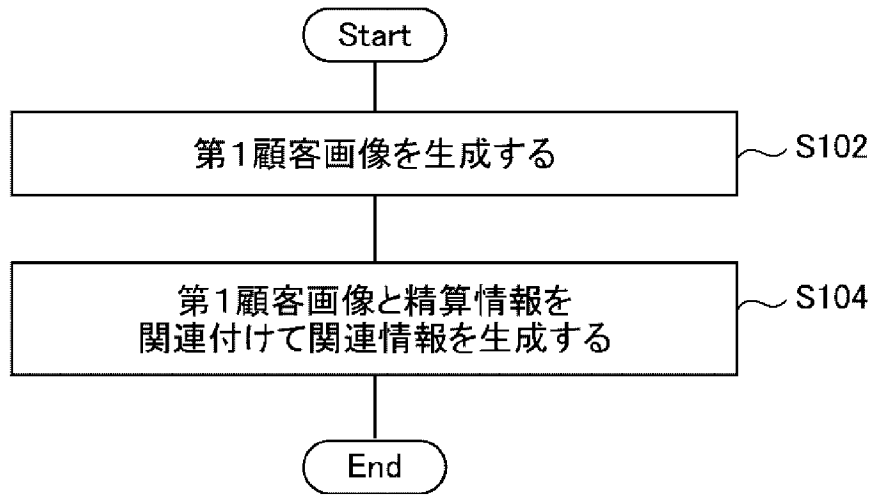
[図1]



[図2]

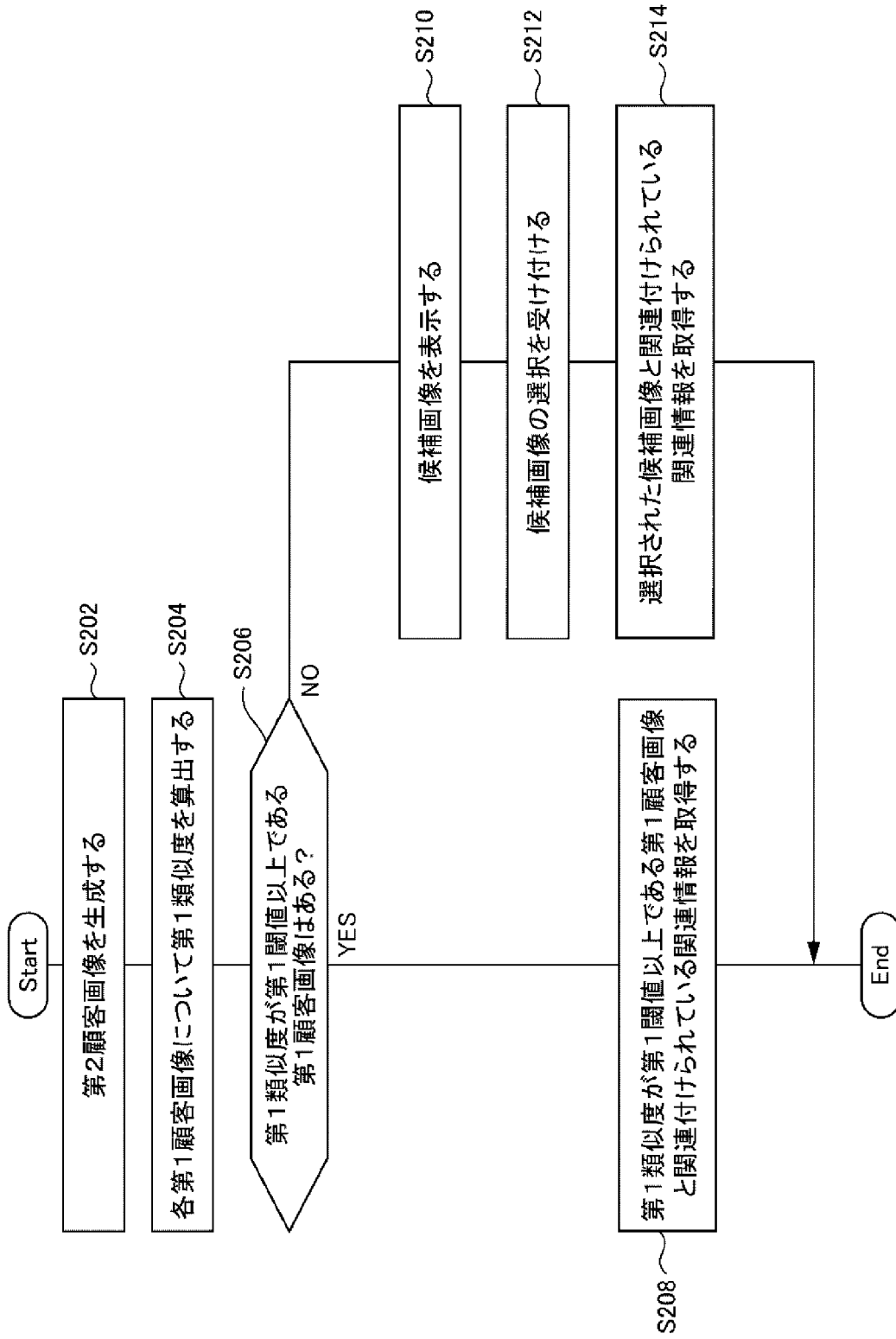


[図3]

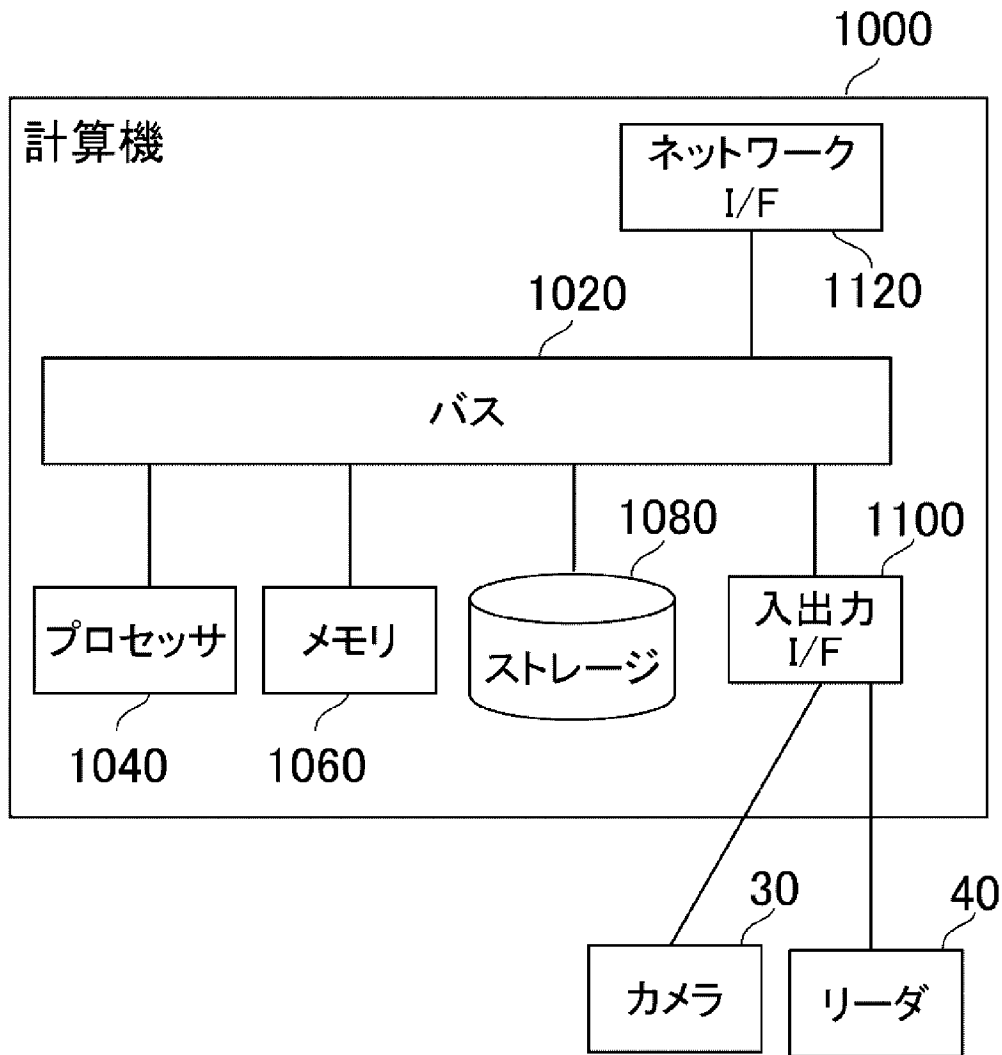




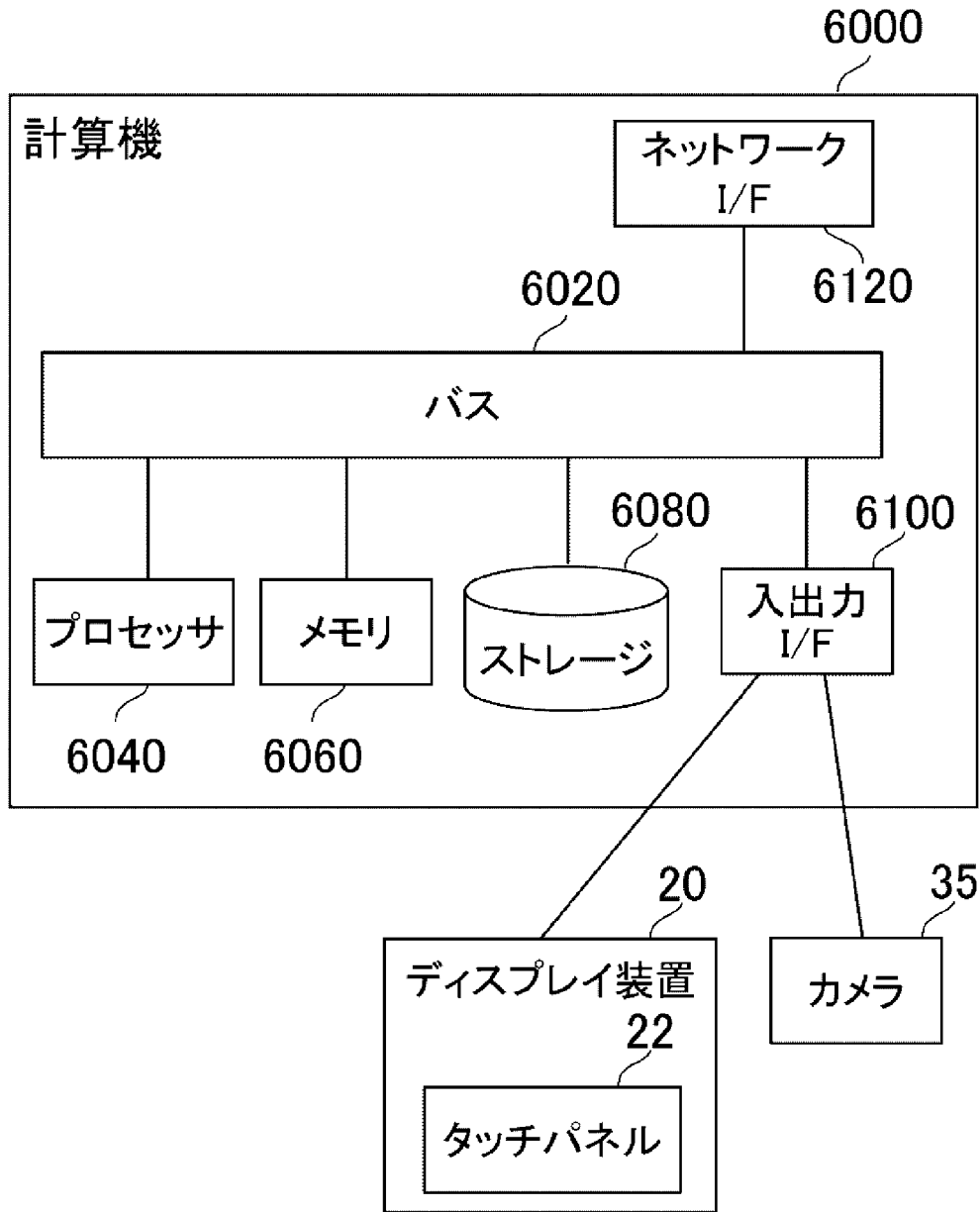
[図4]



[図5]



[図6]



[図7]

200

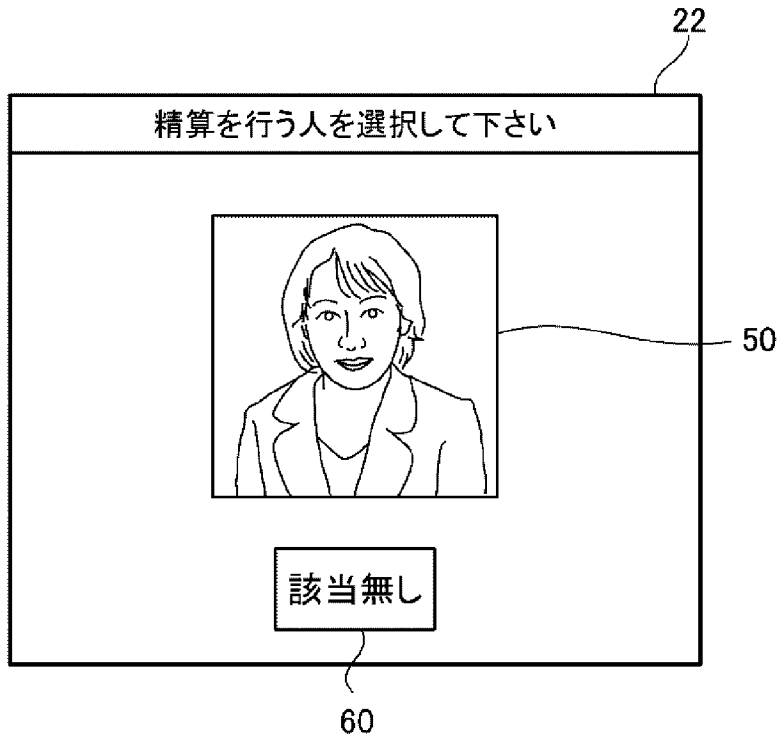
202 精算情報ID	206 商品リスト		
P001	204 商品ID I001	商品ID I003	...

[図8]

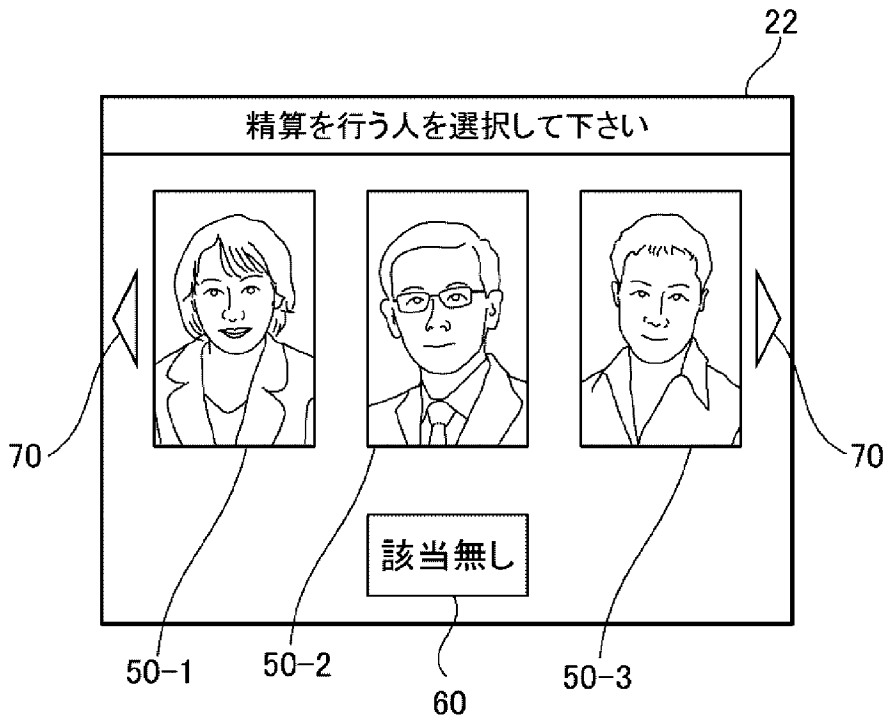
300

302 第1顧客画像	304 精算情報ID
FC_001.png	P003
FC_002.png	P005
FC_003.png	P001

[図9]

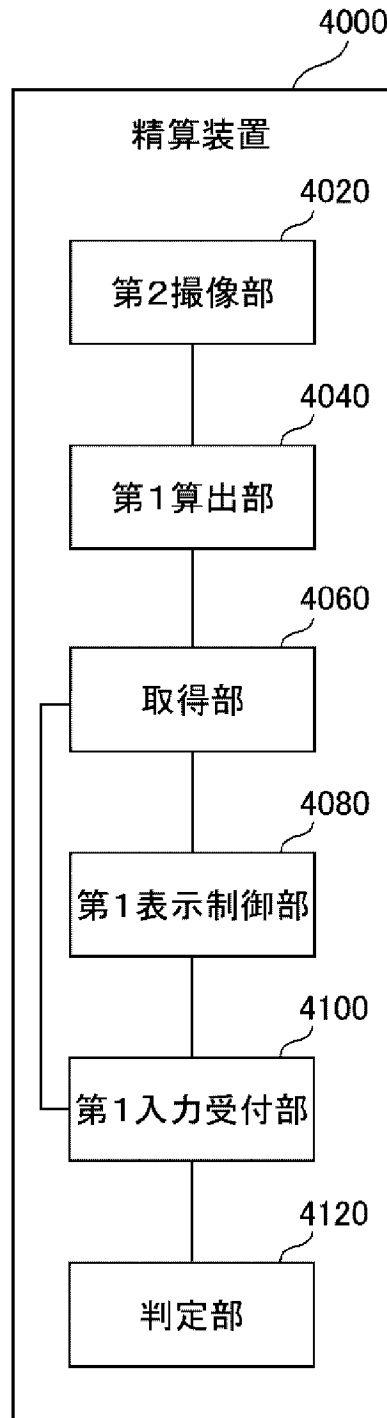


(a)

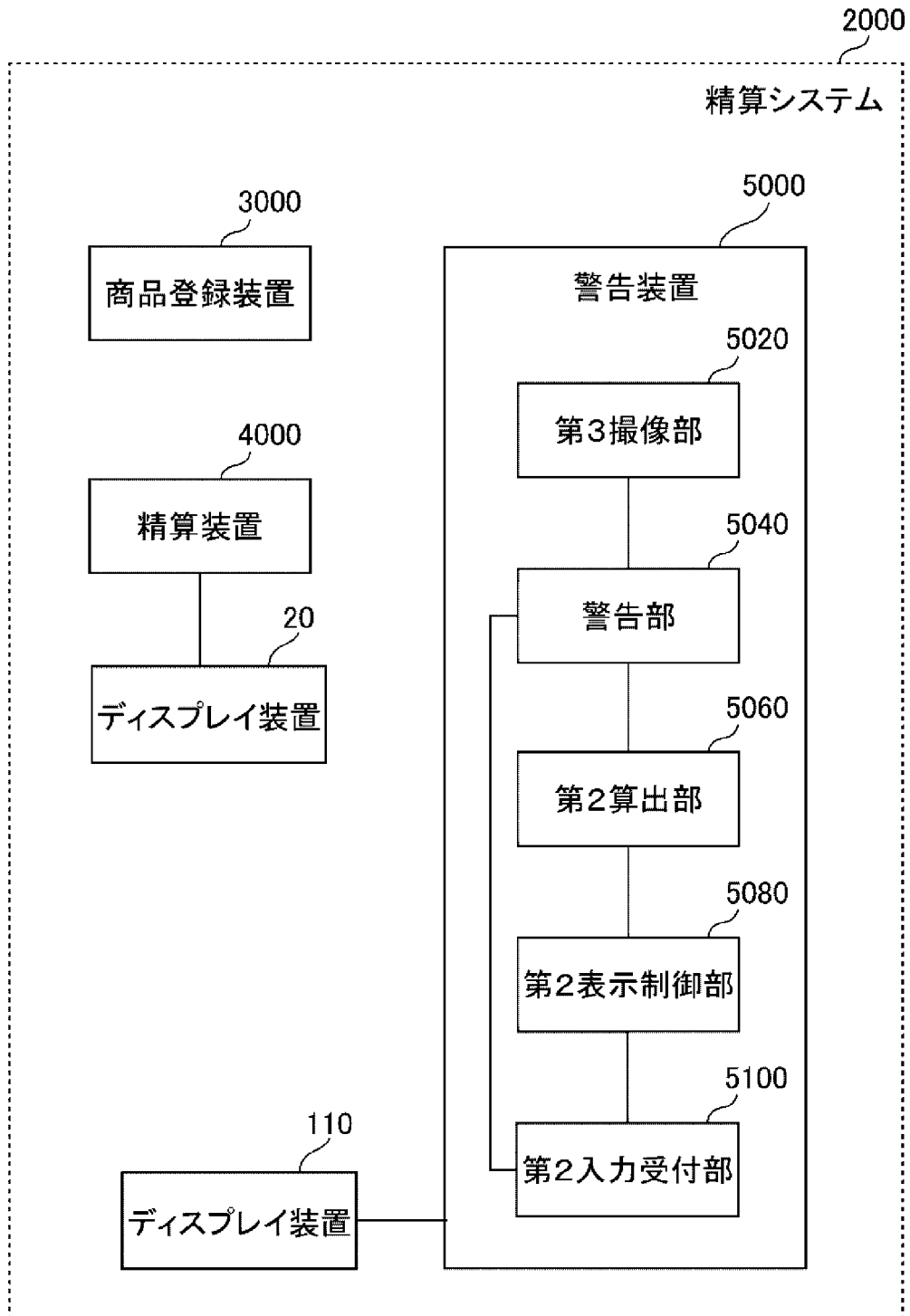


(b)

[図10]



[図11]



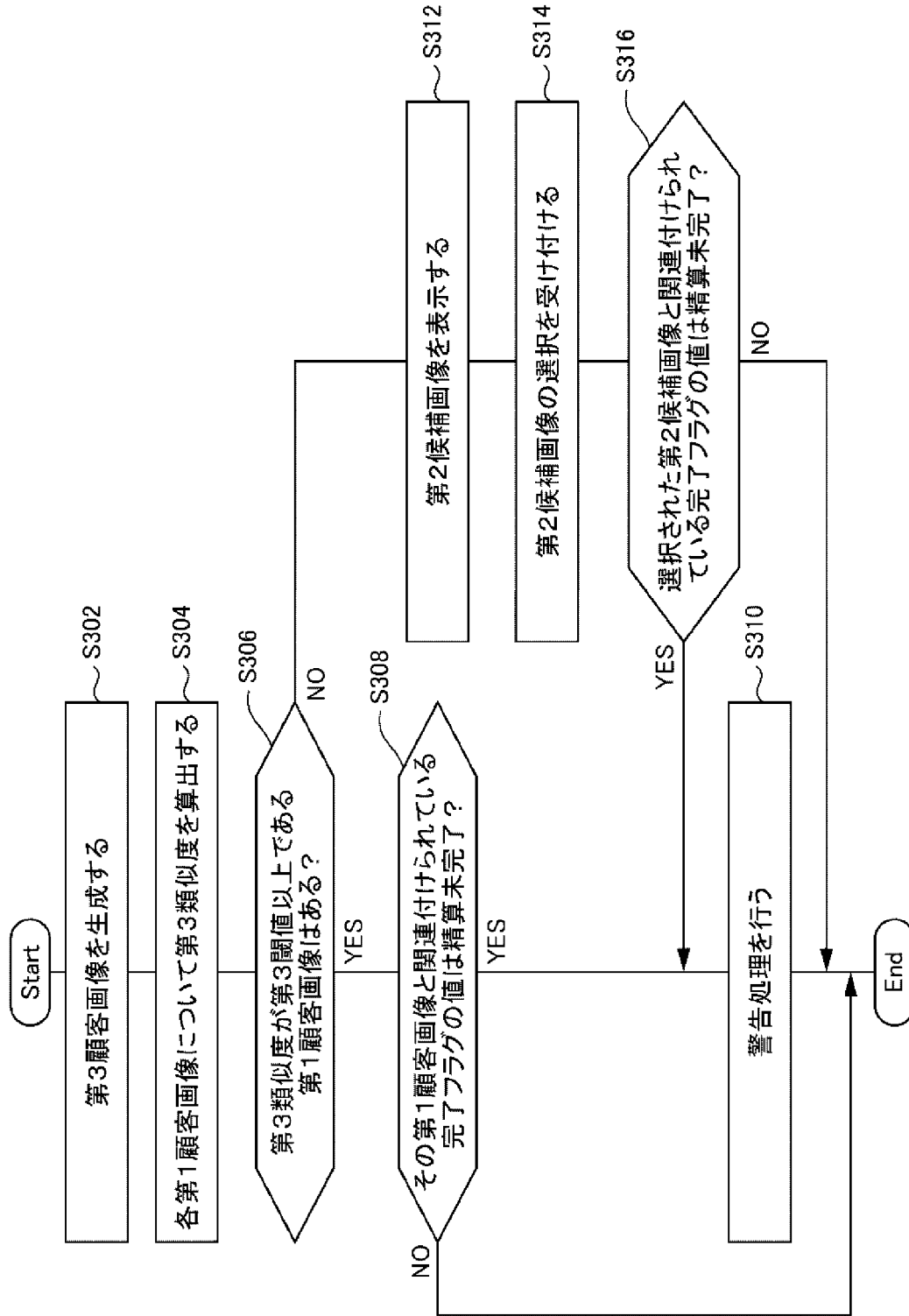


[図12]

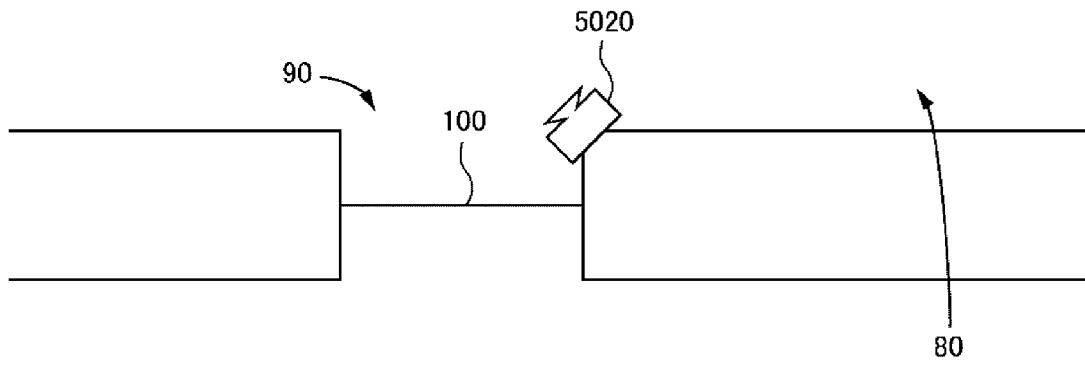
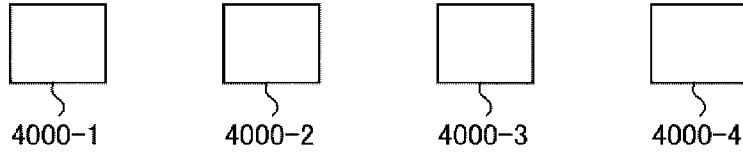
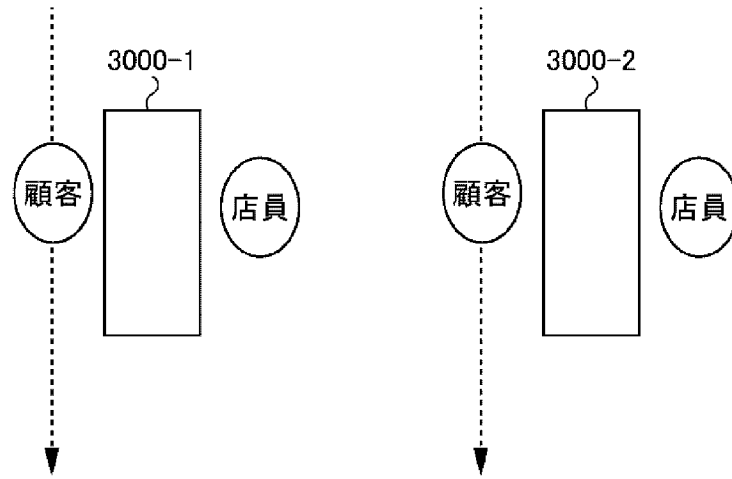
300

302 }	304 }	306 }
第1顧客画像	精算情報ID	完了フラグ
FC_001.png	P003	精算完了
FC_002.png	P005	精算未完了
FC_003.png	P001	精算未完了

[図13]



[図14]



**INTERNATIONAL SEARCH REPORT**

International application No.  
PCT/JP2016/059621

**A. CLASSIFICATION OF SUBJECT MATTER**  
G07G1/00(2006.01)i, G06T7/00(2006.01)i, G07G1/12(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
G07G1/00, G06T7/00, G07G1/12

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2016
Kokai Jitsuyo Shinan Koho	1971-2016	Toroku Jitsuyo Shiran Koho	1994-2016

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y A	JP 2012-248162 A (Teraoka Seiko Co., Ltd.), 13 December 2012 (13.12.2012), paragraphs [0010] to [0098]; fig. 11 to 14 (Family: none)	1, 7, 13-15 2-6, 9 8, 10-12
Y	JP 2015-38721 A (Toshiba Tec Corp.), 26 February 2015 (26.02.2015), paragraph [0086] & US 2015/0026018 A1 paragraph [0098] & CN 104299337 A	2-6
Y	JP 2013-186495 A (Glory Ltd.), 19 September 2013 (19.09.2013), paragraphs [0016], [0095] to [0101]; fig. 12 (Family: none)	9

Further documents are listed in the continuation of Box C.       See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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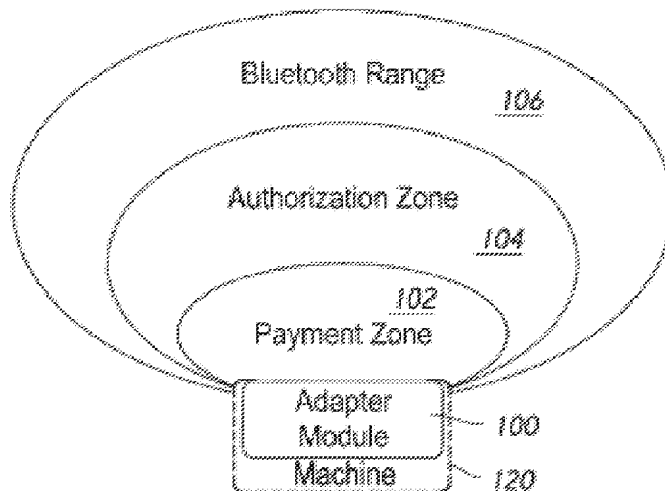
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(54) **MOBILE DEVICE-TO-MACHINE PAYMENT SYSTEMS**

(57) Described herein is a mobile-device-to-machine payment system and method for facilitating a cashless transaction for purchase of at least one product or service by a user from a payment accepting unit.



**Figure 1**

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**Description**

**TECHNICAL FIELD**

**[0001]** The present application relates to the field of payment processing systems, and in particular, to a mobile-device-to-machine payment processing system over a non-persistent network connection.

**BACKGROUND**

**[0002]** Vending machines (or "automatic retailing" machines), in the broadest sense, have been around for thousands of years. The first simple mechanical coin operated vending machines were introduced in the 1880s. Modern vending machines stock many different types of products including, but not limited to drinks (e.g., water, juice, coffee, and soda) and edible food products/items (e.g., snacks, candy, fruit, and frozen meals), as well as a wide variety of non-food items. In this fast paced world, vending machines are ubiquitous.

**[0003]** Vending machines are one type of "payment accepting unit" (payment accepting units are also referred to herein generically as "machines"). A payment accepting unit (or machine) is equipment that requires payment for the dispensing of products and/or services. In addition to vending machines, payment accepting units can also be other machines that require payment for the dispensing of a product and/or services including, but not limited to parking meters, toll booths, laundromat washers and dryers, arcade games, kiosks, photo booths, toll booths, transit ticket dispensing machines, and other known or yet to be discovered payment accepting units.

**[0004]** In using a payment accepting unit, a user will (1) approach the payment accepting unit, (2) determine from the face of the payment accepting unit the product (or service) he/she desires, (3) insert payment (e.g., coins, bills, or payment cards), and (4) input his/her selection into the payment accepting unit using a user interface (e.g., a series of buttons, a key pad, touch screen, or other input mechanism using, for example, the column and row at which a product is located). Based on the user's inputted selection, technology within the payment accepting unit provides the desired product (or service) to the user.

**[0005]** As the number of people with Internet-connected mobile devices proliferates, so does the variety of uses for such devices. Mobile payment is a logical extension. There is a large development effort around bringing mobile payment to the retail sector in an effort to not only provide options to the user, but also increased convenience.

**SUMMARY**

**[0006]** Disclosed herein is a payment processing system or, more specifically, a mobile-device-to-machine payment processing system over a non-persistent net-

work connection with hands-free and manual (sometimes also herein called "swipe" or "swipe-to-pay" mode) modes.

**[0007]** In some implementations, a method of payment processing is performed at a device (e.g., the mobile device 150, Figures 5 and 21) with one or more processors, memory, and two or more communication capabilities. The method includes obtaining, from a payment module (e.g., the adapter module 100, Figures 5 and 20), advertised information via a first communication capability (e.g., a short-range communication technology/protocol such as BLE), where the advertised information at least includes an authorization code. The method includes sending, to a server (e.g., the server 130, Figures 5 and 22), at least the authorization code from the advertised information via a second communication capability distinct from the first communication capability (e.g., a long-range communication technology/protocol such as GSM, CDMA, or Wi-Fi). In response to sending at least the authorization code, the method includes obtaining, from the server, authorization information via the second communication capability, where the authorization information at least includes an authorization grant token. After obtaining the authorization information, the method includes detecting a trigger condition to perform a first transaction with a payment accepting unit (e.g., the payment accepting unit 120 (sometimes also herein called "machine 120") (Figures 5 and 19) such as a vending machine or kiosk for dispensing goods and/or services) associated with the payment module. In response to detecting the trigger condition, the method includes sending, to the payment module, the authorization grant token via the first communication capability.

**[0008]** In some implementations, a method of transmitting machine status information is performed at a device (e.g., the mobile device 150, Figures 5 and 21) with one or more processors, memory, and two or more communication capabilities. The method includes obtaining, from a payment module (e.g., the adapter module 100, Figures 5 and 20), advertised information via a first communication capability (e.g., the short-range communication technology/protocol such as BLE), where the advertised information at least includes status information indicating one or more states of at least one of a payment module and a payment accepting unit associated with the payment module. The method includes sending, to a server (e.g., the server 130, Figures 5 and 22), at least the status information from the advertised information via a second communication capability distinct from the first communication capability (e.g., the long-range communication technology/protocol such as GSM, CDMA, or Wi-Fi).

**[0009]** In some implementations, a method of payment processing acknowledgment information is performed at a payment module (e.g., the adapter module 100, Figures 5 and 20) coupled with a payment accepting unit (e.g., the payment accepting unit 120 (sometimes also herein called "machine 120") (Figures 5 and 19) such as a vend-

ing machine or kiosk for dispensing goods and/or services), the payment module including one or more processors, memory, and one or more first communication capabilities. The method includes obtaining, from the payment accepting unit, a first notification indicating completion of a first transaction performed by a first user of a first mobile device (e.g., the mobile device 150, Figures 5 and 21) at the payment accepting unit and an amount of the first transaction. In response to receiving the notification, the method includes: generating first transaction information based at least in part on the first notification; storing the generated first transaction information; and sending the generated first transaction information to the first mobile device via one of the one or more first communication capabilities (e.g., the short-range communication technology/protocol such as BLE). After sending the first transaction information to the first mobile device, the method includes: deleting the stored first transaction information generated for the first transaction performed by the first user of the first mobile device in accordance with a determination that first acknowledgement information has been received from the first mobile device within a predetermined time period; and maintaining the stored first transaction information generated for the first transaction performed by the first user of the first mobile device in accordance with a determination that the first acknowledgement information has not been received from the first mobile device within the predetermined time period.

**[0010]** In some implementations, a method of updating firmware is performed at a first device (e.g., the mobile device 150, Figures 5 and 21) with one or more processors, memory, and two or more communication capabilities. The method includes obtaining, from a payment module (e.g., the adapter module 100, Figures 5 and 20), advertised information via a first communication capability (e.g., the short-range communication technology/protocol such as BLE), where the advertised information at least includes a current firmware version of the payment module. In accordance with a determination that the current firmware version of the payment module satisfies one or more predefined firmware criteria (i.e., indicating that the payment module's firmware needs updating), the method includes sending, to the payment module, firmware update information via the first communication capability, where the firmware update information includes one or more data packets for updating the current firmware version of the payment module.

**[0011]** In some implementations, a device (e.g., the adapter module 100 (Figures 5 and 20), the mobile device 150 (Figures 5 and 21), the server 130 (Figures 5 and 22), or a combination thereof) includes one or more processors and memory storing one or more programs for execution by the one or more processors, the one or more programs include instructions for performing, or controlling performance of, the operations of any of the methods described herein. In some implementations, a non-transitory computer readable storage medium storing one or more programs, the one or more programs comprising

instructions, which, when executed by a device (e.g., the adapter module 100 (Figure 20), the mobile device 150 (Figure 21), the server 130 (Figure 22), or a combination thereof) with one or more processors, cause the computer system to perform, or control performance of, the operations of any of the methods described herein. In some implementations, a device (e.g., the adapter module 100 (Figure 20), the mobile device 150 (Figure 21), the server 130 (Figure 22), or a combination thereof) includes means for performing, or controlling performance of, the operations of any of the methods described herein.

**[0012]** The subject matter described herein is particularly pointed out and distinctly claimed in the concluding portion of this specification. Objectives, features, combinations, and advantages described and implied herein will be more readily understood upon consideration of the following detailed description of the invention, taken in conjunction with the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

### [0013]

Figure 1 is a schematic diagram that shows three zones: a "communication zone" (e.g., Bluetooth range), an "authorization zone," and a "payment zone" in accordance with some implementations.

Figure 2 is a schematic diagram that shows the three zones of Figure 1 with multiple users therein in accordance with some implementations.

Figure 3 is a table that illustrates the hands-free credit or alert user principle in accordance with some implementations.

Figure 4 is a flow chart showing the logging received signal strength indicator (RSSI) information in accordance with some implementations.

Figure 5 is a block schematic that shows elements of the payment processing system including, but not limited to, the adapter module, the machine, the mobile device, and servers, as well as communications therebetween in accordance with some implementations.

Figure 6 is a block schematic that shows three areas of encryption used (each is bi-directional) between the adapter module, the machine, the mobile device, and/or servers in accordance with some implementations.

Figure 7 is a block diagram that shows communications, messaging, vending sequence, and purchase flow between the adapter module, the mobile device, and a system management server in accordance with some implementations.



Figure 8A is a schematic process flow diagram that shows additional elements and features of the payment processing system (e.g., communications, messaging, vending sequence, and purchase flow) when the user enters the "communication zone" (e.g., Bluetooth range) in accordance with some implementations.

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Figure 8B is a schematic process flow diagram that shows additional elements and features of the payment processing system (e.g., communications, messaging, vending sequence, and purchase flow) when the user enters the "authorization zone" in accordance with some implementations.

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Figure 8C is a schematic process flow diagram that shows additional elements and features of the payment processing system (e.g., communications, messaging, vending sequence, and purchase flow) when the user enters the "payment zone" and, in particular, detailing a hands-free mode embodiment and a swipe mode embodiment in accordance with some implementations.

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Figure 8D is a schematic process flow diagram that shows additional elements and features of the payment processing system (e.g., communications, messaging, vending sequence, and purchase flow) in a vending transaction including a loop for multiple transactions in accordance with some implementations.

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Figure 8E is a schematic process flow diagram that shows additional elements and features of the payment processing system (e.g., communications, messaging, vending sequence, and purchase flow) in the login mode in accordance with some implementations.

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Figure 8F is a schematic process flow diagram that shows additional elements and features of the payment processing system (e.g., communications, messaging, vending sequence, and purchase flow) during boot-up of the adapter module in accordance with some implementations.

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Figure 8G is a schematic process flow diagram that shows additional elements and features of the payment processing system (e.g., communications, messaging, vending sequence, and purchase flow) during an account check/update process in accordance with some implementations.

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Figures 9A-9E are flow charts that show example steps and features of the payment processing system (e.g., communications, messaging, vending sequence, and purchase flow) in accordance with some implementations.

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Figures 10A-10D show a mobile device with a graphical representation of a mobile application shown thereon, the mobile application being used as part of the mobile-device-to-machine payment processing system in accordance with some implementations.

Figure 11 is a perspective view of the in-line dongle adapter module in accordance with some implementations.

Figure 12 is a front plan view of the in-line dongle adapter module of Figure 11 in accordance with some implementations.

Figure 13 is a back plan view of the in-line dongle adapter module of Figure 11 in accordance with some implementations.

Figure 15 is a first end view of a connector receptacle of the in-line dongle adapter module of Figure 11 in accordance with some implementations.

Figure 16 is a second end view of a connector receptacle of the in-line dongle adapter module of Figure 11 in accordance with some implementations.

Figure 17 is a perspective view taken from the first end of the in-line dongle adapter module of Figure 11, the connectors and cables between which the in-line dongle adapter module is inserted being shown in broken lines for illustrative purposes in accordance with some implementations.

Figure 18 is a perspective view taken from the second end of the in-line dongle adapter module of Figure 11, the connectors and cables between which the in-line dongle adapter module is inserted being shown in broken lines for illustrative purposes in accordance with some implementations.

Figure 19 is a perspective view of the in-line dongle adapter module of Figure 11 within a vending machine in accordance with some implementations.

Figure 20 is a block diagram of an adapter module in accordance with some implementations.

Figure 21 is a block diagram of a mobile device in accordance with some implementations.

Figure 22 is a block diagram of a server in accordance with some implementations.

Figure 23 is a schematic flow diagram of a process for authenticating a user to perform a transaction in the payment processing system in accordance with some implementations.

Figure 24A is a block diagram of a packet of information broadcast by the payment module (sometimes also herein called the "adapter module") in accordance with some implementations.

Figure 24B is a block diagram of an authorization request in accordance with some implementations.

Figure 24C is a block diagram of an authorization grant token in accordance with some implementations.

Figure 24D is a block diagram of transaction information generated by the payment module in accordance with some implementations.

Figure 25A is a schematic flow diagram of a process for processing acknowledgment information in the payment processing system in accordance with some implementations.

Figure 25B is a schematic flow diagram of a process for processing interrupted transactions in the payment processing system in accordance with some implementations.

Figures 26A-26C show schematic flow diagrams of processes for updating firmware of the payment module in the payment processing system in accordance with some implementations.

Figures 27A-27C illustrate a flowchart diagram of a method of payment processing in accordance with some implementations.

Figures 28A-28B illustrate a flowchart diagram of a method of transmitting machine status information in accordance with some implementations.

Figures 29A-29C illustrate a flowchart diagram of a method of payment processing acknowledgment in accordance with some implementations.

Figures 30A-30D illustrate a flowchart diagram of a method of updating firmware in accordance with some implementations.

Figure 31A illustrates a schematic flow diagram of a process for providing a representation of a machine event at a mobile device in accordance with some implementations.

Figure 31B is a schematic flow diagram of a process for processing acknowledgment information in the payment processing system in accordance with some implementations.

Figures 32A-32D illustrate example user interfaces

for providing a representation of a machine event at a mobile device in accordance with some implementations.

5 Figures 33A-33B illustrate a flowchart diagram of a method of presenting representations of payment accepting unit events in accordance with some implementations.

10 Figure 34A illustrates a block diagram of an offline-payment operated machine in accordance with some implementations.

15 Figure 34B illustrates signals sampled by the payment module in accordance with some implementations.

20 Figures 35A-35B illustrate a flowchart diagram of a method of retrofitting an offline-payment operated machine to accept electronic payments in accordance with some implementations.

Figure 36 illustrates a flowchart diagram of a method of enabling a payment

25 Figure 37 is a block diagram of a device for retrofitting a payment accepting unit to accommodate a plurality of payment peripherals in accordance with some implementations.

Figure 38 is a schematic flow diagram of a payment peripheral registration process in accordance with some implementations.

30 Figures 39A-39B illustrate a schematic flow diagram of a payment process in accordance with some implementations.

Figures 40A-40D illustrate a flowchart diagram of a method of retrofitting a payment accepting unit to accommodate a plurality of payment peripherals in accordance with some implementations.

35 [0014] Like reference numerals refer to corresponding parts throughout the several views of the drawings.

**DESCRIPTION OF EMBODIMENTS**

40 [0015] Disclosed herein is a payment processing system or, more specifically, a mobile-device-to-machine payment processing system for processing transactions over a non-persistent network connection. The mobile-device-to-machine payment processing system disclosed herein focuses on the unattended retail space (e.g., a payment accepting unit 120, sometimes also herein called a "machine 120"). More specifically, the mobile-device-to-machine payment processing system disclosed herein allows a user (having a mobile device 150

with a mobile application 140 thereon) to make a cashless purchase from a payment accepting unit 120 (having an adapter module 100 associated therewith).

**[0016]** The mobile-device-to-machine payment processing system described herein can be implemented with one or more of the following features: easy installation feature, a non-persistent network connection feature; a manual (swipe to pay) mode feature; a hands-free mode feature; and a multiple vending transactions (multi-vend) feature.

**[0017]** Easy Installation: Installation is very easy, requires no tools, requires no configuration, and takes as little as 30 seconds. This is accomplished by using an adapter module 100 (sometimes also herein called "payment module 100") such as an in-line dongle (a hardware device with software thereon) design for in-line insertion within a multi-drop bus (MDB) of a payment accepting unit 120 (e.g., a vending machine) (sometimes also herein called "the machine 120"). Installation is as simple as "powering down" (turning off) the machine 120, identifying the "wire" that connects with a payment receiving mechanism (e.g., the coin mechanism), disconnecting the wire (so that there are two loose ends, such as a male connection end or adapter of an MDB and a female connection end or adapter of an MDB), plugging (inserting) the adapter module 100 in serial ("in-line") with the wire (e.g., connecting the MDB female adapter to a male adapter of the adapter module 100 and connecting the MDB male adapter to a female adapter of the adapter module 100), tucking the wire and the installed adapter module 100 back into position, and "powering up" (turning on) the machine 120. Most vending machines made since 1995 have this industry standard MDB technology that would allow this easy 30-second installation. On machines without MDB technology, the adapter module 100 can be configured or designed to work with other serial protocols or activate a switch. In essence the adapter module 100 simulates establishing payment on payment accepting unit 120 in much the same manner as other alternative forms of payment (e.g., cash).

**[0018]** Non-persistent Network Connection: Although payment accepting units (or "machines") that accept only cash (e.g., paper currency and coins) may not require a connection (persistent or non-persistent) to a network, traditional payment accepting units that accept cashless payments (e.g., credit cards, debit cards, and alternative mobile device payment methods using, for example, smart phones) require a persistent connection to a network (wired or wireless) to facilitate the cashless payments. In other words, without a persistent (ongoing or accessible on demand) network connection, traditional payment accepting units cannot accept cashless payments. Most traditional payment accepting units that accept cashless payments include the technology to accomplish this persistent network connection that allows them to connect to a remote server. If the network connection to a traditional machine is temporarily interrupted, cashless payments will be temporarily unavailable. If the

machine is located in a location where no network connection is available, cashless payments is not possible. In addition to using a mobile device 150 as an intermediary between the payment accepting units 120 and the server 130, the mobile-device-to-machine payment processing system described herein minimizes (i.e., the manual mode) or eliminates (i.e., the hands-free mode) user interaction with the mobile device 150. Further, in some implementations, the mobile-device-to-machine payment processing system described herein facilitates the acceptance of cashless payments without requiring any network connection near the payment accepting unit 120. In some implementations, when the mobile-device-to-machine payment processing system described herein is located in a remote location where network connection is unavailable, the mobile-device-to-machine payment processing system, therefore, can still accept cashless payments.

**[0019]** Manual (Swipe-to-Pay) Mode: Using a "swipe-to-pay" feature (or just "swipe") refers to a user's action implemented on his/her mobile device 150 where he/she quickly brushes his/her finger (or other pre-determined interaction) on the mobile device's touch screen 152 (Figures 10A-10D) or other input devices associated with the mobile device 150. From the user's perspective, when the user is within range, a pre-installed mobile application 140 automatically connects to the payment accepting unit 120 (e.g., a vending machine). The mobile application 140 might display (on the touch screen 152) a prepaid balance that the user "swipes" to transfer payment to the payment accepting unit 120. The user could observe the transferred funds on the touch screen 152 of the mobile device 150 and/or on the display 122, 124 (Figure 19) of the payment accepting unit 120. The transaction is completed just as if cash was inserted in the machine 120 with the user inputting his selection on the payment accepting unit 120 and the payment accepting unit 120 dispensing the product or service. After the selection is made, the change is returned to the mobile device 150 and this may be shown on the touch screen 152 of the mobile device 150.

**[0020]** Hands-Free Mode: A "hands-free pay" feature (or just "hands-free") would most likely be used with "favorite" payment accepting units 120 (e.g., a frequently used vending machine at a user's work or school). From the user's perspective, he/she would approach the favorite payment accepting unit 120 and notice that the display 122, 124 (Figure 19) of the payment accepting unit 120 shows funds available, he/she would select the product or service using the payment accepting unit's input mechanisms (e.g., buttons 126 or a touch screen display 124 shown in Figure 19), and he/she would retrieve dispensed services or products. It would be that simple. More specifically, when the user is within range, a pre-installed mobile application 140 automatically connects to the payment accepting unit 120 (e.g., a vending machine). The user may leave the mobile device 150 in a pocket, purse, briefcase, backpack, or other carrier. As

the user approaches the payment accepting unit 120 and is in approximately "arm's-length" distance (e.g., 3 to 5 feet) of the payment accepting unit 120, the user could observe the transferred funds on the display 122, 124 (Figure 19) of the payment accepting unit 120. The transaction is completed just as if cash was inserted into the payment accepting unit 120 with the user inputting his/her selection on the payment accepting unit 120 and the payment accepting unit 120 dispensing the product or service. After the selection is made, the change is returned to the mobile device 150. Figure 3 details when the hands-free mode would be available.

**[0021]** Multiple Vending Transactions (Multi-Vend): Both the manual and hands-free modes could be used multiple times in sequence (implemented, for example, as a loop) so that a user may make multiple purchases. After making his/her first selection and receiving his product (or service), the user would observe that additional funds were available on the display 122, 124 (Figure 19) on the payment accepting unit 120. He/she could make another selection (or multiple selections) and receive additional product(s) (or service(s)). More specifically, the display 122, 124 (Figure 19) may reset as if the transaction is complete, but then, because the user is still standing in range, the mobile application 140 would send another credit to the payment accepting unit 120, allowing for a second purchase. When the user walks away, the system clears (e.g., returns unused funds to the application 140 on the mobile device 150).

**[0022]** The features described above, alone or in combination with other features described herein will revolutionize the hundred billion dollar automated retail industry. The hardware is very low cost and there are no recurring fees because no cellular connection is required on the machine 120. Using the mobile-device-to-machine payment processing system described herein, operators of machines 120 can increase frequency of visits by purchasers and items sold with each visit.

**[0023]** The mobile-device-to-machine payment processing system described herein may be implemented as an apparatus, system, and/or method for enabling payments to a machine 120 via a mobile device 150. The mobile-device-to-machine payment processing system may be better understood with reference to the drawings, but the shown mobile-device-to-machine payment processing system is not intended to be of a limiting nature.

**DEFINITIONS**

**[0024]** Before describing the mobile-device-to-machine payment processing system and the figures, some of the terminology should be clarified. Please note that the terms and phrases may have additional definitions and/or examples throughout the specification. Where otherwise not specifically defined, words, phrases, and acronyms are given their ordinary meaning in the art. The following paragraphs provide some of the definitions for

terms and phrases used herein.

**[0025]** Adapter Module 100: As shown in Figures 1 and 2, the adapter module 100 (sometimes also herein called the "payment module 100") is a physical device that is installed in a machine 120 (a payment accepting unit 120). The shown adapter module 100 is an in-line dongle (a hardware device with software thereon) device that may be inserted in-line within a multi-drop bus (MDB) of a machine 120. The adapter module 100 bridges the communication between the machine 120 and a mobile device 150. Although described as a unique component, it should be noted that the adapter module 100 could be implemented as a plurality of devices or integrated into other devices (e.g., components of a machine 120). In its unique component form, the adapter module 100 can be easily inserted into a machine 120 so that the machine 120 is able to perform new features with the assistance of the adapter module 100. Figure 20 shows components associated with the adapter module 100. As shown in Figure 20, the communications unit 770 of the adapter module 100 includes short-range communication capability 776 (e.g., Bluetooth mechanisms). The shown example may be divided into multiple distinct components that are associated with each other or the example may be incorporated into or drawn from other technology (e.g., a computer or a payment accepting unit) as long as the components are associated with each other.

**[0026]** Mobile Device 150 and Application 140 (also referred to as a "mobile application," "mobile app," or "app"): In general, a mobile device 150 may be a user's personal mobile device 150. The mobile device 150 (with a mobile application 140 thereon) acts as a communication bridge between the adapter module 100 (associated with a payment accepting unit 120) and the server 130. The mobile device 150 and the application 140, however, are not "trusted" in that the communications (transmissions) it passes are encrypted. Encrypted (secured) communications are undecipherable (unencryptable, unreadable, and/or unuseable) by the mobile device 150. This keeps the communications passed between the adapter module 100 and the server 130 secured and safe from hacking. Mobile devices include, but are not limited to smart phones, tablet or laptop computers, or personal digital assistants (PDAs), smart cards, or other technology (e.g., a hardware-software combination) known or yet to be discovered that has structure and/or capabilities similar to the mobile devices described herein. The mobile device 150 preferably has an application (e.g., the application 140) running on it. The term "app" is used broadly to include any software program(s) capable of implementing the features described herein. Figures 10A-10D show user interfaces for the application 140 displayed by the mobile device 150. It should be noted that the phrase "mobile device" can be assumed to include the relevant app unless specifically stated otherwise. Similarly, it should be noted that an "app" can be assumed to be running on an associated mobile device unless specifically stated otherwise. Figure 21 shows

components associated with the mobile device 150. The shown example may be divided into multiple distinct components that are associated with each other or the example may be incorporated into or drawn from other technology (e.g., the cell phone itself) as long as the components are associated with each other.

**[0027]** Payment Accepting Unit 120 (or Machine 120): A payment accepting unit 120 (or the machine 120) is equipment that requires payment for the dispensing of an product and/or service. Payment accepting units 120 may be vending machines, parking meters, toll booths, laundromat washers and dryers, arcade games, kiosks, photo booths, toll booths, transit ticket dispensing machines, and other known or yet to be discovered payment accepting units 120. Some payment accepting units 120 can accept cashless payments (payments other than cash (paper currency and coins)) by accepting payment from, for example, credit cards, debit cards, and mobile devices.

**[0028]** Network Connections: For purposes of this discussion, a persistent network connection is a wired or wireless communications connection that is ongoing (e.g., a dedicated connection, a dedicated online connection, and/or a hardwired connection) or accessible on demand (e.g., the ability for the machine to make a temporary connection to a server or the ability for the user to contact a server from his mobile device). Typically the persistent network connection has been conducted over "long-range communication technology" or "long-range communication protocol" (e.g., hardwired, telephone network technology, cellular technology (e.g., GSM, CDMA, or the like), Wi-Fi technology, wide area network (WAN), local area network (LAN), or any wired or wireless communication technology over the Internet that is known or yet to be discovered). Traditionally, machines that accept payment other than cash require a persistent (ongoing or accessible on demand) connection to a network to facilitate payment. This is true for machines that accept, for example, credit cards and debit cards. The payment accepting units 120 described herein do not require a traditional persistent network connection. The user's mobile device 150 acts as a communication bridge between the adapter module 100 and the server 130. Communications between user mobile devices 150 and the servers (e.g., a system management server 130 and/or a funding source server 160) take place using long-range communication technology. Communications between user mobile devices 150 and the adapter module 100 of the payment accepting unit 120 take place using "short-range communication technology" or "short-range communication protocol" (e.g., Bluetooth (such as Bluetooth 4.0, Bluetooth Smart, Bluetooth Low Energy (BLE)), near-field communication (NFC), Ultra Wideband (UWB), radio frequency identification (RFID), infrared wireless, induction wireless, or any wired or wireless technology that could be used to communicate a small distance (approximately a hundred feet or closer) that is known or yet to be discovered). Therefore, neither the adapter module

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100 nor the payment accepting unit 120 requires a traditional persistent long-range wireless network connection. The communications technology shown in the figures may be replaced with alternative like communications technology and, therefore, specific shown communications technologies are not meant to be limiting. For example, Wi-Fi technology could be replaced with another long-range communication technology.

**[0029]** Server: A server is the host processing server that may be operated by the company running the payment processing system. For each user, the server 130 preferably maintains at least one "virtual wallet" having at least one "balance" (which can be \$0) of designated funds for which the server 130 keeps an accounting. The balance may represent, for example, "cash" or it may be a "promotional value" that represents funds that may be spent under certain circumstances. If these funds begin to be depleted, the user may be notified (e.g., via the application 140 on the mobile device 150) that additional funds need to be designated and/or transferred. Alternatively, funds from other sources (e.g., the funding source server 160) may be automatically transferred to restore a predetermined balance. The balance may also be increased based on a promotion (e.g., points earned or coupons). As shown in Figure 22, the server includes appropriate processors 950, memory 960 (which would keep an accounting of the user's balance in a manner similar to a gift card), and communication systems 970. As shown in Figure 22, the communications unit 970 of the server 130 includes long-range communication capability 972 (e.g., cellular technology and/or Wi-Fi mechanisms). The server 130 also includes a security unit 955 for encrypting and decrypting messages. The server 130 receives an authorization request (sometimes also herein called an "AuthRequest") from the adapter module 100 (via a mobile device 150) and, if funds are available, returns an authorization grant (sometimes also herein called an "AuthGrant" or an "authorization grant token") for funds. Figure 22 shows components associated with the server 130. The shown example may be divided into multiple distinct components that are associated with each other or the example may be incorporated into or drawn from other technology (e.g., a computer or a main frame) as long as the components are associated with each other.

**[0030]** Advertise Presence: Each adapter module 100 advertises its presence by broadcasting signals (advertising broadcast signals) to mobile devices in the zones 102, 104, 106. Each adapter module 100 can listen to other adapter modules' advertisements.

**[0031]** Received Signal Strength Indicator (RSSI): The adapter module 100 may have a self-calibrating signal strength to determine zone thresholds (e.g., a payment zone threshold and an authentication zone threshold). At the time the user selects an item (product or service) from the payment accepting unit 120, the Received Signal Strength Indicator (RSSI) is logged. At this moment, it is presumed the user is within "arm's-length" (which

may be a predetermined length approximating the distance of a user standing in front of a machine for the purpose of making a purchase) from the payment accepting unit 120. A mathematical computation (i.e., In-Range Heuristics) is conducted to derive the optimal RSSI threshold at which point payment should be triggered by an application 140 on a mobile device 150. The threshold may be payment accepting unit specific and can vary over a period of time. This optimal zone threshold is preferably reported to the mobile device 150 during an initial handshake.

**[0032]** In-Range Heuristics: A mathematical computation that determines the RSSI threshold to determine when a user is in the authorization zone 104 and/or the payment zone 102. This computation can take into consideration numerous historical data points as well as transaction specific information such as which the mobile device 150 is being used, payment accepting unit type, among other factors. Preferably the RSSI is logged while the user is making his selection (this is the one time in the entire process that the user definitely will be "in range" (e.g., they will be arm's length from the machine 120 because they are physically interacting with the machine 120). The type of user mobile device 150, accelerometer data (e.g., is the user moving or stationary), and/or other information may also be logged while the user is making his selection. The adapter module 100 can give a reference RSSI for the payment zone 102 for the machine 120, and the application 140 can make a +/- adjustment based on the specific mobile device 150 on which it is installed. Over a period of time, the payment processing system continues to improve itself based on additional data points.

**[0033]** Authorization Request ("AuthRequest"): When a user enters the authorization zone 104, the mobile device 150 notifies the adapter module 100 and the adapter module 100 sends a secured authorization request (e.g., the encrypted authorization request) as a "message" (also referred to as a communication or transmissions) to the server 130 via the mobile device 150. Encryption may be performed by a security unit 755 (Figure 20) with security technology (e.g., encryption and decryption means) that may be associated with the processing unit 750 and/or the memory 760. Significantly, the AuthRequest is a request for authorization of funds, not a request for authorization of a transaction. The purpose of the funds is irrelevant to the server 130.

**[0034]** Authorization Grant Token ("AuthGrant"): This is a "message" (also referred to as a communication or transmissions) encrypted by the security unit 955 (Figure 22) with security technology (e.g., encryption and decryption means) of the server 130 with the unique private key corresponding to the adapter module 100. The secured authorization grant (e.g., the encrypted authorization grant) is passed from the server 130 to the adapter module 100 via the mobile device 150 in the form of a message. The mobile device 150, however, is not able to decrypt and/or read the message. The authorization

grant is in response to the authorization request. The amount of the funds granted by the AuthGrant may be determined by factors including, but not limited to, the amount of funds available (or, if funds are not available, a mini-loan could be granted), a pre-authorized amount (e.g., set by the server, set by the user during set-up, set by the funding source, or a standard amount), limited by time (e.g., only a certain amount per hour, or a predetermined amount at specific times of the day), limited to the maximum amount of an item on the machine (or enough for two or three items in the machine), or one or more of these and other factors. Significantly, the AuthGrant makes the funds available, but does not authorize a transaction. The AuthGrant may have an associated expiration period in that it may expire if it is not used in a predetermined time period. The length of time before the AuthGrant expires may be determined by factors including, but not limited to, the trustworthiness of the user (e.g., the user has a long history with the payment processing system or some known provider (e.g., credit card provider, bank, or credit union), the user has a good credit rating, or the user has a large wallet balance), a pre-authorized time period (e.g., set by the server, set by the user during set-up, set by the funding source, or a standard time period), limited by time (e.g., predetermined time periods at specific times of the day such as longer times during breakfast, lunch, and dinner), limited by the machine or the products or services sold in the machine, limited by the number of other users near the machine (e.g., if it is a crowded machine, the AuthGrant may expire faster), or one or more of these and other factors. The AuthGrant remains valid until it expires or some other event occurs to end its validity (e.g., the user cancels it). This means that under normal circumstances the mobile device 150 will hold the AuthGrant authorizing use of funds for a pre-determined time period that will allow the user sufficient time to make a purchase. The authorized amount may be considered to be the "wallet balance" that is held in a virtual "wallet."

**[0035]** Synchronization: Time may be synchronized to the adapter module 100 from the server 130. The server 130 sends time information with encrypted messages and the adapter module 100 uses the time encoded in the messages for synchronization.

**[0036]** The mobile-device-to-machine payment processing system and components thereof may have associated hardware, software, and/or firmware (a variation, subset, or hybrid of hardware and/or software). The term "hardware" includes at least one "processing unit," "processor," "computer," "programmable apparatus," and/or other known or yet to be discovered technology capable of executing instructions or steps (shown as the processing unit 750 in Figure 20, the processing unit 850 in Figure 21, and the processing unit 950 in Figure 22). The term "software" includes at least one "program," "subprogram," "series of instructions," or other known or yet to be discovered hardware instructions or hardware-readable program code. Software may be loaded onto

hardware (or firmware) to produce a "machine," such that the software executes on the hardware to create structures for implementing the functions described herein. Further, the software may be loaded onto the hardware (or firmware) so as to direct the mobile-device-to-machine payment processing system (and components thereof) to function in a particular manner described herein or to perform a series of operational steps as described herein. "Hardware" such as the adapter module 100, the mobile device 150, and the payment accepting unit 120 may have software (e.g., programs and apps) loaded thereon. The phrase "loaded onto the hardware" also includes being loaded into memory (shown as the memory 760 in Figure 20, the memory 860 in Figure 21, and the memory 960 in Figure 22) associated with or accessible by the hardware. The term "memory" is defined to include any type of hardware (or other technology) -readable media (also referred to as computer-readable storage media) including, but not limited to, attached storage media (e.g., hard disk drives, network disk drives, servers), internal storage media (e.g., RAM, ROM, EPROM, FLASH-EPROM, or any other memory chip or cartridge), removable storage media (e.g., CDs, DVDs, flash drives, memory cards, floppy disks, flexible disks), firmware, and/or other known or yet to be discovered storage media. Depending on its purpose, the memory may be transitory and/or non-transitory. Appropriate "messages," "communications," "signals," and/or "transmissions" (that includes various types of information and/or instructions including, but not limited to, data, commands, bits, symbols, voltages, currents, electromagnetic waves, magnetic fields or particles, optical fields or particles, and/or any combination thereof) over appropriate "communication paths," "transmission paths," and other means for signal transmission including any type of connection between two elements on the payment processing system (e.g., the adapter module 100, the mobile device 150, the payment accepting unit 120, hardware systems and subsystems, and memory) would be used as appropriate to facilitate controls and communications.

**[0037]** It should be noted that the terms "programs" and "subprograms" are defined as a series of instructions that may be implemented as software (i.e. computer program instructions or computer-readable program code) that may be loaded onto a computer to produce a "machine," such that the instructions that execute on the computer create structures for implementing the functions described herein or shown in the figures. Further, these programs and subprograms may be loaded onto a computer so that they can direct the computer to function in a particular manner, such that the instructions produce an article of manufacture including instruction structures that implement the function specified in the flow chart block or blocks. The programs and subprograms may also be loaded onto a computer to cause a series of operational steps to be performed on or by the computer to produce a computer implemented process such that the instructions that execute on the computer provide steps

for implementing the functions specified in the flow chart block or blocks. The phrase "loaded onto a computer" also includes being loaded into the memory of the computer or a memory associated with or accessible by the computer. Separate, albeit interacting, programs and subprograms may be associated with the adapter modules 100, the server 130, and the mobile device 150 (including the mobile application 140) and these programs and subprograms may be divided into smaller subprograms to perform specific functions.

**[0038]** The terms "messages," "communications," "signals," and/or "transmissions" include various types of information and/or instructions including, but not limited to, data, commands, bits, symbols, voltages, currents, electromagnetic waves, magnetic fields or particles, optical fields or particles, and/or any combination thereof. Appropriate technology may be used to implement the "communications," "signals," and/or "transmissions" including, for example, transmitters, receivers, and transceivers. "Communications," "signals," and/or "transmissions" described herein would use appropriate technology for their intended purpose. For example, hard-wired communications (e.g., wired serial communications) would use technology appropriate for hard-wired communications, short-range communications (e.g., Bluetooth) would use technology appropriate for close communications, and long-range communications (e.g., GSM, CDMA, Wi-Fi, or the like) would use technology appropriate for remote communications over a distance. Appropriate security (e.g., SSL or TLS) for each type of communication is included herein. The security units 755 and 955 include technology for securing messages. The security technology may be, for example, encryption/decryption technology (e.g., software or hardware). Although encryption/decryption is discussed primarily as being performed using a unique private key, alternative strategies include, but are not limited to encryption/decryption performed using public/private keys (i.e., asymmetric cryptography), or other encryption/decryption strategies known or yet to be discovered. Appropriate input mechanisms and/or output mechanisms, even if not specifically described, are considered to be part of the technology described herein. The communications unit 770 (shown in Figure 20) of the adapter module 100 is shown as including appropriate input and output mechanisms 772, 774 that may be implemented in association (e.g., directly or indirectly in functional communication) with male and female adapters 720, 730 of the adapter module 100. The communications unit 870 (shown in Figure 21) of the mobile device 150 includes mechanisms for both long-range communications (shown as the long-range communication capability 872 such as cellular and/or Wi-Fi mechanisms) for communicating with the server 130 and short-range communications (shown as the short-range communication capability 876 such as Bluetooth mechanisms) for communicating with the adapter module 100.

**[0039]** When used in relation to "communications,"

"signals," and/or "transmissions," the terms "provide" and "providing" (and variations thereof) are meant to include standard means of provision including "transmit" and "transmitting," but can also be used for non-traditional provisions as long as the "communications," "signals," and/or "transmissions" are "received" (that can also mean obtained). The terms "transmit" and "transmitting" (and variations thereof) are meant to include standard means of transmission, but can also be used for non-traditional transmissions as long as the "communications," "signals," and/or "transmissions" are "sent." The terms "receive" and "receiving" (and variations thereof) are meant to include standard means of reception, but can also be used for non-traditional methods of obtaining as long as the "communications," "signals," and/or "transmissions" are "obtained."

**[0040]** The term "associated" is defined to mean integral or original, retrofitted, attached, connected (including functionally connected), positioned near, and/or accessible by. For example, if the user interface (e.g., a traditional display 122 (Figure 19), a touch screen display 124 (Figure 19), a key pad 126 (Figure 19), buttons 126 (Figure 19, shown as part of the key pad 126), a keyboard (not shown), and/or other input or output mechanism) is associated with a payment accepting unit 120, the user interface may be original to the payment accepting unit 120, retrofitted into the payment accepting unit 120, attached to the payment accepting unit 120, and/or a nearby the payment accepting unit 120. Similarly, adapter modules 100 may be associated with payment accepting units 120 in that the adapter modules 100 may be original to the payment accepting unit 120, retrofitted into the payment accepting unit 120, attached to the payment accepting unit 120, and/or a nearby the payment accepting unit 120.

**SYSTEM OVERVIEW**

**[0041]** Figures 5, 6, and 7 together show major components of the mobile-device-to-machine payment system and the interactions there-between.

**[0042]** As shown, the adapter module 100 functionally connected bi-directionally to the payment accepting unit 120 via a wired serial connection such that no security is necessary. The adapter module 100 is also functionally connected bi-directionally to the mobile device 150 (and its installed mobile application 140) via short-range communication technology (e.g., a Bluetooth connection). Because the mobile device 150 is not a "trusted" link (e.g., it could be hacked by a user), only secured communications (transmissions) are passed between the adapter module 100 and the mobile device 150. This keeps communications secured and safe from hacking. The mobile device 150 (and its installed mobile application 140) is also functionally connected bi-directionally to a system management server 130 and/or a funding source server 160 via long-range communication technology (e.g., Wi-Fi or Cellular connection) that preferably

has appropriate security (e.g., SSL security). Security between the mobile device 150 and the system management server 130 has the advantage of protecting communications from the mobile device 150 to the system management server 130 that may include sensitive data and may not be encrypted. The system management server 130 and the funding source server 160 may be connected via a wired Internet connection with SSL security. The system management server 130 may be connected via a wired Internet connection with SSL security to an operators' server 170. Although not necessary to implement a purchase transaction, for other purposes (e.g., inventory), the operators' server 170 may be connected to the payment accepting unit 120 using a handheld computer sync or a cellular connection.

**[0043]** Also, a unique private key may be used to securely transmit encrypted messages between the adapter module 100 and the system management server 130 (although the encrypted transmissions would most likely be routed through the mobile device 150). The server 130 stores a private key for each adapter module 100, and this key is only known to the adapter module 100 and the server 130. No intermediary is privy to this key (especially not the mobile device 150). When the adapter module 100 and the server 130 communicate messages (e.g., AuthRequest and AuthGrant), the security unit 755 of the adapter module 100 encrypts the message with its private key and passes the message to the mobile device 150. The mobile device 150 (which preferably cannot decrypt the message) passes the encrypted message to the server 130. The server 130 is able to decrypt the message using the security unit 955 of the adapter module 100 and the unique private key. The security unit 955 of the server 130 uses this same unique private key to encrypt messages to the adapter module 100 and sends the message to the mobile device 150 to relay to the adapter module 100 that is able to decrypt the message using the security unit 755 of the adapter module 100 and the unique private key.

**[0044]** Figure 7 shows specific communications and messaging with a vending sequence (the numbers to the left of the communications and messaging) between the adapter module 100, the mobile device 150, and the system management server 130. These communications are discussed in more detail in the discussion pertaining to the schematic flow diagrams (Figures 8A-8G) and the flow charts (Figures 9A-9E).

**[0045]** It should be noted that Figures 5, 6, and 7 are examples, and are meant to help in the understanding of the mobile-device-to-machine payment system. For example, the shown long-range communications technology may be replaced with alternative long-range communications technology known or yet to be discovered, the shown short-range communication technology may be replaced with alternative short-range communication technology known or yet to be discovered, and the shown security may be replaced with alternative security known or yet to be discovered. The shown connections are



meant to be examples, and there may be intermediaries that are not shown. The shown components have been simplified in that, for example, only one mobile device 150 (or machine 120, adapter module 100, or server 130) is shown where many may be included. Finally, the order of the steps may be changed and some steps may be eliminated.

**ADAPTER MODULE**

**[0046]** Figures 11-18 show views of adapter module 100a (referred to generally as adapter module 100). Adapter module 100 is a relatively low cost hardware component that is pre-configured to work with the industry standard multi-drop bus (MDB). On machines without MDB technology, the adapter module 100 can be configured or designed to work with other serial protocols or activate a switch. In essence the adapter module 100 simulates establishing payment on payment accepting unit 120 in much the same manner as other alternative forms of payment (e.g., cash).

**[0047]** The shown adapter modules 100 are preferably designed to be used as an in-line dongle for in-line insertion within, for example, a MDB of a machine 120. The wire used in MDB technology uses male and female connection ends or adapters to allow the attachment of peripherals. In the case of a vending machine, the wire with the connection ends or adapters would be present to allow the attachment of a payment receiving mechanism (e.g., a coin mechanism). The MDB male and female adapters 700, 710 may be separated (as shown in Figures 17-18). The adapter module 100a in Figures 11 and 17-18 has a male adapter 720 and a female adapter 730. The adapter module 100a may be plugged (inserted) in serial ("in-line") with the wire. For example, the MDB female adapter 710 may be connected to the male adapter 720 of the adapter module 100 and the MDB male adapter 700 may be connected to the female adapter 730 of the adapter module 100. The resulting in-line configuration is shown in Figure 19. It should be noted that the adapter modules 100 are designed to allow pass-through communications so that if the mobile-device-to-machine payment processing system is not enabled (e.g., for a particular purchase or simply turned off) the MDB functions as though the adapter module 100 is not there and the machine 120 can function normally.

**HANDS-FREE MODE**

**[0048]** Summarily, if it is available, a hands-free mode, from the user's perspective, would allow the user to approach a favorite payment accepting unit 120 and notice that the display (e.g., the displays 122 or 124 shown in Figure 19) associated with the payment accepting unit 120 shows funds available (e.g., the wallet balance), he would select the product or service using input mechanisms (e.g., buttons 126 or a touch screen display 124 shown in Figure 19) associated with the payment accept-

ing unit 120, and he would retrieve his dispensed services or products.

**[0049]** During an initial handshake with the mobile device 150 (when the user is within range), the adapter module 100 reports to the mobile device 150 whether or not hands-free mode is available. If it is available, the installed mobile application 140 automatically connects to the payment accepting unit 120 without the user having to interact with the mobile device 150. The user observes that funds are available on the display 122, 124 of the payment accepting unit 120 and completes the purchase transaction as if cash was inserted in the machine 120 by inputting his selection on the payment accepting unit 120. The payment accepting unit 120 dispenses the product or service. After the selection is made, the change is returned to the mobile device 150.

**[0050]** Whether hands-free payment is available is determined by factors including, but not limited to whether if other mobile devices 150 are in range, if other adapter modules 100 are in range, if there are any alerts, if the payment trigger threshold is having wide variances and so deemed unstable, or if the payment accepting unit operator (e.g., a vending machine operator) has opted to disable hands-free mode for the payment accepting unit 120. In the latter instance, operators can disable via a maintenance mobile device 150, as well as through the operators' server 170 and/or the system management server 130.

**[0051]** Figure 3 is a table that shows considerations, conditions, or factors that may be used to determine whether the hands-free pay feature is available. Starting at the "Favorite?" column, this indicates whether the payment accepting unit 120 is a favorite machine. Preferably the hands-free pay feature is only available for use with "favorite" payment accepting units 120 (e.g., a vending machine at work or school). The "Alert" column has to do with whether there is some reason (e.g., there are too many users in range) that the hands-free pay feature should not work and, if there is such a reason, the user will be notified (alerted) and may be able to use the manual mode to resolve the alert and/or complete the transaction. Figure 3 shows situations in which a user is or is not able to make hands-free purchases from a machine 120 using a mobile application 140 on his mobile device 150. It should be noted that the shown interface is an example. For example, some of the features could be automated or pre-selected. (It should be noted that the left hand column, the "Tab" column, relates to whether the selected tab on the mobile application 140 is "all" or "favorite." Figures 10A-10D all show these tabs. Unlike the other columns in Figure 3, this column has more to do with the functionality and view of the application 140 than specifically with the hands-free feature. The tabs would allow a user to select whether he wanted to be alerted when he was in range of all payment accepting units 120 or just "favorite" payment accepting units 120 and the application 140 would show the appropriate view.)

**[0052]** Balance Display: An optional feature of the mobile-device-to-machine payment system that is particularly helpful in the hands-free mode (although it may be available in the manual mode and/or in a multiple-vend scenarios) is when the user's mobile device 150 sends "credit" to the payment accepting unit 120 (either via hands-free payment or through a manual swipe), the wallet balance is sent to the payment accepting unit 120 that is then displayed to the user on a display 122, 124 of the machine 120. This is particularly beneficial during hands-free mode when the user does not retrieve the mobile device 150 and, therefore, may not know the balance. Also, in a multiple-vend scenario the user would not have to calculate a remaining balance.

**[0053]** An example of a hands-free, multiple-vend scenario where a balance is displayed by the payment accepting unit 120, follows: The user has \$5.00 in his/her virtual wallet as that is the amount that has been authorized (the AuthGrant being stored on the mobile device 150). The user walks up to the payment accepting unit 120 and \$5.00 is displayed on the display 122, 124 of the payment accepting unit 120 since hands-free mode was enabled and credit was sent (e.g., via the short-range communication capability) to the payment accepting unit 120. The user makes a selection of \$1.50 by interacting (e.g., pressing buttons) with the machine 120. The item (product or service) is dispensed and the "change" is "returned" (e.g., via the short-range communication capability) to the virtual wallet. But since the user is still standing in the payment zone 102, the remaining wallet balance of \$3.50 is sent to the payment accepting unit 120 and displayed so that the user can now see that he/she has a \$3.50 balance. (It should be noted that the authorized funds may remain on the machine 120 and not be transferred back to the mobile device 150 between transactions.) The user decides to purchase a \$1.50 item, and the transaction is completed as usual (e.g., by interacting with the machine 120). Now the user is still standing in the payment zone 102 and he/she sees the wallet balance of \$2.00 on the display 122, 124 of the payment accepting unit 120. The user decides that he/she does not wish to purchase anything else and simply walks away. As he/she walks out of the payment zone 102, the credit is cleared from the machine 120, but he/she is left with the knowledge that his wallet balance is \$2.00 even though he/she never touched the mobile device 150. Communications between the payment accepting unit 120 and the adapter module 100 (via the mobile device 150) handle the accounting incidental to the transaction. The remaining balance (\$2.00) is technically stored on the server 130, and may be reflected on the application 140 on the mobile device 150.

**MULTIPLE DISTINCT ZONES**

**[0054]** As shown in Figures 1-2, the functions performed by the adapter module 100 can be divided into distinct zones: a first "communication zone" (e.g., "Blue-

tooth range" 106), a second "authorization zone" 104, and a third "payment zone" 102. The payment zone 102 is smaller than or equal to (overlapping completely) the authorization zone 104. Put another way, the payment zone 102 is within or coextensive with the authorization zone 104. The payment zone 102 is a subset of the authorization zone 104 with a ratio of the payment zone 102 to the authorization zone 104 ranging from 0.01:1 to 1:1. It is not necessarily a fixed ratio and can vary between different payment accepting units 120, different mobile devices 150, different users, and over time. While the zones 102, 104, 106 are depicted as having a uniform shape, the zones may not necessarily be uniform (or constant over time) in that the shape can vary. For example, the shape of the Bluetooth range 106 may vary depending on environmental conditions such as obstacles in the room and payment accepting unit 120 door/wall materials.

**[0055]** Bluetooth Range 106 (sometimes also herein called the "communication zone"): The outermost range is the Bluetooth range 106 (shown in Figures 1-2). This is the area in which the adapter module 100 is able to broadcast its presence. In most situations, the Bluetooth range 106 is a passive range in that no actual data is exchanged between the mobile device 150 and the adapter module 100. While in the Bluetooth range 106, the mobile device 150 monitors the RSSI (Received Signal Strength Indicator).

**[0056]** Authorization Zone 104: The middle region is the authorization zone 104 (shown in Figures 1-2). This is a computed area based on the RSSI. As mentioned, the mobile device 150 monitors the RSSI while it is in the Bluetooth range 106. When the RSSI reaches a certain predetermined threshold based on In-Range Heuristics, the mobile device 150 can be considered to be in the authorization zone 104. In the authorization zone 104 the mobile device 150 establishes a connection to the adapter module 100 (e.g., a Bluetooth connection (Figure 5) with SSL protection (Figure 6)) and informs the adapter module 100 of its presence. After a successful handshake with the adapter module 100, the mobile device 150 registers the adapter module 100 and the adapter module 100 requests an authorization to the server 130 via the mobile devices' network connection (e.g., a Wi-Fi or cellular connection (Figure 5) with SSL protection (Figure 6)). It is important to note the mobile device 150 and the adapter module 100 have a non-exclusive relationship at this point. The adapter module 100 may collect registrations for all mobile devices 150 that are within the authorization zone 104.

**[0057]** An authorization occurs in preparation for when the user enters the payment zone 102 (shown in Figures 1-2). An authorization expires in a set period of time (for example, five minutes), so if the mobile device 150 is still in the authorization zone 104 at the time of expiration, the adapter module 100 submits for and receives another authorization. This will continue for a set number of times (for example, the limit may be three times to limit cases

of numerous authorizations for a mobile device that may remain in the authorization zone 104 for an extended period of time without completing a transaction). Should authorization fail (for instance if the limit had been reached) prior to the user entering the payment zone 102, the adapter module 100 will request authorization when the mobile device 150 enters the payment zone 102 (which adds a few seconds to the experience).

**[0058]** Payment Zone 102: As a user enters the payment zone 102, the mobile device 150 establishes exclusive control of the adapter module 100. Once established, any other user in the payment zone 102 is put into a "waiting" status.

**[0059]** In the payment zone 102, the payment can be triggered automatically if the payment processing system has and is in hands-free mode. In such instances, the mobile device 150 is running the application 140 in background mode and will send credit to the payment accepting unit 120 without any explicit user interaction. The user completes the transaction on the payment accepting unit 120 in much the same manner as if cash had been inserted into the payment accepting unit 120 to establish credit. After the user completes the transaction (that may include one or more purchases), details of the transaction are preferably returned to the mobile device 150 and server 130 in separate messages. The message to the server 130 is preferably encrypted with the adapter module's 100 private key (Figure 6) to ensure data integrity. As shown in Figure 7, the "private key" coded message (Encrypted VendDetails) is preferably sent via the mobile device 150. The message to the mobile device 150 may be sent solely for the purpose of closing the transaction. The transaction history and balance are updated server-side via the encrypted message sent to the server 130.

**[0060]** The other mode of operation is manual mode. In manual mode, the user launches the mobile device 150 and is able to swipe to send payment to the payment accepting unit 120. The user can also swipe back to cancel the payment. Like in hands-free mode, the purchase transaction is completed on the payment accepting unit 120 in the same manner as if cash were inserted into the payment accepting unit 120. The mobile device 150 is only used to send payment. Selection is made directly on the payment accepting unit 120.

**[0061]** Self-Calibrating Zone Threshold: A key, but optional feature, of the payment processing system is a self-calibrating payment zone RSSI threshold. Because RSSI can vary machine to machine, environment to environment, and device to device, having a fixed threshold at which payment is triggered can be problematic. The approach suggested herein is the creation of a self-calibrating threshold. When the user is interacting with the payment accepting unit 120 (such as when he makes his selection on the payment accepting unit 120), the payment accepting unit 120 notifies the adapter module 100 and the adapter module 100 logs the conditions such as RSSI, type of user mobile device 150, accelerometer data, and other information. It is at this point that it can be

ascertained safely that the user is within arm's-length from the payment accepting unit 120 (by necessity the user is arm's-length because he is making some physical interaction with the payment accepting unit 120). This is the only point in the entire transaction in which it can be certain that the user is within arm's-length from the payment accepting unit 120.

**[0062]** Figure 4 shows a simplified set of steps involved when users enter the payment zone 102. Specifically, Figure 4 shows that credit is established 200 (this may have been done in the authorization zone 104, but if not it would be handled in the payment zone 102), that the user makes a selection using the machine 202, that the machine notifies the adapter module of the selection 204, that the adapter module (optionally) logs the RSSI 206, and that the purchase process(es) continues 208. Using the historically logged RSSI data, the adapter module 100 calculates one of several "average" RSSI using various mathematical models. This "average" could be a traditional average, a moving average, a weighted average, a median, or other similar summary function. The adapter module 100 could pre-process the historical data before running the function, such as to eliminate top and bottom data points, suspect data points, etc.

**[0063]** Optionally, during the handshake between the mobile device 150 and the adapter module 100, the information transmitted to the adapter module 100 may include, for example, the model of the mobile device 150. Using the received information pertaining to the mobile device models, the adapter module 100 can create multiple payment thresholds, one for each mobile device model. This allows for variances that may be inherent in different types of Bluetooth radios. An alternative to this method is for the adapter module 100 to broadcast a baseline payment zone threshold, and the mobile device 150 can use an offset from this baseline based on its specific model type. The payment zone thresholds (or baseline offsets) can be unique to specific types of mobile devices (e.g., by manufacturer, operating system, or component parts), models of mobile devices, or individual mobile devices (unique to each user).

**[0064]** In a typical scenario in which the payment zone threshold has been calibrated, the adapter module 100 advertises its presence along with the threshold at which it considers any mobile device 150 to be in the authorization zone 104. This is a one-way communication from adapter module 100 to mobile device 150. Once the mobile device 150 enters the authorization zone 104, there is a handshake that is established between the adapter module 100 and the mobile device 150. During this handshake, the mobile device 150 can share its model information with the adapter module 100, and the adapter module 100 can return the payment zone 102 threshold for that specific model.

**[0065]** Optionally, in addition to calibrating the payment zone threshold, the adapter module 100 can apply the self-calibrating model to the authorization zone 104 to calibrate the authorization zone threshold. As with the

payment zone thresholds, the authorization zone thresholds can be unique to specific types of mobile devices, models of mobile devices, or individual mobile devices. In this scenario, the adapter module 100 would broadcast multiple thresholds by device type and the mobile device 150 would determine which threshold to apply (or alternatively broadcast a baseline and the mobile device 150 uses an offset based on its device model). Even in this scenario, the authorization zone 104 is a one-way communication.

**[0066]** Optionally, along with the threshold that is calculated (in the payment and/or the authorization zone(s)), a safety margin can be added to minimize scenarios in which a user is within range, but the mobile-device-to-machine payment processing system does not recognize it because the threshold may not have been reached. For example, if the calculated RSSI for an iPhone™ 5 on machine 4567 is -68 db, the mobile-device-to-machine payment processing system may add a safety margin of -5 db, and establish the threshold at -73 db. So when a user's phone is communicating with the adapter module 100 at an RSSI of -73 db or better, the mobile-device-to-machine payment processing system will allow the mobile device 150 to credit the payment accepting unit 120. The safety margin can be set on the server 130 and downloaded to the adapter module 100, or set on the mobile device 150, or set on the adapter module 100 itself.

**[0067]** Optionally, in the payment zone threshold, the mobile device 150 can use other data to determine when to cancel the exclusive control of the payment accepting unit 120, to identify when the user is moving out of the payment zone 102. External data could include accelerometer data from the mobile device 150. Using that data, the mobile device 150 can determine whether the user is standing relatively still in front of the payment accepting unit 120, or if the user is in motion - effectively walking away from the payment accepting unit 120.

**SIGNAL UNAVAILABILITY ADAPTATION**

**[0068]** The mobile-device-to-machine payment processing system described herein uses a mobile device's 150 short-range communication technology (e.g., Bluetooth mechanisms) (shown as short-range communication capability 876 in Figure 21) and a mobile device's 150 long-range communications technology (e.g., cellular and/or Wi-Fi mechanisms) (shown as long-range communication capability 872 in Figure 21). The short-range communication capability 876 communicates with the adapter module's 100 short-range communication technology (e.g., Bluetooth mechanisms) (shown as short-range communication capability 776 in Figure 20). The long-range communication capability 872 communicates with the server's 130 long-range communications technology (e.g., cellular and/or Wi-Fi mechanisms) (shown as long-range communication capability 972 in Figure 22). The mobile device 150 (with a mobile application 140 thereon) acts as a communication bridge be-

tween the adapter module 100 (associated with a payment accepting unit 120) and the server 130. This process is described herein and works properly if there is cellular or Wi-Fi coverage within the payment zone 102.

**[0069]** One option if there is no cellular or Wi-Fi coverage within the payment zone 102 is to determine whether there is cellular or Wi-Fi coverage within the authorization zone 104 or the Bluetooth range 106. If there is, then the sizes of the zones 102, 104, 106 could be adapted and the timing could be adapted. For example, if the mobile devices 150 detected problems with the cellular or Wi-Fi coverage within the payment zone 102, the user could carry his mobile device 150 into the other zones (or the mobile device 150 could use short-range communication technology to communicate with other mobile devices 150 within the authorization zone 104 or the Bluetooth range 106) to determine whether the zones have cellular or Wi-Fi coverage. If they do have coverage, communication between the mobile device 150 and the server 130 can be advanced (conducted earlier when the mobile device 150 is further from the machine 120) or delayed (conducted later when the mobile device 150 is further from the machine 120). This can be thought of as changing the size or shapes of the zones 102, 104, 106. The timing would also have to be adjusted so that the authorization of funds (AuthGrant) does not expire before the user has a chance to make a purchase. It also means that balance updates to the server 130 may happen after the user has moved away from the machine 120 and has cellular or Wi-Fi coverage again.

**[0070]** Another option if there is no cellular or Wi-Fi coverage within any of the zones 102, 104, 106 is for the user to obtain authorization while outside of the zones in a place with cellular or Wi-Fi coverage. This may occur, for example, if a user knows that he will be going to a place with a payment accepting unit 120 equipped with an adapter module 100 (perhaps to a favorite payment accepting unit 120) that does not have (or rarely has) cellular or Wi-Fi coverage. A user may also use the mobile application 140 to query payment accepting units 120 in a given range (e.g., within 50 miles) or at a given location (e.g., at a campground or in a particular remote city) to determine whether there is cellular or Wi-Fi coverage within the zones 102, 104, 106. The user can then obtain pre-authorization from the server 130 using the mobile application 140. Again, the timing would also have to be adjusted so that the authorization of funds (AuthGrant) does not expire before the user has a chance to make a purchase. It also means that balance updates to the server 130 may happen after the user has moved away from the machine 120 and has cellular or Wi-Fi coverage again. A mobile-device-to-machine payment system having the ability to implement this option would be able to accept cashless payments without requiring any network connection near the payment accepting unit 120. In some implementations, the mobile-device-to-machine payment processing systems described herein is located in a remote location where no signal is available,

therefore, can accept cashless payments.

**[0071]** As an example of a situation in which there might be no cellular or Wi-Fi coverage within any of the zones 102, 104, 106 of a particular payment accepting unit 120, the user (a teenager) may be traveling to a remote location to attend summer camp where there is no cellular or Wi-Fi coverage. The camp may have several payment accepting units 120 (e.g., a machine that creates a dedicated "hotspot" that requires payment for use, vending machines, or machines for renting equipment such as bikes, kayaks, or basketballs). The camp facility might notify parents that the mobile-device-to-machine payment system is available. The parents, while at home, could obtain authorization for a particular amount (that could be doled out a certain amount per day or limited to type of machine or location) to be authorized and "loaded" into the user's mobile device 150 and specify that the authorization will not expire for a certain period or until a certain date. Thereafter, while at camp, the user could use the mobile application 140 on his mobile device 150 in a manner similar to those discussed elsewhere herein. Short-range communications may be used for communications between the adapter modules 100 (associated with the machines 120) and users' mobile devices 150.

**[0072]** One subtle but powerful component of the payment processing system described herein is that it requires a long-range communication capability (e.g., an Internet or cellular network connection) only in the authorization zone 104 and only for the time period required to send the AuthRequest and receive the AuthGrant. Once a valid AuthGrant is received by the mobile device 150, the long-range communication capability (e.g., an Internet or cellular network connection) is not required by either the mobile device 150 or the adapter module 100 in the payment zone 102 as long as the AuthGrant is valid (unexpired). This mechanism allows the system to seamlessly handle authenticated transactions in (temporary) offline mode, with the deferred acknowledgement and transaction messages performing the bookkeeping and cleanup when network connection is regained. The alternatives described above provide a unique way to artificially extend the authorization zone to include any location where the mobile device 150 can communicate with the server 130.

**MULTIPLE USER RESOLUTION**

**[0073]** As shown in Figure 2, in one practical scenario, multiple users are in the zones 102, 104, 106. As shown in Figure 2, users 1, 2, and 3 are in the payment zone 102 near the machine 120; users 5 and 6 are shown as positioned between the authorization zone 104 and the Bluetooth range 106; users 4 and 7 are in the Bluetooth range 106, user 10 is positioned on the edge of the Bluetooth range 106; and users 8 and 9 are positioned outside of Bluetooth range 106. In some implementations, the mobile-device-to-machine payment processing system manages and resolves issues pertaining to multiple users.

**[0074]** Users 4 and 7 are within the Bluetooth range 106 and the user 10 is either entering or leaving the Bluetooth range 106. Within the Bluetooth range 106 the users' mobile devices 150 are able to see the adapter module's 100 advertisement. In this zone, the mobile device 150 preferably does not initiate a connection. The adapter module 100 is preferably unaware of the users in the Bluetooth range 106. All the adapter module 100 is doing is advertising its presence to any multitude of users that may be in Bluetooth range 106.

**[0075]** The adapter module 100 begins to log users as the users (and their respective mobile devices 150) enter the authorization zone 104 (shown in Figure 2 as users 5 and 6). At this point, there is a non-exclusive connection initiated by the mobile device 150 to the adapter module 100. It does a handshake (e.g., to exchange information needed to obtain authorization and, optionally, to log information needed for a self-calibrating authorization zone threshold) and the mobile device 150 contacts the server 130 for an authorization (e.g., sending an AuthRequest and receiving an AuthGrant). The adapter module 100 registers all mobile devices 150 that have requested and received AuthGrants. The adapter module 100 continues communicating with any other mobile device 150 that enters the authorization zone 104. After initial contact, the adapter module 100 may provide the mobile device 150 with a deferral delay of when to check back in with the adapter module 100 allowing opportunity for other mobile devices 150 to communicate with the adapter module 100.

**[0076]** If there is only one user in the payment zone 102, a purchase transaction may be performed. If there are multiple users in the payment zone 102, the mobile-device-to-machine payment system must handle the situation.

**[0077]** One optional solution for handling the situation of the multiple users in the payment zone 102 is queuing users in the payment zone 102. Once any mobile device 150 enters the payment zone 102, it establishes exclusivity to a particular mobile device 150 (e.g., in a first-come-first-serve manner). Technically, however, the adapter module 100 is not establishing an exclusive connection to the mobile device 150. The adapter module 100 can still perform a round-robin poll and communicate with and advertise to other mobile devices 150. Instead, the adapter module 100 establishes a queue prioritized by RSSI and time (e.g., who was first and whether the authorization has expired) and it notifies (e.g., alerts) other mobile devices 150 to wait. The earliest valid (unexpired) authorization takes precedence when there is any tie in the RSSI. Otherwise, for example, the strongest average RSSI takes priority. Preferably the queue is not a static measure of the RSSI but an averaged measure over the period of time in the queue. This compensates for a scenario in which a user may be walking around in the queue and then shows up at the payment accepting unit 120 just as the previous user is finishing. If another

user was also in the payment zone 102 and stood there the entire time, but may have newer authorization, he could win out.

**[0078]** Anytime that the adapter module 100 cannot determine exactly which user is in the payment zone 102 in front of the payment accepting unit 120, the adapter module 100 will disable hands-free payment. The mobile device 150 will send an alert to the user and he can use swipe to pay (manual mode). All users in payment zone 102 will show "Connected" and the first to swipe payment to the payment accepting unit 120 then locks out other users.

### MULTIPLE MODULE RESOLUTION

**[0079]** In the scenario where there are multiple modules present, determining which payment accepting unit 120 a user is in front of can be a challenge. In some implementations, the mobile-device-to-machine payment processing system described herein allows adapter modules 100 to communicate to other adapter modules 100 in range via Bluetooth. Each user receives authorization grants for specific payment accepting units 120. This means if there are multiple adapter modules 100 within the same authorization zone 104, there will be multiple authorization grants for the user. When the user enters the payment zone 102, it can be difficult to differentiate which payment accepting unit 120 the user is in front of if the payment zones 102 overlap.

**[0080]** To solve this problem, when the user enters the payment zone 102, the adapter modules 100 communicate with each other to determine the RSSI for the particular user (based on the signal from his mobile device 150) to triangulate which adapter module 100 (and the associated payment accepting unit 120) is closer to the user. Optionally, the intermodule communications can restrict the user to establishing an exclusive connection with only one payment accepting unit 120.

**[0081]** Optionally, when the user connects to a payment accepting unit 120, the mobile device 150 can send a communication to the payment accepting unit 120 for momentary display to the user on the display 122, 124 of the payment accepting unit 120. For example, the mobile device 150 can send a communication (e.g., "connected" or "Fred's Mobile Device Connected") to the payment accepting unit's display 122, 124 for a predetermined period of time (e.g., 1-3 seconds) so when the user is in payment zone 102, it is clear which payment accepting unit 120 the user is connected to prior to making a purchase (either in hands-free or manual mode).

**[0082]** In addition, when the user is in manual mode, the mobile device 150 can display (e.g., on the touch screen 152 as shown in Figures 10A-10D) a visual indication of the payment accepting unit 120 (e.g., a picture and/or a payment accepting unit ID of the payment accepting unit 120) for visual confirmation. If the user is in manual mode, the user can manually change the payment accepting unit 120.

### DESCRIPTIVE SCENARIO

**[0083]** Figure 7, Figures 8A-8G, and 9A-9E (as well as other figures) can be used to understand a detailed scenario of the mobile-device-to-machine payment processing system described herein. A flow of communications and steps are loosely described below with reference to these (and other figures). It should be noted that alternative scenarios could include, for example, a modified order of the steps performed.

**[0084]** Prior to vending transactions, a user downloads a mobile application 140 onto his mobile device 150, creates an account, and configures a funding source via, for example, a funding source server 160. A funding source may be, for example, a debit card, a credit card, campus cards, rewards points, bank accounts, payment services (e.g., PayPal™) or other payment option or combination of payment options known or yet to be discovered. The funding sources may be traditional and/or nontraditional payment sources that are integrated into the ecosystem described herein and then used indirectly as a source of funds. Funds from the funding source are preferably held on the server 130 such that when an AuthRequest is received by the server 130, the server 130 can send an AuthGrant authorizing funds for a purchase.

**[0085]** The user can specify one or more "favorite" adapter module(s) 100 (that has a one-to-one relationship to the payment accepting unit 120) that he may visit regularly, such as a vending machine at school or work. Favorite adapter modules 100 appear on a prefiltered list and allow for additional rich features such as hands-free payment.

**[0086]** The payment accepting unit 120 may be equipped with an adapter module 100 that is constantly advertising its availability via Bluetooth (or other "signals," "communications," and/or "transmissions"). This ongoing advertising and scanning for adapter modules is shown in Figure 8A. As shown, the mobile device 150 is continuously scanning for any adapter module 100 within Bluetooth (or other "signal," "communication," and/or "transmission") range. When the user is within range of that adapter module 100, the mobile device 150 tracks and monitors the signal strength until a predetermined "authorization zone" threshold is achieved.

**[0087]** Figures 8B and 9A generally show that when the authorization zone threshold is reached, the mobile device 150 enters the authorization zone (block 302) and registers the adapter module 100. The mobile device 150 connects to the server 130 (block 304). The application 140 on the mobile device 150 creates a request for authorization (AuthRequest) and passes the AuthRequest to the server 130 using appropriate communication technology (e.g., GSM, CDMA, Wi-Fi, or the like) (block 306). The server 130 responds with an authorization grant (AuthGrant) encrypted with the specific adapter module's private key (block 306). This authorization token may minimally include the User identifier (ID), Apparatus ID (for the adapter module 100), authorization amount, and

expiration time. The mobile device 150 receives the AuthGrant from the server 130, and retains it until the mobile device 150 is ready to issue payment to an adapter module 100. The mobile device 150 collects all pending AuthGrants that may be one or more depending on how many adapter modules 100 are in-range. Unused AuthGrants that expire are purged from the mobile device 150 and the server 130. It is important to note that the mobile device 150 is unable to read the AuthGrant because it is encrypted with the adapter module's unique private key that is only known to server 130 and adapter module 100. This provides a preferred key element of security in the system as the adapter module 100 only trusts AuthGrants that are issued by the server 130, and the AuthGrants cannot be read or modified by the mobile device 150 or any other party in between the server and the adapter module 100. Additional mobile devices 150 may enter the authorization zone 104 (block 308).

**[0088]** As the user approaches a specific adapter module 100, the user enters the payment zone 102 and an event threshold is triggered based on heuristics performed by the mobile device 150. Blocks 310 and 312 show the loop steps of waiting for a mobile device 150 from the authorization zone 104 to enter the payment zone 102. If the user leaves the authorization zone 104 without entering the payment zone 102, the adapter module 100 returns to advertising its presence (block 300).

**[0089]** Figures 8C and 9B generally show the user entering the payment zone. The mobile device 150 verifies that it has an unexpired and valid AuthGrant. If the AuthGrant is not good, it may be requested again, repeating the Authorization Request process (block 315). If the AuthGrant is good, the mobile device 150 sends the valid AuthGrant (including the wallet balance (block 322)) to the adapter module 100 to initiate a transaction. The mobile device 150 may issue the AuthGrant automatically without specific user interaction if the hands-free mode is supported (and the device is a favorite (block 318), there is only one device in the payment zone 102 (block 318), and (optionally) there is only one user in the authorization zone 104 (block 320). If any of these factors are not present, the mobile device 150 will prompt and/or wait for the user to begin the transaction manually (block 324).

**[0090]** Figures 8D, 9C, and 9D generally show the transaction process. As shown in Figure 9C, the adapter module 100 runs through a series of questions to determine if there are any issues that would prevent vending including: has the user canceled in-app? (block 326), has the user walked away? (block 328), is the coin return pressed? (block 330), has more than a predetermined period of time elapsed? (block 332). If the answer to any of these questions is "yes," the transaction does not proceed. If the answers to all of these questions is "no," the user makes a selection (block 334) on the payment accepting unit 120 in the same or similar manner as compared to if cash or credit were presented to the payment accepting unit 120. If the machine 120 is able to vend

(block 336), it attempts to release the product. If the vend fails (block 338) it is reported by the machine (block 340) and a credit is returned to the virtual wallet (block 342). If the vend is successful (block 338) it is reported by the machine (block 344). Put another way, after the transaction is complete, the adapter module 100 returns to the mobile device 150 the details of the transaction as well as an encrypted packet containing the vend details to be sent to the server 130 via the mobile device 150. Optionally, the adapter module 100 can pass additional information not directly related to the transaction such as payment accepting unit health, sales data, error codes, etc. **[0091]** Figures 8D and 9E generally show the multi-vend function. If the machine has enabled multi-vend capabilities (block 350) and the multi-vend limit has not been reached, the process returns to the question of whether the user is in the payment zone (block 310 of Figure 9A). If the machine does not have enabled multi-vend capabilities (block 350) or the multi-vend limit has been reached, the wallet is decremented by the vend amount(s) and "change" is returned to the virtual wallet (block 354) and the process ends (block 356).

**[0092]** Figure 8E is a schematic flow diagram of an example login process. Figure 8F is a schematic flow diagram of an example boot-up process. Figure 8G is a schematic flow diagram of an example account check/update process.

**[0093]** Several of the figures are flow charts (e.g., Figures 9A-9E) illustrating methods and systems. It will be understood that each block of these flow charts, components of all or some of the blocks of these flow charts, and/or combinations of blocks in these flow charts, may be implemented by software (e.g., coding, software, computer program instructions, software programs, subprograms, or other series of computer-executable or processor-executable instructions), by hardware (e.g., processors, memory), by firmware, and/or a combination of these forms. As an example, in the case of software, computer program instructions (computer-readable program code) may be loaded onto a computer to produce a machine, such that the instructions that execute on the computer create structures for implementing the functions specified in the flow chart block or blocks. These computer program instructions may also be stored in a memory that can direct a computer to function in a particular manner, such that the instructions stored in the memory produce an article of manufacture including instruction structures that implement the function specified in the flow chart block or blocks. The computer program instructions may also be loaded onto a computer to cause a series of operational steps to be performed on or by the computer to produce a computer implemented process such that the instructions that execute on the computer provide steps for implementing the functions specified in the flow chart block or blocks. Accordingly, blocks of the flow charts support combinations of steps, structures, and/or modules for performing the specified functions. It will also be understood that each block of the

flow charts, and combinations of blocks in the flow charts, may be divided and/or joined with other blocks of the flow charts without affecting the scope of the invention. This may result, for example, in computer-readable program code being stored in whole on a single memory, or various components of computer-readable program code being stored on more than one memory.

**ADDITIONAL IMPLEMENTATIONS**

**[0094]** Figure 23 illustrates a schematic flow diagram of a process 1000 of authenticating a user to perform a transaction in the payment processing system in accordance with some implementations. In some implementations, the payment processing system includes one or more payment modules 100 (e.g., each associated with a respective payment accepting unit 120 such as an automatic retailing machine for dispensing goods and/or services), one or more mobile devices 150 (e.g., each executing the application 140 for the payment processing system either as a foreground or background process), and the server 130. The server 130 manages the payment processing system and, in some cases, is associated with an entity that supplies, operates, and/or manufactures the one or more payment modules 100. For brevity, the process 1000 will be described with respect to a respective payment module 100 and a respective mobile device 150 in the payment processing system.

**[0095]** The payment module 100 broadcasts (1002), via a short-range communication capability (e.g., BLE), a packet of information (sometimes also herein called "advertised information"). The packet of information at least includes an authorization code and an identifier associated with the payment module 100 (module ID). In some implementations, the packet of information further includes a firmware version of the payment module 100 and one or more status flags corresponding to one or more states of the payment module 100 and/or the payment accepting unit 120. The information included in the packet broadcast by the payment module 100 is further discussed below with reference to Figure 24A.

**[0096]** In some implementations, the payment module 100 sends out a unique authorization code every X seconds (e.g., 100 ms, 200 ms, 500 ms, etc.). In some implementations, the unique authorization codes are randomly or pseudo-randomly generated numbers. In some implementations, the payment module 100 stores broadcasted authorization codes until a received authorization grant token matches one of the stored authorization codes. In some implementations, the payment module 100 stores broadcasted authorization codes for a predetermined amount of time (e.g., Y minutes) after which time an authorization code expires and is deleted. In some implementations, the authorization code is encrypted with a shared secret key known by the server 130 but unique to the payment module 100. In some implementations, the payment module 100 initializes a random number and then the authorization codes are se-

quential counts from this random number. In such implementations, the payment module 100 stores the earliest valid (unexpired) counter without a need to store every valid authorization code. In some implementations, the authentication code included in the broadcast packet of information is a hash value of the randomly or pseudo-randomly generated number or the sequential number.

**[0097]** The mobile device 150 receives the broadcasted packet of information, and the mobile device 150 sends (1004), via a long-range communication capability (e.g., GSM, CDMA, Wi-Fi, or the like), an authorization request to the server 130. For example, an application 140 that is associated with the payment processing system is executing as a foreground or background process on the mobile device 150. In this example, the application 140 receives the broadcasted packet of information when the mobile device 150 is within the communication zone of the payment module 100 (i.e., BLE range) and either automatically sends the authorization request to the server 130 or sends the authorization request to the server 130 when the mobile device 150 is within the authorization zone of the payment module 100. In some implementations, the broadcasted packet of information includes a baseline authorization zone threshold (i.e., an authorization zone criterion) indicating a baseline RSSI that the mobile device 150 (or the application 140) is required to observe before being within the authorization zone of the payment module 100. In some implementations, the mobile device 150 (or the application 140) offsets the baseline authorization zone threshold based on the strength and/or reception of the short-range communication capability (e.g., BLE radio/transceiver) of the mobile device 150. In some implementations, the authorization request at least includes the authorization code which was included in the broadcasted packet of information, an identifier associated with the user of the mobile device 150 or the user account under which the user of the mobile device 150 is logged into the application 140 (user ID), and the identifier associated with the payment module 100 (module ID). In some implementations, the authentication code included in authorization request is the hash value in cleartext. The authorization request is further discussed below with reference to Figure 24B.

**[0098]** After receiving the authorization request, the server 130 processes (1006) the authorization request. In some implementations, the server 130 decrypts the authorization code included in the authorization request with the shared secret key corresponding to the payment module 100. In some implementations, the server 130 determines whether the user associated with the user ID in the authorization request has sufficient funds in his/her account for the payment processing system to perform a transaction at the machine 120 that is associated with the payment module 100 corresponding to the module ID in the authorization request.

**[0099]** The server 130 sends (1008), via a long-range communication capability (e.g., GSM, CDMA, Wi-Fi, or the like), an authorization grant token to the mobile device



150. In some implementations, the server 130 does not send the authorization grant token if the authorization code in the authorization request cannot be decrypted with the shared secret key corresponding to the payment module 100 (e.g., the authorization code is corrupted or hacked). In some implementations, the server 130 does not send the authorization grant token if the user associated with the user ID in the authorization request does not have sufficient funds in his/her account. In some implementations, in addition to the authorization grant token, the server 130 sends a message directly to the mobile device 150 which is not encrypted with the shared secret key corresponding to the payment module 100. After receiving the message, the mobile device 150 displays an appropriate message to the user such as insufficient balance or declined authorization. In some implementations, the server 130 sends an authorization grant token for an amount equal to zero; in which case, the payment module 100 interprets this as a declined or failed authorization which can result for any number of reasons including, but not limited to, insufficient balance or credit.

**[0100]** The mobile device 150 receives the authorization grant token, and, subsequently, the mobile device 150 detects (1010) a trigger condition. In some implementations, the mobile device 150 (or the application 140) detects the trigger condition via the hand-free mode (e.g., upon entrance into the payment zone of the payment module 100) or manual mode (e.g., interacting with the user interface of the application 140 to initiate a transaction with the payment accepting unit associated with the payment module 100).

**[0101]** In some implementations, unused authorization grants (e.g., if there was no trigger condition or it expired) are canceled by the mobile device 150 by sending a cancellation message to the server 130 corresponding to the unused authorization grant. In some implementations, the server 130 denies or limits the number of authorization grants sent to the mobile device 150 until it has received transaction information or cancellation of authorization outstanding authorization grants sent to the mobile device 150.

**[0102]** In response to detecting the trigger condition, the mobile device 150 sends (1012), via a short-range communication capability (e.g., BLE), the authorization grant token to the payment module 100. Subsequently, the machine 120 displays credit to the user (e.g., via one of the displays 122 or 124 shown in Figure 19) and the user interacts with the input mechanisms of the machine 120 (e.g., via the buttons 126 or a touch screen display 124 shown in Figure 19) to purchase products and/or services.

**[0103]** Figure 24A illustrates a block diagram of a packet 1100 of information broadcast by the payment module 100 (e.g., in step 1002 of the process 1000 in Figure 23) in accordance with some implementations. In some implementations, the packet 1100 at least includes: module ID 1102 and authorization code 1104. In some implementations, the packet 110 additional includes: a

firmware version 1106 and one or more status flags 1108.

**[0104]** In some implementations, the module ID 1102 is a unique identifier corresponding to the payment module 100 (sometimes also herein called the "adapter module 100") that broadcast the packet 1100.

**[0105]** In some implementations, the authorization code 1104 is a hash value in cleartext. In some implementations, the payment module 100 randomly or pseudo-randomly generates a number or determines a sequential number (See step 1002 of process 1000 in Figure 23) and performs a predetermined hash function (e.g., SHA-256) on the number to produce the hash value as the authorization code 1104. In some implementations, the authorization code 1104 is a unique code that is encrypted with a secret encryption key corresponding to the payment module 100. The secret encryption key is shared with the server 130, which enables the server 130 to decrypt the authorization code 1104 and encrypt the authorization grant token but not the mobile device 150. In some implementations, the encryption between server 130 and payment module 100 is accomplished by two pairs of public/private keys.

**[0106]** In some implementations, the firmware version information 1106 identifies a current firmware version 1112 of the payment module 100. In some implementations, the firmware version information 1106 also includes update status information 1114 indicating one or more packets received by the payment module 100 to update the firmware or one or more packets needed by the payment module 100 to update the firmware. See Figures 26A-26B and 30A-30D and the accompanying text for further discussion regarding updating the firmware of the payment module 100.

**[0107]** In some implementations, the one or more status flags 1108 indicate a state of the payment module 100 and/or the payment accepting unit 120 associated with the payment module 100. In some implementations, the one or more status flags 1108 indicate a state of the payment module 100 such upload information indicator 1116 indicating that that the payment module 100 has information to be uploaded to the server 130 (e.g., transaction information for one or more interrupted transactions). In some implementations, upload information indicator 1116 triggers the mobile device 150 to connect to payment module 100 immediately (e.g., if it has interrupted transaction information to be uploaded to the server 130). See Figures 25A-25B and 29A-29C and the accompanying text for further discussion regarding interrupted transactions. In some implementations, the one or more status flags 1108 indicate a state of the payment accepting unit 120 including one or more of an error indicator 1118 (e.g., indicating that a bill and/or coin acceptor of the payment accepting unit 120 is experiencing a jam, error code, or malfunction), a currency level indicator 1120 (e.g., indicating that the level of the bill and/or coin acceptor reservoir of the payment accepting unit 120 is full or empty), and/or inventory level(s) indicator 1122 (e.g., indicating that one or more products of the payment

accepting unit 120. In some implementations, the one or more status flags 1108 are error codes issued by payment accepting unit 120 over the MDB.

**[0108]** In some implementations, the zone criteria information 1110 specifies an authorization zone criterion 1124 (e.g., a baseline authorization zone threshold indicating a baseline RSSI that the mobile device 150 (or the application 140) is required to observe before being within the authorization zone of the payment module 100) and/or a payment zone criterion 1126 (e.g., a baseline payment zone threshold indicating a baseline RSSI that the mobile device 150 (or the application 140) is required to observe before being within the payment zone of the payment module 100). In some implementations, the baseline authorization zone threshold and the baseline payment zone threshold are default values determined by the server 130 or stored as variables by the application 140, in which case the authorization zone criterion 1124 and payment zone criterion 1126 are offsets to compensate for the strength and/or reception of the short-range communication capability (e.g., BLE radio/transceiver) of the payment module 100. Alternatively, zone criteria information 1110 includes a spread between the baseline authorization zone threshold and the baseline payment zone threshold. Thus, the mobile device 150 (or the application 140) determines the baseline authorization zone threshold and the baseline payment zone threshold based on the spread value and a default value for either the baseline authorization zone threshold or the baseline payment zone threshold. For example, the spread indicates -10 db and the default baseline payment zone threshold is -90 db; thus, the baseline authorization zone threshold is -80 db. Continuing with this example, after determining the baseline authorization zone threshold and the baseline payment zone threshold, the mobile device 150 (or the application 140) may further adjust the authorization zone threshold and/or the payment zone threshold based on the strength and/or reception of its short-range communication capability (i.e., BLE radio/transceiver).

**[0109]** Figure 24B is a block diagram of an authorization request 1130 sent by the mobile device 150 to the server 130 (e.g., in step 1004 of the process 1000 in Figure 23) in accordance with some implementations. In some implementations, the authorization request 1130 at least includes: a module ID 1102, a user ID 1134, and an authorization code 1104.

**[0110]** In some implementations, the module ID 1102 is a unique identifier corresponding to the payment module 100 that broadcast the 1100 that included the authorization code 1104.

**[0111]** In some implementations, the user ID 1134 is an identifier associated with the user of the mobile device 150 sending the authorization request 1130 to the server 130. In some implementations, the user ID 1134 is associated with the user account under which the user of the mobile device 150 is logged into the application 140.

**[0112]** In some implementations, the authorization

code 1130 includes the authorization code 1104 included in the packet 1100 of information that was broadcast by the payment module 100.

**[0113]** Figure 24C is a block diagram of an authorization grant token 1140 sent by the server 130 to the mobile device 150 (e.g., in step 1008 of the process 1000 in Figure 23) in accordance with some implementations. In some implementations, in accordance with a determination that the authorization code 1136 included in the authorization request 1130 from the mobile device 150 is valid and that the user associated with the mobile device 150 has sufficient funds in his/her account for the payment processing system, the server 130 generates the authorization grant token 1140. In some implementations, the authorization grant token 1140 at least includes: a module ID 1102, a user ID 1134, an authorized amount 1146, (optionally) an expiration period offset 1148, and (optionally) the authorization code 1104.

**[0114]** In some implementations, the module ID 1102 is a unique identifier corresponding to the payment module 100 that broadcast the packet 1100 that included the authorization code 1104.

**[0115]** In some implementations, the user ID 1134 is an identifier associated with the user of the mobile device 150 that sent the authorization request 1130 to the server 130.

**[0116]** In some implementations, the authorized amount 1146 indicates a maximum amount for which the user of the mobile device 150 is authorized for a transaction using the authorization grant token 1140. For example, the authorized amount 1146 is predefined by the user of the mobile device 150 or by the server 130 based on a daily limit or based on the user's total account balance or based on a risk profile of the user correspond to the user ID 1134.

**[0117]** In some implementations, the expiration period 1148 offset indicates an offset to the amount of time that the payment module 100 holds the authorization grant token 1140 valid for initiation of a transaction with the machine 120 associated with the payment module 100. For example, the expiration period offset 1148 depends on the history and credit of the user of mobile device 150 or a period predefined by the user of mobile device 150.

**[0118]** In some implementations, the authorization grant token 1140 further includes the authorization code 1104 that was included in the authorization request 1130. In some implementations, when the authorization code 1104 is the hash value, the server 130 encrypts the authorization grant token 1140 including the hashed value with the shared secret encryption key associated with payment module 100. Subsequently, when mobile device 150 sends the authorization grant token 1140 to payment module 100 after detecting a trigger condition, the payment module 100 decrypts the authorization grant token 1140 using the secret key known only to server 130 and payment module 100 (which authenticates the message and the authorization grant), and then matches the hash value included in the decrypted authorization

grant token 1140 to previously broadcast valid (unexpired) hash values (i.e., auth codes) to determine validity of the (which was known only by payment module 100).

**[0119]** Figure 24D illustrates a block diagram of transaction information 1150 generated by the payment module 100 (e.g., in step 1204 of the process 1200 in Figure 25A) in accordance with some implementations. In some implementations, the transaction information 1150 includes: a transaction ID 1152 for the respective transaction, a module ID 1154, a user ID 1156, (optionally) the authorization code 1158, transaction status information 1160, the transaction amount 1162, and other information 1164.

**[0120]** In some implementations, the transaction ID 1152 is a unique identifier corresponding to the respective transaction. In some implementations, the transaction ID 1152 is encoded based on or associated with the time and/or date on which and the location at which the respective transaction took place.

**[0121]** In some implementations, the module ID 1154 is a unique identifier corresponding to the payment module 100 that performed the respective transaction.

**[0122]** In some implementations, the user ID 1156 is an identifier associated with the user of the mobile device 150 that initiated the respective transaction.

**[0123]** In some implementations, the authorization code 1158 corresponds to the original authorization code (e.g., auth code 1104, Figures 24A-24C) and/or authorization grant token (e.g., auth grant token 1140, Figure 24C) that was used to initiate the respective transaction. In some implementations, the authorization code 1156 is encrypted with a unique encryption key corresponding to the payment module 100.

**[0124]** In some implementations, the transaction status information 1160 includes an indication whether the respective transaction was completed, not-completed, or aborted. For example, the respective transaction is incomplete if a jam occurred at the payment accepting unit 120 and the user did not receive the product associated with the respective transaction. For example, if the user walks away from the payment accepting unit 120 after money was credited for the respective transaction, the respective transaction is aborted. In another example, if respective transaction times out after a predetermined time period because the user failed to select a product at the payment accepting unit 120, the respective transaction is aborted. In another example, if the user actuates a bill or coin return mechanism of the payment accepting unit 120, the respective transaction is aborted.

**[0125]** In some implementations, the transaction amount 1162 indicates the amount of the respective transaction or the amount of each of multiple transactions (e.g., in a multi-vend scenario). In some implementations, the transaction amount 1162 is encrypted with a unique encryption key corresponding to the payment module 100.

**[0126]** In some implementations, the other information 1164 includes other information related to the respective

transaction such as the items dispensed by the payment accepting unit 120 and the type of transaction (e.g., coins, bills, credit card, manual mode, hands-free mode, etc.). In some implementations, the other information 1164 includes other information related to the payment module 100 and/or the payment accepting unit 120 associated with the payment module 100. For example, the other information 1164 includes a verification request to the server 130 in order to implement new firmware. See Figures 26A-26B and the accompanying text for further discussion of the verification request. In another example, the other information 1164 includes transaction information from one or more previous interrupted transactions. In another example, the other information 1164 includes transaction information for one or more transactions paid via bills and/or coins. In another example, the other information 1164 includes inventory information as to one or more products of the payment accepting unit 120.

**[0127]** Figure 25A illustrates a schematic flow diagram of a process 1200 of processing acknowledgement information in accordance with some implementations. In some implementations, the payment processing system includes one or more payment modules 100 (e.g., each associated with a respective payment accepting unit 120 such as an automatic retailing machine for dispensing goods and/or services), one or more mobile devices 150 (e.g., each executing the application 140 for the payment processing system either as a foreground or background process), and the server 130. The server 130 manages the payment processing system and, in some cases, supplies, operates, and/or manufactures the one or more payment modules 100. For brevity, the process 1200 will be described with respect to a respective payment module 100 associated with a respective payment accepting unit 120 (machine 120) and a respective mobile device 150 in the payment processing system. In the process 1200, the payment module 100 receives first acknowledgement information for a first transaction via the mobile device 150 that initiated the first transaction.

**[0128]** The payment module 100 obtains (1202) a first notification indicating completion of a first transaction from the machine 120. For example, after the process 1000 in Figure 23, the user of the mobile device 150 selects a product to purchase from the machine 120 by interacting with one or more input mechanisms of the machine 120 (e.g., buttons 126 or a touch screen display 124 shown in Figure 19), and the machine 120 dispenses the selected product. Continuing with this example, after the product is dispensed, the transaction is complete and the payment module 100 obtains a notification from the machine of the completed transaction. In some implementations, the notification includes the amount of the transaction and (optionally) machine status information associated with the machine 120 such as inventory information as to one or more products of the payment accepting unit 120 and/or the like.

**[0129]** After obtaining the first notification, the payment module 100 generates (1204) first transaction informa-

tion based on the first notification, and the payment module 100 stores the first transaction information. In some implementations, the transaction information includes a transaction ID for the first transaction, a module ID corresponding to payment module 100, a user ID corresponding to the mobile device 150, transaction status information indicating that the first transaction is complete, and the transaction amount indicated by the first notification. In some implementations, the payment module 100 retains the authorization code included in the original broadcasted packet and/or the authorization grant token and includes the authorization code in the first transaction information. In some implementations, the authorization code is encrypted with a secret key corresponding to the payment module 100, which is shared with the server 130 but not the mobile device 150. In some implementations, the first transaction information further includes other information such as the machine status information included in the first notification or transaction information corresponding to previous interrupted transaction(s). See Figure 24D and the accompanying text for further discussion regarding transaction information 1150.

**[0130]** The payment module 100 sends (1206), via a short-range communication capability (e.g., BLE), the first transaction information to the mobile device 150.

**[0131]** The mobile device 150 sends (1208), via a long-range communication capability (e.g., GSM, CDMA, Wi-Fi, or the like), the first transaction information to the server 130.

**[0132]** The server 130 processes (1210) the first transaction information. For example, the server 130 debits the account of the user associated with the user ID in the first transaction information in the amount indicated by the first transaction information.

**[0133]** The server 130 sends (1212), via a long-range communication capability (e.g., GSM, CDMA, Wi-Fi, or the like), first acknowledgment information to the mobile device 150. In some implementations, the first acknowledgment information acknowledges that the server 130 received the first transaction information. In some implementations, the first acknowledgment information includes the user ID, the module ID, the transaction ID, and (optionally) the authorization grant included in the transaction information (e.g., auth grant 1158, Figure 24D).

**[0134]** After receiving the first acknowledgement information, the mobile device 150 sends (1214), via a short-range communication capability (e.g., BLE), the first acknowledgment information to the payment module 100.

**[0135]** After receiving the first acknowledgment information, the payment module 100 deletes (1216) the stored first transaction information.

**[0136]** Figure 25B illustrates a schematic flow diagram of a process 1250 of processing interrupted transactions in accordance with some implementations. In some implementations, the payment processing system includes one or more payment modules 100 (e.g., each associ-

ed with a respective payment accepting unit 120 such an automatic retailing machine for dispensing goods and/or services), one or more mobile devices 150 (e.g., each executing the application 140 for the payment processing system either as a foreground or background process), and the server 130. The server 130 manages the payment processing system and, in some cases, supplies, operates, and/or manufactures the one or more payment modules 100. For brevity, the process 1250 will be described with respect to a respective payment module 100 associated with a respective payment accepting unit 120 (machine 120) and a respective mobile device 150 in the payment processing system. In the process 1250, the payment module 100 receives first acknowledgment information for a first transaction via a second mobile device 150-2 that did not initiate the first transaction.

**[0137]** After receiving a first authorization request associated with a first authorization code from a first mobile device 150-1, the server 130 sends (1252), via a long-range communication capability (e.g., GSM, CDMA, Wi-Fi, or the like), a first authorization grant token to the first mobile device 150-1 associated with a first user 1251-1.

**[0138]** After receiving the first authorization grant token and in response to detecting a trigger condition (e.g., via the hand-free mode or the manual mode), the first mobile device 150-1 sends (1254), via a short-range communication capability (e.g., BLE), the first authorization grant token to the payment module 100 associated with the machine 120 in order to initiate a first transaction.

**[0139]** The payment module 100 processes (1256) the first transaction associated with the first authorization grant token and generates first transaction information when the first transaction is completed. In some implementations, the first transaction information includes a transaction ID for the first transaction, a module ID corresponding to payment module 100, a user ID corresponding to the first mobile device 150-1, transaction status information indicating that the first transaction is complete, and the transaction amount for the first transaction. The payment module 100 stores the first transaction information with a timestamp indicating the time and date that the first transaction information was generated.

**[0140]** The payment module 100 sends (1258), via a short-range communication capability (e.g., BLE), the first transaction information to the first mobile device 150-1 to send to the server 130 in order to acknowledge the first transaction.

**[0141]** In accordance with a determination that first acknowledgement information is not received for the first transaction within a predefined time period, the payment module 100 times-out (1260) the first transaction and maintains the first transaction information. In some implementations, a transaction times-out when the connection between the mobile device and the payment module is interrupted and transaction information is not acknowledged within a predefined time period.

**[0142]** For example, the connection between the first mobile device 150-1 and the payment module 100 is in-

interrupted when the first user 1251-1 turns off the first mobile device 150-1, the first user 1251-1 turns the first mobile device 150-1 into airplane mode, the first user 1251-1 walks away out of the communication zone (i.e., BLE range) of the payment module 100, the first mobile device 150-1 otherwise loses its long-range communication connection, or the first mobile device 150-1 otherwise loses power. In this example, either the first user 1251-1 maliciously interrupted the connection to prevent the acknowledgement information from being received by the payment module 100 by powering down the first mobile device 150-1, or the connection was involuntarily or unintentionally interrupted by the first mobile device 150-1's battery running out or a losing cellular signal.

**[0143]** In some implementations, the first user 1251-1 is blocked by the payment module 100 from performing any additional transactions until the payment module 100 receives an acknowledgement from the server 130 via any connection (e.g., from the second user 1251-2). In some implementations, unused authorization grants (e.g., if there was no trigger condition or it expired) are canceled by the first mobile device 150-1 by sending a cancellation message to the server 130 corresponding to the unused authorization grant. In some implementations, the server 130 denies or limits the number of authorization grants sent to the first mobile device 150-1 until it has received transaction information or cancellation of authorization outstanding authorization grants sent to the first mobile device 150-1. In some implementations, server 130 denies approval of, or limit the number of, additional authorization grants from user 1251-1 for transacting with a second payment module (not shown) until the server 130 receives transaction information, cancellation of authorization, or a predefined time period has expired for outstanding authorization grants sent to the first mobile device 150-1 for transacting with a first payment module. In this example, a user may be limited to only 1 authorization grant for the first payment module 100 and no more than 3 outstanding authorization grants in a predetermined number of hours regardless of the number of payment modules the user may be attempting to use.

**[0144]** After receiving a second authorization request associated with a second authorization code from a second mobile device 150-2 subsequent to receiving the first authorization request from the first mobile device 150-1, the server 130 sends (1262), via a long-range communication capability (e.g., GSM, CDMA, Wi-Fi, or the like), a second authorization grant token to the second mobile device 150-2 associated with a second user 1251-2.

**[0145]** After receiving the second authorization grant token and in response to detecting a trigger condition (e.g., via the hand-free mode or the manual mode), the second mobile device 150-2 sends (1264), via a short-range communication capability (e.g., BLE), the second authorization grant token to the payment module 100 associated with the machine 120 in order to initiate a second transaction.

**[0146]** The payment module 100 processes (1266) the second transaction associated with the second authorization grant token and generates second transaction information when the second transaction is completed. In some implementations, the second transaction information includes a transaction ID for the second transaction, a module ID corresponding to payment module 100, a user ID corresponding to the second mobile device 150-2, transaction status information indicating that the second transaction is complete, and the transaction amount for the second transaction. The payment module 100 stores the second transaction information with a timestamp indicating the time and date that the second transaction information was generated.

**[0147]** The payment module 100 sends (1268), via a short-range communication capability (e.g., BLE), the first transaction information associated with the interrupted first transaction and the second transaction information associated with the second transaction to the second mobile device 150-1 to send to the server 130 in order to acknowledge the first and second transactions. In this way, the first transaction information associated with the previous, interrupted first transaction initiated by the first mobile device 150-1 is appended to the second transaction information for the second transaction initiated by the second mobile device 150-2.

**[0148]** The second mobile device 150 sends (1270), via a long-range communication capability (e.g., GSM, CDMA, Wi-Fi, or the like), the first transaction information and the second transaction information to the server 130.

**[0149]** After receiving the first transaction information and the second transaction information, the server 130 processes the first transaction information and the second transaction information. For example, the server 130 debits the account of the first user 1251-1 associated with the user ID for first mobile device 150-1 in the first transaction information in the amount indicated by the first transaction information. Continuing with this example, the server 130 also debits the account of the second user 1251-2 associated with the user ID for second mobile device 150-2 in the second transaction information in the amount indicated in the second transaction information.

**[0150]** The server 130 sends (1272), via a long-range communication capability (e.g., GSM, CDMA, Wi-Fi, or the like), first and second acknowledgment information to the second mobile device 150-2 acknowledging the first and second transactions. In some implementations, the first acknowledgment information includes the user ID of the first mobile device 150-1 that initiated the first transaction, the module ID of the payment module 100 that processed the first transaction, the transaction ID of the first transaction, and (optionally) the authorization code associated with the first transaction. In some implementations, the second acknowledgment information includes the user ID of the second mobile device 150-2 that initiated the second transaction, the module ID of the payment module 100 that processed the second

transaction, the transaction ID of the second transaction, and (optionally) the authorization code associated with the second transaction.

**[0151]** After receiving the first and second acknowledgment information, the mobile device 150 sends (1274), via a short-range communication capability (e.g., BLE), the first acknowledgment information to the payment module 100.

**[0152]** After receiving the first and second acknowledgment information, the payment module 100 deletes (1276) the stored first transaction information and also the stored second transaction information. In some implementations, the payment module 100 marks the first and second transaction as complete.

**[0153]** Figure 26A is a schematic flow diagram of a process 1300 of updating firmware of the payment module 100 in the payment processing system in accordance with some implementations. In some implementations, the payment processing system includes one or more payment modules 100 (e.g., each associated with a respective payment accepting unit 120), one or more mobile devices 150 (e.g., each executing the app 140 for the payment processing system either as a foreground or background process), and the server 130. The server 130 manages the payment processing system and, in some cases, supplies, operates, and/or manufactures the one or more payment modules 100. For brevity, the process 1300 will be described with respect to a respective payment module 100 and a respective mobile device 150 in the payment processing system.

**[0154]** The payment module 100 broadcasts (1302), via a short-range communication capability (e.g., BLE), a packet of information (e.g., broadcast packet 1100, Figure 24A). The packet of information at least includes a firmware version (e.g., current firmware version 1112, Figure 24A) of the payment module 100. The information included in the packet broadcasted by the payment module 100 is further discussed herein with reference to Figure 24A.

**[0155]** The mobile device 150 determines (1304) that the current firmware version of the payment module 100 satisfies firmware criteria (e.g., predates a firmware version stored by the mobile device 150). Various other firmware criteria are further discussed below with reference to the method 1700 in Figures 30A-30D.

**[0156]** In accordance with a determination that the firmware criteria are satisfied, the mobile device 150 sends (1306) firmware update information (e.g., data packets corresponding to the firmware of the mobile device 150) to the payment module 100.

**[0157]** The payment module 100 broadcasts (1308) update status information (e.g., update status information 1114 in Figure 24A, identifying remaining data packets needed for the firmware update) included in the advertised information to the one or more mobile devices in the payment processing system (e.g., at least including the respective mobile device 150). Although not illustrated, the process 1300 sometimes includes a second mo-

bile device, which sends firmware update information that includes additional data packets distinct from the data packets sent by the respective mobile device 150.

**[0158]** When all needed data packets have been received by the payment module 100, the update status information includes a verification request, which the mobile device 150 then sends (1310) to the server 130 via a long-range communication capability (e.g., GSM).

**[0159]** The server 130 processes (1312) the verification request. For example, the server 130 processes the verification request by verifying that the received data packets are not corrupt, form a complete set, and correspond to a latest firmware version.

**[0160]** After processing the verification request, the server 130 sends (1314) to the mobile device 150 a firmware command (e.g., implement the firmware update at the payment module 100) via the long-range communication capability, which the mobile device 150 then sends (1316) to the payment module 100 via the short-range communication capability.

**[0161]** The payment module 100 then executes (1318) the firmware command. For example, the payment module implements the firmware update using the received data packets corresponding to a latest firmware version.

**[0162]** Figure 26B is a schematic flow diagram of a process 1320 of updating firmware of the payment module 100 in the payment processing system in accordance with some implementations. In some implementations, the payment processing system includes one or more payment modules 100 (e.g., each associated with a respective payment accepting unit 120), one or more mobile devices 150 (e.g., each executing the app 140 for the payment processing system either as a foreground or background process), and the server 130. The server 130 manages the payment processing system and, in some cases, supplies, operates, and/or manufactures the one or more payment modules 100. For brevity, the process 1320 will be described with respect to a respective payment module 100 and a respective mobile device 150 in the payment processing system.

**[0163]** The payment module 100 broadcasts (1322), via a short-range communication capability (e.g., BLE), a packet of information (e.g., broadcast packet 1100, Figure 24A). The packet of information at least includes a firmware version (e.g., current firmware version 1112, Figure 24A) of the payment module 100. The information included in the packet broadcasted by the payment module 100 is further discussed herein with reference to Figure 24A.

**[0164]** The mobile device 150 then sends (1324) to the server 130, via a long-range communication capability (e.g., GSM), the packet of information that at least includes the firmware version of the payment module 100.

**[0165]** The server 130 determines (1326) that current firmware version of the payment module 100 satisfies firmware criteria (e.g., predates a firmware version stored by the mobile device 150). Various other firmware criteria are further discussed below with reference to the method

1700 in Figures 30A-30D.

**[0166]** In accordance with a determination that the firmware criteria are satisfied, the server 130 sends (1328) to the mobile device 150 firmware update information (e.g., data packets corresponding to the firmware of the mobile device 150), which the mobile device 150 then sends (1330) to the payment module 100.

**[0167]** The payment module 100 broadcasts (1332) update status information (e.g., identification of remaining data packets needed for the firmware update) included in the advertised information to the one or more mobile devices in the payment processing system (e.g., at least including the respective mobile device 150), which the one or more mobile devices 150 then send (1334) to the server 130. When all needed data packets have been received by the payment module 100, the update status information includes a verification request.

**[0168]** The server 130 processes (1336) the verification request. For example, the server 130 processes the verification request by verifying that the received data packets are not corrupt, form a complete set, and correspond to a latest firmware version.

**[0169]** After processing the verification request, the server 130 sends (1338) to the mobile device 150 a firmware command (e.g., implement the firmware update at the payment module 100) via the long-range communication capability, which the mobile device 150 then sends (1340) to the payment module 100 via the short-range communication capability.

**[0170]** The payment module then executes (1342) the firmware command. For example, the payment module implements the firmware update using the received data packets corresponding to a latest firmware version.

**[0171]** Figure 26C is a schematic flow diagram of a process 1350 of updating firmware of the payment module 100 in the payment processing system in accordance with some implementations. In some implementations, the payment processing system includes one or more payment modules 100 (e.g., each associated with a respective payment accepting unit 120), one or more mobile devices 150 (e.g., each executing the app 140 for the payment processing system either as a foreground or background process), and the server 130. The server 130 manages the payment processing system and, in some cases, supplies, operates, and/or manufactures the one or more payment modules 100. For brevity, the process 1350 will be described with respect to a respective payment module 100 and a respective mobile device 150 in the payment processing system.

**[0172]** The payment module 100 broadcasts (1352), via a short-range communication capability (e.g., BLE), a packet of information (e.g., broadcast packet 1100, Figure 24A). The packet of information at least includes a firmware version (e.g., current firmware version 1112, Figure 24A) of the payment module 100. The information included in the packet broadcast by the payment module 100 is further discussed herein with reference to Figure 24A.

**[0173]** The mobile device 150 determines (1354) that the current firmware version of the payment module 100 satisfies firmware criteria (e.g., predates a firmware version stored by the mobile device 150). Various other firmware criteria are further discussed below with reference to the method 1700 in Figures 30A-30D. In some implementations, the mobile device 150 stores a firmware image for the payment module 100. For example, the firmware image was previously downloaded by the mobile device 150 from the server 130 as part of an update for application 140. In some implementations, the firmware image downloaded by the mobile device 150 is encrypted with a common encryption key known to all payment modules 100 in the payment processing system (as opposed to the unique encryption key corresponding to each payment module 100 in the payment processing system). In some implementations, the firmware image downloaded by the mobile device 150 is encrypted with an encryption key that is later sent as part of the firmware approval message in steps 1360 and 1362, where the firmware approval message is encrypted with a unique encryption key corresponding to the payment module 100.

**[0174]** In accordance with a determination that the firmware criteria are satisfied, the mobile device 150 sends (1356), via a second communication capability (e.g., GSM, CDMA, Wi-Fi, or the like), a firmware update request (e.g., a request for permission to update the firmware of the payment module 100) to the server 130. In some embodiments, the firmware update request includes a module ID corresponding to the payment module 100, a user ID associated with a user of the mobile device 150, the current firmware version 1112 of the payment module 100, and the firmware version stored by the mobile device 150.

**[0175]** The server 130 processes (1358) the firmware update request. The server 130 determines whether to permit or decline the firmware update request. If the server 130 permits the firmware update request, the mobile device 150 updates the firmware version of the payment module 100 with the firmware version stored by the mobile device. For example, the server 130 declines the firmware update request if the firmware version stored by the mobile device 150 is out of date (i.e., a firmware version C, distinct from a firmware version A of the payment module 100 and a firmware version B stored by the mobile device 150, is the latest firmware image). In another example, the server 130 declines the firmware update request if the firmware version stored by the mobile device 150 (e.g., firmware version B) is determined to be faulty and/or blacklisted, even if a latest firmware (e.g., firmware version C, distinct from firmware version A and firmware version B) is not yet available.

**[0176]** In accordance with a determination that the firmware version stored by the mobile device 150 is approved by the server 130, the server 130 sends (1360) to the mobile device 150, via the second communication capability, a firmware update approval message (e.g.,

permission to update the firmware of the payment module 100), which the mobile device 150 then sends (1362) to the payment module 100 via the short-range communication capability. In some implementations, in accordance with a determination that the server 130 permits the firmware update request, the server 130 responds to the application 140 of the mobile device 150 with an affirmative firmware update approval message (e.g., approval to update firmware of payment module 100) to be sent to the payment module 100. In some implementations, the firmware update approval message contains one or more verification values (e.g., a list of checksum values for each 4 KB block of encrypted firmware image stored by the mobile device 150) and a hash value (e.g., SHA-256 hash of the complete, decrypted firmware image) for data packets corresponding to the approved firmware update version. Furthermore, in some implementations, the firmware update approval message includes a firmware decryption key (e.g., for decrypting received data packets corresponding to the approved firmware update version). In some implementations, the firmware update approval message is encrypted using a unique encryption key corresponding to the payment module 100.

**[0177]** In some implementations, if the payment module 100 is already updating its firmware when it receives the firmware update approval message (e.g., a process which may have been started by a different mobile device 150 at an earlier time), then the payment module 100 simply verifies the validity of the firmware update approval message and resumes the firmware update. However, if the payment module 100 was not already updating its firmware, it will verify the validity of the firmware update approval message, store to the memory 760 (Figure 20) (e.g., EEPROM) the one or more verification values and the hash value (e.g., list of checksums and a SHA-256 hash), and erase the firmware-update area of the memory 760 (e.g., where the one or data packets for the firmware update will be stored). In these cases, the payment module 100 subsequently receives firmware update formation (e.g., one or more data packets) from the mobile device 150 which are stored in the firmware-update area of the memory 760. Furthermore, in some implementations, if the payment module 100 already has a stored firmware update to the specified firmware version ready to be processed, but it has not yet rebooted to install it, the firmware update request is ignored.

**[0178]** After the server 130 approves the firmware update request, the mobile device 150 sends (1364) to the payment module 100, via the short-range communication capability, firmware update information (e.g., data packets corresponding to the firmware stored by the mobile device 150). As long as the payment module 100 is connected to the mobile device 150, the payment module 100 will identify one or more data blocks (i.e., corresponding to the approved firmware update version) that are still needed, which are sent by the mobile device 150 as the one or more data packets. In some implementations, after receiving the firmware update approval message, the

payment module 100 sends to the mobile device 150 update status information identifying and requesting one or more data blocks still needed for the firmware update (e.g., a specific 256 B block/chunk of firmware). Additionally and/or alternatively, the packet of information (e.g., broadcast packet 1100, Figure 24A) broadcast by the payment module 100 includes information identifying one or more data blocks still needed by the payment module 100 for the firmware update or one or more data blocks already received by the payment module 100. After receipt of the one or more data packets, the firmware update information is stored by the payment module 100 into memory (e.g., the memory 760, Figure 20).

**[0179]** The payment module 100 verifies (1366) the firmware update information. In some implementations, each time a data packet is received from the mobile device 150 corresponding to a complete data block (e.g., a 4 KB block) of the firmware update, the payment module 100 will compare a generated verification value (e.g., a checksum of the 4 KB block) against a corresponding verification value for the block that was included in the update approval message (e.g., a checksum from the list included in the firmware update approval message). If the verification values do not match, the corresponding data block is erased, and the update process resumes from that point (e.g., the particular 4 KB block that did not pass verification).

**[0180]** After verifying the firmware update information, the payment module 100 executes (1368) the firmware update information. After all data blocks have been received by the payment module 100, and their verification values (e.g., checksums) have been successfully verified, in some implementations, the payment module 100 sets an internal flag indicating that it should reboot itself when it determines it is a safe time to do so. In some implementations, a safe time for rebooting is based on the current time of day (e.g., 2:00 AM), or observed activity of the payment accepting unit 120 (e.g., when no user has connected in the past 10 minutes).

**[0181]** In some implementations, when the payment module 100 decides to reboot, it sets an install-firmware flag in memory (e.g., EEPROM) and resets itself. Upon reboot of the payment module 100, a bootloader observes the set install-firmware flag and executes an associated firmware installation handler. In some implementations, the firmware installation handler double checks all of the block checksums of the firmware update information (e.g., a firmware update image). If the checksums do not match, an error has occurred (e.g., corrupted data) and the update is aborted, with the currently installed firmware then booting up. If the checksums do match, however, the bootloader erases the currently installed firmware and then decrypts the firmware update information (e.g., a firmware update image) into the installed firmware area of memory (e.g., memory 760, Figure 20).

**[0182]** After the firmware update information has been decrypted, the bootloader computes a hash value (e.g.,



a SHA-256 hash) of the firmware update information (e.g., of a firmware update image) and compares it to the hash value received from the server 130 that was included in the update approval message. If the hash values do not match, an error has occurred, causing the boot-loader to erase the installed firmware and re-install a default (i.e., gold master) firmware image, as that is the only image available to install at that point. Finally, the boot-loader loads and runs the installed firmware (either the updated firmware version or the gold master).

**[0183]** Figures 27A-27C illustrate a flowchart diagram of a method 1400 of payment processing in accordance with some implementations. In some implementations, the method 1400 is performed by a device with one or more processors, memory, and two or more communication capabilities. For example, in some implementations, the method 1400 is performed by the mobile device 150 (Figures 5 and 21) or a component thereof (e.g., application 140). In some implementations, the method 1400 is governed by instructions that are stored in a non-transitory computer readable storage medium (e.g., the memory 860, Figure 21) and the instructions are executed by one or more processors (e.g., the processing unit 840, Figure 21) of the device. Optional operations are indicated by dashed lines (e.g., boxes with dashed-line borders).

**[0184]** The device obtains (1402), from a payment module, advertised information via a first communication capability, where the advertised information at least includes an authorization code. In some implementations, the payment module 100 broadcasts/advertises a packet of information (i.e., the advertised information such as the packet 1100, Figure 24A) via one or more short-range communication protocols such as BLE, NFC, and/or the like (i.e., a non-persistent communication channel). As such, the payment module 100 is not tied up in handshakes with each mobile device 150 within its communication zone. In some implementations, the application 140 associated with the payment processing system, which is executed on the mobile device 150 (e.g., a mobile phone), receives the packet when the mobile device 150 is within the communication zone (i.e., BLE range) of the payment module 100.

**[0185]** In some implementations, the advertised information is a packet with a module identifier (ID) associated with the payment module 100, an authorization code, the payment module 100's current firmware version, and a plurality of status flags associated with a state of the payment accepting unit 120 and/or the payment module 100. For example, Figure 24A illustrates the packet 1100 of information that is broadcast by the payment module 100. In some implementations, the authorization code is a cleartext hash value. In some implementations, the authorization code is encrypted with a unique encryption key corresponding to the payment module 100. In some implementations, the packet also includes customized or baseline thresholds for the authorization and payment zones (e.g., RSSI values such as -80 db and -90 db,

respectively). In some implementations, the packet also includes a request (e.g., a status flag) for mobile device 150 to connect to it immediately so as to upload information to the server 130 (e.g., transaction information for one or more interrupted transaction). In some implementations, the payment module 100 broadcasts the advertised information every X second with a unique authorization code.

**[0186]** In some implementations, the first communication capability corresponds (1404) to a short-range communication protocol. For example, the first communication capability of the mobile device 150 is a radio/transceiver means for communicating via one or more short-range communication protocols such as BLE, NFC, and/or the like (i.e., a non-persistent communication channel).

**[0187]** The device sends (1406), to a server, at least the authorization code from the advertised information via a second communication capability distinct from the first communication capability. In some implementations, the mobile device 150 sends an authorization request to the server 130 that at least includes the authorization code from the obtained advertised information, the user ID corresponding to the user of the mobile device 150, and the module ID corresponding to the payment module 100. For example, see authorization request 1130 in Figure 24B.

**[0188]** In some implementations, the second communication capability corresponds (1408) to a long-range communication protocol. For example, the second communication capability of the mobile device 150 is a radio/transceiver means for communicating via one or more long-range communication protocols such as Wi-Fi, CDMA, GSM, and/or the like (i.e., a non-persistent communication channel).

**[0189]** In some implementations, the advertised information further includes (1410) an authorization zone threshold criterion, and the device sends at least the authorization request code comprises sending, to the server, at least the authorization request code via the second communication capability in accordance with a determination that the authorization zone threshold criterion is satisfied. In some implementations, the advertised information includes a baseline authorization zone threshold (i.e., an authorization zone criterion) indicating a baseline RSSI that the mobile device 150 (or the application 140) is required to observe before being within the authorization zone of the payment module 100. In some implementations, the mobile device 150 (or the application 140) offsets the baseline authorization zone threshold based on the strength and/or reception of the short-range communication capability (e.g., BLE radio/transceiver) of the mobile device 150. In some implementations, the mobile device 150 forwards the authorization code to the server 130 when the authorization zone criterion is satisfied (i.e., the mobile device 150 observes an RSSI equal to or exceeding the baseline authorization zone threshold). For example, baseline authorization zone threshold

for a payment module associated with module ID 0xA23 is -70 db. Continuing with this example, the mobile device 150 (or the application 140) offsets the baseline authorization zone threshold by -5 db because the mobile device 150's BLE radio/transceiver is weak. Continuing with this example, when the mobile device 150 observes an RSSI equal to or exceeding -75 db from payment module 100 associated with module ID 0xA23, the mobile device 150 forwards the authorization code to the server 130.

**[0190]** In some implementations, the advertised information further includes status information indicating one or more states of at least one of the payment module and the payment accepting unit, and the device sends (1412), to the server, the status information from the advertised information via the second communication capability. Figure 24A, for example, shows the packet 1100 with one or more status flags 1108. For example, the one or more status flags 1108 included in the packet 1100 are encoded with a predetermined code known by the server 130. In some implementations, the status information indicates that the payment module 100 has information to be uploaded to the server (e.g., transaction information for one or more interrupted transactions). In some implementations, the status information indicates information for the attention of the payment accepting machine 120's operator. For example, when the payment accepting unit 120 is a vending machine, the status information indicates that a particular item is low or out of stock. In another example, the status information indicates that the payment accepting unit 120 is experiencing a bill and/or coin jam. In another example, the status information indicates that the payment accepting unit 120's bill and/or coin reservoir is empty, nearly empty, full, or nearly full.

**[0191]** In response to sending at least the authorization code, the device obtains (1414), from the server, authorization information via the second communication capability, where the authorization information at least includes an authorization grant token. Figure 24B, for example, shows the authorization grant token 1140. In some implementations, the mobile device 150 receives the authorization grant token when the authorization code is valid and the first user has sufficient funds in his/her account for the payment processing system to perform a transaction at the payment accepting unit 120. In some implementations, the authorization grant token or a portion thereof is encrypted with the encryption key corresponding to the payment module 100. In some implementations, the authorization grant token includes an authorized amount, an expiration offset period, a user ID associated with the user of the mobile device 150, and a module ID associated with the payment module 100. For example, the expiration offset period depends on the first user's history and credit or a period predefined by the first user. For example, the authorized amount is predefined by the first user, based on a daily limit, based on the first user's total balance, or based on a risk profile associated with the user identified by the user ID. In some implementations, the authorization grant token or a por-

tion thereof (e.g., the authorized amount or the auth code) is encrypted with an encryption key corresponding to the payment module 100 identified by the module ID.

**[0192]** In some implementations, the authorization request code is (1416) encrypted with a shared secret key corresponding to the payment module, and at least a portion of the authorization grant token is encrypted with the shared secret key corresponding to the payment module. For example, at least the authorized amount or the authorization code included in the authorization grant token is encrypted with the shared secret key. In some implementations, the shared secret key is known by the payment module 100 and the server 130. For example, the server 130 manages transactions for a plurality of payment modules and the server 130 stores a table of encryption keys for each of the payment modules. In this example, the server 130 selects an encryption key that corresponds to the respective payment module 100 and encrypts the authorized amount with the selected encryption key. In some implementations, the shared secret key is one of a public or private key in an asymmetrical cryptography scheme. Thus, in the above example, the mobile device 150 is an un-trusted party in the payment processing system; thus, the mobile device 150 cannot decrypt the authorization code or at least a portion of the authorization grant token.

**[0193]** After obtaining the authorization information, the device detects (1418) a trigger condition to perform a first transaction with a payment accepting unit (e.g., an automatic retailing machine such as a vending machine for dispensing goods and/or services) associated with the payment module. In the hands-free mode, the trigger condition is detected when the mobile device 150 enters the payment zone of the payment module 100 which occurs upon satisfaction of a payment zone criterion. In the manual mode, trigger condition is detected when the user of the mobile device 150 interacts with the user interface of the application 140 for the payment processing system while the application 140 is executed in as a foreground process on the mobile device 150.

**[0194]** In some implementations, the advertised information further includes (1420) a payment zone threshold criterion, and the device the trigger condition by: determining whether the payment zone threshold criterion is satisfied; and, in accordance with a determination that the payment zone threshold criterion is satisfied, detecting the trigger condition. In some implementations, the advertised information includes payment zone threshold criterion indicating a baseline RSSI that the mobile device 150 (or the application 140) is required to observe before being within the payment zone of payment module 100. In some implementations, the payment zone threshold criterion is a default RSSI value (e.g., -80 db) and the advertised information includes an offset (e.g., -5 db) to account for the strength and/or reception quality of the short-range radio/transceiver (e.g., BLE) of the payment module 100. In some implementations, the trigger condition is detected when the mobile device 150 enters the

payment zone of the payment module 100 which occurs upon satisfaction of a payment zone criterion. For example, when the RSSI observed by the mobile device 150 from the payment module 100 exceeds a predetermined payment zone threshold the payment zone threshold criterion is satisfied. In some implementations, the mobile device 150 provides an indication on the user interface of the application 140 for the payment processing system indicating whether the user is within the payment zone of payment module 100 and/or how close he/she is to the payment zone of payment module 100.

**[0195]** In some implementations, the device detects (1422) the trigger condition by: detecting a user input from a user of the device; and, in response to detecting the user input, detecting the trigger condition to perform a transaction with the payment accepting unit. For example, while the application 140 associated with the payment processing system is executed as a foreground process on the mobile device 150, the user of the mobile device interacts with the user interface of the application 140 to initiate a transaction with the payment accepting unit 120. In this example, the user performs a touch gesture with the touch screen of the mobile device 150, vocally commands the application 150 to initiate the transaction, or the like. Continuing with this example, after detecting the user interaction, the mobile device 150 (or the application 140) sends the payment module 100 the authorization grant token and the user is credited with the amount authorized in the authorization grant token in order to select goods and/or services provided by payment accepting unit 120 for purchase with the credit.

**[0196]** In some implementations, the authorization information further includes (1424) an expiration period for the authorization grant token, and the device sends, to the payment module, the authorization grant token via the first communication capability in response to detecting the trigger condition and in accordance with a determination that the expiration period has not elapsed. In some implementations, after detecting the trigger condition, the mobile device (or the application 140) determines whether an expiration period indicated by the authorization grant token has elapsed before sending the authorization grant token to the payment module 100. In some implementations, after determining that an expired authorization grant token is expired, the mobile device (or the application 140) determines automatically deletes the expired authorization grant token and requests a replacement authorization grant token by sending, to the server 130, the authorization request code included in current advertised information broadcasted by the payment module 100.

**[0197]** In response to detecting the trigger condition, the device sends (1426), to the payment module, the authorization grant token via the first communication capability. Continuing with the example in operation 1422, after detecting the user interaction, the mobile device 150 (or the application 140) sends the payment module 100 the authorization grant token and the user is credited with

the amount authorized in the authorization grant token in order to select goods and/or services provided by payment accepting unit 120 for purchase with the credit.

**[0198]** For example, when the payment module 100 broadcasts the packet of information, if authorization code 12345 was issued in the packet (e.g., a new authorization code is issued every 100 ms), and a user uses that code to make a payment (when it comes back to the payment module 100 in the authorization grant token), the payment module 100 knows that authorization code 12345 has been used. Continuing with this example, if another subsequent user attempts to make a payment using the same authorization code 12345, the payment module 100 does not allow the subsequent user to use authorization code 12345 in order to prevent replay attacks. Additionally, in some implementations, the advertised authorization code expires after M minutes (e.g., 3, 5, 10, etc. minutes). In some implementations, the authorization code is a unique randomly or pseudo-randomly generated number that is stored by the payment module for M minutes after the authorization code is advertised, at which time it expires. In some implementations, the advertised authorization codes are unique incremental numbers that are advertised every X seconds. In this embodiment, the payment module 100 determines whether an authorization code in an authorization grant token is valid by identifying a current advertised authorization code and determining whether the advertised authorization is newer than the oldest valid authorization code based on the current advertised authorization code, the advertisement frequency (e.g., every X seconds), and the expiration period (e.g., M minutes).

**[0199]** In some implementations, after sending the authorization grant token, the device obtains (1428), from the payment module, first transaction information indicating a status of the first transaction with the payment accepting unit the first communication capability, and the device sends, to the server, the first transaction information corresponding to the status of the first transaction the second communication capability. In some implementations, the first transaction information indicates the status of the transaction initiated with an authorization grant token such as a complete, incomplete, or aborted transaction. For example, the first transaction is incomplete when the payment accepting unit 120 experiences a malfunction (e.g., a vending mechanism jams and the user of the mobile device 150 fails to receive a selected product) or the first transaction times-out by the user of the mobile device 150 waiting Z seconds without selecting goods and/or services from the payment accepting unit 120. For example, the first transaction is aborted when the user of the mobile device 150 actuates the coin return of the payment accepting unit 120 or walks away from the payment accepting unit 120 without selecting goods and/or service. In some implementations, the first transaction information includes the amount of the first transaction, current inventory state of products in payment accepting unit 120, other machine status informa-

tion, and the like.

**[0200]** It should be understood that the particular order in which the operations in Figures 27A-27C have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. Additionally, it should be noted that details of other processes described herein with respect to other methods described herein (e.g., the method 1500 in Figures 28A-28B, the method 1600 in Figures 29A-29C, the and method 1700 in Figures 30A-30D) are also applicable in an analogous manner to the method 1400 described above with respect to Figures 27A-27C.

**[0201]** Figures 28A-28B illustrate a flowchart diagram of a method 1500 of transmitting machine status information in accordance with some implementations. In some implementations, the method 1500 is performed by a device with one or more processors, memory, and two or more communication capabilities. For example, in some implementations, the method 1500 is performed by the mobile device 150 (Figures 5 and 21) or a component thereof (e.g., application 140). In some implementations, the method 1500 is governed by instructions that are stored in a non-transitory computer readable storage medium (e.g., the memory 860, Figure 21) and the instructions are executed by one or more processors (e.g., the processing unit 840, Figure 21) of the device. Optional operations are indicated by dashed lines (e.g., boxes with dashed-line borders).

**[0202]** The device obtains (1502), from a payment module, advertised information via a first communication capability, where the advertised information at least includes status information indicating one or more states of at least one of a payment module and a payment accepting unit associated with the payment module. For example, in some implementations, the payment module 100 broadcasts the packet 1100 (Figure 24A) which includes the one or more status flags 1108.

**[0203]** In some implementations, the first communication capability corresponds (1504) to a short-range communication protocol. As described above, short-range communication protocols include BLE, NFC, and/or other protocols utilizing non-persistent communication channels.

**[0204]** In some implementations, the status information indicates (1506) that the payment module is storing one or more interrupted transactions. As described in greater detail below with respect to Figures 29A-29C, in some implementations, interrupted transactions (sometimes referred to as "incomplete transactions") arise from the loss of a connection (e.g., the mobile device 150 has no cellular reception) or power. In some implementations, for example, the status flags 1108 (e.g., in packet 1100, Figure 24A) include upload information indicator 1116, which indicates that the payment module is storing one or more interrupted transactions, and/or also includes

transaction information (e.g., transaction information 1150, Figure 24D) corresponding to the one or more incomplete transactions (e.g., an amount of the first transaction, a user ID, etc.). In some implementations, upload information indicator 1116 triggers the mobile device 150 to connect to payment module 100 immediately (e.g., if it has interrupted transaction information to be uploaded to the server 130). Alternatively, as described in greater detail below, the transaction information 1150 is generated and sent separately from the status flags 1108.

**[0205]** In some implementations, the status information indicates (1508) that the payment accepting unit requires servicing. For example, the status flags 1108 (e.g., in packet 1100, Figure 24A) include the bill/coin jam indicator 1118, which indicates that a blockage is detected in the payment feeding mechanism (e.g., bill or coin jam). Furthermore, in some implementations, the status flags 1108 (e.g., in packet 1100, Figure 24A) include the full bill/coin reservoir indicator 1120, which indicates that currency stored in the payment accepting unit requires collection by an operator of the machine. In some implementations, the status information indicates that the payment accepting unit requires servicing after a predefined period of time has elapsed since a prior servicing. In an example, the payment module 100 is configured to send status information indicating that the payment accepting unit 120 requires servicing after one month has elapsed since a last servicing.

**[0206]** In some implementations, the status information indicates (1510) a count of at least one product in the payment accepting unit. For example, the status flags 1108 (e.g., in packet 1100, Figure 24A) includes the inventory levels indicator 1122, which indicates that the remaining inventory of an item (e.g., an inventory levels indicator 1122 having a value of 1 indicates one corresponding item remaining for a particular product).

**[0207]** In some implementations, the status information is (1512) encoded with a predefined code. In some implementations, the status information is encrypted and/or encoded with a predefined code and/or key. For example, the status flags 1108 (e.g., in packet 1100, Figure 24A) include 4 Bytes of information which is encoded according to a predefined encoding scheme known by the server 130 which indicates a plurality of states of the payment module and/or the payment accepting unit 120 associated with the payment module 100.

**[0208]** In some implementations, the advertised information further includes (1514) an authorization code for authorizing a user of the device to perform a cashless transaction with the payment accepting unit. Authorization codes are described in greater detail above with respect to Figures 24C and 27A-27C and the accompanying text.

**[0209]** The device sends (1516), to a server, at least the status information from the advertised information via a second communication capability distinct from the first communication capability. For example, in step 1004 of method 1000 in Figure 23, the mobile device 150 sends

an authorization request to the server 130 that includes the authorization code included in the broadcasted packet, the user ID associated with the mobile device 150, the module ID associated with the payment module 100, and also the status information.

**[0210]** In some implementations, the second communication capability corresponds (1518) to a long-range communication protocol. For example, in some implementations, the long-range communication protocol is one of GSM, Wi-Fi, CDMA, LTE, and/or the like.

**[0211]** In some implementations, after sending the status information to the server, the device receives (1520) a request, from the server, via the second communication capability to obtain one or more interrupted transactions from the payment module; obtains, from the payment module, transaction information via the first communication capability, where the transaction information corresponds to the one or more interrupted transactions performed by one or more previous users at the payment accepting unit; and sends, to the server, the transaction information via the second communication capability. In some implementations, in response to the status flags indicating one or more interrupted transactions, the server 130 requests that the mobile device 150 connect to the payment module 100 to upload the one or more interrupted transactions. This may occur even when the user of the mobile device 150 does not initiate a transaction with the payment module 100. In some implementations, the mobile device 150 obtains the transaction information upon entering an authorization zone (e.g., the authorization zone 104). See Figures 29A-29C and the accompanying text for further discussion of interrupted transactions. For example, interrupted transactions arise from the loss of a network connection (e.g., the mobile device 150 has no cellular reception) or power.

**[0212]** It should be understood that the particular order in which the operations in Figures 28A-28B have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. Additionally, it should be noted that details of other processes described herein with respect to other methods described herein (e.g., the method 1400 in Figures 27A-27C, the method 1600 in Figures 29A-29C, and the method 1700 in Figures 30A-30D) are also applicable in an analogous manner to the method 1500 described above with respect to Figures 28A-28B.

**[0213]** Figures 29A-29C illustrate a flowchart diagram of a method 1600 of pay payment processing acknowledgment in accordance with some implementations. In some implementations, the method 1600 is performed by a payment module with one or more processors, memory, and one or more first communication capabilities, which is coupled with a payment accepting unit (e.g., the payment accepting unit 120 (sometimes also herein called "machine 120")) (Figures 5 and 19) such as a vend-

ing machine or kiosk for dispensing goods and/or services). For example, in some implementations, the method 1600 is performed by the adapter module 100, (Figures 5 and 20). In some implementations, the method 1600 is governed by instructions that are stored in a non-transitory computer readable storage medium (e.g., the memory 760, Figure 20) and the instructions are executed by one or more processors (e.g., the processing unit 750, Figure 20) of the payment module. Optional operations are indicated by dashed lines (e.g., boxes with dashed-line borders).

**[0214]** The payment module obtains (1602), from the payment accepting unit, a first notification indicating completion of a first transaction performed by a first user of a first device at the payment accepting unit and an amount of the first transaction. For example, in step 1202 of the process 1200 in Figure 25A, the payment module 100 obtains a first notification from the payment accepting unit 120 after a first transaction is completed at the payment accepting unit 120.

**[0215]** In response to receiving the notification, the payment module (1604): generates first transaction information based at least in part on the first notification; stores the generated first transaction information; and sends the generated first transaction information to the first device via one of the one or more first communication capabilities. In some implementations, the payment module 100 generates the transaction information 1150 (Figure 24D) which includes the transaction ID 1152 (e.g., which sequentially increases after each completed transaction), the module ID 1154 (e.g., a unique ID for the payment module 100), the user ID 1156 (e.g., a unique user ID of the mobile device 150 such as a MAC address), the authorization grant 1158, the transaction status 1160 (e.g., complete, incomplete, or aborted), the transaction amount 1162 (e.g., \$1.00), and/or other information 1164. The other information 1164 includes, in some implementations, information included in the packet 1100 (Figure 24A), such as one or more status flags 1108 indicating a state of the payment accepting unit, and/or other information pertaining to the payment accepting unit, the first device, the first transaction, and/or the first user. In some implementations, the first transaction information is also stored until reception of an acknowledgement from the first device (e.g., the mobile device 150). The transaction information 1150, for example, is stored in the memory 760 (Figure 20) of the payment module 100.

**[0216]** In some implementations, the one or more first communication capabilities correspond to a short-range communication protocol. As described above, short-range communication protocols include BLE, NFC, and/or other protocols utilizing non-persistent communication channels.

**[0217]** In some implementations, the first device forwards the first transaction information to a server (e.g., the server 130) via a second communication capability (e.g., a long-range communication protocol such as CD-

MA, GSM, Wi-Fi, or the like), and the server 130 debits the account of the first user of the first device based on the amount of the first transaction, which is indicated in the first transaction information. In some implementations, the server 130 sends encrypted acknowledgment information via the second communication capability to the first device, and the first device forwards the encrypted acknowledgment information to the payment module via the first communication capability.

**[0218]** After sending the first transaction information to the first device and in accordance with a determination that first acknowledgement information is received from the first device within a predetermined time period, the payment module deletes (1606) the stored first transaction information generated for the first transaction performed by the first user of the first device. In some implementations, the payment module 100 marks the first and second transaction as complete (in addition to or instead of deleting the first and second transaction information). For example, when the predetermined time period is 30 seconds, the payment module 100 deletes the first transaction information stored in the memory 760 (Figure 20) if the first acknowledgment information is received within 30 seconds of sending the first transaction information. For example, the payment module 100 determines whether the first acknowledgement information is received within a predetermined time period by comparing a timestamp of the stored first transaction information and the current time when (or if) the first acknowledgement is received.

**[0219]** In some implementations, the payment module encrypts (1608) the generated first transaction information, and the first acknowledgement information is encrypted. For example, the first transaction information is encrypted with a key corresponding to the payment module 100, and the first acknowledgement information is encrypted with a key selected by the server 130 that corresponds to the payment module 100. In this example, the keys are distinct, the same, or mutually known.

**[0220]** After sending the first transaction information to the first device and in accordance with a determination that the first acknowledgement information is not received from the first device within the predetermined time period, the payment module maintains (1610) the stored first transaction information generated for the first transaction performed by the first user of the first device. In one example, an acknowledgement is not received because the first device (e.g., the mobile device 150) loses power. In another example, the first device loses its long-range communication connection to the server 130, and is therefore unable to forward the first transaction information to a server for debiting the first user's account, or receiving an acknowledgement from the server 130. In another example, the user of the first device maliciously severs the long-range communication connection to interrupt the transaction information from being sent to the server 130, or to interrupt the acknowledgement information from being received by the payment module 100.

In some implementations, if the payment module 100 does not receive the acknowledgment information within the predetermined time period, or if the acknowledgment information cannot be decrypted (e.g., it has been fraudulently modified or accessed), the payment module 100 maintains the first transaction information (e.g., keeps transactions information 1150 stored in the memory 760, Figure 20) and attempts to send the first transaction information to the server 130 via another device (e.g., a second mobile device 150). For example, as discussed in greater detail below, the payment module leverages a subsequent second transaction involving a second device, and the first transaction information is sent to the second device with second transaction information that corresponds to a second transaction initiated by the user of the second device.

**[0221]** In some implementations, in accordance with the determination that the first acknowledgement information is not received from the first device within a predetermined time period, the payment module disables (1612) usage rights for the first user at the payment accepting unit. For example, the first user or user ID associated with the first device is suspended from performing cashless transactions, and further authorization grant tokens received from the first user or user ID are ignored by the payment module 100. Thus, for example, the first user cannot initiate another transaction cashless transaction with the payment module 100. In some implementations, the server 130 and/or payment module 100 records a history of incomplete transactions. In some implementations, the server 130 and/or payment module 100 blacklists the user only after a predefined number of incomplete transactions (e.g., 20 incomplete transactions), accounting for incomplete transactions that arise from non-malicious actions, such as a loss of cellular connection or power.

**[0222]** In some implementations, in accordance with the determination that the first acknowledgement information is not received from the first device within the predetermined time period, the payment module broadcasts (1614) an information packet via one of the one or more first communication capabilities, where the information packet includes one or more status flags indicating one or more unacknowledged first transactions including the first transaction performed by the first user of the first device. For example, the payment module 100 broadcasts packets (e.g., the packet 1100, Figure 24A) which include the status flags 1108 that indicate (e.g., upload information indicator 1116) that the payment module 100 has information that needs to be uploaded to the server 130 (e.g., transaction information for the interrupted/unacknowledged first transaction). Alternatively, in some implementations, the transaction information 1150 (Figure 24D) corresponding to an incomplete transaction is appended to the advertised information instead of merely setting the upload information indicator 1116 in the broadcast advertised information.

**[0223]** In some implementations, after determining that

the first acknowledgement information is not received from the first device within the predetermined time period, the payment module obtains (1616), from the payment accepting unit, a second notification indicating completion of a second first transaction performed by a second user of a second device at the payment accepting unit and an amount of the first transaction. In response to receiving the second notification, the payment module 100 generates second transaction information based at least in part on the second notification, stores the generated second transaction information, and sends the generated first transaction information and the generated second transaction information to the second device via one of the one or more first communication capabilities. Thus, the payment module 100 leverages the subsequent second transaction by sending the first transaction information with the second transaction information. In some implementations, when the second user enters an authorization zone (e.g., authorization zone 104, Figure 1), transaction information corresponding to the first user's incomplete first transaction is transmitted to the second device.

**[0224]** In some implementations, in accordance with a determination that second acknowledgement information is received from the second device within the predetermined time period, the payment modules deletes (1618) the stored first transaction information generated for the first transaction performed by the first user of the first device and the stored second transaction information generated for the second transaction performed by the second user of the second device. For example, in step 1272 of the process 1250 in Figure 25B, after receiving the first transaction information and the second transaction information, the server 130 sends acknowledgement information to the payment module 100 via the second device 150-2, which acknowledges reception of the first transaction information and the second transaction information. Continuing with this example, in step 1276 of the process 1250 in Figure 25B, after receiving the acknowledgement information, the payment module 100 deletes the first transaction information and the second transaction information.

**[0225]** In some implementations, in accordance with a determination that the second acknowledgement information is not received from the second device within a predetermined time period, the payment module maintains (1620) the stored first transaction information generated for the first transaction performed by the first user of the first device and the stored second transaction information generated for the second transaction performed by the second user of the second device. In some further implementations, the payment module 100 leverages a subsequent transaction involving a third device, and both the first and second transaction information are sent to the third device with third transaction information that corresponds to a third transaction initiated by the user of the third device.

**[0226]** It should be understood that the particular order

in which the operations in Figures 29A-29C have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. Additionally, it should be noted that details of other processes described herein with respect to other methods described herein (e.g., the method 1400 in Figures 27A-27C, the method 1500 in Figures 28A-28B, and the method 1700 in Figures 30A-30D) are also applicable in an analogous manner to the method 1600 described above with respect to Figures 29A-29C.

**[0227]** Figures 30A-30D illustrate a flowchart diagram of a method 1700 of updating firmware of the payment module in the payment processing system in accordance with some embodiments. In some implementations, the method 1700 is performed by a device (e.g., the mobile device 150) with one or more processors, memory, and two or more communication capabilities. In some implementations, the method 1700 is governed by instructions that are stored in a non-transitory computer readable storage medium (e.g., the memory 860, Figure 21) and the instructions are executed by one or more processors of the mobile device 150 (e.g., the processing unit 850, Figure 21). Optional operations are indicated by dashed lines (e.g., boxes with dashed-line borders).

**[0228]** As noted above, in some circumstances, a payment module (e.g., the payment module 100, Figure 26A) in a payment processing system cannot establish a direct communications channel to a server (e.g., the server 130, Figure 26A), and is therefore unable to directly receive firmware updates from the server. In these cases, as described below, if the firmware of the payment module is determined to satisfy certain criteria (e.g., firmware version is out-of-date), one or more devices (e.g., the mobile device 150) will send data packets to the payment module for updating the payment module's firmware. The device serves as a communications bridge between the payment module and the server, whereby the device obtains a verification request from the payment module, which the device then sends to the server for processing (e.g., the server 130 verifies that the data packets are non-corrupted and complete). After processing the verification request, the server sends a firmware command to the device, which the device then sends to the payment module for execution.

**[0229]** A device (e.g., the mobile device 150) obtains (1702), from a payment module (e.g., the payment module 100), advertised information via a first communication capability, where the advertised information at least includes a current firmware version of the payment module. In some implementations, the current firmware version corresponds to a timestamp (e.g., February 5, 2014), while in other implementations, the current firmware version is denoted by a version number (e.g., v1.4). Advertised information is described in greater detail herein with respect to Figure 24A.

**[0230]** In some implementations, the first communication capability corresponds (1704) to a short-range communication protocol. As described above, short-range communication protocols include BLE, NFC, and/or other protocols utilizing non-persistent communication channels.

**[0231]** The device determines (1708) that the current firmware version of the payment module satisfies one or more predefined firmware criteria.

**[0232]** In some implementations, the current firmware version of the payment module is compared (1710) with a firmware version stored by the device, and the one or more predefined firmware criteria are satisfied (1712) if the current firmware version of the payment module does not match the firmware version stored by the device. In some implementations, the device obtains an indication (e.g., from the server 130, Figure 26A) that the firmware version it stores is the latest firmware version. In some implementations, the latest firmware version is determined from a timestamp associated with the firmware. Alternatively, in some implementations, it is presumed that the firmware version stored by the device is the latest version.

**[0233]** In some implementations, the predefined firmware criteria are satisfied if the current firmware version of the payment module predates the firmware version stored by the device (e.g., the firmware of payment module 100 has a timestamp of February 5, 2014, compared to the firmware of mobile device 150 which has a timestamp of April 4, 2014), or has a version number less than the firmware version stored by the device (e.g., firmware v1.4 of the payment module 100 compared to firmware v1.5 of the mobile device 150, where the firmware version numbers are assigned in monotonically ascending order by the server 130). In other implementations, the predefined firmware criteria are satisfied if the current firmware version of the payment module is newer than the firmware version stored by the device. This arises, for example, if a firmware rollback procedure is initiated, where the newer firmware version of the payment module is overwritten with an older firmware version of the device.

**[0234]** Alternatively, in some implementations, the device receives, from a server, the determination that the current firmware version of the payment module satisfies one or more predefined firmware criteria. In these implementations, for example, the device sends the current firmware version of the payment module to the server (e.g., the server 130, Figure 26A) via a second communication capability (e.g., GSM), where the server determines (e.g., by comparing the current firmware version of the payment module and a latest version of the firmware) if the current firmware version satisfies predefined firmware criteria (as described in greater detail above).

**[0235]** In some implementations, prior to sending firmware update information and in accordance with a determination that the current firmware version of the

payment module does not match the firmware version stored by the first device (1714), the device sends (1716), to a server, a firmware update request so as to update the firmware of the payment module via a second communication capability. In some implementations, the second communication capability corresponds (1718) to a long-range communication protocol. For example, in some implementations, the long-range communication protocol is one of GSM, Wi-Fi, CDMA, LTE, and/or the like.

**[0236]** In some implementations, in response to sending the firmware update request, the device receives (1720) from the server, a firmware update approval message, and in response to receiving the firmware update approval message, the device sends (1724), to the payment module, the firmware update approval message. In some implementations, as described in greater detail with respect to Figure 26C, the server (e.g., server 130) permits or declines the firmware update request for any of a number of reasons (e.g., firmware stored by the mobile device 150 is out of date).

**[0237]** Furthermore, in some implementations, firmware update approval message includes (1722) a verification value for each of the one or more data packets and a hash value for the firmware update information. A more in-depth discussion is provided in the corresponding description for Figure 26C, with respect to the ways in which the payment module 100 uses the verification value and hash value for verifying and executing the firmware update information (e.g., one or more data packets corresponding to a latest firmware version).

**[0238]** In some implementations, sending the firmware update information via the first communication capability includes (1726), in response to receiving the firmware update approval message from the server, sending, to the payment module, the firmware update information via the first communication capability.

**[0239]** In some implementations, the device obtains (1728) update status information from the payment module, wherein the update status information indicates remaining packets for updating the current firmware version of the payment module. As described in greater detail with respect to Figure 26C, in some implementations, the update status information indicating remaining packets (e.g., packets 50-100) for updating the current firmware version is sent by the payment module 100 after receiving a firmware update approval message, while in other implementations, the update status information is included in broadcasted packet 1100 that is broadcast by the payment module 100. Alternatively and/or additionally, the update status information indicates one or more data packets received for updating the current firmware version of the payment module to the most recent firmware version. Furthermore, in some implementations, the update status information identifies the firmware version to which the remaining and/or received data packets correspond. Furthermore, in some implementations, sending the firmware update information via



the first communication capability is based on the update status information.

**[0240]** In accordance with a determination that the current firmware version of the payment module satisfies one or more predefined firmware criteria, the device sends (1730), to the payment module, firmware update information via the first communication capability, where the firmware update information includes one or more data packets for updating the current firmware version of the payment module. In some implementations, the firmware update information is stored by the device, and was included in a latest update to the application 140 associated with the payment processing system. In some implementations, the firmware update information is obtained from a server (e.g., the server 130, Figure 26A) via a second communication capability (e.g., GSM), and sent to the payment module via the first communication capability.

**[0241]** In some implementations, advertised information further includes (1706) an authorization zone threshold criterion, and the device determines (1732) that the authorization zone threshold criterion is satisfied. For example, in some implementations, the device starts transmitting data packets to update the payment module firmware upon entering the authorization zone (e.g., the authorization zone 140, Figure 1) of the payment module. In some implementations, once the device has started transmitting data packets, if the device later leaves the authorization zone, the device continues to transmit data packets as long as the device remains with the communication zone of the payment module (e.g., BLE range), or, alternatively, the device ceases transmission of data packets.

**[0242]** In some implementations, the device obtains (1734) additional advertised information, where the additional advertised information at least includes update status information. In some implementations, the additional advertised information further includes a new authorization code and/or status flags. In some implementations, the update status information identifies (1738) one or more remaining data packets (e.g., packets 50-100) for updating the current firmware version of the payment module to the most recent firmware version. Alternatively and/or additionally, the update status information identifies (1740) one or more data packets received for updating the current firmware version of the payment module to the most recent firmware version. Furthermore, in some implementations, the update status information identifies the firmware version to which the remaining and/or received data packets correspond. Optionally, the update status information is included in transaction information (e.g., the transaction information 1150, after completing a transaction).

**[0243]** In some implementations, the update status information includes (1736) a verification request. For example, a verification request is generated and included in update status information when the payment module 100 has received all data packets necessary for complet-

ing the firmware update. A verification request is generally associated with a request to implement the received data packets in order to update the firmware of the payment module 100. In some implementations, a verification request is a request for a server (e.g., the server 130, Figure 26A) to determine if any received data packets are corrupted, if the received data packets form a complete set sufficient to initiate a firmware update, and/or if the received data packets correspond to a latest firmware version. In some embodiments, a verification request is a checksum performed by the payment module on the received data packets for the firmware update according to a predefined checksum algorithm. Furthermore, in some implementations, the verification request is sent to the server with transaction status information (e.g., transaction information 1150, Figure 24D) after a user completes a transaction (e.g., the step 1260 in process 1250 of Figure 25B).

**[0244]** In some implementations in which the device obtains additional advertised information including a verification request, the device sends (1742), to a server, at least the current firmware version and a verification request via a second communication capability. In some implementations, the second communication capability corresponds (1744) to a long-range communication protocol (e.g., GSM, Wi-Fi, CDMA, LTE, and/or the like). In some implementations, the verification request is sent by the payment module directly to the server via a secure communications channel (e.g., an encrypted channel).

**[0245]** Furthermore, in some implementations, the device obtains (1746), from the server, a firmware command via the second communication capability, and sends (1748), to the payment module, the firmware command via the first communication capability. The server processes the verification request prior to issuing a firmware command to the device to send to the payment module. As described above, in some implementations, the server determines if any received data packets are corrupt (e.g., by using a checksum), if the received data packets form a complete set sufficient to initiate a firmware update, and/or if the received data packets correspond to a latest firmware version. In some implementations, unless some or all of these aforementioned conditions (e.g., corrupted data packets, complete set, etc.) are not satisfied, the server issues an approval code and/or a firmware command to initiate an update of the payment module's firmware. In some embodiments, the server determines whether a checksum included in the verification request matches a checksum value determined by the server for the firmware update indicated by the verification request (e.g., a version number). For example, if the checksum included in the verification request does not match the server's checksum, the server issues a firmware command to not implement the firmware update and to delete the data packets corresponding to the firmware update associated with the verification request was sent. In this example, the checksums may not match if one or more of the data packets

for the firmware update are corrupted or have been altered.

**[0246]** In some implementations, the firmware command is a rollback command (e.g., ignore firmware update and keep current firmware version of the payment module 100), a delete command (e.g., deleting either all or a portion of the data packets for the firmware update), or an initialization command (e.g., initializing the firmware update in the payment module 100). If the server determines, in some implementations, that the received data packets do not correspond to a latest firmware version (e.g., the firmware update information stored by the device corresponds to firmware v1.4, compared to a latest firmware v1.5), the server will send, to the device or directly to the payment module, firmware update information including one or more data packets corresponding to a latest firmware version. This may occur, for example, if the mobile device 150 itself is not storing the latest firmware. In some implementations, the firmware command is encrypted with an encryption key that corresponds to the payment module (e.g., a shared secret key or a public key in an asymmetric cryptography scheme).

**[0247]** In some implementations, a second device with one or more processors, memory, and two or more communication capabilities, obtain (1750), from the payment module, advertised information via the first communication capability, where the advertised information at least includes a current firmware version of the payment module and the update status information. The second device determines (1752) whether the current firmware version of the payment module predates a most recent firmware version. In accordance with a determination that the current firmware version of the payment module satisfies one or more predefined firmware criteria, the second device sends (1754), to the payment module, firmware update information via the first communication capability, where the firmware update information one or more additional data packets for updating the current firmware version based at least in part on the update status information. Thus, in some implementations, multiple devices send to the payment module portions of a complete set of data packets needed for a firmware update, where the data packets sent by one device are distinct from the data packets sent by another device. In one example, when a firmware update includes data packets 1 through 100, a first device (e.g. the mobile device 150) sends data packets 1 through 50 to the payment module 100, and a second device (a different mobile device 150, not shown) sends data packets 50 through 100.

**[0248]** It should be understood that the particular order in which the operations in Figures 30A-30D have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. Additionally, it should be noted that details of other processes described herein with respect to other methods described herein (e.g., the

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method 1400 in Figures 27A-27C, the method 1500 in Figures 28A-28B, and the method 1600 in Figures 29A-29C) are also applicable in an analogous manner to the method 1600 described above with respect to Figures 30A-30D.

**[0249]** Figure 31A illustrates a schematic flow diagram of a process 1800 for providing a representation of a machine event at a mobile device in accordance with some implementations. In some implementations, the payment processing system includes one or more payment modules 100 (e.g., each associated with a respective payment accepting unit 120 such as an automatic retailing machine for dispensing goods and/or services), one or more mobile devices 150 (e.g., each executing the application 140 for the payment processing system either as a foreground or background process), and the server 130. The server 130 manages the payment processing system and, in some cases, supplies, operates, and/or manufactures the one or more payment modules 100. For brevity, the process 1800 will be described with respect to a respective payment module 100 associated with a respective payment accepting unit 120 (sometimes also herein called the "machine 120") and a respective mobile device 150 in the payment processing system.

**[0250]** In some implementations, the process 1800 occurs after the mobile device 150 sends the AuthGrant in Figure 8C. In some implementations, the process 1800 occurs after the mobile device 150 sends the authorization grant to the payment module 100 in operation 1012 of process 1000 in Figure 23.

**[0251]** The payment module 100 obtains (1802) an indication corresponding to an event at the machine 120. For example, after the process 1000 in Figure 23, the user of the mobile device 150 selects a product to purchase from the machine 120 by interacting with one or more input mechanisms of the machine 120 (e.g., buttons 126 or a touch screen display 124 shown in Figure 19), and the machine 120 dispenses the selected product. Continuing with this example, after the product is dispensed, the transaction is complete and the payment module 100 obtains an indication from the machine of the completed transaction. In some implementations, the indication includes the amount of the transaction and (optionally) machine status information associated with the machine 120 such as inventory information as to one or more products of the payment accepting unit 120 and/or the like. In some implementations, the indication includes status information indicating that the transaction was aborted (e.g., via actuation of a coin return mechanism at the machine 120) or that there was an error with the transaction (e.g., a vending jam or other malfunction with the machine 120).

**[0252]** After obtaining the indication corresponding to completion of the first transaction, the payment module 100 generates (1804) a notification corresponding to the event at the machine 120.

**[0253]** The payment module 100 sends (1806), via a short-range communication capability (e.g., BLE), the

notification to the mobile device 150. In some embodiments, in addition to the notification corresponding to the event at machine 120, the payment module 100 sends a promotion or advertisement to the mobile device 150 that is targeted to the user of the mobile device 150 based on the transaction or the user ID included in the AuthGrant or authorization grant token that initiated the transaction. In some embodiments, in addition to the notification corresponding to the event at machine 120, the payment module 100 sends a pseudo randomly selected promotion or advertisement to the mobile device 150 that is selected from a set of promotions or advertisements stored by the payment module 100. For example, the promotion is a coupon for a free soda following the purchase of ten sodas from the machine 120 by the user of the mobile device 150. For example, the promotion is a random 50% off coupon or free soda coupon. For example, the transaction corresponds to a vended soda and the advertisement corresponds to a new soda from the same company that produces the vended soda.

**[0254]** The mobile device 150 provides (1808) a representation of the notification. For example, in Figure 32A, the mobile device 150 displays user interface 1902 on touch screen 152 with a message 1906 that indicates that the first transaction is complete. For example, in Figure 32C, the mobile device 150 displays user interface 1920 on touch screen 152 with a message 1922 that indicates that the transaction was aborted. For example, in Figure 32D, the mobile device 150 displays user interface 1930 on touch screen 152 with a message 1932 that indicates that there was an error with the transaction. For example, the mobile device 150 also displays a representation of the promotion or advertisement on the user interface for the application 140.

**[0255]** Figure 31B illustrates a schematic flow diagram of a process 1850 for processing acknowledgement information in accordance with some implementations. In some implementations, the payment processing system includes one or more payment modules 100 (e.g., each associated with a respective payment accepting unit 120 such as an automatic retailing machine for dispensing goods and/or services), one or more mobile devices 150 (e.g., each executing the application 140 for the payment processing system either as a foreground or background process), and the server 130. The server 130 manages the payment processing system and, in some cases, supplies, operates, and/or manufactures the one or more payment modules 100. For brevity, the process 1850 will be described with respect to a respective payment module 100 associated with a respective payment accepting unit 120 (machine 120) and a respective mobile device 150 in the payment processing system.

**[0256]** In some implementations, the process 1850 occurs after the mobile device 150 sends the AuthGrant in Figure 8C. In some implementations, the process 1850 occurs after the mobile device 150 sends the authorization grant to the payment module 100 in operation 1012 of process 1000 in Figure 23.

**[0257]** The payment module 100 obtains (1852) an indication corresponding to completion of a first transaction from the machine 120. For example, after the process 1000 in Figure 23, the user of the mobile device 150 selects a product to purchase from the machine 120 by interacting with one or more input mechanisms of the machine 120 (e.g., buttons 126 or a touch screen display 124 shown in Figure 19), and the machine 120 dispenses the selected product. Continuing with this example, after the product is dispensed, the transaction is complete and the payment module 100 obtains an indication from the machine of the completed transaction. In some implementations, the indication includes the amount of the transaction and (optionally) machine status information associated with the machine 120 such as inventory information as to one or more products of the payment accepting unit 120 and/or the like.

**[0258]** After obtaining the indication corresponding to completion of the first transaction, the payment module 100 generates (1854) a first notification with first transaction information based on the indication, and the payment module 100 stores the first transaction information. In some implementations, the first transaction information includes a transaction ID for the first transaction, a module ID corresponding to payment module 100, a user ID corresponding to the mobile device 150, transaction status information indicating that the first transaction is complete, and the transaction amount indicated by the indication. In some implementations, the payment module 100 retains the authorization code included in the original broadcasted packet and/or the authorization grant token and includes the authorization code in the first transaction information. In some implementations, the authorization code is encrypted with a secret key corresponding to the payment module 100, which is shared with the server 130 but not the mobile device 150. In some implementations, the first transaction information further includes other information such as the machine status information included in the first notification or transaction information corresponding to previous interrupted transaction(s). See Figure 24D and the accompanying text for further discussion regarding transaction information 1150.

**[0259]** The payment module 100 sends (1856), via a short-range communication capability (e.g., BLE), the first notification with first transaction information to the mobile device 150. In some embodiments, in addition to first transaction information corresponding to completion of the first transaction at machine 120, the first notification includes a promotion or advertisement to the mobile device 150 that is targeted to the user of the mobile device 150 based on the transaction or the user ID included in the AuthGrant or authorization grant token that initiated the transaction. In some embodiments, in addition to first transaction information corresponding to completion of the first transaction at machine 120, the first notification includes a pseudo randomly selected promotion or advertisement to the mobile device 150 that is selected from

a set of promotions or advertisements stored by the payment module 100. For example, the promotion is a coupon for a free soda following the purchase of ten sodas from the machine 120 by the user of the mobile device 150. For example, the promotion is a random 50% off coupon or free soda coupon. For example, the transaction corresponds to a vended soda and the advertisement corresponds to a new soda from the same company that produces the vended soda.

**[0260]** The mobile device 150 provides (1858) a representation of the first notification. For example, in Figure 32A, the mobile device 150 displays user interface 1902 on touch screen 152 with a message 1906 that indicates that the first transaction is complete. For example, the mobile device 150 also displays a representation of the promotion of advertisement on the user interface for the application 140.

**[0261]** The mobile device 150 sends (1860), via a long-range communication capability (e.g., GSM, CDMA, Wi-Fi, or the like), the first transaction information to the server 130.

**[0262]** The server 130 processes (1862) the first transaction information. For example, the server 130 debits the account of the user associated with the user ID in the first transaction information in the amount indicated by the first transaction information.

**[0263]** The server 130 sends (1864), via a long-range communication capability (e.g., GSM, CDMA, Wi-Fi, or the like), first acknowledgment information to the mobile device 150. In some implementations, the first acknowledgment information acknowledges that the server 130 received the first transaction information. In some implementations, the first acknowledgment information includes the user ID, the module ID, the transaction ID, and (optionally) the authorization grant included in the transaction information (e.g., auth grant 1158, Figure 24D).

**[0264]** After receiving the first acknowledgement information, the mobile device 150 sends (1866), via a short-range communication capability (e.g., BLE), the first acknowledgment information to the payment module 100.

**[0265]** After receiving the first acknowledgment information, the payment module 100 deletes (1868) the stored first transaction information.

**[0266]** Attention is now directed towards implementations of user interfaces and associated processes that may be implemented on the mobile device 150 with zero or more speakers, zero or more microphones, and a display. For example, the display is a touch screen (sometimes also herein called a "touch screen display") enabled to receive one or more contacts and display information (e.g., media content, websites and web pages thereof, user interface for the application 140, and/or user interfaces for applications). Figures 32A-32D illustrate example user interfaces for providing a representation of a machine event at a mobile device in accordance with some implementations.

**[0267]** Figures 32A-32D show user interfaces dis-

played on mobile device 150 (e.g., a mobile phone); however, one skilled in the art will appreciate that the user interfaces shown in Figures 32A-32D may be implemented on other similar computing devices. The user interfaces in Figures 32-32D are used to illustrate the processes described herein, including the process described with respect to Figures 31A-31B and 33A-33B.

**[0268]** For example, a user of the mobile device 150 approaches a machine 120 (e.g., vending machine 78x928 as shown in Figures 10A-10D) and executes application 140 on the mobile device 150 so as to perform an electronic transaction with the machine 120. For example, with reference to Figures 10C-10D, the user of the mobile device 150 initiates a transaction with the machine 120 (e.g., vending machine 78x928) by performing a swipe gesture at a location corresponding to the representation of the dollar bill (e.g., a substantially vertical swipe gesture from a location corresponding to the representation of the dollar bill to the top edge of the mobile device 150).

**[0269]** Figure 32A illustrates the mobile device 150 displaying a user interface 1902 of the application 140 on touch screen 152 after the user of the mobile device 150 initiates and performs a transaction with the machine 120. In Figure 32A, the user interface 1902 includes prepaid balance 1904 which indicates that \$1.00 has been deducted from the prepaid balance after performing a transaction with the machine 120 as compared to the prepaid balance in Figure 10C-10D (i.e., \$9.00 in Figures 10C-10D and \$8.00 in Figure 32A). In Figure 32A, the user interface 1902 also includes a message 1906 indicating that the transaction with the machine 120 is complete.

**[0270]** Figure 32B illustrates the mobile device 150 displaying a user interface 1910 of the application 140 on touch screen 152 after the user of the mobile device 150 initiates a transaction with the machine 120 and an error with the transaction occurs or the transaction is aborted. In Figure 32B, the user interface 1910 shows the representation of the dollar bill sliding onto the touch screen 152 (e.g., in a substantially top to bottom manner). In Figure 32B, the interface 1910 includes prepaid balance 1912 which indicates that no money has been deducted from the prepaid balance after performing a transaction with the machine 120 as compared to the prepaid balance in Figure 10C-10D (i.e., \$9.00 in Figures 10C-10D and \$9.00 in Figure 32B).

**[0271]** Figure 32C illustrates the mobile device 150 displaying a user interface 1920 of the application 140 on touch screen 152 after the representation of the dollar bill slides onto the touch screen 152 in Figure 32B due to the transaction being aborted. For example, the user aborts the transaction by actuating a coin return mechanism of the machine 120. In another example, the user aborts the transaction by selection an abort affordance on the interface of the application 140 (not shown). In Figure 32C, the user interface 1920 includes a message 1922 indicating that the transaction with the machine 120

was aborted and that the user's account was not debited for the aborted transaction.

**[0272]** Figure 32D illustrates the mobile device 150 displaying a user interface 1930 of the application 140 on touch screen 152 after the representation of the dollar bill slides onto the touch screen 152 in Figure 32B due to the occurrence of an error with the transaction. For example, a malfunction with the machine 120 (e.g., a vending jam or stuck item) causes the error to occur. In Figure 32D, the user interface 1930 is associated with the application 140 executed on the mobile device 150. In Figure 32D, the user interface 1930 includes a message 1932 indicating that an error occurred during the transaction with the machine 120 and that the user's account was not debited for the transaction.

**[0273]** Figures 33A-33B illustrate a flowchart diagram of a method 2000 of presenting representations of payment accepting unit events in accordance with some implementations. In some implementations, the method 2000 is performed by a device with one or more processors, memory, one or more output devices, and two or more communication capabilities. For example, in some implementations, the method 2000 is performed by the mobile device 150 (Figures 5 and 21) or a component thereof (e.g., the application 140). In some implementations, the method 2000 is governed by instructions that are stored in a non-transitory computer readable storage medium (e.g., the memory 860, Figure 21) and the instructions are executed by one or more processors (e.g., the processing unit 850, Figure 21) of the device. Optional operations are indicated by dashed lines (e.g., boxes with dashed-line borders).

**[0274]** After sending a request to a payment module via a first communication capability transaction to initiate a transaction with a payment accepting unit (e.g., an offline-payment operated machine such as a vending machine or kiosk) associated with the payment module, the mobile device obtains (2002) a notification from the payment module via the first communication capability, where the notification indicates an event at the payment accepting unit associated with the payment module. In some implementations, method 2000 occurs after the mobile device 150 sends the AuthGrant in Figure 8C. In some implementations, method 2000 occurs after the mobile device 150 sends the authorization grant to the payment module 100 in operation 1012 of process 1000 in Figure 23. Operation 1806 of Figure 31A, for example, shows the mobile device 150 receiving a notification sent by the payment module 100 (e.g., the adapter module 100, Figures 5 and 20) sent via the first communication capability (e.g., a short-range communication technology/protocol such as BLE). The notification indicates an event at the payment accepting unit (e.g., the payment accepting unit 120, Figures 5 and 19) (sometimes also herein called "machine 120") associated with the payment module 100.

**[0275]** In some implementations, the first communication capability corresponds (2004) to a short-range communication protocol.

As described above, the short-range communication protocols include BLE, NFC, and/or other protocols utilizing non-persistent communication channels.

**[0276]** In response to obtaining the notification, the mobile device provides (2006) a representation of the notification to a user of the mobile device via the one or more output devices of the mobile device. For example, in Figure 32A, the mobile device 150 displays user interface 1902 on touch screen 152 with a message 1906 that indicates that the first transaction is complete. For example, in Figure 32C, the mobile device 150 displays user interface 1920 on touch screen 152 with a message 1922 that indicates that the transaction was aborted. For example, in Figure 32D, the mobile device 150 displays user interface 1930 on touch screen 152 with a message 1932 that indicates that there was an error with the transaction.

**[0277]** In some implementations, the one or more output devices of the mobile device include (2008) at least one of: a display, one or more speakers, one or more LEDs, and a vibration mechanism. For example, the mobile device 150 includes one or more of a display (e.g., the touch screen 152, Figures 10A-10D), one or more speakers, one or more LEDs, and a vibration mechanism.

**[0278]** In some implementations, the representation of the notification is at least one of (2010): a message displayed on the display of the mobile device; a banner notification displayed on a display of the mobile device; a vibration alert from the vibration mechanism of the mobile device; an aural alert from the one or more speakers of the mobile device; and a visual alert from the one or more LEDs of the mobile device. For example, in Figures 32B-32D, the representation of the notification includes messages 1906, 1922, and 1932 displayed on the touch screen 152 of the mobile device 150. In another example, the representation of the notification is a predefined sequence of vibrations provided by the vibration mechanism of the mobile device 150. In another example, the representation of the notification is a predefined sequence of tones provided by the one or more speakers of the mobile device 150. In another example, the representation of the notification is a predefined sequence of blinking LEDs of the mobile device 150.

**[0279]** In some implementations, the notification indicates (2012) abortion of a transaction initiated by the user of the mobile device. In Figure 32C, for example, the user interface 1920 includes the message 1922 indicating that the transaction has been aborted. For example, the user aborts the transaction by actuating a coin return mechanism of the machine 120. In another example, the user aborts the transaction by selection an abort affordance on the interface of the application 140 (not shown).

**[0280]** In some implementations, the notification indicates (2014) completion of a transaction between the user of the mobile device and the payment accepting unit. In Figure 32A, for example, the user interface 1902 includes the message 1906 indicating that completion of

the transaction with the machine 120 initiated by the user of the mobile device 150.

**[0281]** In some implementations, the notification indicating completion of the transaction at least includes (2016) an amount of the completed transaction. In Figure 32A, for example, the user interface 1902 includes prepaid balance 1904 which indicates that \$1.00 has been deducted from the prepaid balance after performing a transaction with the machine 120 as compared to the prepaid balance in Figure 10C-10D (i.e., \$9.00 in Figures 10C-10D and \$8.00 in Figure 32A).

**[0282]** In some implementations, the mobile device sends (2018) at least a portion of the notification to a server via a second communication capability distinct from the first communication capability. Operation 1860 of Figure 31B, for example, shows the mobile device 150 sending first transaction information to the server 130 for a completed transaction via the second communication capability (e.g., a long-range communication protocols such as Wi-Fi, CDMA, GSM, and/or the like). For example, the first transaction information at least includes the amount of the first completed transaction.

**[0283]** In some implementations, the first communication capability corresponds (2020) to a short-range communication protocol and the second communication capability corresponds to a long-range communication protocol. For example, the first communication capability of the mobile device 150 is a radio/transceiver means for communicating via one or more short-range communication protocols such as BLE, NFC, and/or the like (i.e., a non-persistent communication channel). For example, the second communication capability of the mobile device 150 is a radio/transceiver means for communicating via one or more long-range communication protocols such as Wi-Fi, CDMA, GSM, and/or the like.

**[0284]** In some implementations, the notification indicates (2022) failure of a transaction initiated by the user of the mobile device or a malfunction associated with the payment accepting unit. In Figure 32D, for example, the user interface 1930 includes the message 1932 indicating that there was an error with the transaction. For example, the transaction fails due to a vending jam or other malfunction. In another example, the payment accepting unit experiences a malfunction due to an open door or the like. In some implementations, at least a portion of the failure/malfunction notification is sent to the sever 130 and an alert is subsequently sent to the operator of the payment accepting unit (e.g., the machine 120) by the server 130.

**[0285]** It should be understood that the particular order in which the operations in Figures 33A-33B have been described is merely for example purposes and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. Additionally, it should be noted that details of other processes described herein with respect to other methods described

herein are also applicable in an analogous manner to the method 2000 described above with respect to Figures 33A-33B.

**[0286]** Figure 34A illustrates a block diagram of an offline-payment operated machine 2100 in accordance with some implementations. For example, the offline-payment operated machine 2100 (e.g., a form of the machine 120) is an electro-mechanical machine capable of accepting currency (e.g., coins), which is not connected to any networks (e.g., telephone, cellular, or Wi-Fi). For example, the offline-payment operated machine 2100 is a washer or dryer at a laundromat, a parking meter, a car wash payment kiosk, or other offline-payment operated machine that dispenses goods and/or services.

**[0287]** In Figure 34A, the offline-payment operated machine 2100 includes a microswitch 2102, a control unit 2106, a power supply 2108, a transistor 2110, and an operation unit 2112. The components of the offline-payment operated machine 2100 in Figure 34A are examples and one of skill in the art will appreciate that various other components may be included in or excluded from the offline-payment operated machine 2100.

**[0288]** In Figure 34A, the microswitch 2102 is a leveraged microswitch with lever 2104. For example, the microswitch 2102 is a CHERRY BRAND™ microswitch with a normally open terminal ("NO"), a normally closed terminal ("NC"), and a common terminal. For example, the lever 2104 is incorporated into a coin slot of the offline-payment operated machine 2100 and is depressed whenever a coin slides down the coin slot into a coin reservoir of the offline-payment operated machine 2100 (not shown). For example, when the lever 2104 is depressed and the microswitch 2102 is wired in the NO configuration as shown in Figure 34A, the switch is closed. Continuing with this example, when the switch is closed, control unit 2106 receives a pulse (i.e., a payment acceptance signal) from the common terminal of the microswitch 2102 indicating depression of the lever 2104 from the reception of a US quarter (i.e., \$0.25) or coin of another value.

**[0289]** In some implementations, when the control unit 2106 receives a preset sequence of payment acceptance signals indicative of a preset number of coins being received by the microswitch 2102, the control unit 2106 initiates the operation of the offline-payment operated machine 2100. For example, after receiving the preset sequence of payment acceptance signals (e.g., three pulses indicating reception of three US quarters), the control unit 2106 initiates operation of the offline-payment operated machine 2100 by applying current to the gate of the transistor 2110 which allows current to flow from the power supply 2108 to operation unit 2112. For example, the operation unit 2112 is a motor of a dryer which begins spinning once current flows from the power supply 2108.

**[0290]** In Figure 34A, payment module 2120 (e.g., a form of the adapter module 100, Figures 5 and 20) is configured to be installed in the offline-payment operated

machine 2100 so as to retrofit the offline-payment operated machine 2100 to be able to accept electronic payments. In some implementations, the payment module 2120 includes all or some of the components included adapter module 100 in Figure 20 such as processing unit 750, memory 760, a security unit 755, and a communications unit 770. In some implementations, the payment module 2120 also includes a first interface module 2122, a second interface module 2124, and a lead 2136 for drawing power from power supply 2108 of the offline-payment operated machine 2100.

**[0291]** In Figure 34A, the first interface module 2122 is configured to sample payment acceptance signals from the microswitch 2102 (e.g., a coin receiving switch) via lead 2132 of the offline-payment operated machine 2100. For example, the payment acceptance signals are indicative of a coin being received by the microswitch 2102 which depress lever 2104. In Figure 34A, the second interface module 2124 is configured to sample control signals from the control unit 2106 of the offline-payment operated machine 2100 via lead 2134 that initiate an operation of the offline-payment operated machine (e.g., the application of current to the gate of the transistor 2110) in response to receiving a preset sequence of payment acceptance signals from the microswitch 2102 (e.g., the coin receiving switch) indicative of the preset number of coins.

**[0292]** Figure 34B illustrates signals sampled by the payment module 2120 in accordance with some implementations. In Figure 34B, sample 2150 represents a preset sequence of payment acceptance signals sampled by the first interface module 2122 via lead 2132 that are sent from the microswitch 2102 to the control unit 2106. For example, the preset sequence of payment acceptance signals indicative of the preset number of coins include pulses (i.e., payment acceptance signals) 2152, 2154, 2156, and 2158. For example, the leading edges of pulses 2152, 2154, 2156, and 2158 at times 2182, 2184, 2186, and 2188 indicate reception of a coin by microswitch 2102 which causes the switch to close when wired in the NO configuration as shown in Figure 34A. In Figure 34B, sample 2170 represents a control signal sampled by the second interface module 2124 via lead 2134 that is sent from the control unit 2106 to transistor 2110. In Figure 34B, the sample 2170 includes a pulse 2172 that is sent from the control unit 2106 to transistor 2110 at time 2190 after receiving the preset sequence of payment acceptance signals from the microswitch 2102 (i.e., pulses 2152, 2154, 2156, and 2158).

**[0293]** Figures 35A-35B illustrate a flowchart diagram of a method of retrofitting an offline-payment operated machine to accept electronic payments in accordance with some implementations. In some implementations, the method 2200 is performed by a payment module with one or more processors and memory. In some implementations, the payment module also includes a short-range communication capability corresponding to a short-range communication protocol (e.g., a non-persist-

ent communication channel such as BLE, NFC, and/or the like), where the short-range communication capability is configured to communicate with one or more mobile devices, where each of the one or more mobile devices is configured with a complimentary short-range communication capability and a long-range communication capability corresponding to a long-range communication protocol (e.g., Wi-Fi, CDMA, GSM, and/or the like).

**[0294]** In some implementations, the payment module is coupled with an offline-payment operated machine (e.g., the payment accepting unit 120, Figures 5 and 19 (sometimes also herein called "machine 120"), or the offline-payment operated machine 2100, Figure 34A) such as dryer or washer in a laundromat, a parking meter, a car wash payment kiosk, or the like. In some implementations, the offline-payment operated machine includes a coin receiving switch (e.g., the microswitch 2102, Figure 34A) and a control unit (e.g., the control unit 2106, Figure 34A). In some implementations, the payment module further includes: (A) a first interface module (e.g., the first interface module 2122, Figure 34A) configured to sample payment acceptance signals from the coin receiving switch of the offline-payment operated machine, where the signals are indicative of a coin being received by the coin receiving switch; and (B) a second interface module (e.g., the second interface module 2124, Figure 34A) configured to sample control signals from the control unit of the offline-payment operated machine that initiate an operation of the offline-payment operated machine in response to receiving a preset sequence of payment acceptance signals from the coin receiving switch indicative of the preset number of coins. By sampling and storing these signals, the payment module 2120 is able to simulate operation of a respective coin receiving switch in response to receiving the correct/preset number of coins so as to trigger operation of the offline-payment operated machine in response to completion of an electronic payment.

**[0295]** For example, in some implementations, the method 2200 is performed by the adapter module 100 (Figures 5 and 20) or payment module 2120 (Figure 34A). In some implementations, the method 2200 is governed by instructions that are stored in a non-transitory computer readable storage medium (e.g., the memory 760, Figure 20) and the instructions are executed by one or more processors (e.g., the processing unit 750, Figure 20) of the payment module. Optional operations are indicated by dashed lines (e.g., boxes with dashed-line borders).

**[0296]** In some implementations, the payment module detects (2202), via the first interface module, a preset sequence of payment acceptance signals from the coin receiving switch that causes the control unit to initiate the operation of the offline-payment operated machine, where the preset sequence of payment acceptance signals are indicative of a preset number of coins received by the coin receiving switch. For example, with reference to Figures 34A-34B, the first interface module 2122 of

the payment module 2120 samples payment acceptance signals via lead 2132 from the microswitch 2102 to the control unit 2106. For example, each of the payment acceptance signals is indicative of reception of a coin by the microswitch 2102. Continuing with this example, the second interface module 2124 of the payment module 2120 samples control signals via lead 2134 from the control unit 2106 to the transistor 2110. The payment module 2120 detects a preset sequence of payment acceptance signals from the microswitch 2102 that causes the control unit 2106 to apply a current to the gate of the transistor 2110 (e.g., the control signals). For example, the preset sequence of payment acceptance signals is indicative of a preset number of coins received by the microswitch 2102 to cause operation of the offline-payment operated machine 2100. For example, the application of current to the gate of the transistor 2110 allows current to flow from the power supply 2108 to the operation unit 2112 so that the operation. For example, the operation unit 2112 is a motor of a dryer which begins spinning once current flows from the power supply 2108.

**[0297]** In some implementations, the payment module determines (2204) the predefined signal sequence to emulate the preset sequence of payment acceptance signals from the coin receiving switch. In some implementations, after detecting the preset sequence of payment acceptance signals that causes the control unit 2106 to initiate the operation of the offline-payment operated machine 2100, the payment module 2120 determines a predefined signal sequence to emulate the preset sequence of payment acceptance signals. In some implementations, the money value associated with each pulse in the preset sequence of payment acceptance signals from the microswitch 2102, indicative of the preset number of coins to initiate the operation of the offline-payment operated machine 2100, is a default currency (e.g., USD) and amount (e.g., \$0.25) set in the firmware of the payment module 2120. In some implementations, the money value associated with the each pulse in the preset sequence of payment acceptance signals from the microswitch 2102, indicative of the preset number of coins to initiate the operation of the offline-payment operated machine 2100, is set by the server 130 and can be changed remotely by using the mobile device 150 as a communications bridge to send information indicating the value of a pulse from the server 130 to the mobile device 150 via the second communication capability (e.g., GSM, CDMA, or Wi-Fi) and forwarding the information from the mobile device to the payment module 2120 via the first communication capability (e.g., BLE). For instance, in most cases, each pulse is US \$0.25.

**[0298]** In some implementations, determining the predefined signal sequence includes (2206) at least one of: identifying a count of pulses in the present sequence of payment acceptance signals; identifying amplitude of pulses in the present sequence of payment acceptance signals; identifying shape of pulses in the present sequence of payment acceptance signals; and identifying

an interval between pulses. In some implementations, after detecting the preset sequence of payment acceptance signals (e.g., the sample 2150, Figure 34B), the payment module 2120 determines a predefined signal sequence to emulate the preset sequence of payment acceptance signals by identifying a count of pulses in the preset sequence of payment acceptance signals, an interval between pulses in the preset sequence of payment acceptance signals, the shape of pulses in the preset sequence of payment acceptance signals, and an amplitude of pulses in the preset sequence of payment acceptance signals.

**[0299]** The payment module receives (2208) a request via the short-range communication capability from a respective mobile device to perform an operation of the offline-payment operated machine. For example, with reference to Figure 8C, the payment module 2120 (Figure 34A) receives the AuthGrant from the mobile device 150 via the short-range communication capability (e.g., BLE) indicating that the user of the mobile device 150 wishes to perform the operation of the offline-payment operated machine 2100 (Figure 34A). For example with reference to operation 1012 in Figure 23, the payment module 2120 (Figure 34A) receives an authorization grant token from the mobile device 150 via the short-range communication capability (e.g., BLE) indicating that the user of the mobile device 150 wishes to perform the operation of the offline-payment operated machine 2100 (Figure 34A).

**[0300]** The payment module validates (2210) the request. Validation of the request indicates (2212) that the respective mobile device is authorized to initiate payment for the operation by a remote server via the long-range communication capability. In some implementations, the payment module 2120 validates the request from the mobile device 150 by determining whether the AuthGrant or the authorization grant token includes a valid authorization code.

**[0301]** In accordance with a determination that the request is valid, the payment module causes (2220) the payment operated machine to perform the operation by issuing a predefined signal sequence to the control unit, where the predefined signal sequence emulates a signal sequence that would be issued by the coin receiving switch in response to receiving a preset number of coins. For example, with reference to Figure 34B, the payment module 2120 issues a predefined signal sequence with first interface module 2122 to the control unit 2106 that emulates sample 2150 in Figure 34B. Continuing with this example, in response to receiving the predefined signal sequence from the payment module 2120 control unit 2106 causes initiation of the operation of the offline-payment operated machine 2100 by applying current to the gate of the transistor 2110 which allows current to flow from the power supply 2108 to operation unit 2112. In some implementations, the control unit 2106 causes initiation of the operation by setting a timer to an amount of time corresponding to the preset number of coins



whereby current flows to the gate of the transistor 2110 for the set amount of time. For example, the preset number of coins is a number of a coins required to run the offline-payment operated machine 2100 by for a default amount of time and subsequent coins may be added to extend the amount of time that the offline-payment operated machine 2100 by will run. In some implementations, the preset number of coins is a number of a coins required to cause the offline-payment operated machine 2100 to dispense a purchased item, such as laundry detergent.

**[0302]** Alternatively, in some implementations, in accordance with a determination that the request is valid, the offline-payment operated machine 2100 displays credit to the user (e.g., via one of the displays 122 or 124 shown in Figure 19) and the user interacts with the input mechanisms of the offline-payment operated machine 2100 (e.g., via the buttons 126 or a touch screen display 124 shown in Figure 19) to perform the operation of the machine. For example, if the offline-payment operated machine 2100 is a dryer, the user of the mobile device 150 selects the appropriate spin cycle via input mechanisms of the dryer, and when the user of the mobile device 150 selects a start/run input mechanism of the dryer, control unit 1506 of the dryer causes initiation of the operation of the dryer (e.g., starting a motor that corresponds to operation unit 2112 in Figure 34A).

**[0303]** In some implementations, prior to sending the operation information and after causing the offline-payment operated machine to perform the operation by issuing the predefined signal sequence to the control unit, the payment module obtains (2216) a notification from the offline-payment operated machine indicating initiation of the operation of the offline-payment operated machine and the preset number of coins. For example, after issuing the preset signal sequence to control unit 2106, the payment module 2120 (Figure 34A) obtains a notification indicating that the control unit 2106 sent control signals to initiate operation of the offline-payment operated machine 2100 in response to receiving the predefined signal sequence. For example, the notification is obtained by the second interface module 2124 (e.g., the sample 2170, Figure 34B) sampling controls signals sent by control unit 2106 (e.g., application of current to the gate of the transistor 2110 which allows current to flow from the power supply 2108 to operation unit 2112).

**[0304]** In response to receiving the notification, the payment module (2218): generates the operation information based at least in part on the notification; and stores the generated operation information in the memory. For example, after obtaining the notification, the payment module 2120 (Figure 34A) generates operation information corresponding to performance of the operation and the preset number of coins associated with the predefined signal sequence (e.g., the amount required to initiate operation of the offline-payment operated machine 2100) and stores the operation information in memory local to the payment module 2120 (e.g., the memory

760, Figure 20).  
**[0305]** In some implementations, the payment module sends (2220) operation information corresponding to the operation to the respective mobile device via the short-range communication capability. For example, after operation 2218, the payment module 2120 (Figure 34A) sends the operation information to the mobile device 150 via the first communication capability of the mobile device 150 such as a radio/transceiver means for communicating via one or more short-range communication protocols such as BLE, NFC, and/or the like (i.e., a non-persistent communication channel)

**[0306]** It should be understood that the particular order in which the operations in Figures 35A-35B have been described is merely for example purposes and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. Additionally, it should be noted that details of other processes described herein with respect to other methods described herein (e.g., the method 2300 in Figure 36) are also applicable in an analogous manner to the method 2200 described above with respect to Figures 35A-35B.

**[0307]** Figure 36 illustrates a flowchart diagram of a method 2300 of enabling a payment operated machine to accept electronic payments in accordance with some implementations. In some implementations, the method 2300 is performed by an offline-payment operated machine (e.g., the payment accepting unit 120, Figures 5 and 19 (sometimes also herein called "machine 120"), or the offline-payment operated machine 2100, Figure 34A) such as dryer or washer in a laundromat, a parking meter, a car wash payment kiosk, or the like.

**[0308]** In some implementations, the offline-payment operated machine includes a control unit (e.g., the control unit 2106, Figure 34A), memory, and a coin receiving switch (e.g., the microswitch 2102, Figure 34A). In some implementations, the offline-payment operated machine also includes a short-range communication capability corresponding to a short-range communication protocol (e.g., a non-persistent communication channel such as BLE, NFC, and/or the like), where the short-range communication capability is configured to communicate with one or more mobile devices, where each of the one or more mobile devices is configured with a complimentary short-range communication capability and a long-range communication capability corresponding to a long-range communication protocol (e.g., Wi-Fi, CDMA, GSM, and/or the like). For example, in some implementations, the method 2300 is performed by the machine 120, (Figures 5 and 19). In some implementations, the method 2300 is governed by instructions that are stored in a non-transitory computer readable storage medium and the instructions are executed by the control unit of the offline-payment operated machine.

**[0309]** The offline-payment operated machine receives (2302) a request via a short-range communication

capability from a respective mobile device to perform an operation of the offline-payment operated machine. For example, with reference to Figure 8C, the payment module 2120 (Figure 34A) receives the AuthGrant from the mobile device 150 via the short-range communication capability (e.g., BLE) indicating that the user of the mobile device 150 wishes to perform the operation of the offline-payment operated machine 2100 (Figure 34A). For example with reference to operation 1012 in Figure 23, the payment module 2120 (Figure 34A) receives an authorization grant token from the mobile device 150 via the short-range communication capability (e.g., BLE) indicating that the user of the mobile device 150 wishes to perform the operation of the offline-payment operated machine 2100 (Figure 34A).

**[0310]** The offline-payment operated machine validates (2304) the request. Validation of the request indicates (2306) that the respective mobile device is authorized to initiate payment for the operation by a remote server via the long-range communication capability. In some implementations, the payment module 2120 validates the request from the mobile device 150 by determining whether the AuthGrant or the authorization grant token includes a valid authorization code.

**[0311]** In accordance with a determination that the request is valid, the offline-payment operated machine performs (2308) the operation by issuing a predefined signal sequence to the control unit, where the predefined signal sequence emulates a preset number of coins received by the coin receiving switch. For example, in accordance with a determination that the request is valid, the offline-payment operated machine or a component thereof issues a predefined signal sequence to the control unit 2106 that emulates sample 2150 in Figure 34B. Continuing with this example, in response to receiving the predefined signal sequence from the payment module 2120, control unit 2106 causes initiation of the operation of the offline-payment operated machine 2100 by applying current to the gate of the transistor 2110 which allows current to flow from the power supply 2108 to operation unit 2112. In another example, in accordance with a determination that the request is valid, the control unit 2106 causes initiation of the operation of the offline-payment operated machine 2100 by applying current to the gate of the transistor 2110 which allows current to flow from the power supply 2108 to operation unit 2112.

**[0312]** It should be understood that the particular order in which the operations in Figure 36 have been described is merely for example purposes and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. Additionally, it should be noted that details of other processes described herein with respect to other methods described herein (e.g., the method 2200 in Figures 35A-35B) are also applicable in an analogous manner to the method 2300 described above with respect to Figure 36.

**[0313]** Figure 37 is a block diagram of a device 2400 for retrofitting the payment accepting unit 120 (sometimes also herein called "machine 120") to accommodate a plurality of payment peripherals 2430 in accordance with some implementations. The device 2400 is similar to and adapted from adapter module 100 (sometimes also herein called "payment module 100") as shown in Figure 20 in that the device 2400 connects to a multi-drop bus (MDB) of payment accepting unit 120 and, optionally, provides the payment processing functionalities discussed in Figures 7, 8A-8G, 9A-9E, and 23 (e.g., via the internal payment peripheral 2440).

**[0314]** In some implementations, during normal operation, the payment accepting unit 120 includes a multi-drop bus (MDB) connecting a payment accepting unit controller 2460 of the payment accepting unit 120 with payment peripherals (e.g., other payment peripheral(s) 2450, 2455 including coin acceptors, bill acceptors, cashless payment devices such as a payment card reader, and/or the like). In some implementations, the device 2400 is connected in-line to the MDB as shown in Figures 17 and 18. In some implementations, the MDB protocol or the payment accepting unit 120 is configured to support a limited number of payment peripherals or does not support particular payment peripherals. For example, in some circumstances, the payment accepting unit 120 supports a maximum of two cashless payment devices, or the payment accepting unit 120 only supports a bill acceptor and a coin acceptor but not cashless payment devices or other payment peripherals. The device 2400 expands the number of payment peripherals connected to the payment accepting unit 120 beyond this limited number and enables support for a plurality of payment peripherals, which may or may not be compliant with the payment accepting unit 120 and/or the MDB protocol.

**[0315]** In Figure 37, the device 2400 is configured to perform as a virtual payment peripheral of the payment accepting unit 120 and to perform as a virtual payment accepting unit for the one or more payment peripherals 2430. As such, in some implementations, the payment accepting unit controller 2460 views the device 2400 as another payment peripheral connected to the MDB, where the device 2400 sends signals to the payment accepting unit controller 2460 in a manner as if originated by the device 2400 that is functioning as a singular virtual payment peripheral. Moreover, in some implementations, the one or more payment peripherals 2430 view the device 2400 as the payment accepting unit controller 2460, where signals are sent to the one or more payment peripherals 2430 in a manner as if originated by the payment accepting unit 120. To accomplish this, the device 2400 manages and hosts the one or more payment peripherals 2430. Additionally, the device 2400 translates addresses and modifies the communications as necessary to ensure the payment accepting unit 120 understands the traffic that is coming through to it as a singular virtual payment peripheral.

**[0316]** In Figure 37, the device 2400 includes a slave

interface 2402 (e.g., the male adapter 720, Figure 20) and an additional interface 2404 (e.g., the female adapter 730, Figure 20) for connecting the device 2400 to the MDB. In some implementations, the device 2400 includes a pass-through channel to enable signals from the payment accepting unit controller 2460 to reach other payment peripheral(s) 2455 and to enable signals from other the payment peripheral(s) 2455 to reach the payment accepting unit controller 2460. In Figure 37, the device 2400 also includes a device controller 2410 with a processing unit 2412 (e.g., including one or more processors, cores, microcontrollers, microprocessors, or the like) and memory 2414 storing one or more programs for execution by the processing unit 2412. In some implementations, the one or more programs cause the device 2430 to perform as a virtual payment peripheral of the payment accepting unit 120 and to perform as a virtual payment accepting unit for the one or more payment peripherals 2430. In Figure 37, the device 2400 also includes one or more host interfaces 2420 (e.g., MDB ports or non-MDB ports) for connecting the device 2400 with one or more payment peripherals 2430 (e.g., payment peripherals 2430-A to 2430-N).

**[0317]** In some implementations, device 2400 optionally includes internal payment peripheral 2440 with hardware, software, firmware, or a combination thereof for providing the payment processing functionalities discussed in Figures 7, 8A-8G, 9A-9E, and 23 (e.g., including the security unit 755 and the communications unit 770 shown in Figure 20).

**[0318]** Figure 38 illustrates a schematic flow diagram of a payment peripheral registration process 2500 in accordance with some implementations. As a result of process 2500, the device 2400 is registered as a slave (e.g., a payment peripheral) to the payment accepting unit 120, and the one or more payment peripherals 2430 are registered as slaves to the device 2400, for example, in accordance with MDB protocol.

**[0319]** In some implementations, the payment accepting unit 120 (i.e., the payment accepting unit controller 2460, Figure 37) polls (2502) the device 2400.

**[0320]** In some implementations, in response to the poll command, the device 2400 sends (2504) a reset signal to the payment accepting unit 120. For example, the device 2400 sends the reset signal to the payment accepting unit 120 if it has not yet been registered as a slave (e.g., a payment peripheral). In another example, the device 2400 sends the reset signal to re-register itself as a slave. In some implementations, the device 2400 identifies itself as a coin acceptor, a bill acceptor, or a cashless payment device to the payment accepting unit 120 via the reset signal.

**[0321]** In some implementations, in response to the reset signal, the payment accepting unit 120 sends (2506) a setup signal to the device 2400. In some implementations, the setup signal includes an address assigned to the device 2400.

**[0322]** In some implementations, after receiving and

processing the setup signal, the device 2400 sends (2508) an acknowledgement to the payment accepting unit 120 confirming registration as a slave.

**[0323]** In some implementations, the device 2400 polls (2512) the payment peripheral 2430-A.

**[0324]** In some implementations, in response to the poll command, the payment peripheral 2430-A sends (2514) a reset signal to the device 2400. For example, the payment peripheral 2430-A sends the reset signal to the device 2400 if it has not yet been registered as a slave (e.g., a payment peripheral) to the device 2400. In another example, the payment peripheral 2430-A sends the reset signal to re-register itself as a slave. In some implementations, the payment peripheral 2430-A identifies itself as a coin acceptor, a bill acceptor, or a cashless payment device to the device 2400 via the reset signal.

**[0325]** In some implementations, in response to the reset signal, the device 2400 sends (2516) a setup signal to the payment peripheral 2430-A. In some implementations, the setup signal includes an address assigned to the payment peripheral 2430-A.

**[0326]** In some implementations, after receiving and processing the setup signal, the payment peripheral 2430-A sends (2518) an acknowledgement to device 2400 confirming registration as a slave.

**[0327]** In some implementations, the device 2400 polls (2522) the payment peripheral 2430-N.

**[0328]** In some implementations, in response to the poll command, the payment peripheral 2430-N sends (2524) a reset signal to the device 2400. For example, the payment peripheral 2430-N sends the reset signal to the device 2400 if it has not yet been registered as a slave (e.g., a payment peripheral). In another example, the payment peripheral 2430-N sends the reset signal to re-register itself as a slave. In some implementations, the payment peripheral 2430-N identifies itself as a coin acceptor, a bill acceptor, or a cashless payment device to the device 2400 via the reset signal.

**[0329]** In some implementations, in response to the reset signal, the device 2400 sends (2526) a setup signal to the payment peripheral 2430-N. In some implementations, the setup signal includes an address assigned to the payment peripheral 2430-N.

**[0330]** In some implementations, after receiving and processing the setup signal, the payment peripheral 2430-N sends (2528) an acknowledgement to the device 2400 confirming registration as a slave.

**[0331]** Figures 39A-39B illustrate a schematic flow diagram of a payment process 2600 in accordance with some implementations. In some implementations, device 2400 has already been registered as a slave (i.e., a payment peripheral) to payment accepting unit 120 and payment peripherals 2430-A, 2430-N have already been registered as slaves to device 2400 according to process 2500 in Figure 38.

**[0332]** In some implementations, the payment accepting unit 120 polls the device 2400, along with other payment peripherals connected to the MDB and registered

as slaves (e.g., other payment peripherals 2450, 2455 (Figure 37)), according to a predetermined time period (e.g., 5 ms). For example, the predetermined time period is assigned by the MDB protocol or specification (e.g., versions 1.0 to 3.0 or higher), which is incorporated herein by reference in its entirety. In response to the poll commands, all slave devices (e.g., at least including the device 2400) respond with an acknowledgment (e.g., indicating that it is still present on the MDB) or with another signal (e.g., indicating another state). In some implementations, in response to a command from payment accepting unit 120, the device 2400 immediately responds to the command and asynchronously relays the command to at least one of the one or more payment peripherals 2430.

**[0333]** In some implementations, in a manner similar to the payment accepting unit 120, the device 2400 also polls all of the one or more payment peripherals 2430 according to the predetermined time period (e.g., 5 ms). For example, the device 2400 polls all of the one or more payment peripherals 2430 whenever it is polled by the payment accepting unit 120.

**[0334]** In some implementations, the payment accepting unit 120 (i.e., the payment accepting unit controller 2460, Figure 37) polls (2602) the device 2400.

**[0335]** In response to the polling command in operation 2602, the device 2400 sends (2604) an acknowledgment to the payment accepting unit 120.

**[0336]** In response to or independent of the polling command in operation 2602, the device 2400 also polls (2606) the payment peripheral 2430-N. In response to the polling command in operation 2606, the payment peripheral 2430-N sends (2608) an acknowledgment to the device 2400.

**[0337]** In response to or independent of the polling command in operation 2602, the device 2400 also polls (2610) the payment peripheral 2430-A. In response to the polling command in operation 2610, the payment peripheral 2430-A sends (2612) a request to begin a payment session. For example, the request to begin the payment session is sent in response to a user inserting payment (e.g., a bill(s) or coin(s)) into the payment peripheral 2430-A prior to the polling command in operation 2610.

**[0338]** In response to the request to begin the payment session, the device 2400 sends (2614) an acknowledgment to the payment peripheral 2430-A.

**[0339]** In response to the request to begin the payment session, the device 2400 also sends a disable command to the payment peripheral 2430-N so as to disable the payment peripheral 2430-N while processing the payment session for the payment peripheral 2430-A. In response to the disable command, the payment peripheral 2430-N sends (2618) an acknowledgment to the device 2400.

**[0340]** The payment accepting unit 120 (i.e., the payment accepting unit controller 2460, Figure 37) polls (2620) the device 2400.

**[0341]** In response to the polling command in operation

2620, the device 2400 sends (2622) a request to begin a payment session to the payment accepting unit 120. For example, the request to begin the payment session mirrors the request to begin the payment session received from the payment peripheral 2430-A.

**[0342]** In response to the request to begin the payment session in operation 2622, the payment accepting unit 120 sends (2624) an acknowledgement to the device 2400 and also sends (2626) a vend request to the device 2400. In process 2600, vending of a service or product is taken as a non-limiting example.

**[0343]** In response to receiving the vend request, the device 2400 sends (2628) an acknowledgment to the payment accepting unit 120.

**[0344]** In some implementations, the payment accepting unit 120 polls (2630) the device 2400 N times prior to sending the vend approved signal in operation 2640. In some implementations, the device 2400 responds to the N polling command with acknowledgments indicating that the device 2400 is still present and processing the vend request.

**[0345]** In response to receiving the vend request, the device 2400 also relays (2630) the vend request to the payment peripheral 2430-A.

**[0346]** In response to the vend request, the payment peripheral 2430-A sends (2632) an acknowledgement to the device 2400.

**[0347]** Subsequently, the device 2400 polls (2634) the payment peripheral 2430-A. In response to the polling command in operation 2634, the payment peripheral 2430-A sends (2636) a vend approved signal to the device 2400. For example, the vend approved signal indicates that the payment inserted by the user was not-refunded and was used to purchase a service or product.

**[0348]** In response to receiving the vend approved signal, the device 2400 sends (2638) an acknowledgment to the payment peripheral 2430-A and also relays (2640) the vend approved signal to the payment accepting unit 120.

**[0349]** In response to receiving the vend approved signal, the payment accepting unit 120 sends (2642) an acknowledgment to the device 2400 and also sends (2644) a request to the device 2400 to indicate whether the vend was a success or a failure.

**[0350]** In response to receiving the request in operation 2644, the device 2400 sends (2646) a response to the payment accepting unit 120 indicating that the vend was a success or a failure and also relays (2650) the request to the payment peripheral 2430-A to indicate whether the vend was a success or a failure.

**[0351]** In response to the request in operation 2650, the payment peripheral 2430-A sends (2652) an acknowledgement to the device 2400.

**[0352]** In response to receiving the response in operation 2646, the payment accepting unit 120 sends (2648) an acknowledgement to the device 2400 and also sends (2654) a command to end the payment session to the device 2400.

**[0353]** In response to receiving the command to end the payment session, the device 2400 sends (2656) an acknowledgment to the payment accepting unit 120 and relays (2658) the command to end the payment session to the payment peripheral 2430-A.

**[0354]** In response to the command to end the payment session, the payment peripheral 2430-A sends (2660) an acknowledgment to the device 2400.

**[0355]** After receiving the acknowledgment from the payment peripheral 2430-A, the device 2400 sends (2662) an enable command to the payment peripheral 2430-N so as to enable the payment peripheral 2430-N after completion of the payment session for the payment peripheral 2430-A. In response to the enable command, the payment peripheral 2430-N sends (2664) an acknowledgment to the device 2400.

**[0356]** Figures 40A-40D illustrate a flowchart diagram of a method 2700 retrofitting a payment accepting unit to accommodate a plurality of payment peripherals in accordance with some implementations. In some implementations, the method 2700 is performed by a device with one or more processors, memory, a slave interface configured to couple the device with the payment accepting unit via a multi-drop bus (MDB), and one or more host interfaces configured to couple the device with one or more payment peripherals, (e.g., a coin acceptor, a bill acceptor, a cashless payment device such as a payment card reader, and the like) where a respective payment peripheral is decoupled from an MDB interface of the payment accepting unit and coupled with a respective one of the one or more host interfaces, and where the one or more payment peripherals are configured to communicate via MDB protocol. For example, in some implementations, the method 2700 is performed by the device 2400 (Figure 37) or a component thereof (e.g., device controller 2410). In some implementations, the method 2700 is governed by instructions that are stored in a non-transitory computer readable storage medium (e.g., the memory 2414, Figure 37) and the instructions are executed by one or more processors (e.g., the processing unit 2412, Figure 37) of the device. Optional operations are indicated by dashed lines (e.g., boxes with dashed-line borders).

**[0357]** The device performs (2702) as a virtual payment peripheral for the payment accepting unit by registering the device as a slave to the payment accepting unit, and the device performs as a virtual payment accepting unit for the one or more payment peripherals by registering the one or more payment peripherals as slaves to the device using the MDB protocol. In some implementations, the MDB protocol supports a limited number of payment peripherals. Device 2400 expands the number of payment peripherals connected to the payment accepting unit 120 beyond this limited number by emulating the payment accepting unit 120 to the one or more payment peripherals 2430 coupled with the one or more host interfaces 2420 and emulating a payment peripheral to the payment accepting unit 120. As such, in

some implementations, the payment accepting unit 120 (i.e., the payment accepting unit controller 2460) views the device 2400 as another payment peripheral connected to the MDB, where the device 2400 sends signals to the payment accepting unit controller 2460 in a manner as if originated by the device 2400 that is functioning as a singular virtual payment peripheral. Moreover, in some implementations, the one or more payment peripherals 2430 view the device 2400 as the payment accepting unit controller 2460, where signals are sent to the one or more payment peripherals 2430 in a manner as if originated by the payment accepting unit controller 2460.

**[0358]** In some implementations, registering the device as a slave to the payment accepting unit further comprises (2716): identifying the device to the payment accepting unit as a cashless payment peripheral; and accepting registration of the device with the payment accepting unit as a cashless payment peripheral. For example, the device 2400 identifies itself to the payment accepting unit 120 as a cashless payment device (e.g., a payment card reader) when sending the reset signal to the payment accepting unit 120 in operation 2504 (Figure 38).

**[0359]** In some implementations, registering the device as a slave to the payment accepting unit further comprises (2718): identifying the device to the payment accepting unit as a coin acceptor peripheral; and accepting registration of the device with the payment accepting unit as a coin acceptor peripheral. For example, the device 2400 identifies itself to the payment accepting unit 120 as a coin acceptor when sending the reset signal to the payment accepting unit 120 in operation 2504 (Figure 38).

**[0360]** In some implementations, registering the device as a slave to the payment accepting unit further comprises (2720): identifying the device to the payment accepting unit as a bill acceptor peripheral; and accepting registration of the device with the payment accepting unit as a bill acceptor peripheral. For example, the device 2400 identifies itself to the payment accepting unit 120 as a bill acceptor/validator when sending the reset signal to the payment accepting unit 120 in operation 2504 (Figure 38).

**[0361]** The device receives (2704) a command from the payment accepting unit via the slave interface, where signals from the payment accepting unit are sent in a manner as if sent to a singular payment peripheral. For example, with reference to process 2600, the payment accepting unit 120 sends a command to the device 2400 to end the payment session in operation 2654 (Figure 39B).

**[0362]** In response to receiving the command from the payment accepting unit, the device (2706): sends an acknowledgement to the command from the payment accepting unit via the slave interface, where signals are sent to the payment accepting unit in a manner as if originated by the device that is functioning as a singular virtual payment peripheral; and relays the command to the

respective payment peripheral via the respective one of the one or more host interfaces corresponding to the respective payment peripheral, where the device sends signals to and receives signals from the payment accepting unit asynchronous of the device sending signals to and receiving signals from the one or more payment peripherals. Continuing with the example above, with reference to process 2600, in response to receiving the command to end the payment session, the device 2400 sends an acknowledgment to the payment accepting unit 120 in operation 2656 (Figure 39B) in a manner as if originated by the device that is functioning as a singular virtual payment peripheral. Continuing with this example, in response to receiving the command to end the payment session, the device 2400 also asynchronously relays the command to end the payment session to the payment peripheral 2430-A in operation 2658 (Figure 39B). As such, the command is relayed to the payment peripheral 2430-A asynchronous of sending the acknowledgment to the payment accepting unit 120.

**[0363]** In some implementations, in response to relaying the command, the device receives (2708) via the respective one of the one or more host interfaces corresponding to the respective payment peripheral a response from the respective payment peripheral. For Continuing with the example above, with reference to process 2600, in response to the relayed complete session command, the payment peripheral 2430-A sends an acknowledgment to the device 2400 in operation 2660 (Figure 39B).

**[0364]** In some implementations, in response to receiving the response from the respective payment peripheral, the device: sends an acknowledgement to the respective payment peripheral, where signals are sent to the one or more payment peripherals in a manner as if originated by the payment accepting unit; and relays the response to the payment accepting unit via the slave interface, where the device sends signals to and receives signals from the payment accepting unit asynchronous of the device sending signals to and receiving signals from the one or more payment peripherals. In some implementations, in response to receiving the response from the respective payment peripheral, the device forgoes the above steps.

**[0365]** In some implementations, the device receives (2710) a command from respective payment peripheral via the respective one of the one or more host interfaces corresponding to the respective payment peripheral, where signals from the one or more payment peripherals are sent in a manner as if sent to the payment accepting unit, and, in response to receiving the command from the respective payment peripheral, the device: sending an acknowledgement to the command from the respective payment peripheral, where signals are sent to the one or more payment peripherals in a manner as if originated by the payment accepting unit; and relaying the command to the payment accepting unit via the slave interface, where the device sends signals to and receives

signals from the payment accepting unit asynchronous of the device sending signals to and receiving signals from the one or more payment peripherals. For example, with reference to process 2600, when polled in operation 2634 (Figure 39B), the payment peripheral 2430-A sends a vend approved signal to the device 2400 in a manner as if sent to the payment accepting unit 120 in operation 2636. Continuing with this example, in response to receiving the vend approved signal, the device 2400 sends an acknowledgement to the payment peripheral 2430-A in a manner as if originated by the payment accepting unit 120 in operation 2638 (Figure 39B). Continuing with this example, in response to receiving the vend approved signal, the device 2400 also asynchronously relays the vend approved signal to the payment accepting unit 120 in operation 2640 (Figure 39B). As such, the command is relayed to the payment accepting unit 120 asynchronous of sending the acknowledgment to the payment peripheral 2430-A.

**[0366]** In some implementations, the device further includes an internal payment peripheral including a short-range communication capability corresponding to a short-range communication protocol, where the short-range communication capability is configured to communicate with one or more mobile devices, and where each of the one or more mobile devices is configured with a complimentary short-range communication capability and a long-range communication capability corresponding to a long-range communication protocol. For example, with reference to Figure 37, the device 2400 includes the internal payment peripheral 2440 which includes hardware, software, firmware, or a combination thereof for providing the payment processing functionalities discussed in Figures 7, 8A-8G, 9A-9E, and 23 (e.g., the security unit 755 and the communications unit 770 as shown in Figure 20). For example, the respective mobile device corresponds to mobile device 150 (Figure 21) with long-range communication capability 872 and short-range communication capability 876.

**[0367]** In some implementations, the device receives (2712) a transaction request via the short-range communication capability from a respective mobile device to perform a transaction with the payment accepting unit, validates the transaction request, where validation of the transaction request indicates that the respective mobile device is authorized to initiate payment for the transaction by a remote server via the long-range communication capability, and, in accordance with a determination that the transaction request is valid, causing the payment accepting unit to perform the requested transaction by, issuing a signal to perform the transaction to the payment accepting unit via the slave interface. In some implementations, the device 2400 or a component thereof (e.g., internal payment peripheral 2440, Figure 37) receives a transaction request via the short-range communication capability (e.g., BLE, NFC, or the like) from the respective mobile device 150 (Figures 7, 8A-8G, 9A-9E, and 21), and the device 2400 or a component thereof (e.g., inter-

nal payment peripheral 2440, Figure 37; or the device controller 2410, Figure 37) validates the transaction request from the respective mobile device 150 by determining whether an AuthGrant or authorization grant token associated with the transaction request includes a valid authorization code. In some implementations, in accordance with a determination that the transaction request is associated with a valid authorization code, the device 2400 or a component thereof (e.g., internal payment peripheral 2440, Figure 37; or the device controller 2410, Figure 37) issues a command to the payment accepting unit 120 to perform the requested transaction by via the slave interface 2402 in a manner as if originated by the device 2400 that is functioning as a singular virtual payment peripheral.

**[0368]** In some implementations, in accordance with a determination that a command received from the respective one of the one or more payment peripherals corresponds to a transaction, the device stores (2714) transaction information at least including an amount of the transaction in associated with an identifier for the respective one of the one or more payment peripherals; after storing the transaction information, sends the transaction information to the respective mobile device via the short-range communication capability; and issues a command to the respective mobile device to send the transaction information to the remote server via the long-range communication capability. In some implementations, the device 2400 or a component thereof (e.g., the internal payment peripheral 2440, Figure 37; or the device controller 2410, Figure 37) monitors commands and signals from the one or more payment peripherals 2430 that are relayed to the payment accepting unit 120 and, in accordance with a determination that the command and signals are associated with transactions, stores transaction information such as the transaction amount and the respective payment peripheral 2430 associated with the transaction. For example, the device 2400 stores transaction information for each of the one or more payment peripherals 2430 in a table that associates the transaction information with a payment peripheral type (e.g., bill acceptor, coin acceptor, payment card reader, etc.). In some implementations, the device 2400 or a component thereof (e.g., the internal payment peripheral 2440, Figure 37; or the device controller 2410, Figure 37) sends the table of transaction information or a portion thereof to the respective mobile device 150 that sent the transaction request (or another mobile device 150 that performs a transaction with the device 2400) via the short-range communication capability. In some implementations, the device 2400 or a component thereof (e.g., the internal payment peripheral 2440, Figure 37; or the device controller 2410, Figure 37) commands the respective mobile device 150 to send the table of transaction information or the portion thereof to the server 130 via its long-range communication capability. As such, the device 2400 uses the respective mobile device 150 as a communication bridge to the server 130.

**[0369]** In some implementations, the device 2400 or a component thereof (e.g., the internal payment peripheral 2440, Figure 37; or the device controller 2410, Figure 37) also monitors the commands and signals from the one or more payment peripherals 2430 that are relayed to the payment accepting unit 120 and, in accordance with a determination that the command and signals are associated with error codes (e.g., a coin jam, low coin or bill count, etc.) and other information associated with the operation of the one or more payment peripherals 2430, stores corresponding operation information. In some implementations, the device 2400 also sends the operation information along with the table the table of transaction information or the portion thereof to the server 130.

**[0370]** In some implementations, the payment accepting unit further includes one or more other payment peripherals coupled with the MDB, a respective payment peripheral of the one or more other payment peripherals is one of a bill acceptor, coin acceptor, or payment card reader, and where the device further includes an additional interface configured to couple the device with the one or more other payment peripherals of the payment accepting unit. For example, with reference to Figure 37, the other payment peripheral(s) 2450 (e.g., acceptors, coin acceptors, payment card readers, etc.) are connected to the MDB before the device 2400 (e.g., prior to the slave interface 2402) and the other payment peripheral(s) 2455 (e.g., acceptors, coin acceptors, payment card readers, etc.) are connected to the MDB after the device 2400 (e.g., after the additional interface 2404).

**[0371]** In some implementations, the device further includes a pass-through channel, the pass-through channel is configured to pass-through signals from the one or more other payment peripherals to the payment accepting unit. For example, with reference to Figure 37, the device 2400 includes a pass-through channel to enable signals from the payment accepting unit controller 2460 to reach the other payment peripheral(s) 2455 and to enable signals from other the payment peripheral(s) 2455 to reach the payment accepting unit controller 2460.

**[0372]** It should be understood that the particular order in which the operations in Figures 40A-40D have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. Additionally, it should be noted that details of other processes described herein with respect to other methods described herein are also applicable in an analogous manner to the method 2700 described above with respect to Figures 40A-40D.

#### MISCELLANEOUS

**[0373]** It should be noted that relative terms are meant to help in the understanding of the technology and are not meant to limit the scope of the invention. Similarly, unless specifically stated otherwise, the terms used for

labels (e.g., "first," "second," and "third") are meant solely for purposes of designation and not for order or limitation. The term "short" in the phrase "short-range" (in addition to having technology specific meanings) is relative to the term "long" in the phrase "long-range."

[0374] The terms "may," "might," "can," and "could" are used to indicate alternatives and optional features and only should be construed as a limitation if specifically included in the claims.

[0375] It should be noted that, unless otherwise specified, the term "or" is used in its nonexclusive form (e.g., "A or B" includes A, B, A and B, or any combination thereof, but it would not have to include all of these possibilities). It should be noted that, unless otherwise specified, "and/or" is used similarly (e.g., "A and/or B" includes A, B, A and B, or any combination thereof, but it would not have to include all of these possibilities). It should be noted that, unless otherwise specified, the terms "includes" and "has" mean "comprises" (e.g., a device that includes, has, or comprises A and B contains A and B, but optionally may contain C or additional components other than A and B). It should be noted that, unless otherwise specified, the singular forms "a," "an," and "the" refer to one or more than one, unless the context clearly dictates otherwise.

[0376] It is to be understood that the inventions, examples, and implementations described herein are not limited to particularly exemplified materials, methods, and/or structures. It is to be understood that the inventions, examples, and implementations described herein are to be considered preferred inventions, examples, and implementations whether specifically identified as such or not.

[0377] The terms and expressions that have been employed in the foregoing specification are used as terms of description and not of limitation, and are not intended to exclude equivalents of the features shown and described. While the above is a complete description of selected implementations of the present invention, it is possible to practice the invention using various alternatives, modifications, adaptations, variations, and/or combinations and their equivalents. It will be appreciated by those of ordinary skill in the art that any arrangement that is calculated to achieve the same purpose may be substituted for the specific embodiment shown. It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention that, as a matter of language, might be said to fall therebetween.

[0378] The following clauses, which form part of the description, provide general expressions of the disclosure herein:

A1. A mobile-device-to-machine payment system for facilitating a cashless transaction for purchase of at least one product or service by a user from a payment accepting unit having input mechanisms, the user

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having a mobile device having both short-range communication technology and long-range communication technology, the payment accepting unit capable of dispensing at least one product or service, said system comprising:

- (a) an adapter module associated with the payment accepting unit, said adapter having short-range communication technology for communicating with the short-range communication technology of the mobile device;
- (b) a server having long-range communication technology for communicating with the long-range communication technology of the mobile device;
- (c) said adapter module for sending an authorization request for funds to the mobile device using short-range communication technology, the mobile device forwarding said authorization request for funds to said server using long-range communication technology; and
- (d) said server for sending an authorization grant for funds to the mobile device using long-range communication technology, the mobile device forwarding said authorization grant for funds to said adapter module using short-range communication technology;
- (e) wherein the payment accepting unit dispenses the at least one product or service in response to receiving user input to the payment accepting unit input mechanism if said adapter module has received said authorization grant.

A2. The system of clause A1, said adapter module having security technology and said server having security technology, said authorization request being secured by said adapter module security technology to create a secured authorization request, said authorization grant being secured by said server security technology to create a secured authorization grant, and said secured authorization request and said secured authorization grant being undecipherable to the mobile device.

A3. The system of clause A1, said adapter module and said server sharing a unique private key, said adapter module having encryption/decryption technology and said server having encryption/decryption technology, said authorization request being encrypted by said adapter module encryption/decryption technology using said unique private key to create an encrypted authorization request, said encrypted authorization request being decrypted by said server encryption/decryption technology using said unique private key, said authorization grant being encrypted by said server encryption/decryption technology using said unique private key to create an encrypted authorization grant, said encrypted au-



thorization grant being decrypted by said adapter module encryption/decryption technology using said unique private key, and said encrypted authorization request and said encrypted authorization grant being undecipherable to the mobile device.

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A4. The system of any of clauses A1-A3, further comprising:

(a) said adapter module surrounded by two zones, a payment zone and an authorization zone, wherein said payment zone is within said authorization zone;

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(b) said adapter module sending said authorization request when the mobile device is within said authorization zone; and

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(c) the mobile device forwarding said authorization grant for funds to said adapter module when the mobile device is within said payment zone.

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A5. The system of any of clauses A1-A3, further comprising:

(a) said adapter module surrounded by three zones, a payment zone, an authorization zone, and a communication zone, wherein said payment zone is within said authorization zone and said authorization zone is within said communication zone;

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(b) the mobile device receiving advertising broadcast signals from said adapter module within said communication zone;

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(c) said adapter module sending said authorization request when the mobile device is within said authorization zone; and

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(d) the mobile device forwarding said authorization grant for funds to said adapter module when the mobile device is within said payment zone.

A6. The system of any of clauses A1-A3, having a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device.

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A7. The system of any of clauses A1-A3, having a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device, said system further comprising:

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(a) a display of the payment accepting unit for displaying funds available based on information from said authorization grant; and

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(b) input mechanisms of the payment accepting unit for receiving user selection input when the user interacts with the input mechanisms to select the at least one product or service to be dispensed.

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A8. The system of any of clauses A1-A3, wherein said adapter module is an in-line dongle for in-line insertion within a multi-drop bus of the payment accepting unit.

A9. The system of any of clauses A1-A3:

(a) the payment accepting unit having a multi-drop bus to a payment receiving mechanism, the multi-drop bus having a male adapter and a female adapter;

(b) said adapter module having a male adapter and a female adapter; and

(c) said adapter module insertable in serial with the multi-drop bus by connecting said male adapter of said adapter module to the female adapter of the multi-drop bus and by connecting said female adapter of said adapter module to the male adapter of the multi-drop bus.

A10. A mobile-device-to-machine payment system for facilitating a cashless transaction for purchase of at least one product or service by a user from a payment accepting unit having input mechanisms, the user having a mobile device having both short-range communication technology and long-range communication technology, the payment accepting unit capable of dispensing at least one product or service, said system comprising:

(a) an adapter module associated with the payment accepting unit, said adapter having short-range communication technology for communicating with the short-range communication technology of the mobile device, said adapter module having security technology, and said adapter module surrounded by two zones, a payment zone and an authorization zone, wherein said payment zone is within said authorization zone;

(b) a server having long-range communication technology for communicating with the long-range communication technology of the mobile device, said server having security technology;

(c) said adapter module for sending a secured authorization request for funds secured by said adapter module security technology to the mobile device using short-range communication technology when the mobile device is within said authorization zone, the mobile device forwarding said secured authorization request for funds to said server using long-range communication technology; and

(d) said server for sending a secured authorization grant for funds secured by said server security technology to the mobile device using long-range communication technology, the mobile device forwarding said secured authorization grant for funds to said adapter module using

short-range communication technology when the mobile device is within said payment zone; (e) wherein the payment accepting unit dispenses the at least one product or service in response to receiving user input to the payment accepting unit input mechanism if said adapter module has received said secured authorization grant.

A11. The system of clause A10, said secured authorization grant being undecipherable to the mobile device.

A12. The system of clause A10, said adapter module and said server sharing a unique private key, said adapter module security technology being encryption/decryption technology and said server security technology being encryption/decryption technology, said secured authorization request being encrypted by said adapter module encryption/decryption technology using said unique private key to create an encrypted secured authorization request, said encrypted secured authorization request being decrypted by said server encryption/decryption technology using said unique private key, said secured authorization grant being encrypted by said server encryption/decryption technology using said unique private key to create an encrypted secured authorization grant, said encrypted secured authorization grant being decrypted by said adapter module encryption/decryption technology using said unique private key, and said encrypted secured authorization request and said encrypted secured authorization grant being undecipherable to the mobile device.

A13. The system of any of clauses A10-A12, further comprising:

- (a) said adapter module being surrounded by three zones, said payment zone, said authorization zone, and a communication zone, wherein said authorization zone is within said communication zone; and
- (b) the mobile device receiving advertising broadcast signals from said adapter module within said communication zone.

A14. The system of any of clauses A10-A12, having a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device.

A15. The system of any of clauses A10-A12, having a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device, said system further comprising:

- (a) a display of the payment accepting unit for displaying funds available based on information from said secured authorization grant; and
- (b) input mechanisms of the payment accepting unit for receiving user selection input when the user interacts with the input mechanisms to select the at least one product or service to be dispensed.

A16. The system of any of clauses A10-A12, wherein said adapter module is an in-line dongle for in-line insertion within a multi-drop bus of the payment accepting unit.

A17. The system of any of clauses A10-A12:

- (a) the payment accepting unit having a multi-drop bus to a payment receiving mechanism, the multi-drop bus having a male adapter and a female adapter;
- (b) said adapter module having a male adapter and a female adapter;
- (c) said adapter module insertable in serial with the multi-drop bus by connecting said male adapter of said adapter module to the female adapter of the multi-drop bus and by connecting said female adapter of said adapter module to the male adapter of the multi-drop bus.

A18. A method for using a mobile-device-to-machine payment system for facilitating a cashless transaction for purchase of at least one product or service by a user from a payment accepting unit having input mechanisms, the user having a mobile device having both short-range communication technology and long-range communication technology, the payment accepting unit capable of dispensing at least one product or service, said method comprising the steps of:

- (a) sending an authorization request for funds to the mobile device using short-range communication technology of an adapter module associated with the payment accepting unit;
- (b) receiving said authorization request for funds from said short-range communication technology of said adapter module at the short-range communication technology of the mobile device;
- (c) forwarding said authorization request for funds to a server using the long-range communication technology of the mobile device;
- (d) receiving said authorization request for funds from the long-range communication technology of the mobile device at long-range communication technology of said server;
- (e) sending an authorization grant for funds to the mobile device using said long-range communication technology of said server;

(f) receiving said authorization grant for funds from long-range communication technology of said server at the long-range communication technology of the mobile device;  
 (g) forwarding said authorization grant for funds to said adapter module using the short-range communication technology of the mobile device;  
 (h) receiving said authorization grant for funds from the short-range communication technology of the mobile device at short-range communication technology of said adapter module; and  
 (i) dispensing the at least one product or service from the payment accepting unit in response to receiving user input to the payment accepting unit input mechanism if said adapter module has received said authorization grant.

A19. The method of clause A18, further comprising: securing said authorization request using security technology associated with said adapter module to create a secured authorization request, securing said authorization grant using security technology associated with said server to create a secured authorization grant, and said secured authorization request and said secured authorization grant being undecipherable to the mobile device.

A20. The method of clause A18, further comprising: sharing a unique private key between said adapter module and said server, encrypting using said unique private key said authorization request using encryption/decryption technology associated with said adapter module to create an encrypted authorization request, decrypting using said unique private key said encrypted authorization request using encryption/decryption technology associated with said server, encrypting using said unique private key said authorization grant using said encryption/decryption technology associated with said server to create an encrypted authorization grant, decrypting using said unique private key said encrypted authorization grant using encryption/decryption technology associated with said adapter module, and said encrypted authorization request and said encrypted authorization grant being undecipherable to the mobile device.

A21. The method of any of clauses A18-A20, further comprising:

- (a) surrounding said adapter module with two zones, a payment zone and an authorization zone, wherein said payment zone is within said authorization zone;
- (b) said adapter module sending said authorization request when the mobile device is within said authorization zone; and
- (c) the mobile device forwarding said authorization grant for funds to said adapter module when

the mobile device is within said payment zone.

A22. The method of any of clauses A18-A20, further comprising:

- (a) surrounding said adapter module with three zones, a payment zone, an authorization zone, and a communication zone, wherein said payment zone is within said authorization zone and said authorization zone is within said communication zone;
- (b) the mobile device receiving advertising broadcast signals from said adapter module within said communication zone;
- (c) said adapter module sending said authorization request when the mobile device is within said authorization zone; and
- (d) the mobile device forwarding said authorization grant for funds to said adapter module when the mobile device is within said payment zone.

A23. The method of any of clauses A18-A20, having a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device.

A24. The method of any of clauses A18-A20, having a hands-free mode in which the payment accepting unit dispenses the at least one product or service without the user interacting with the mobile device, said method further comprising the steps of:

- (a) displaying funds available on a display of the payment accepting unit, said funds available being based on information from said authorization grant; and
- (b) receiving user selection input when the user interacts with input mechanisms of the payment accepting unit to select the at least one product or service to be dispensed.

A25. The method of any of clauses A18-A20, further comprising the step of inserting said adapter module as an in-line dongle for in-line insertion within a multi-drop bus of the payment accepting unit.

A26. The method of any of clauses A18-A20, the payment accepting unit having a multi-drop bus to a payment receiving mechanism, the multi-drop bus having a male adapter and a female adapter, and said adapter module having a male adapter and a female adapter, said method further comprising the step of inserting said adapter module in serial with the multi-drop bus by connecting said male adapter of said adapter module to the female adapter of the multi-drop bus and by connecting said female adapter of said adapter module to the male adapter of the multi-drop bus.

Claims

1. A method (2200) of retrofitting an offline-payment operated machine (2100) to accept electronic payments, the method being performed by a payment module (2120) including one or more processors, memory, and a short-range communication capability configured to communicate with one or more mobile devices, the payment module (2120) being coupled with the offline-payment operated machine (2100) that includes a coin receiving switch (2102) and a control unit (2106), the payment module (2120) further including an interface (2122) configured to emulate payment acceptance signals from the coin receiving switch (2102) of the offline-payment operated machine (2100), where the payment acceptance signals are indicative of coins being received by the coin receiving switch (2102), the method comprising:

broadcasting, via the short-range communication capability, a packet of information (1100) including an identifier associated with the payment module (2120);  
 receiving (2208) via the short-range communication capability and from a respective mobile device (150) of the one or more mobile devices a request to perform an operation of the offline-payment operated machine, wherein the request includes an authorization grant token (1140);  
 validating (2210) the request by determining whether the authorization grant token (1140) includes a valid authorization code, wherein the validation indicates that the respective mobile device (150) is authorized to initiate payment for the operation by a remote server via a long-range communication capability of the respective mobile device (150); and  
 in accordance with a determination that the request is valid, causing the payment operated machine to perform the operation by issuing a predefined signal sequence to the control unit (2106) via the interface, wherein the predefined signal sequence emulates a signal sequence that would be issued by the coin receiving switch in response to receiving the preset number of coins.

2. The method of claim 1, wherein the payment module is an adapter module (100) and the offline-payment operated machine (2100) is a payment accepting unit (120) comprising a payment receiving mechanism, wherein the payment receiving mechanism of the payment accepting unit (120) is a coin acceptor.

3. The method of claim 2, wherein the adapter module (100) is inserted as an in-line dongle for in-line in-

sertion within a multi-drop bus of the payment accepting unit (120).

4. The method of claim 2, wherein the adapter module (100) includes a pass-through channel, wherein the pass-through channel is configured to enable signals from a payment accepting unit controller (2460) of the offline-payment operated machine (2100) to reach one or more other payment peripherals (2455) and to enable signals from one or more other payment peripherals to reach the payment accepting unit controller (2460).

5. The method of claim 1, further comprising:  
 after issuing the preset signal sequence to the control unit (2106), obtaining by a second interface of the payment module (2124) a notification indicating that the control unit sent control signals to initiate operation of the offline-payment operated machine in response to receiving the predefined signal sequence; and  
 in response (2218) to obtaining the notification:

generating operation information based at least in part on the notification; and  
 storing the generated operation information in the memory.

6. The method of claim 5, further comprising:  
 sending (2220) the operation information corresponding to the operation to the respective mobile device (150) via the short-range communication technology.

7. The method of claim 1, wherein the packet of information (1100) includes a payment zone criterion (1126) that the mobile device (150) is required to observe before being within a payment zone of the payment module (2120).

8. The method of claim 7, wherein the request is sent in response to the mobile device (150) entering the payment zone of the payment module (2120) which occurs upon satisfaction of the payment zone criterion, wherein the payment zone criterion (1126) is adjusted by the respective mobile device (150) based on the strength and/or reception of its short-range communication capability.

9. The method of claim 8, wherein the payment zone criterion (1126) corresponds to a baseline payment zone threshold indicating a baseline received signal strength that the respective mobile device (150) is required to observe before being within the payment zone of the payment module (2120).

10. The method of claim 9, wherein the payment module

(2120) receives from the respective mobile device (150) a model type of the respective mobile device (150), wherein the baseline payment zone is subject to an offset based on the model type.

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11. The method of claim 2, wherein the payment accepting unit (120) has a multi-drop bus to a payment receiving mechanism, the multi-drop bus having a male adapter and a female adapter, and said adapter module having a male adapter and a female adapter, wherein said adapter module (100) has been inserted in serial with the multi-drop bus by connecting said male adapter of said adapter module to the female adapter of the multi-drop bus and by connecting said female adapter of said adapter module to the male adapter of the multi-drop bus.

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12. The method of claim 1, wherein the offline-payment operated machine 2100 is a dryer or washer at a laundromat, a parking meter, a car wash payment kiosk, or a vending machine.

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13. A payment module (2120) for retrofitting an offline-payment operated machine (2100) to accept electronic payments, wherein the offline-payment operated machine (2100) at least includes a control unit (2106) and a coin receiving switch (2102), the payment module (2120) comprising:

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an interface (2122) configured to emulate payment acceptance signals from the coin receiving switch (2102) of the offline-payment operated machine (2100), where the payment acceptance signals are indicative of coins being received by the coin receiving switch (2102); a short-range communication technology configured to communicate with one or more mobile devices; one or more processors; and memory (760) storing one or more programs to be executed by the one or more processors, the one or more programs comprising instructions for: performing the method of any one of claims 1-12.

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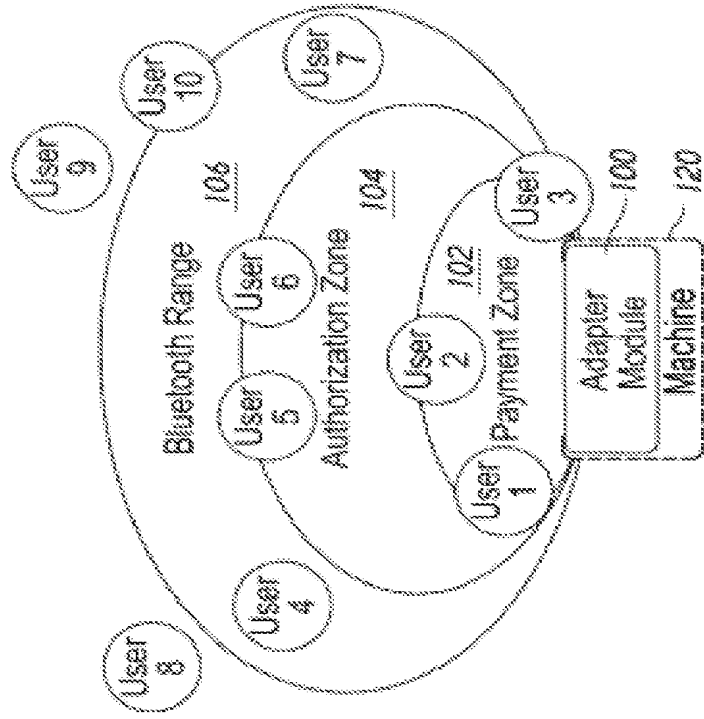


Figure 1

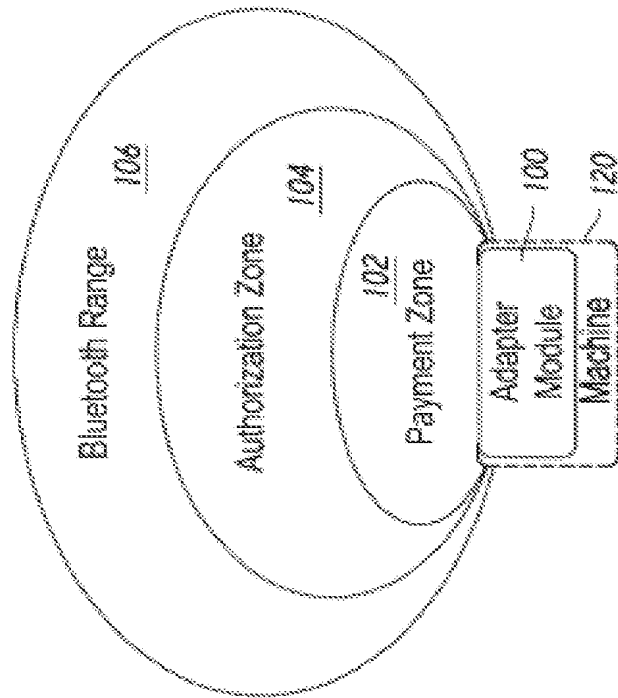


Figure 2

Tab	Favorite?	Alert	View to User
All	Yes	No	User can make Hands-free Credit with the connected vending machine
All	No	Yes	User needs to launch Mobile Device and then swipe to make transaction manually
Favorite	Yes	No	Hands-free transaction will be available to the user via vending machine
Favorite	No	No	User is not alerted for the vending machine which is not a favorite machine. Hands-free mode will not work, manual swipe for transaction required by user.
Either All or Favorite	Yes	Yes	BUT Hands-free Credit is not available (disabled by module, expired AuthGrant, insufficient balance, or other issue), then user will get an alert so that user can swipe credit manually.

Figure 3

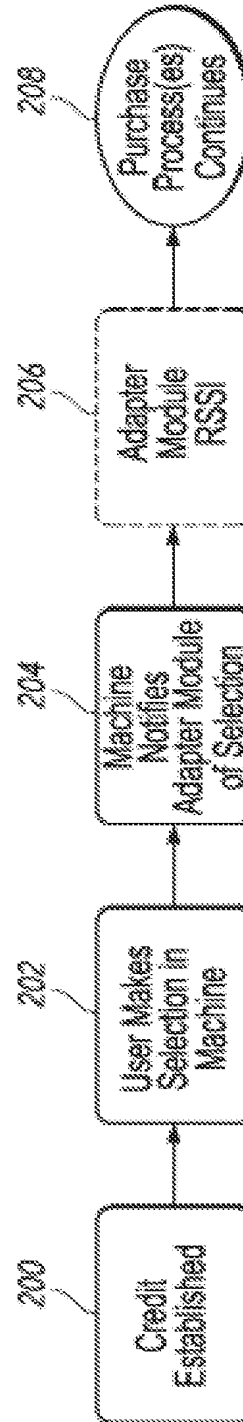


Figure 4

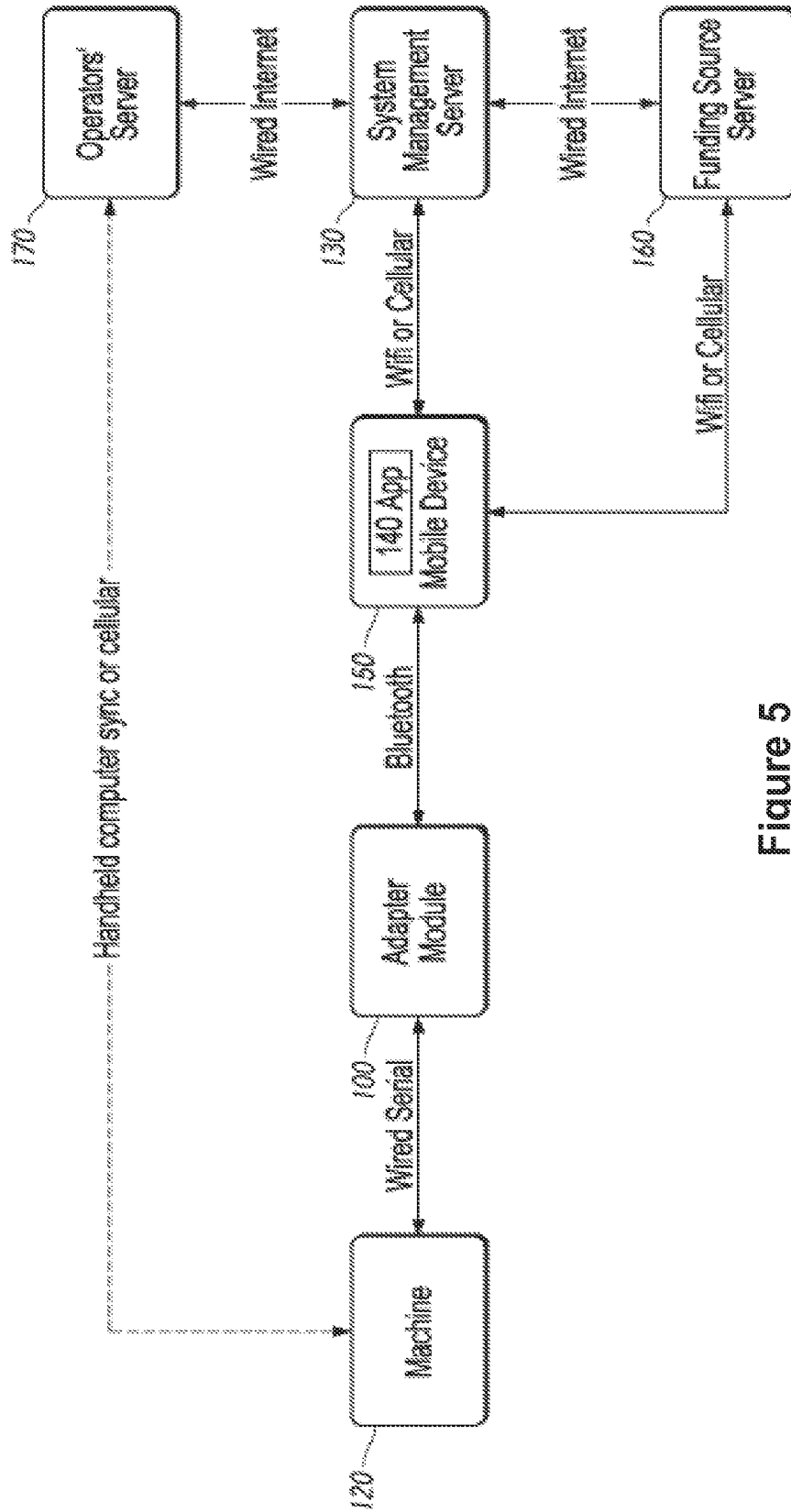


Figure 5



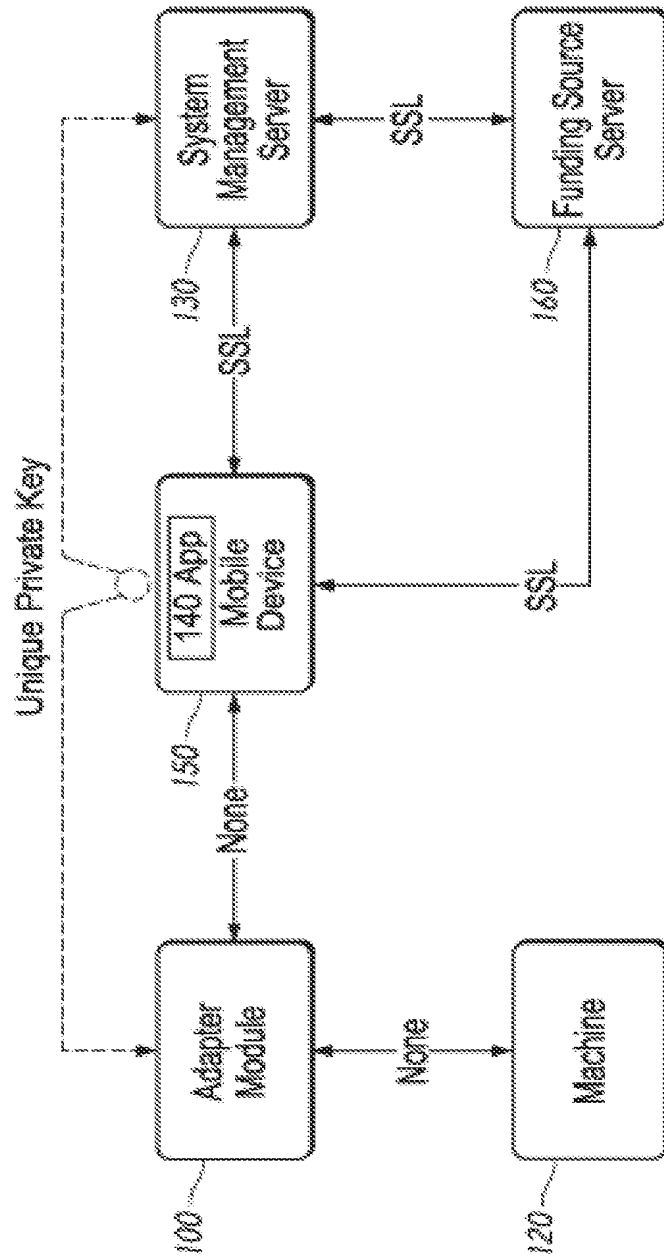


Figure 6

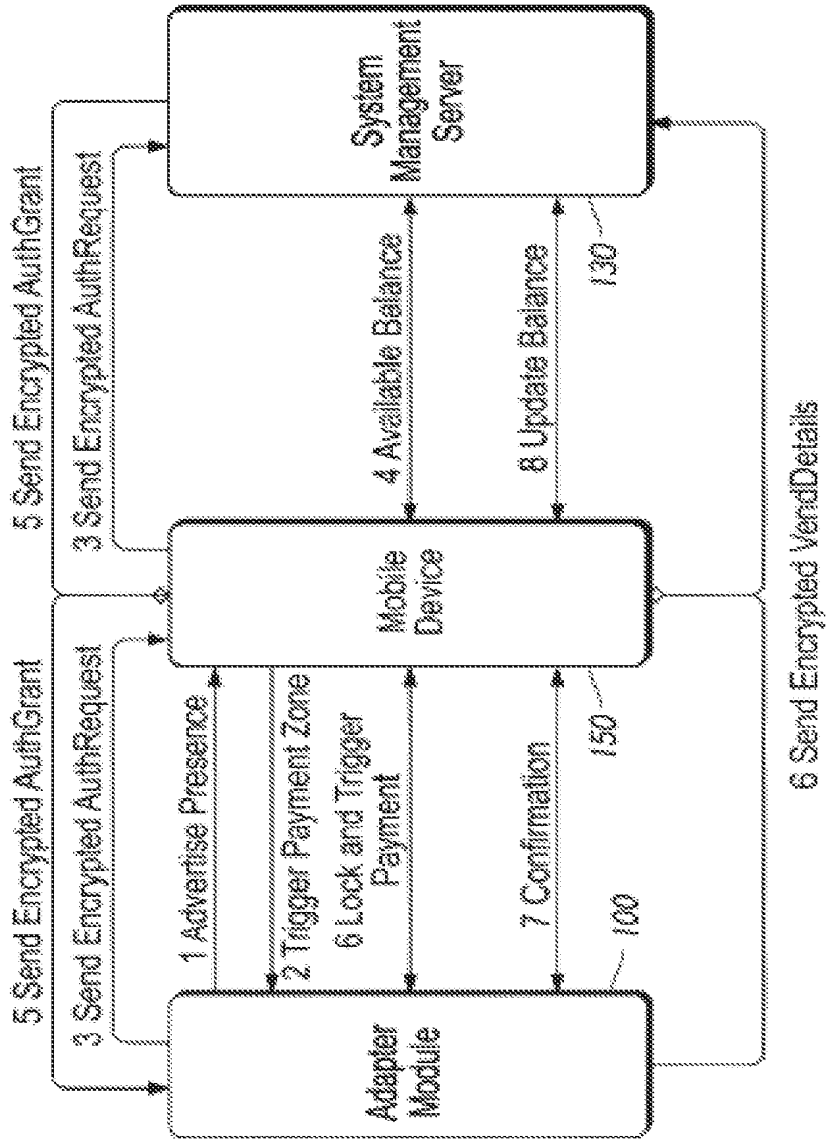


Figure 7

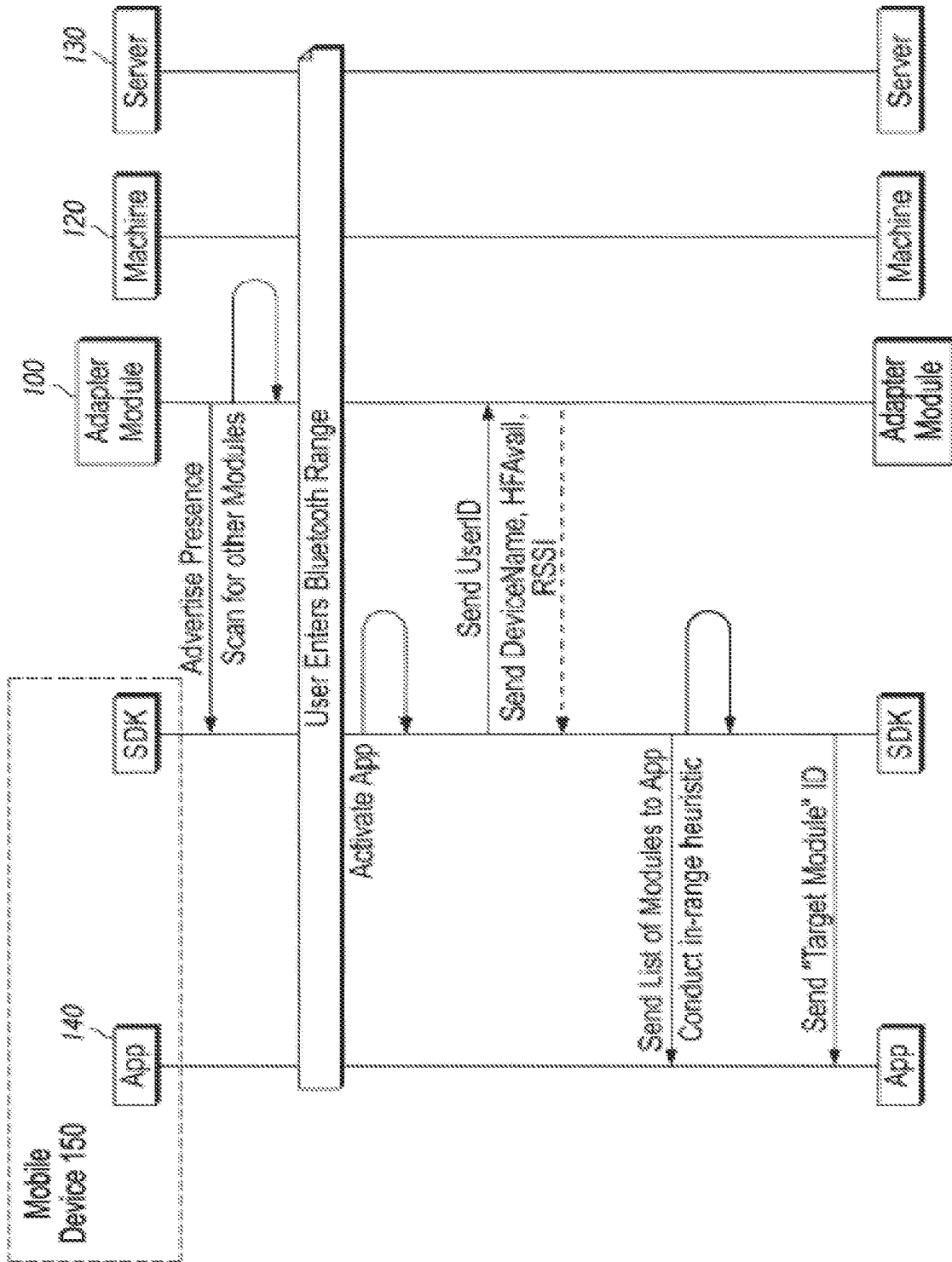


Figure 8A

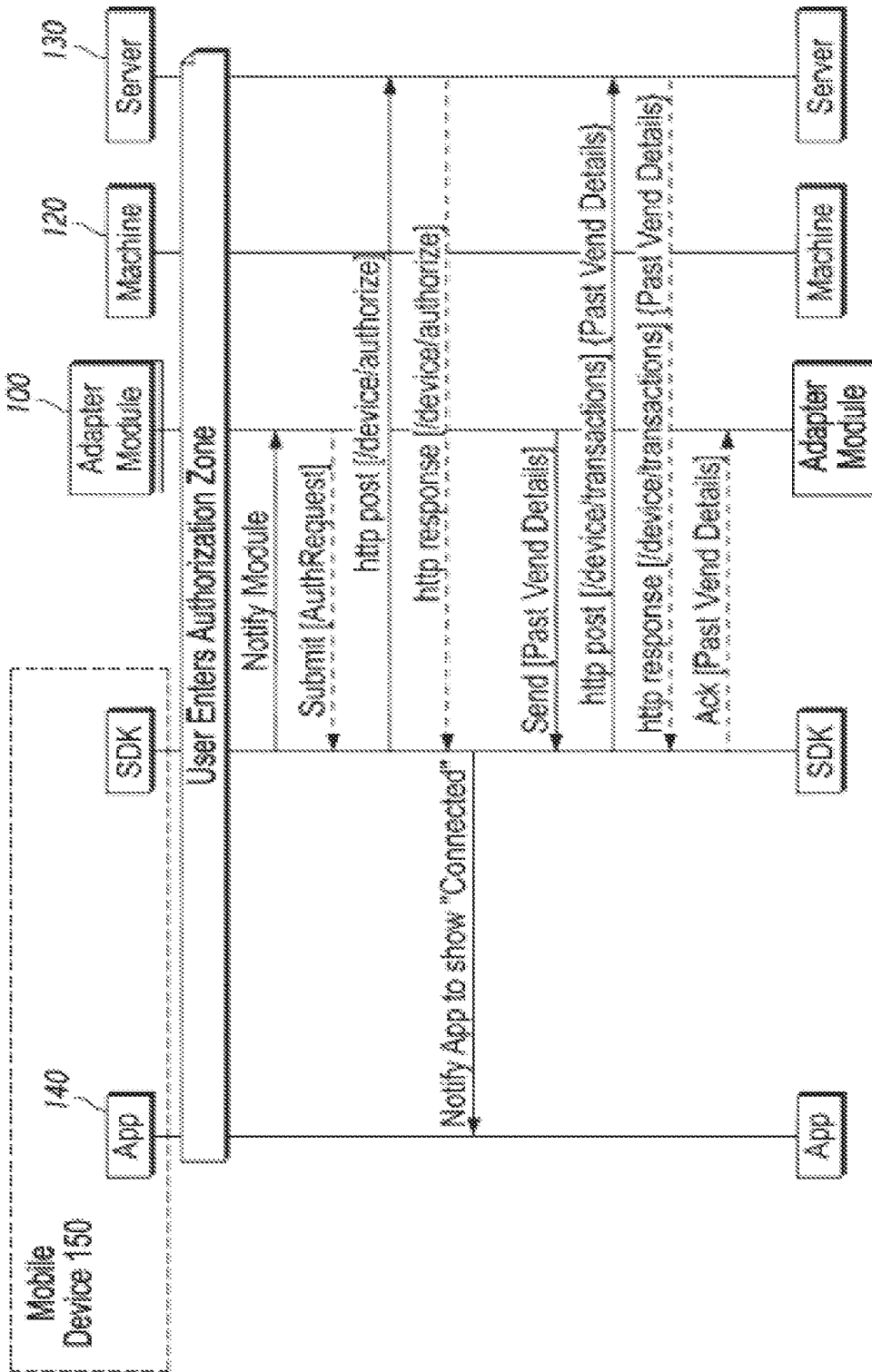


Figure 8B

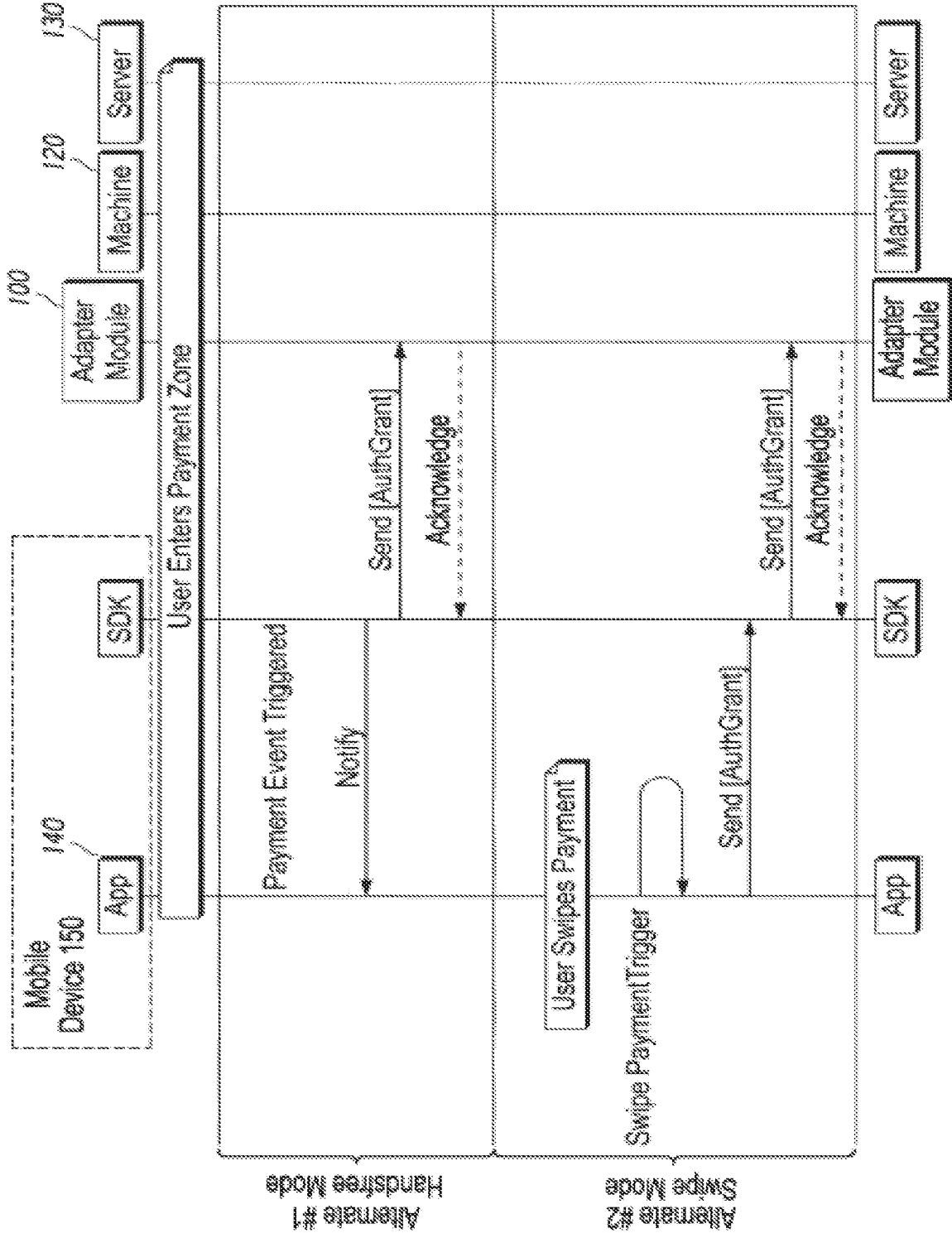


Figure 8C

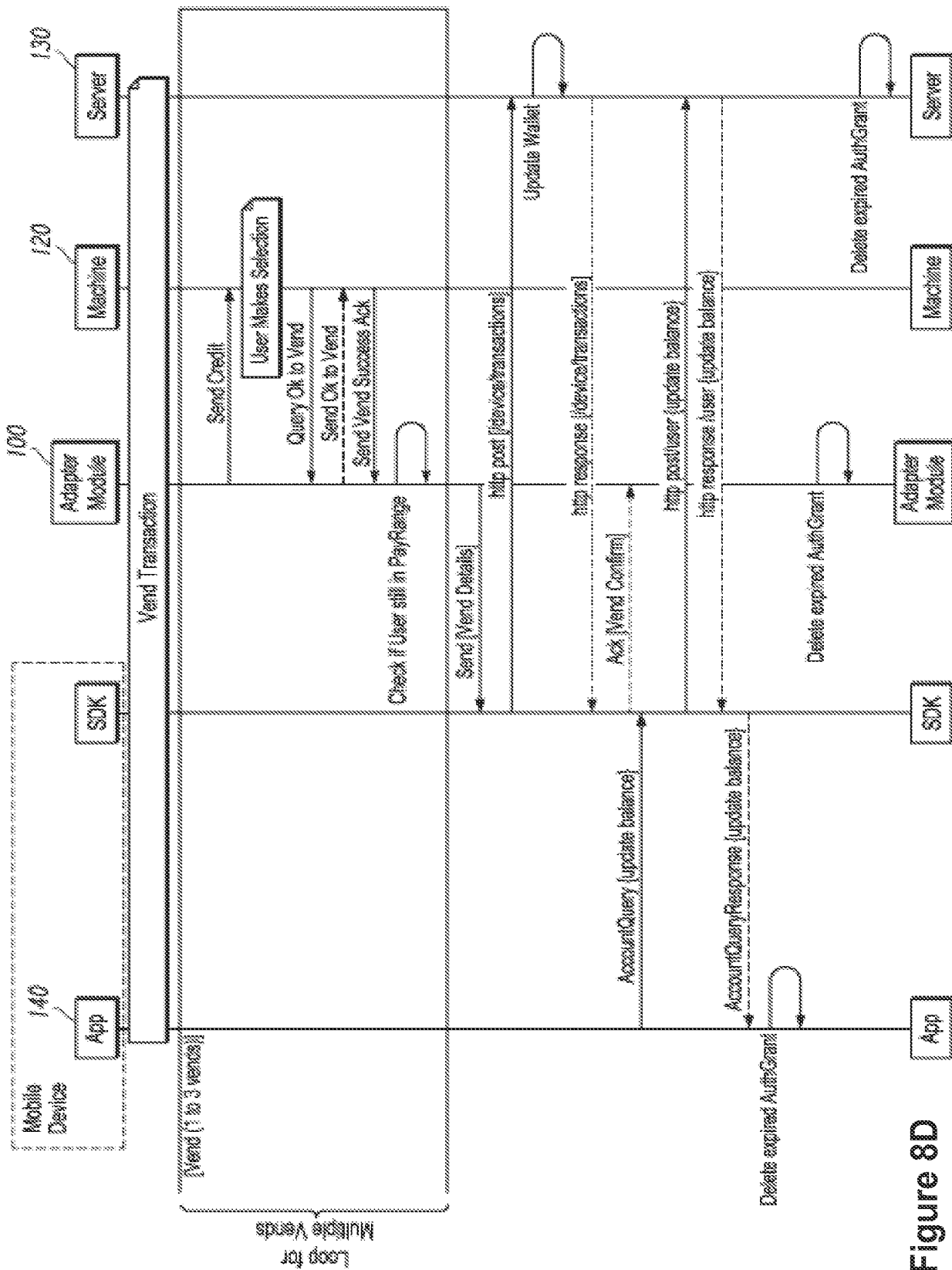


Figure 8D

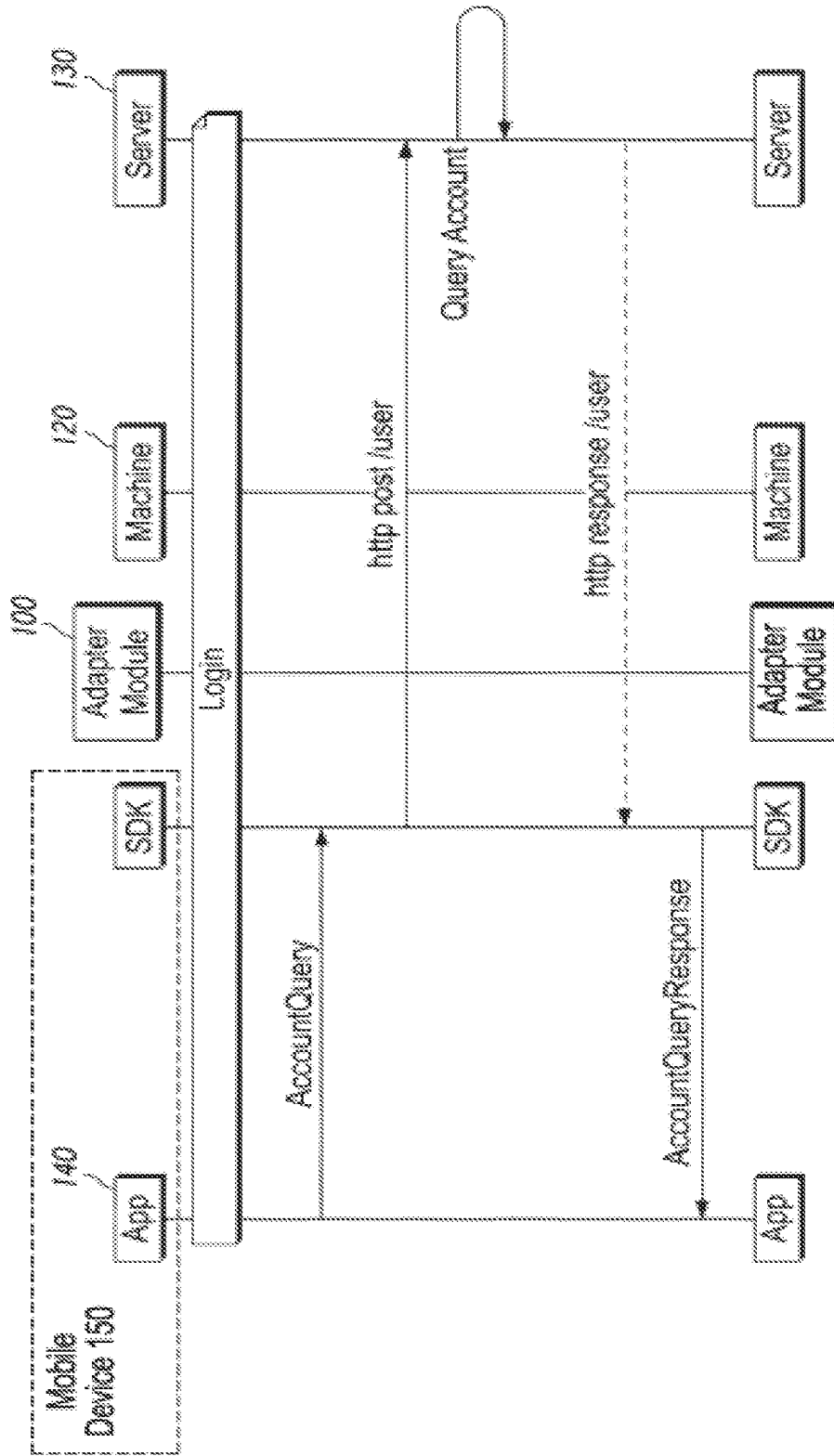


Figure 8E

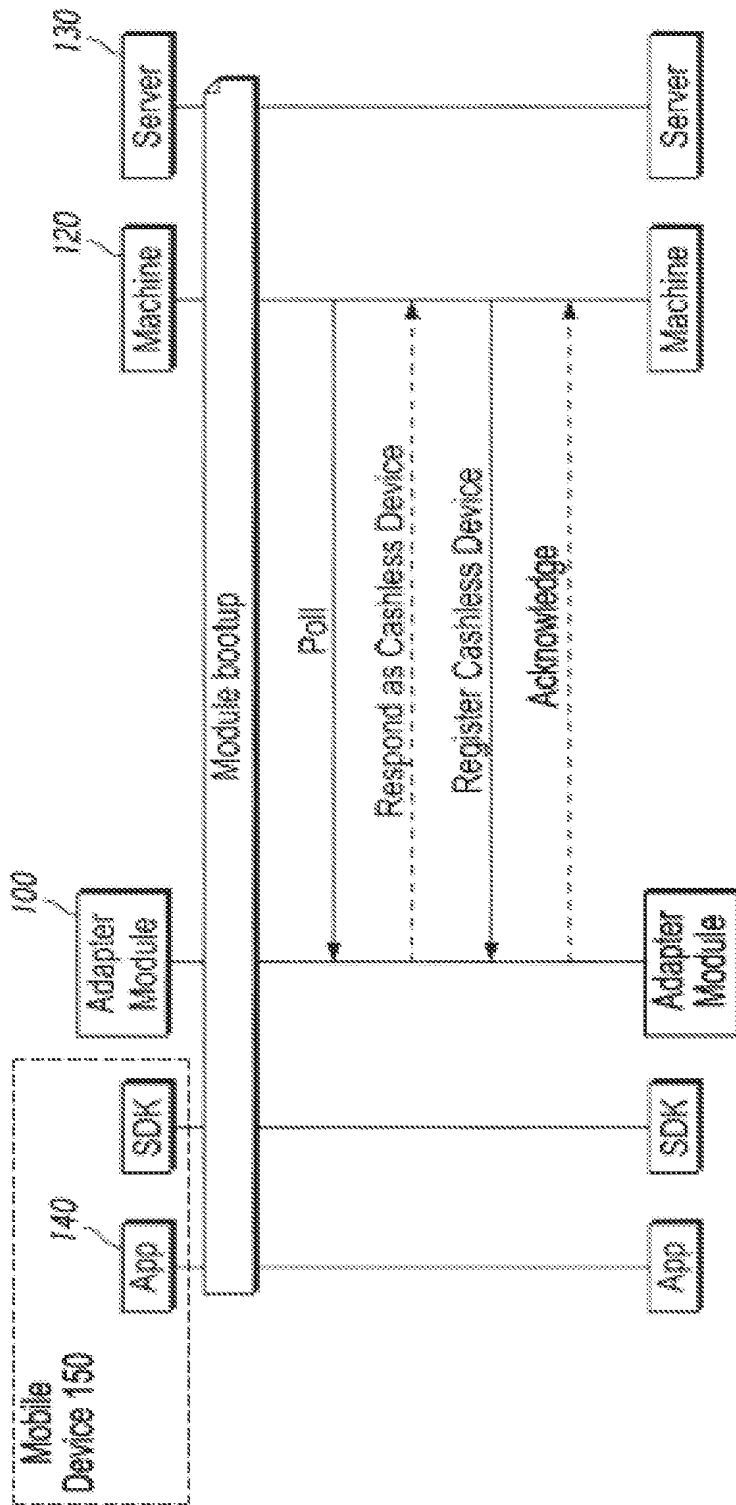


Figure 8F



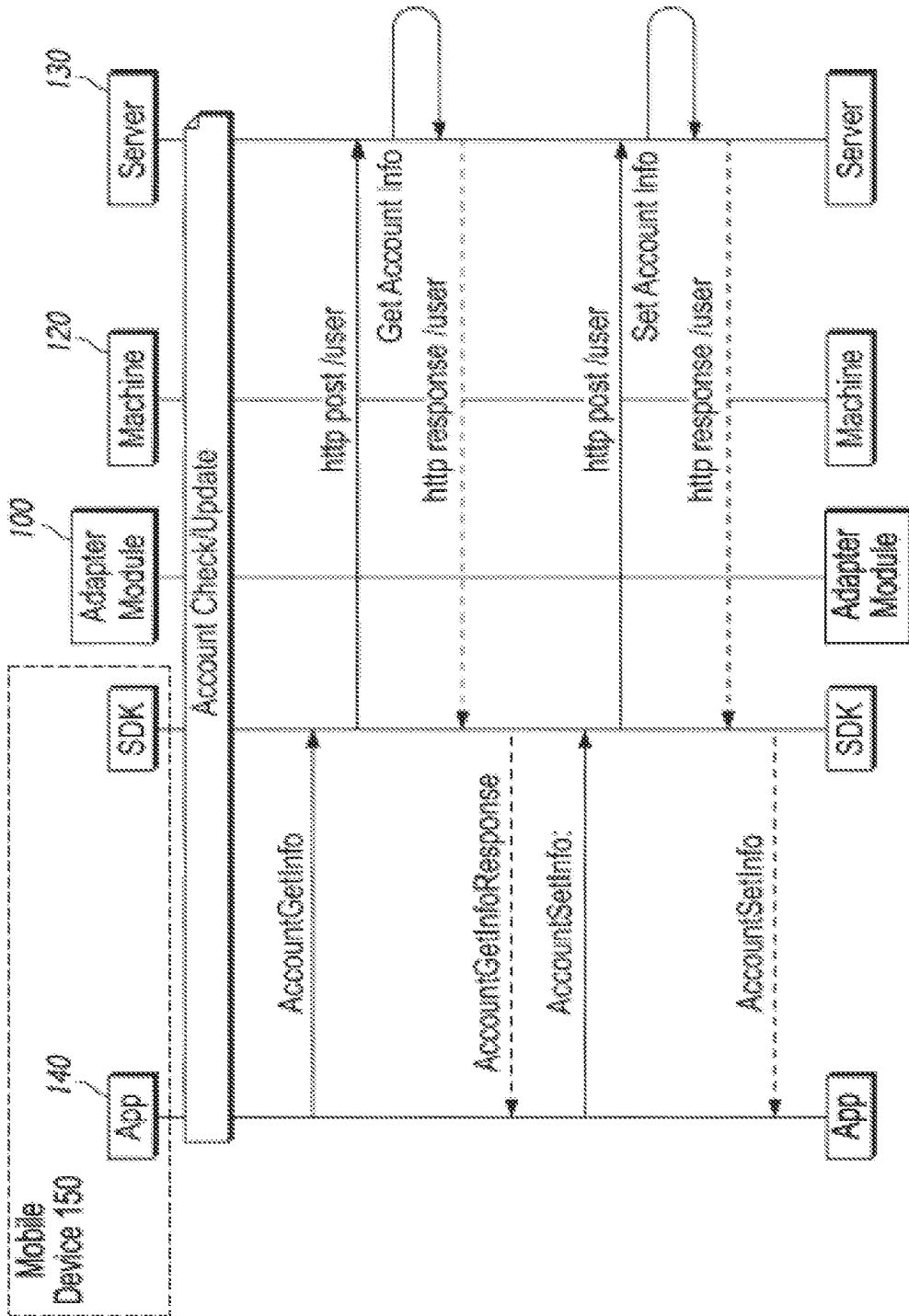


Figure 8G

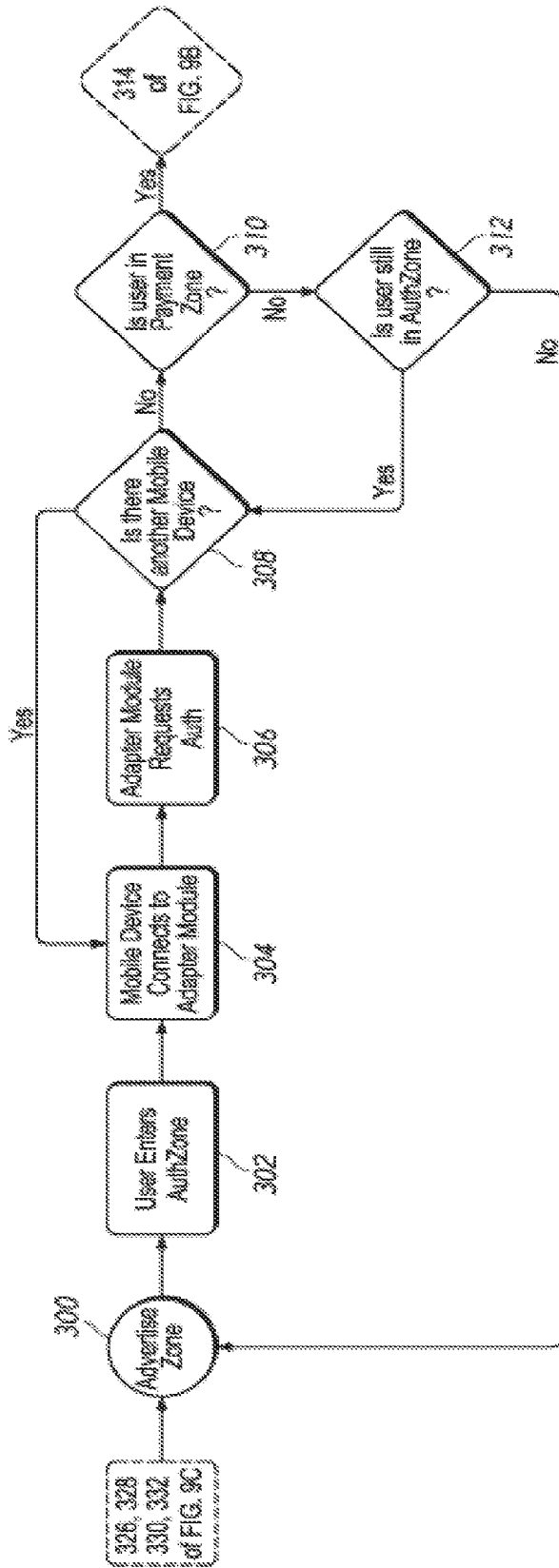


Figure 9A

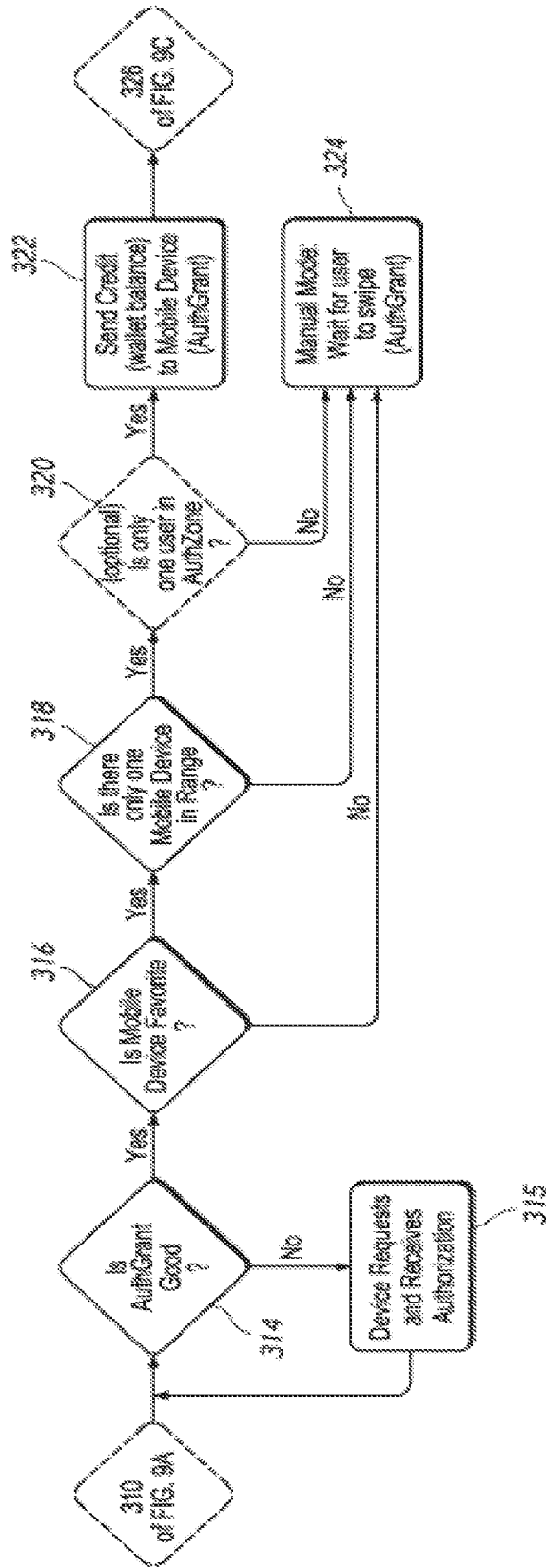
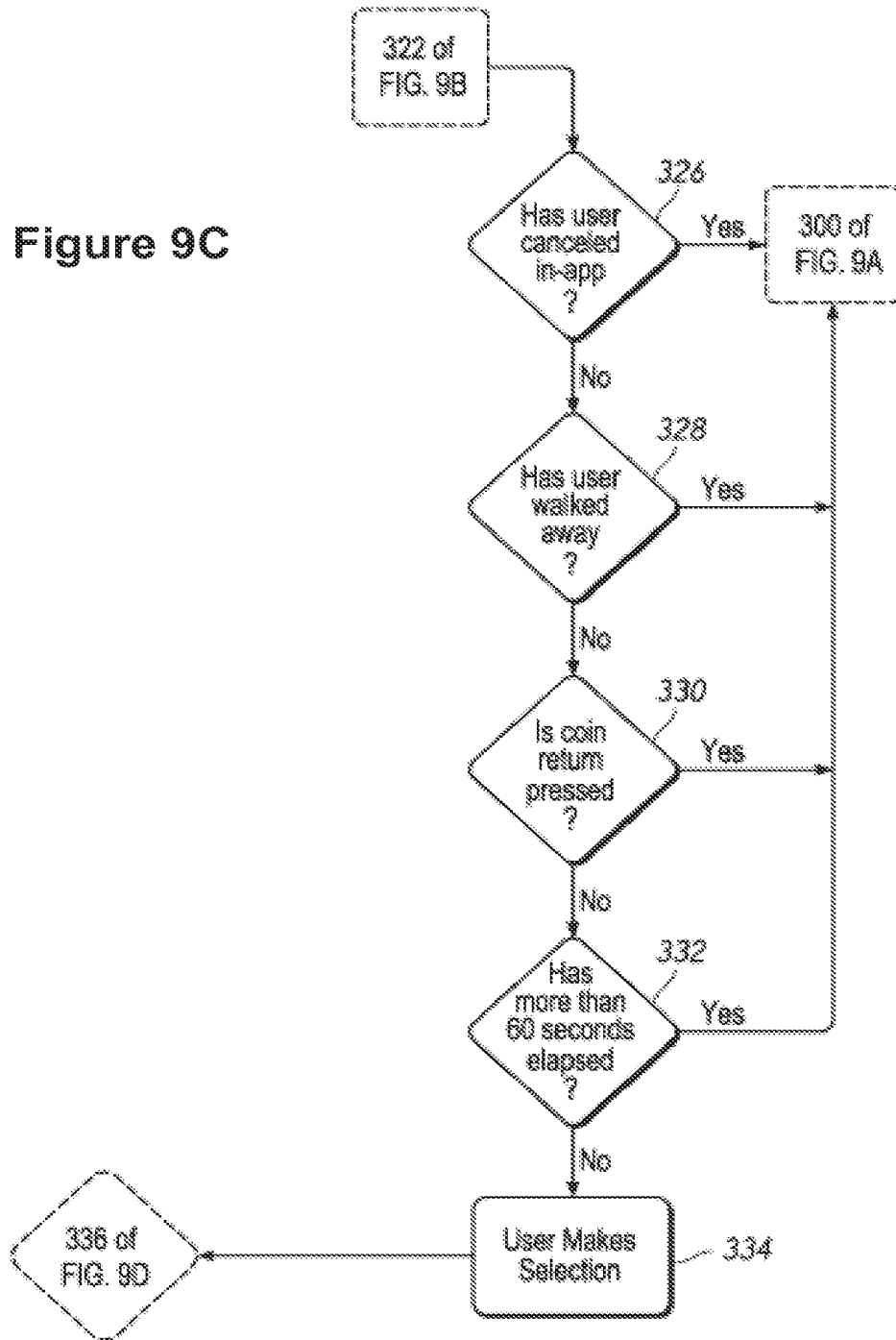


Figure 9B

Figure 9C



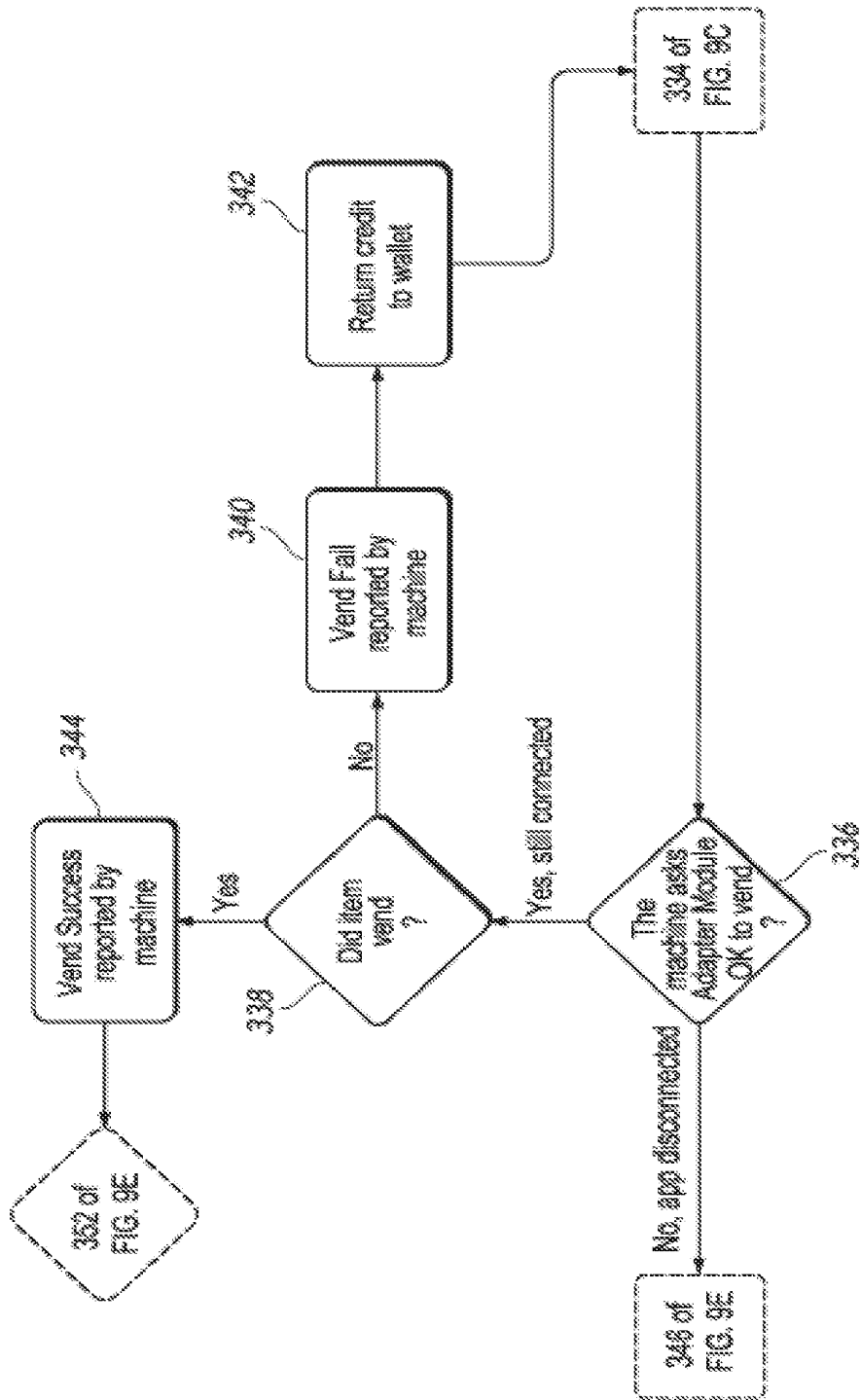


Figure 9D

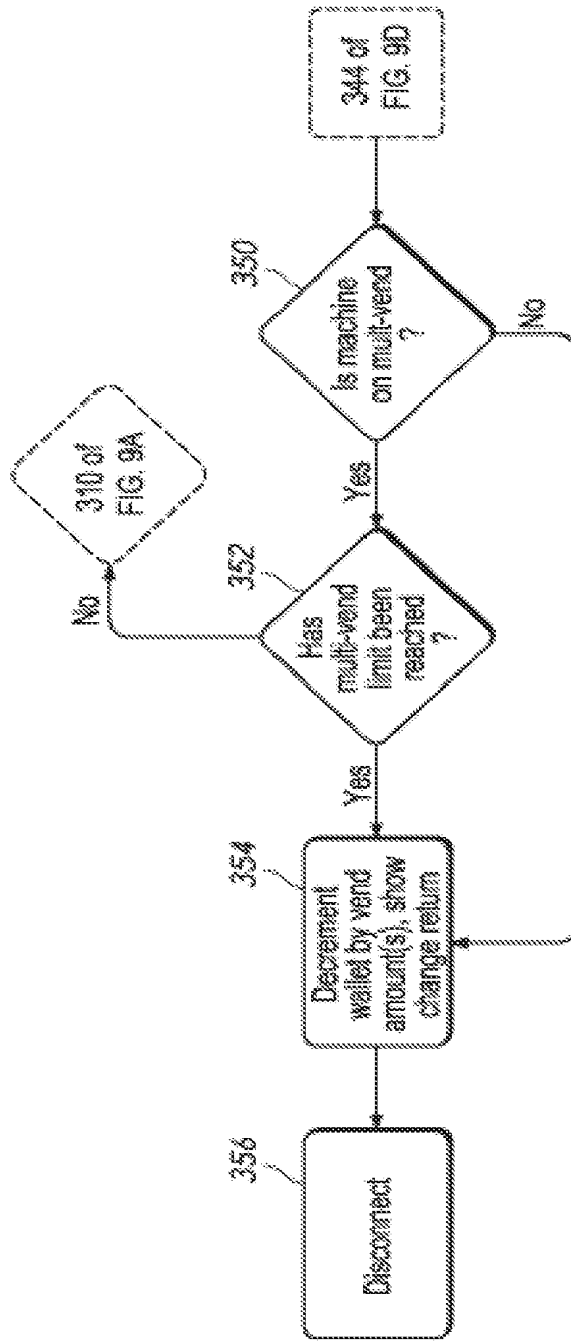


Figure 9E

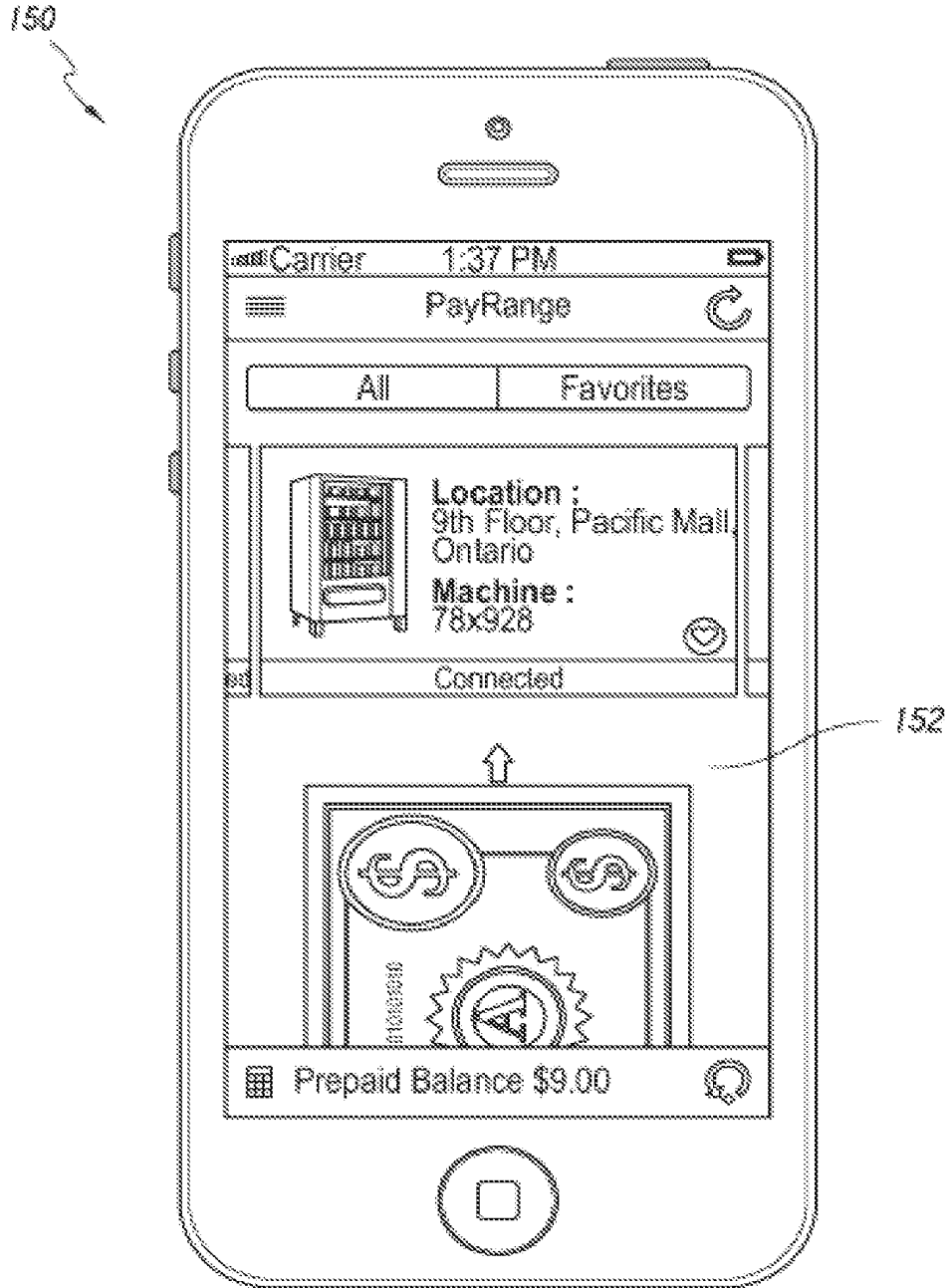


Figure 10A

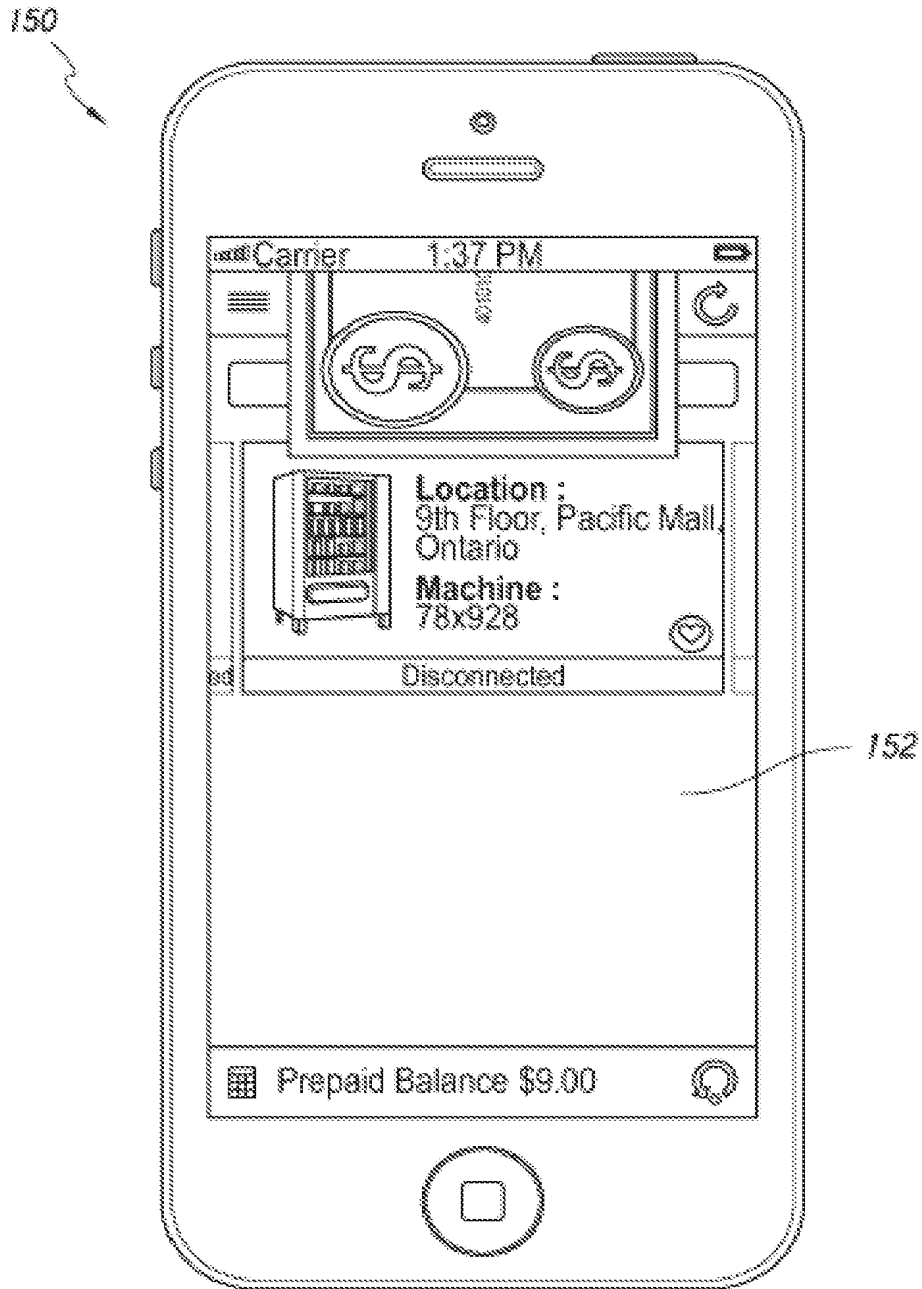


Figure 10B



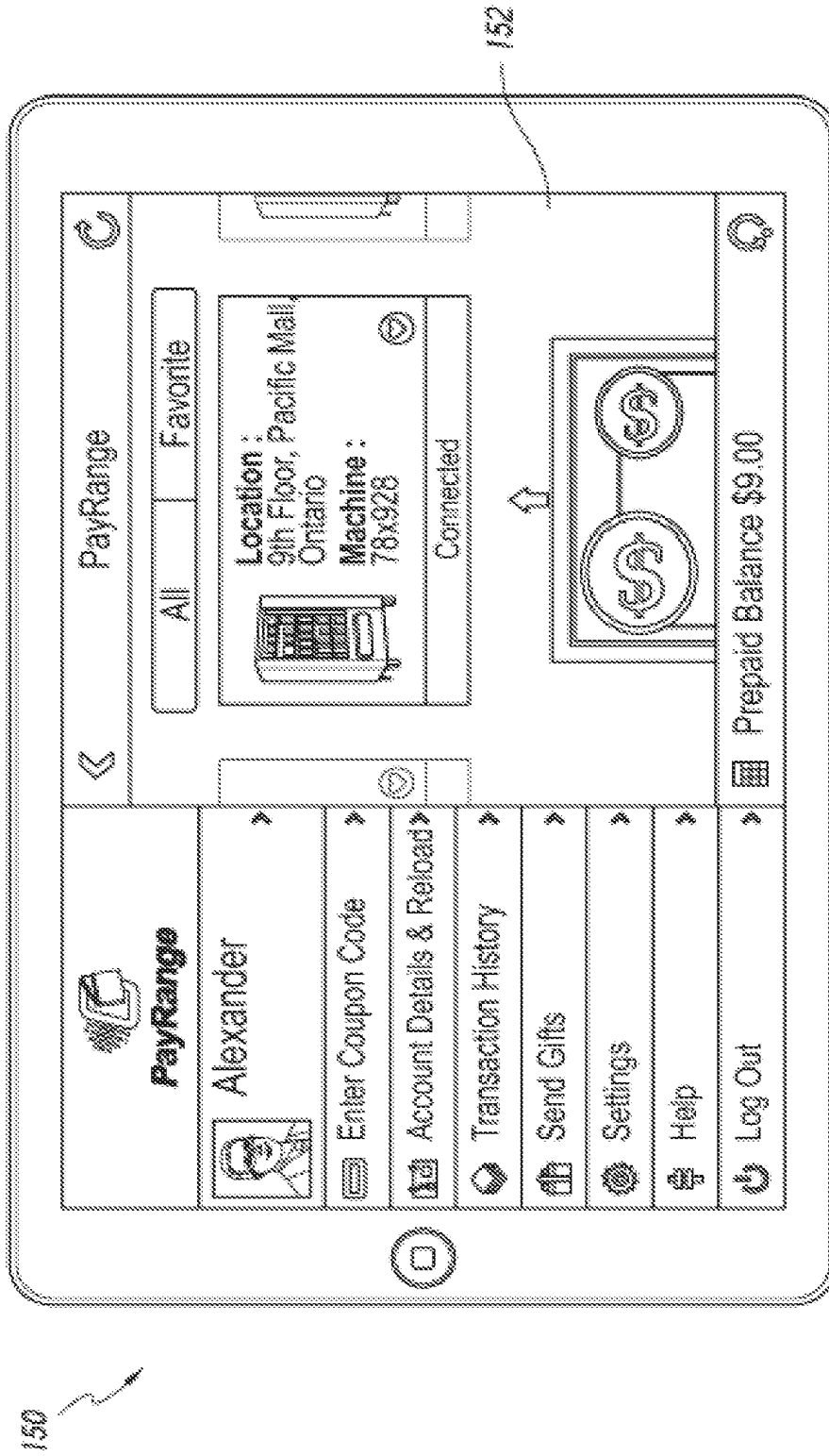


Figure 10C

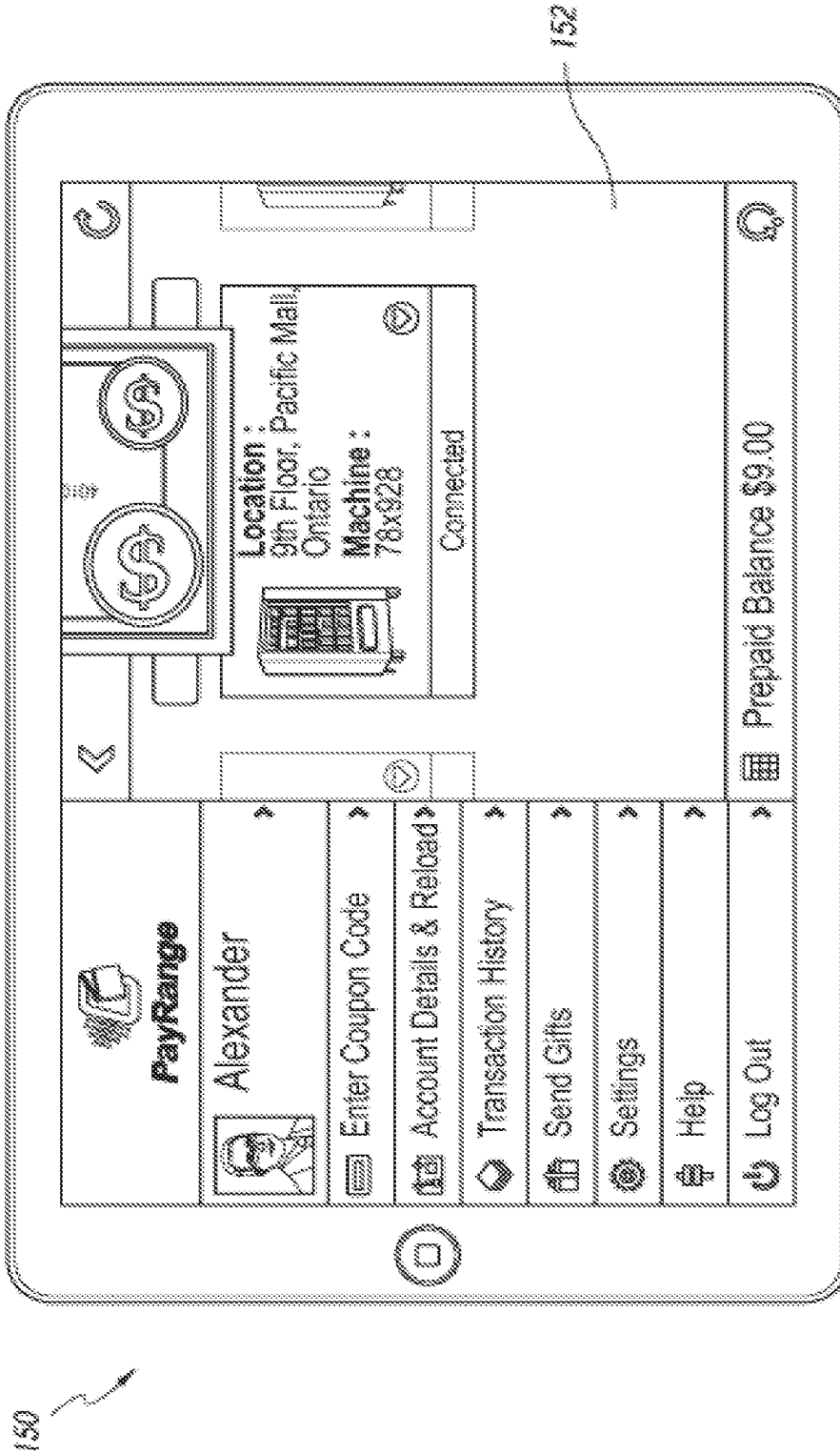


Figure 10D

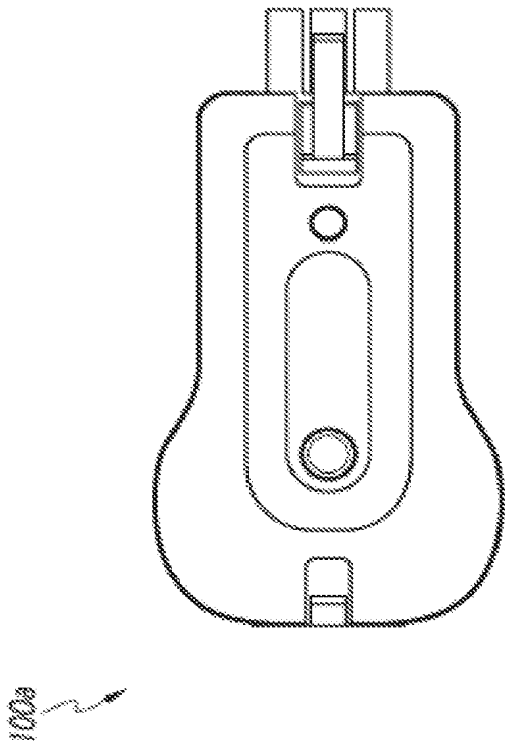


Figure 12

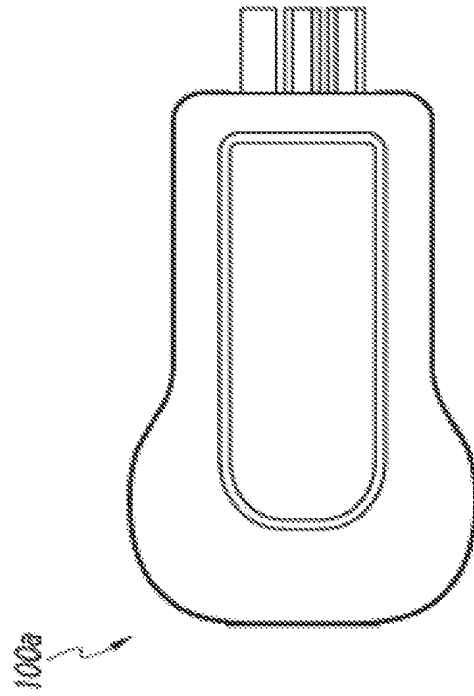


Figure 13

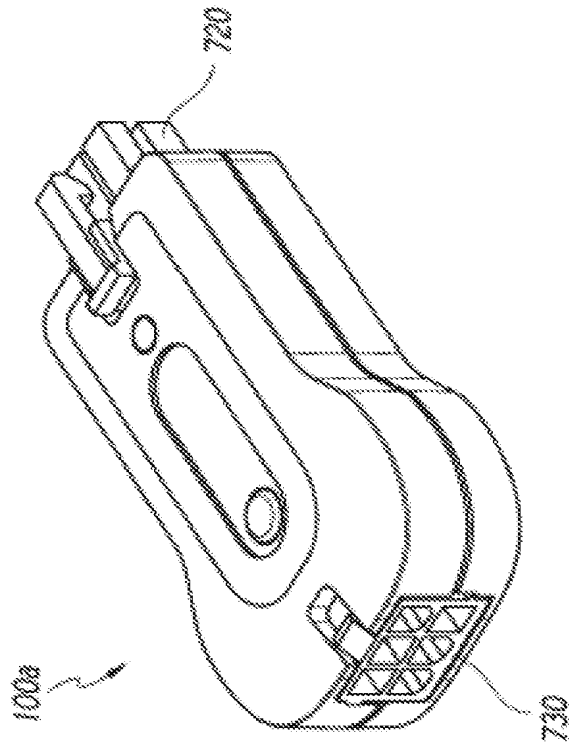


Figure 11

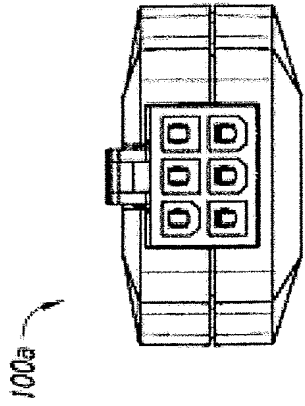


Figure 15

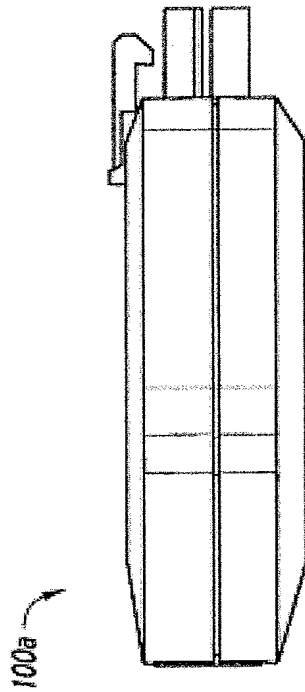


Figure 14



Figure 16

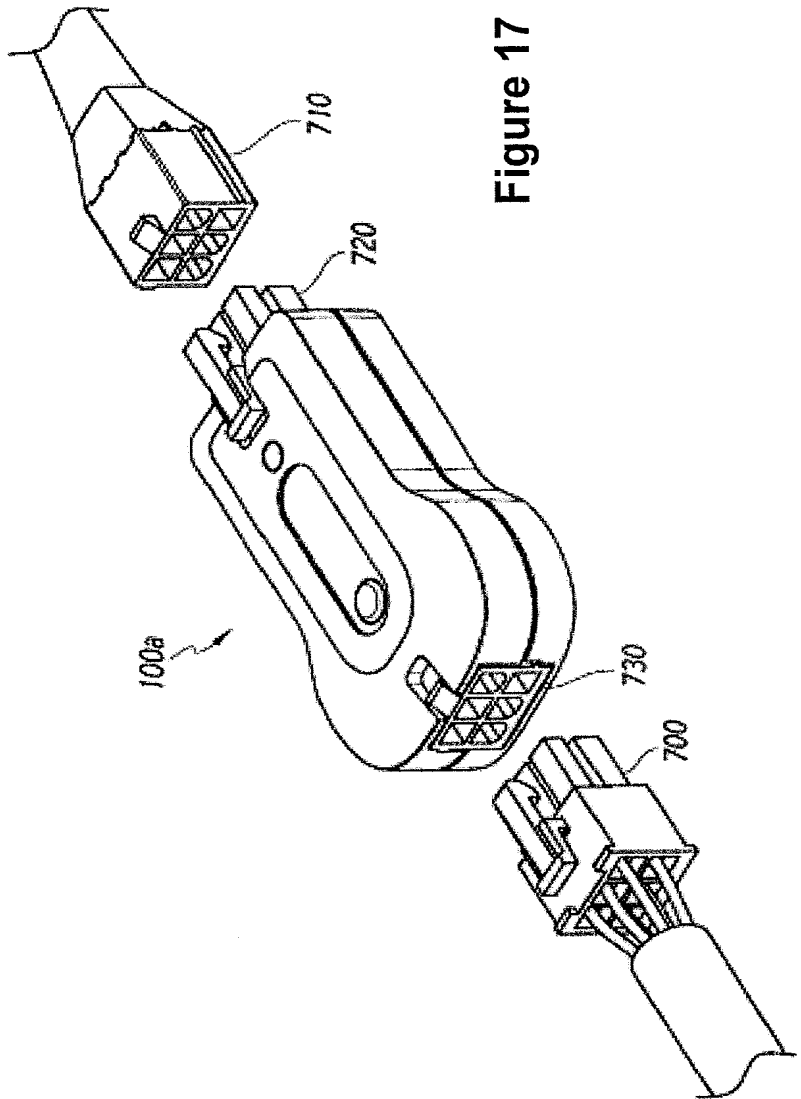


Figure 17

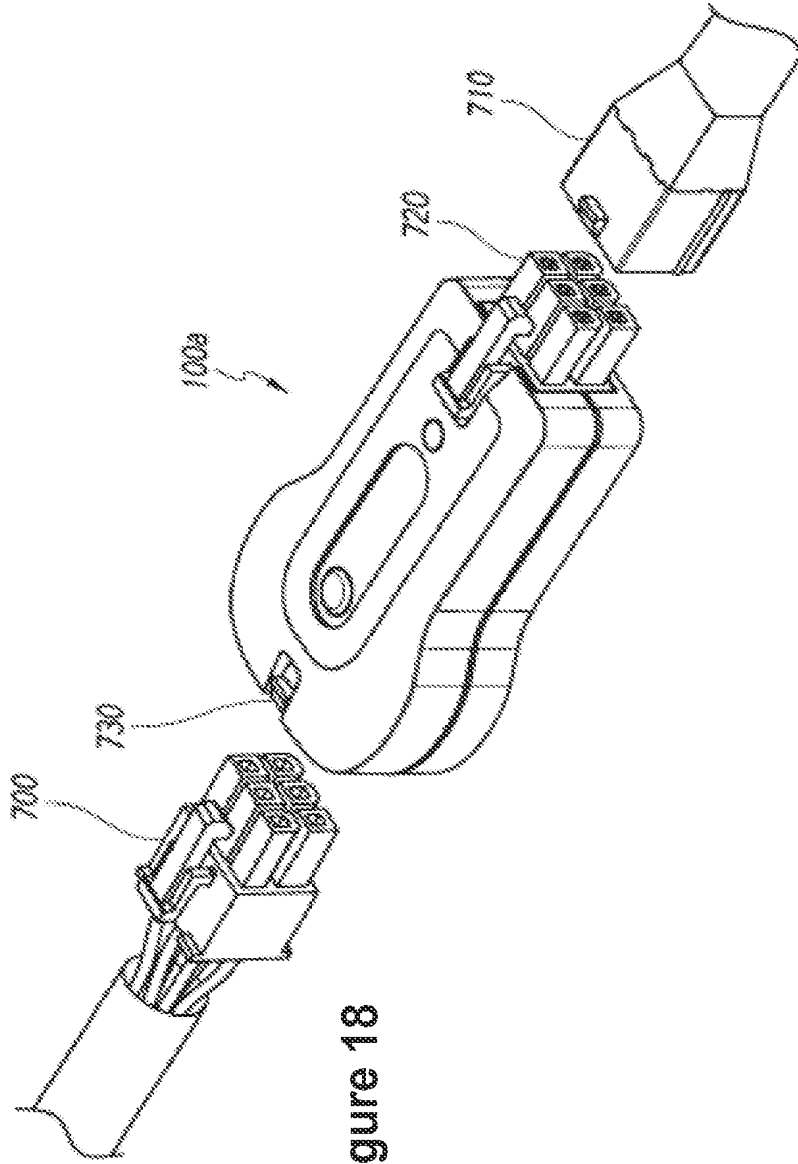
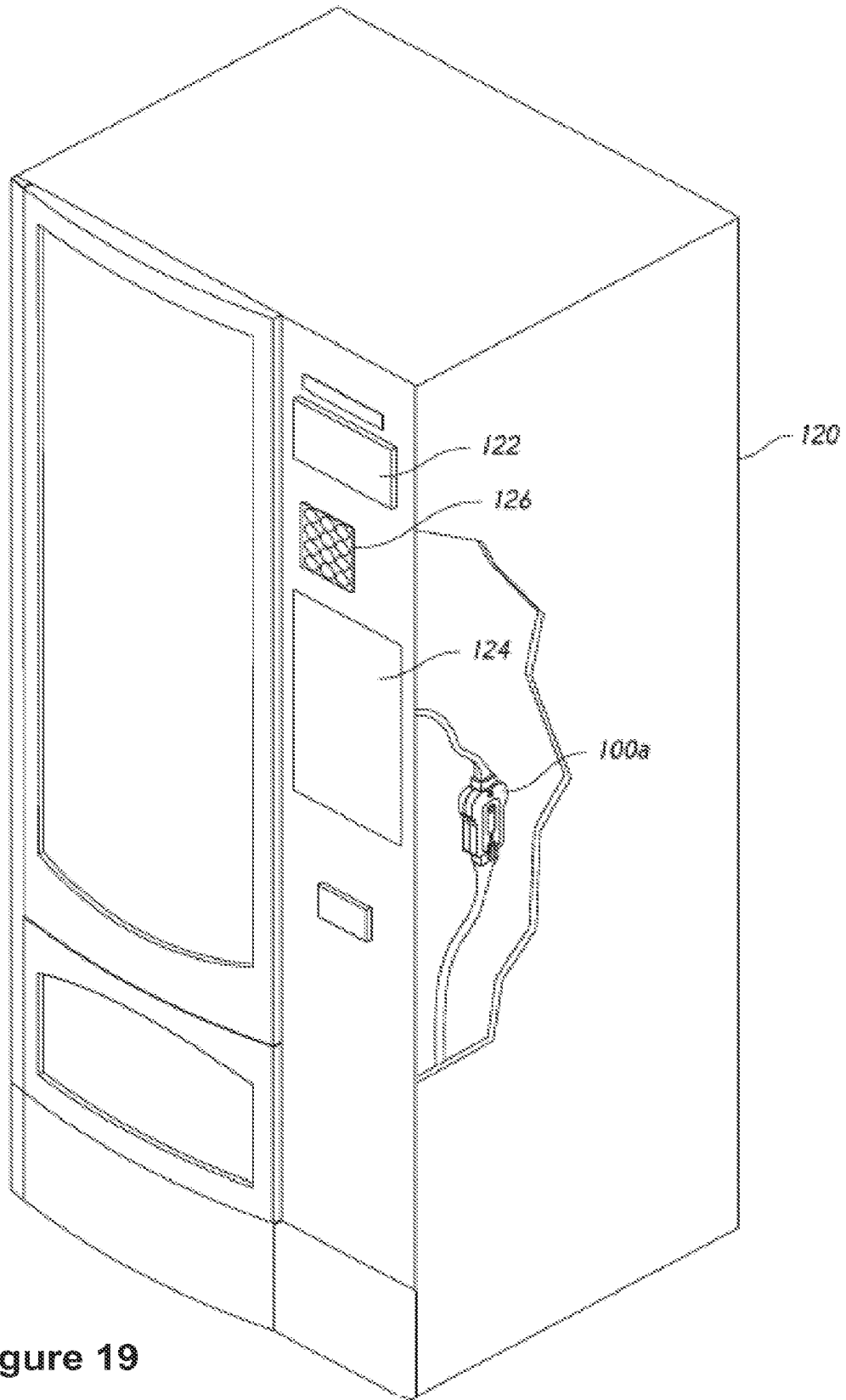


Figure 18



**Figure 19**

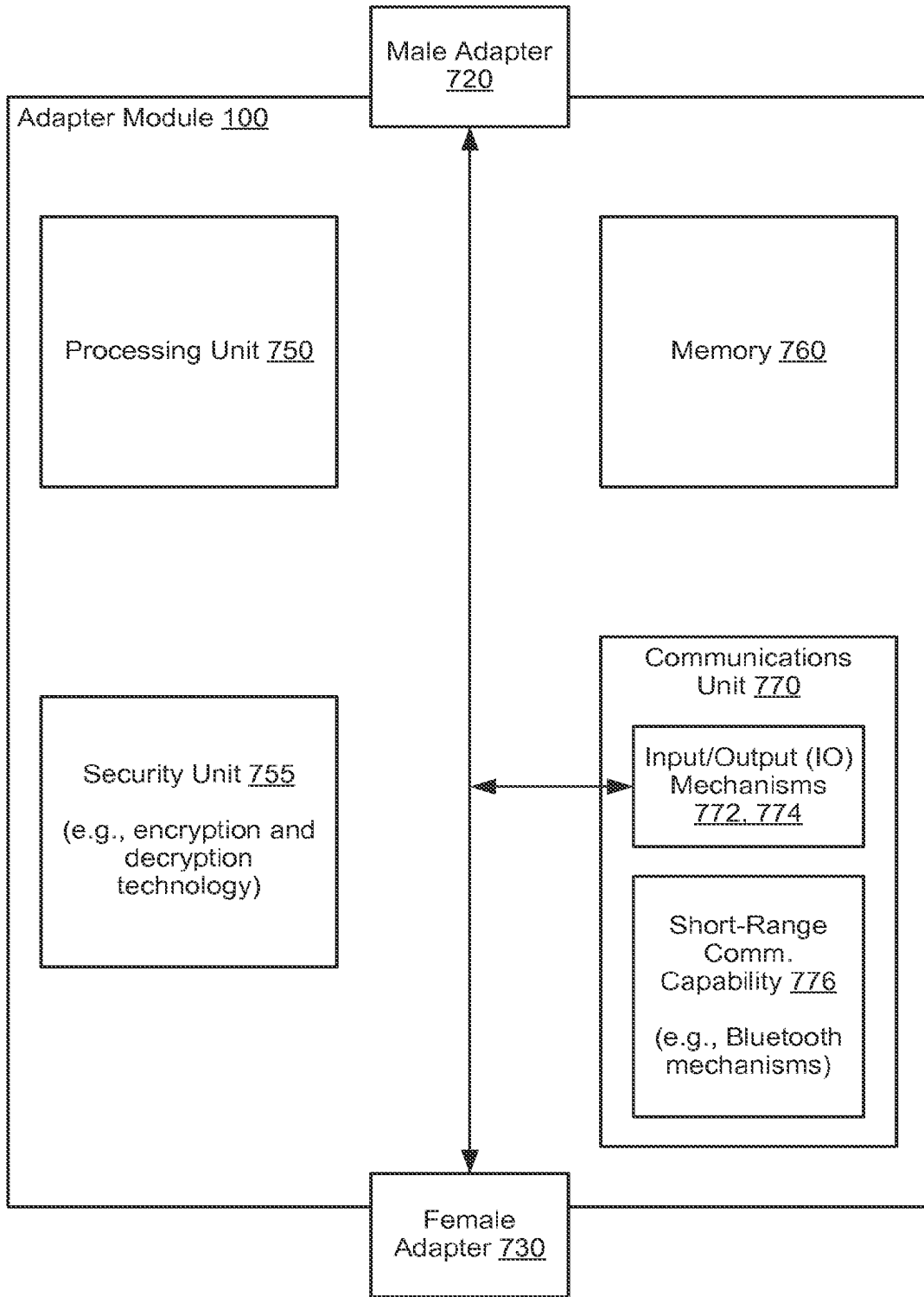
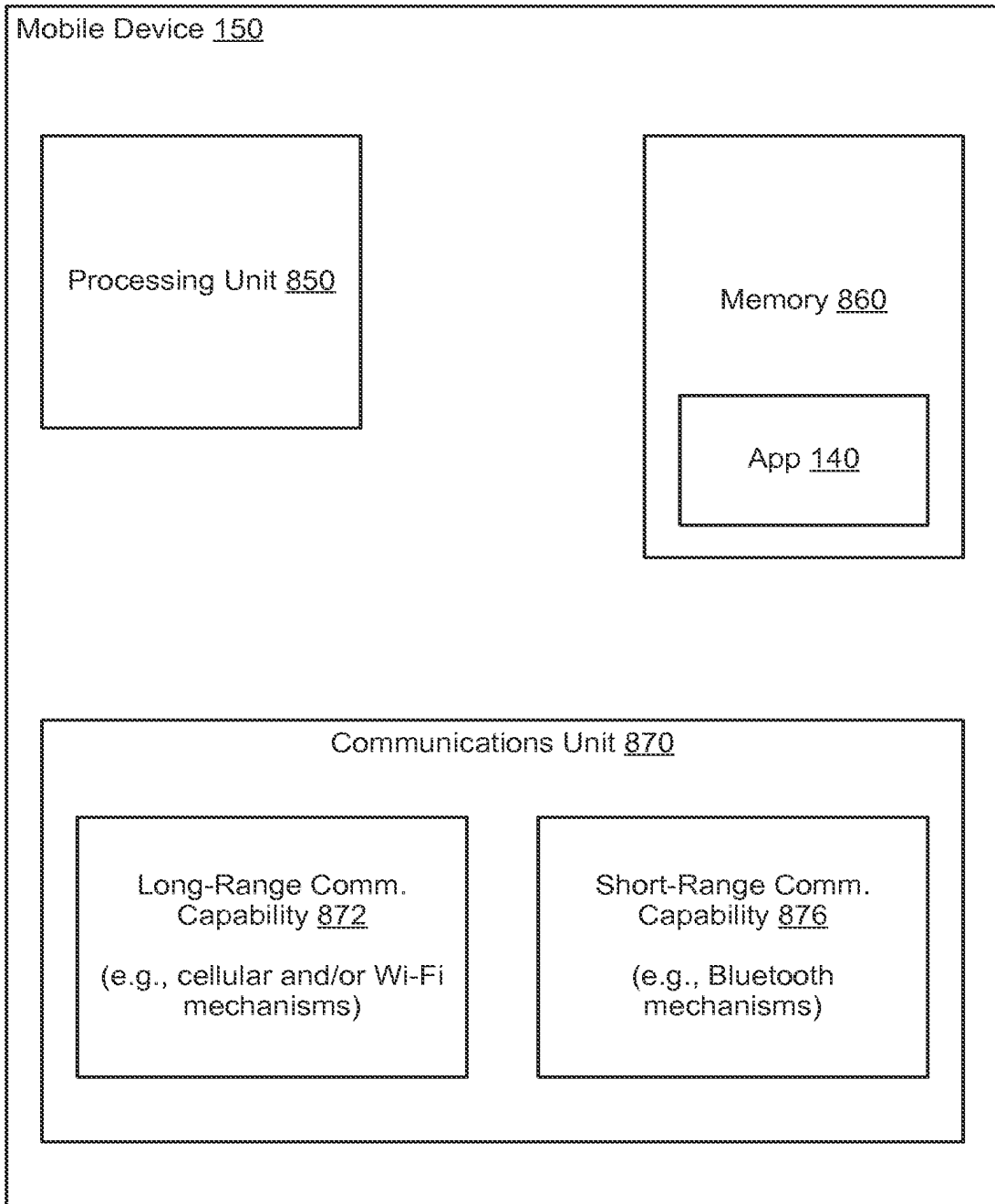
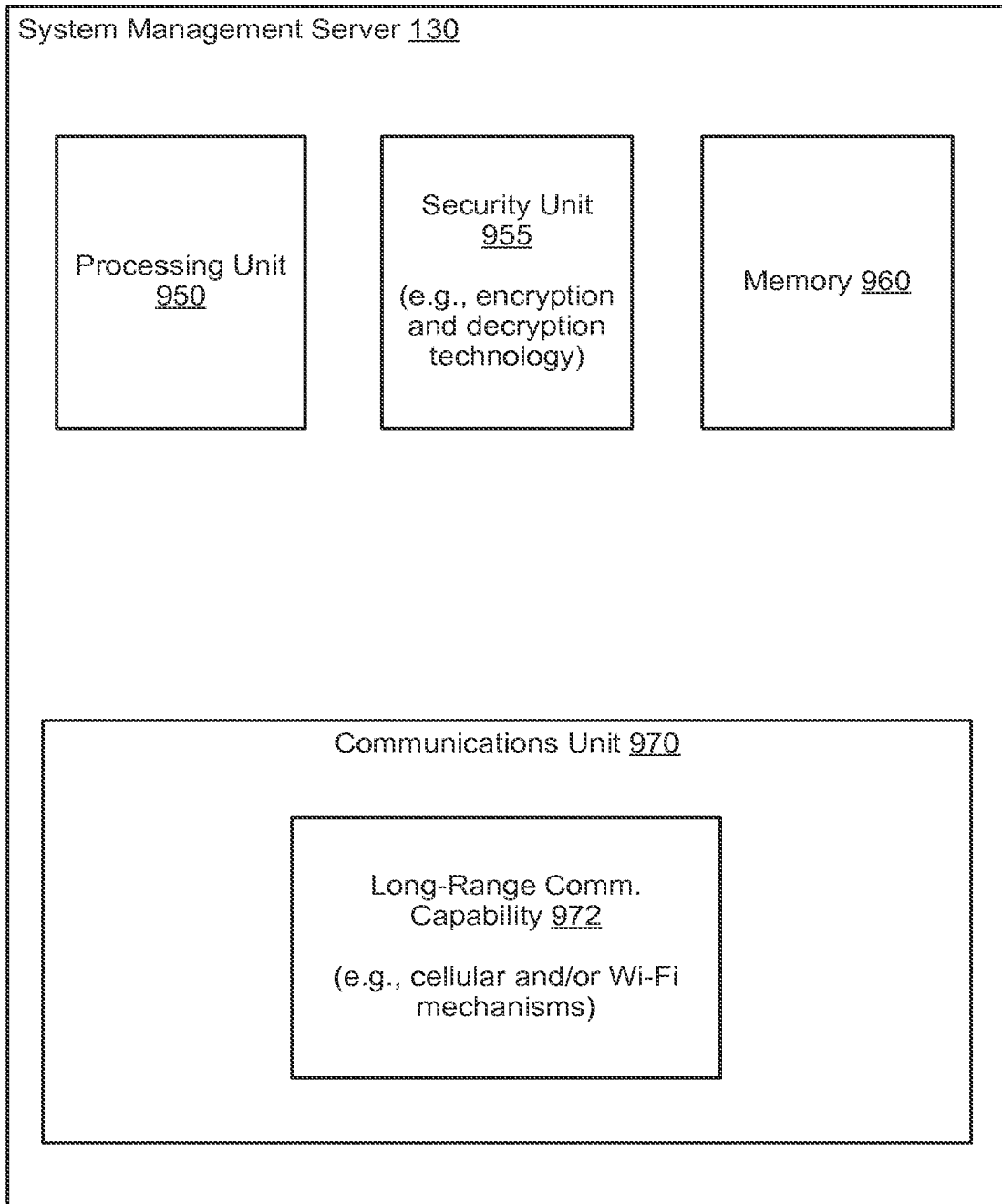


Figure 20



**Figure 21**





**Figure 22**

1000

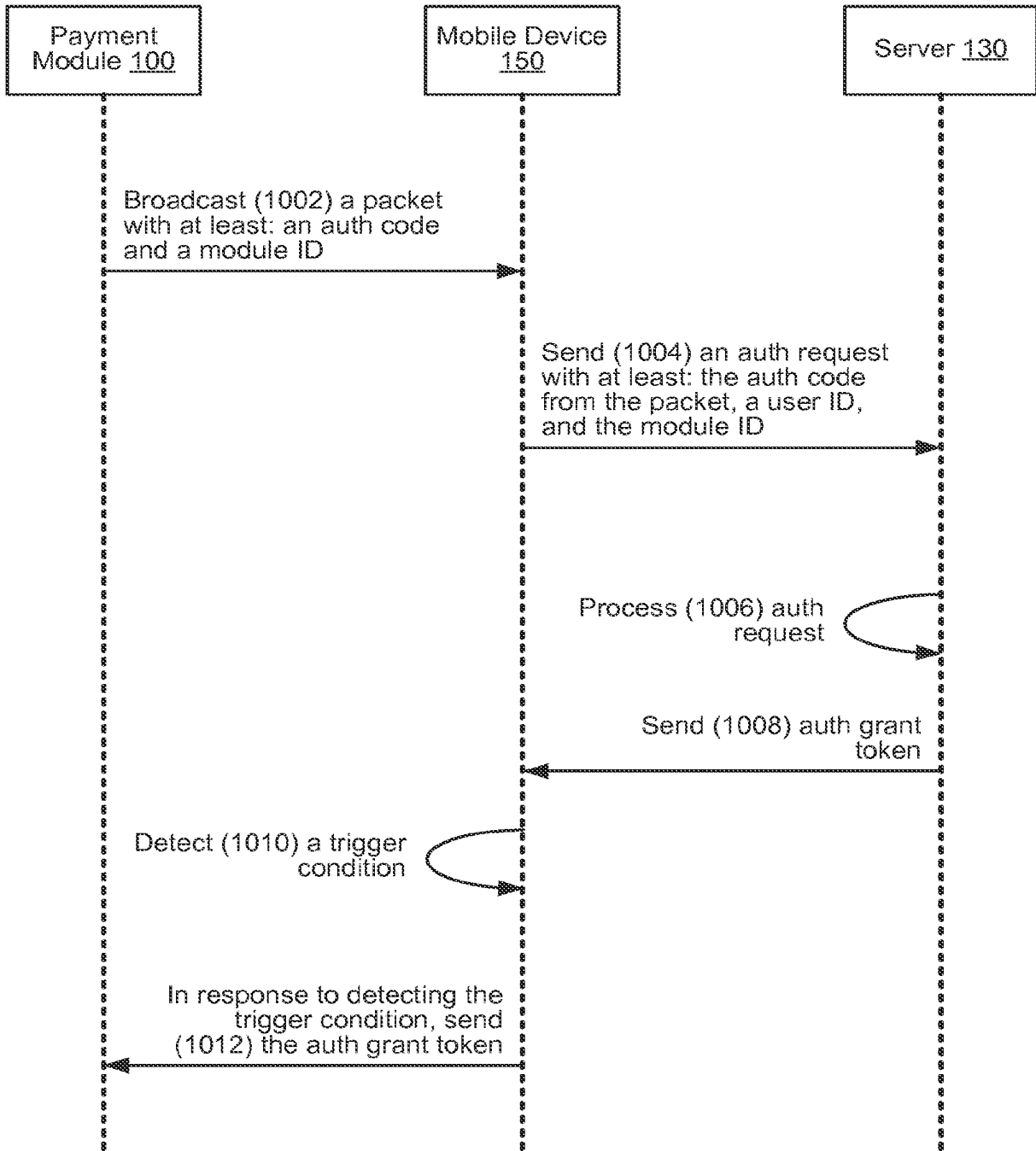


Figure 23

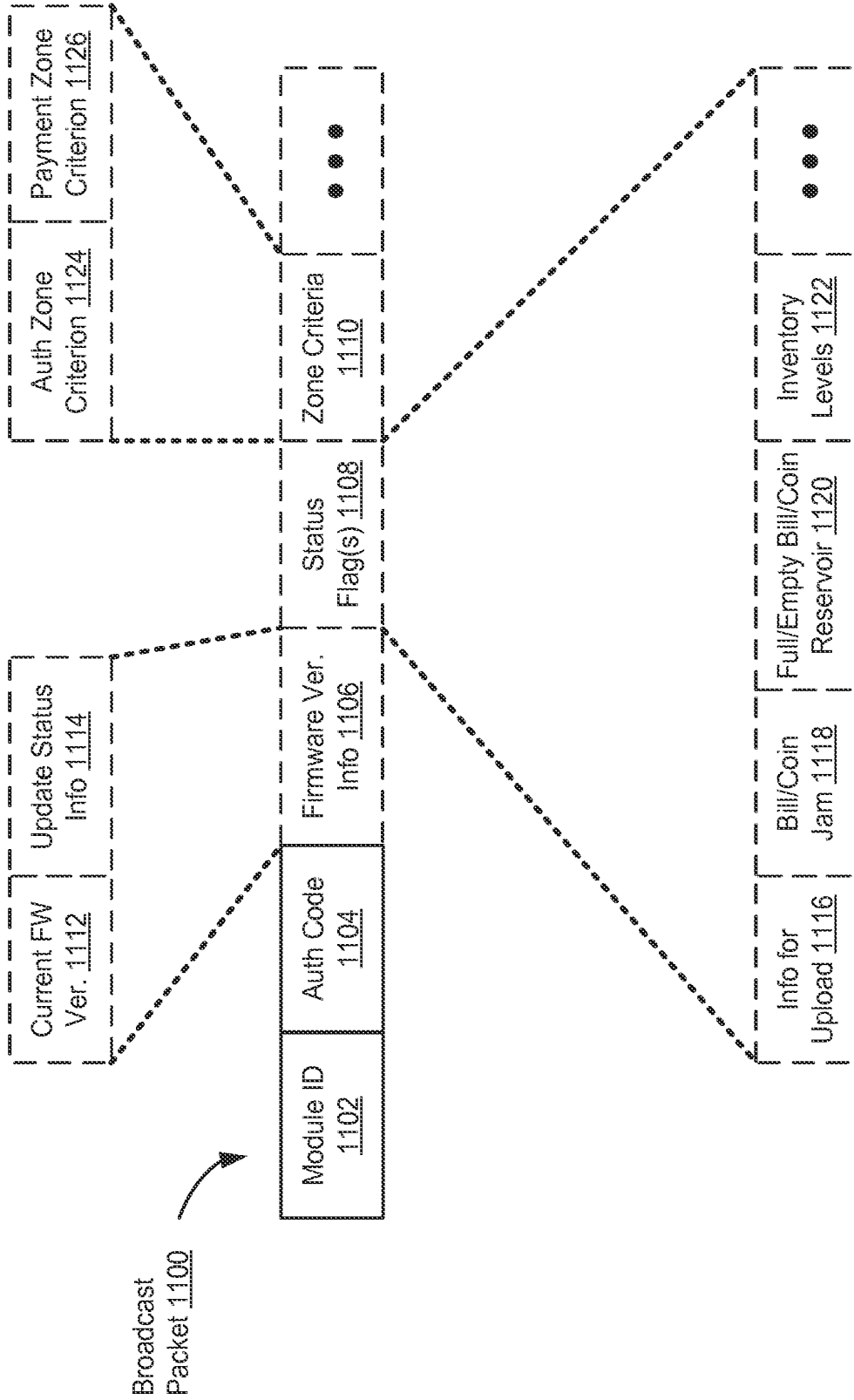
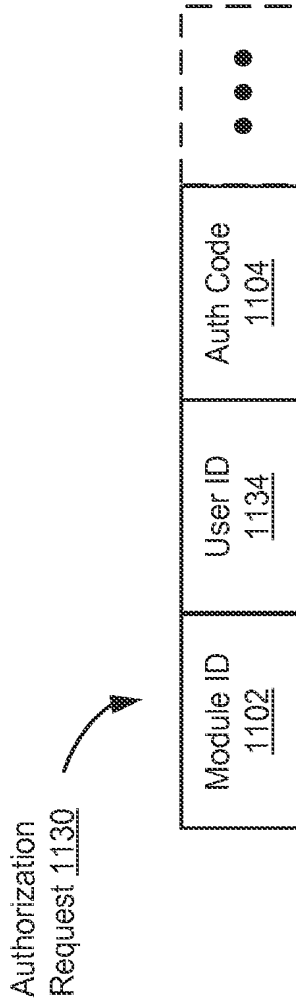
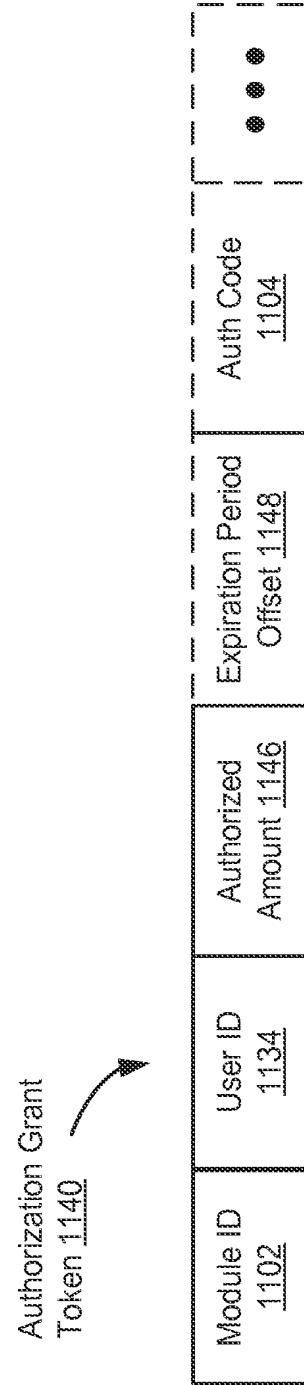


Figure 24A



**Figure 24B**



**Figure 24C**

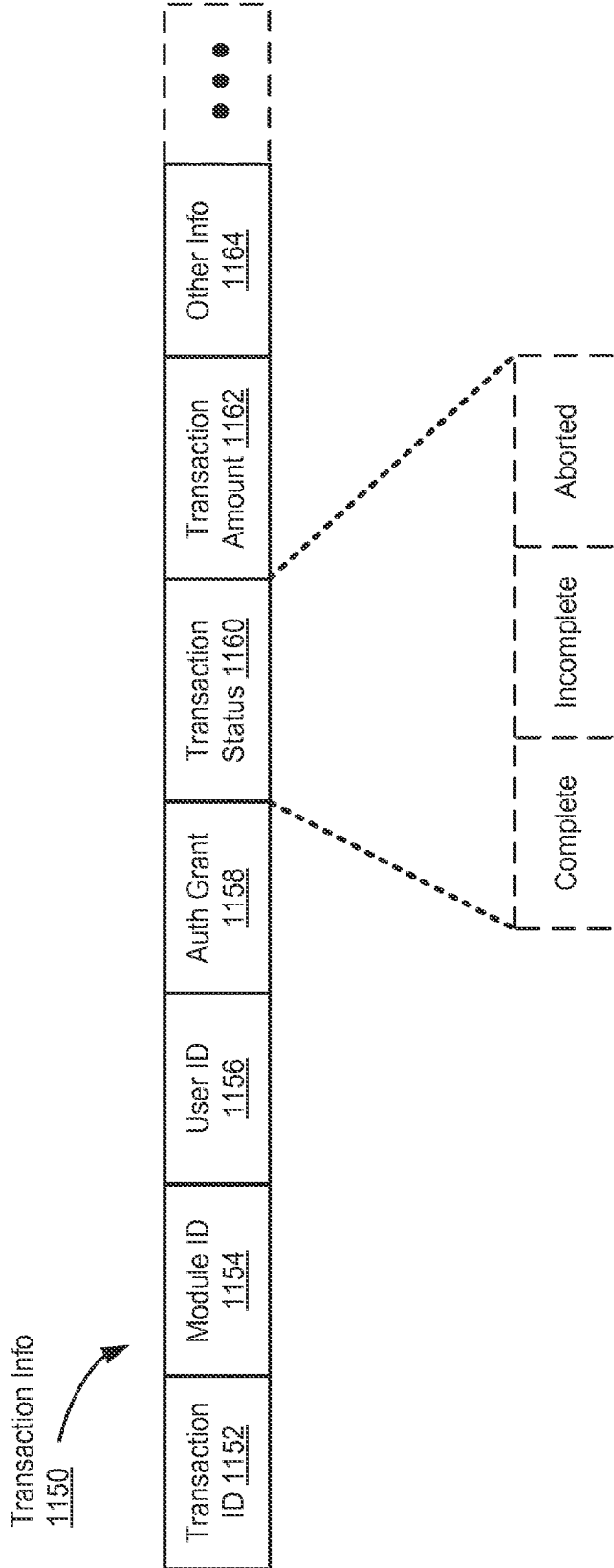


Figure 24D

1200

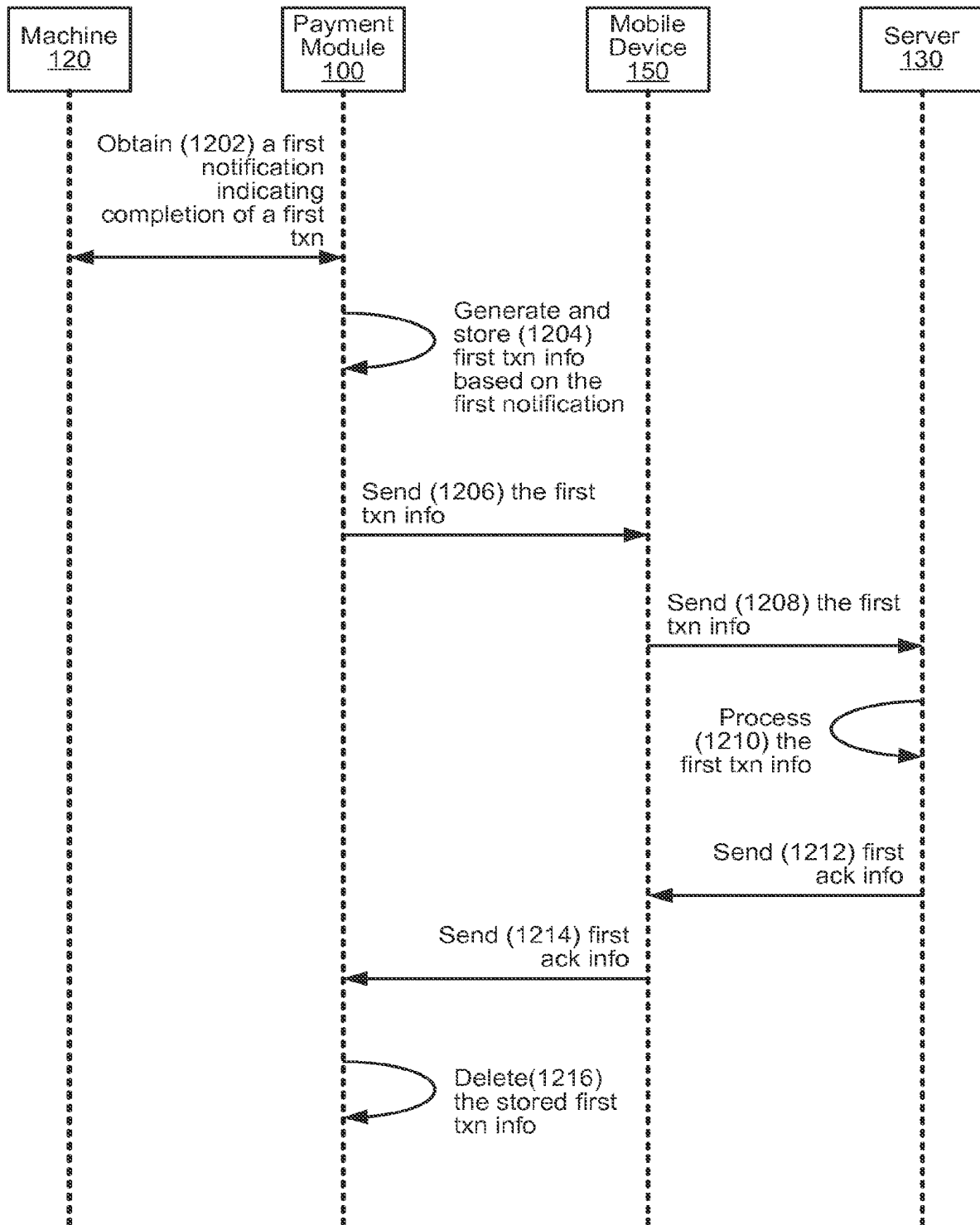


Figure 25A

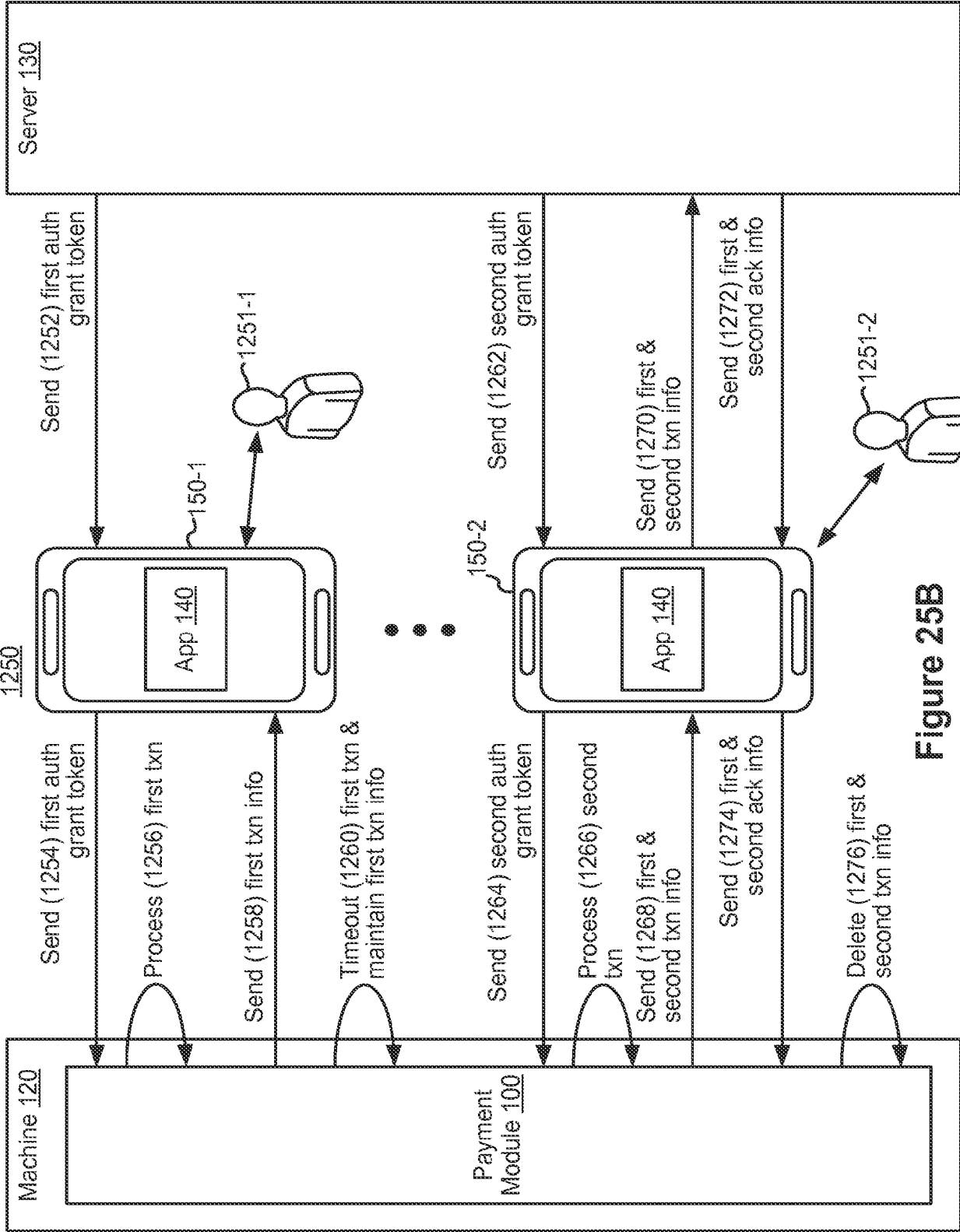


Figure 25B

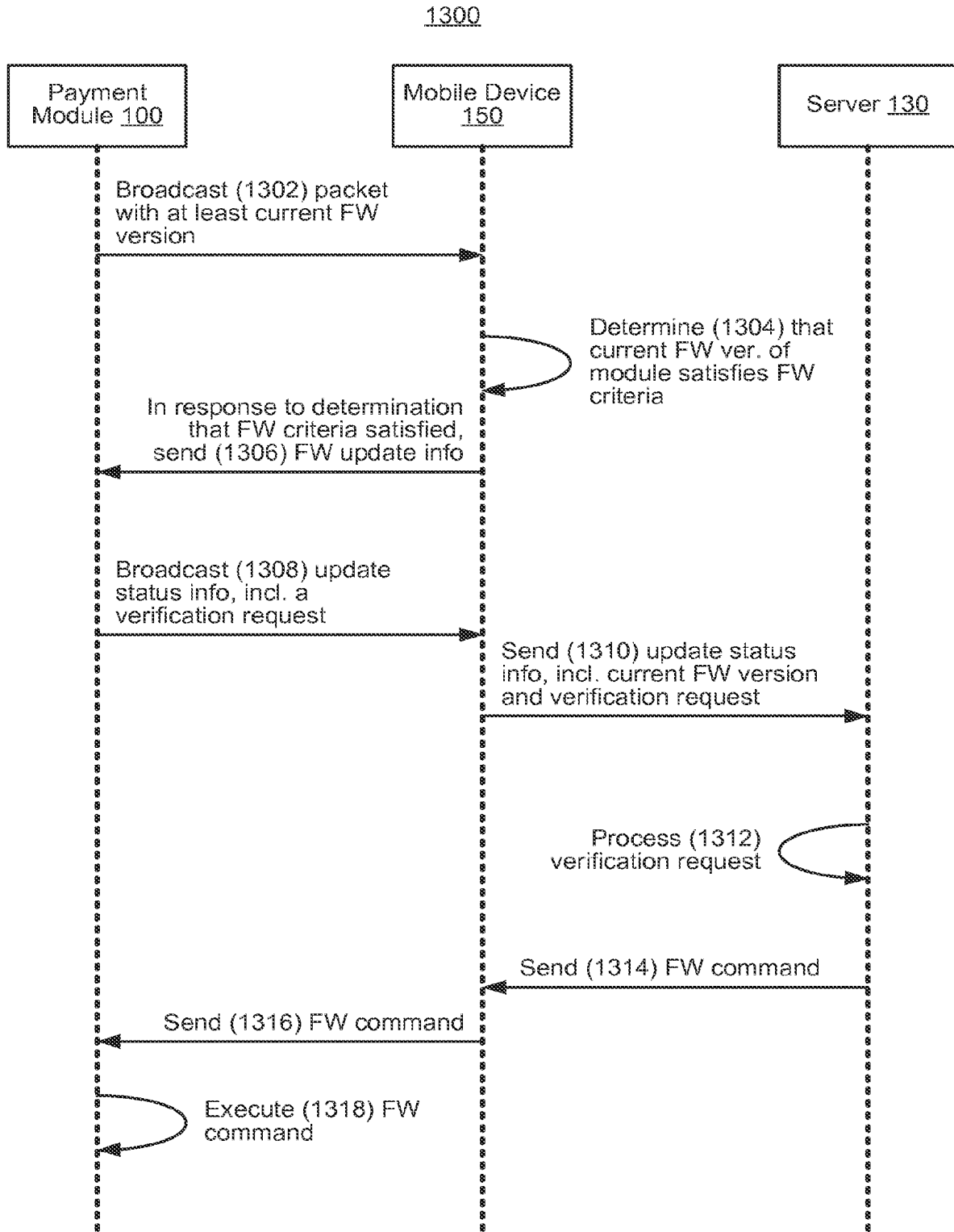


Figure 26A



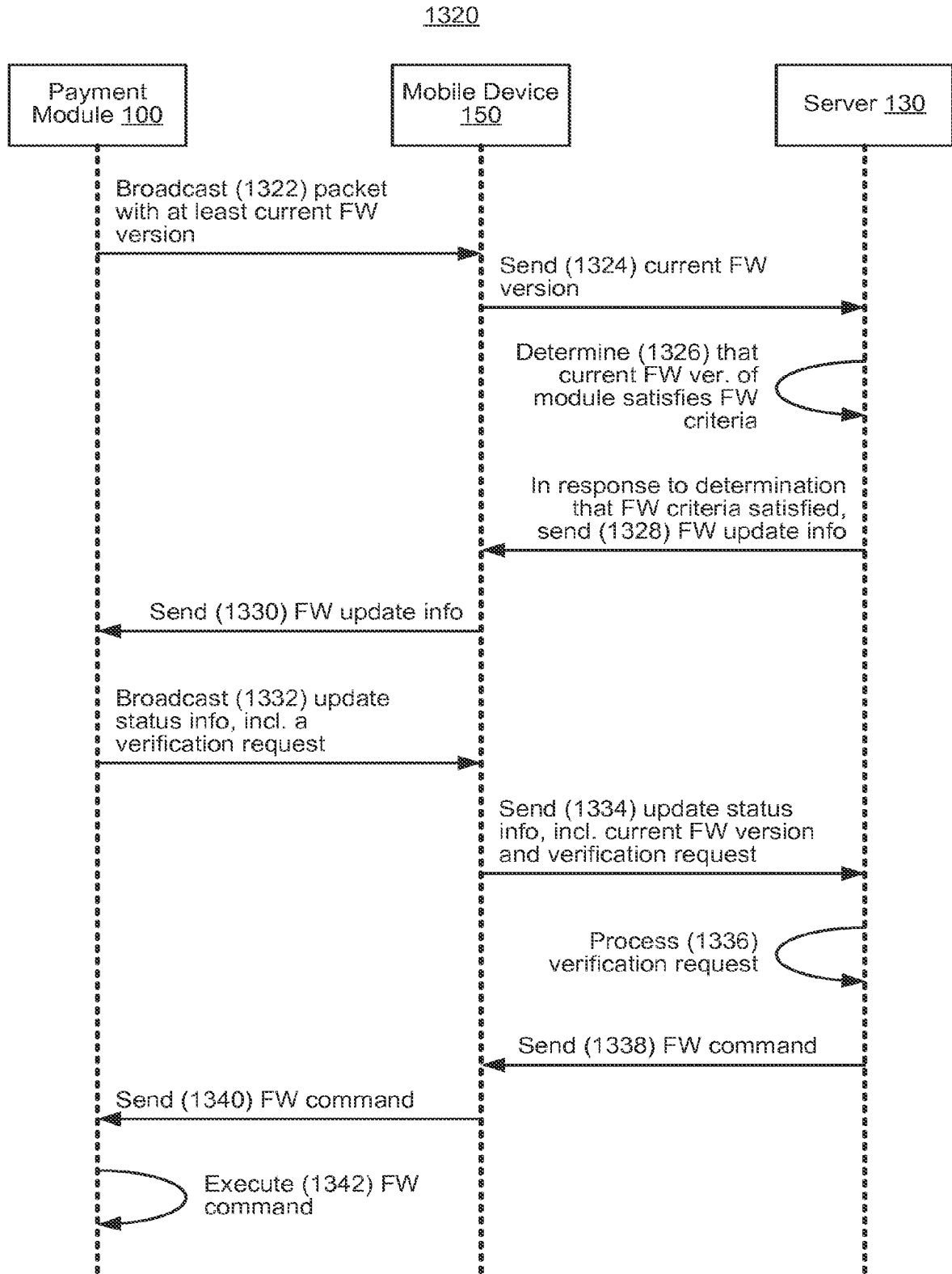


Figure 26B

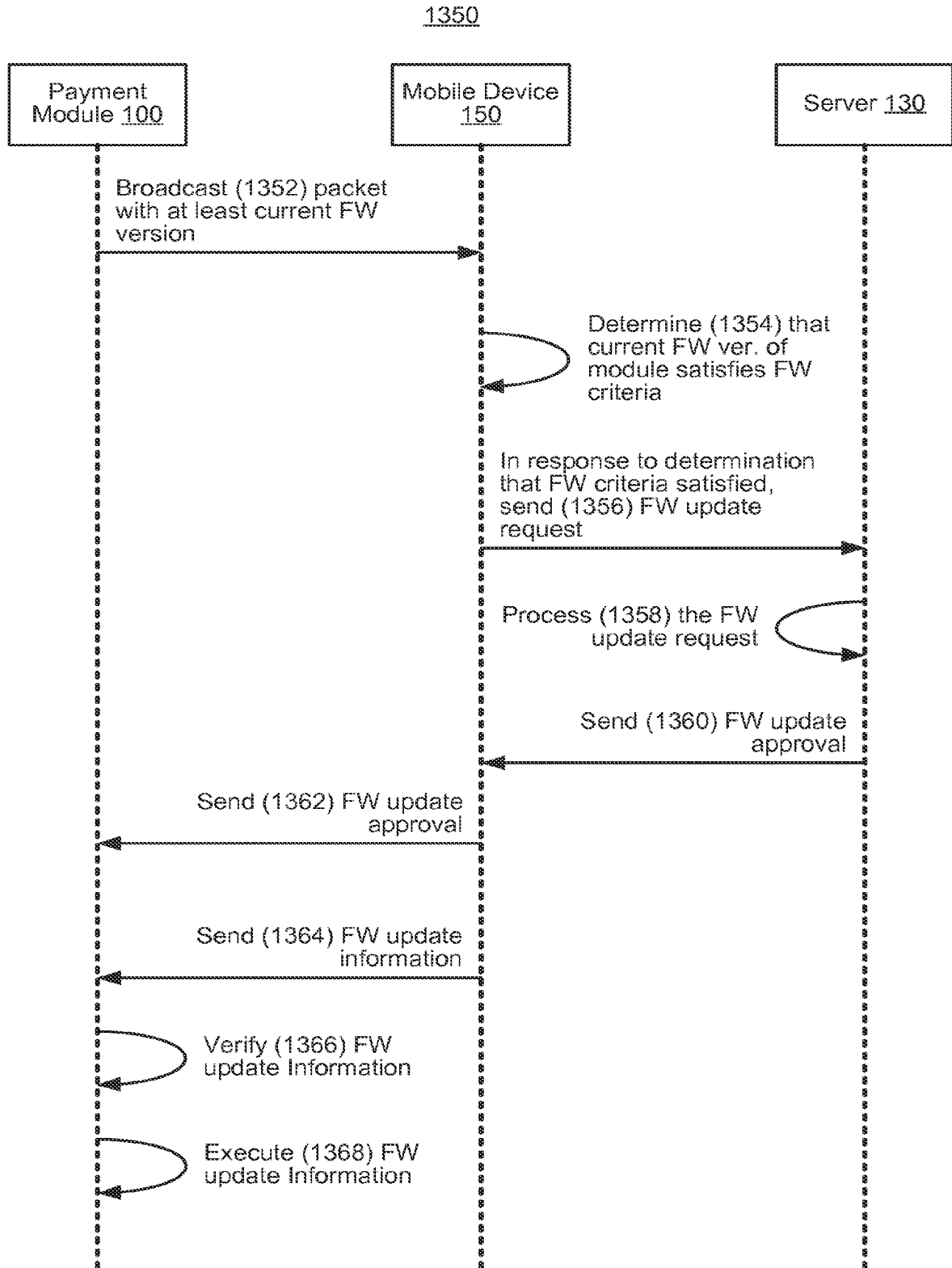


Figure 26C

1400

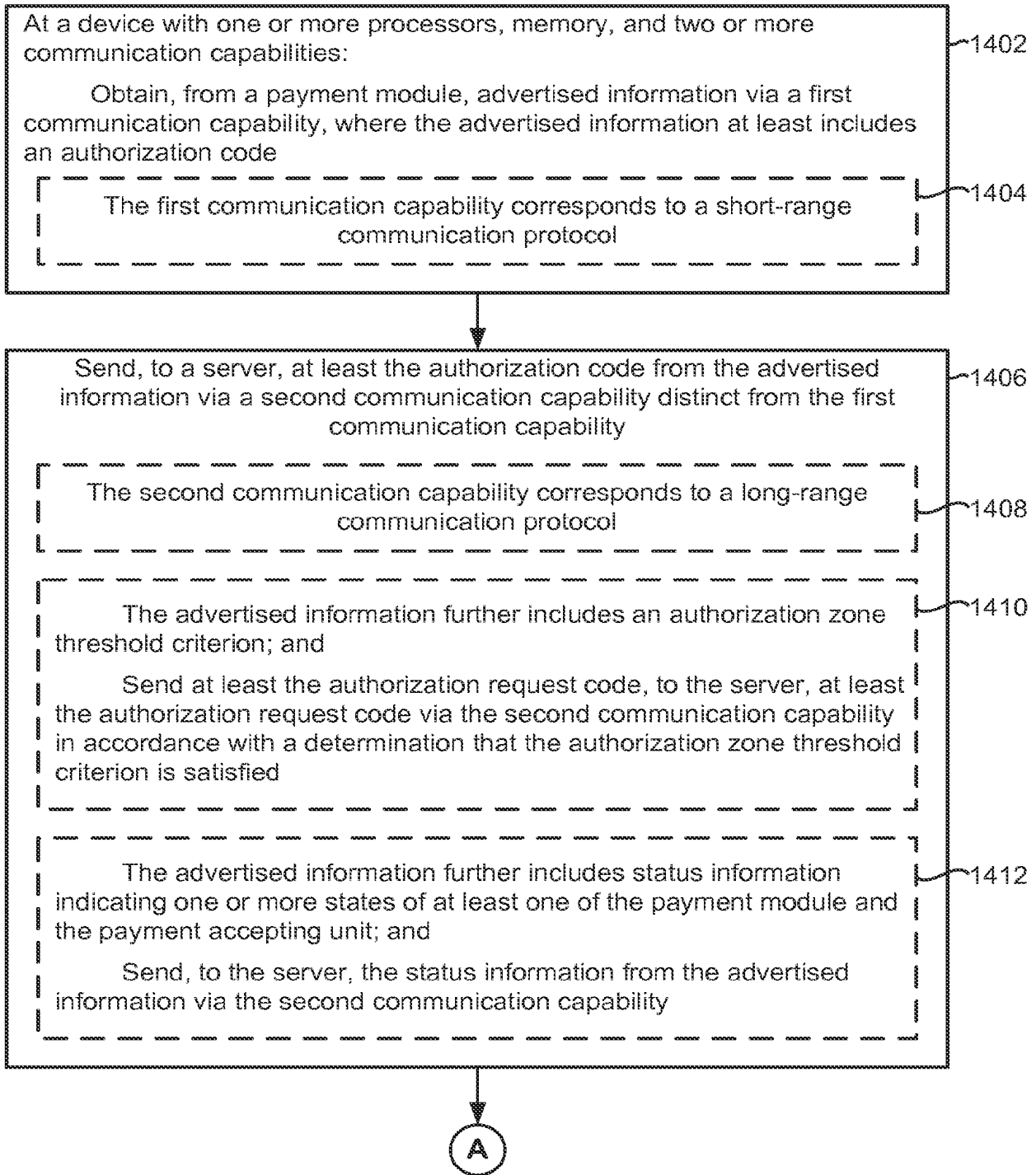


Figure 27A

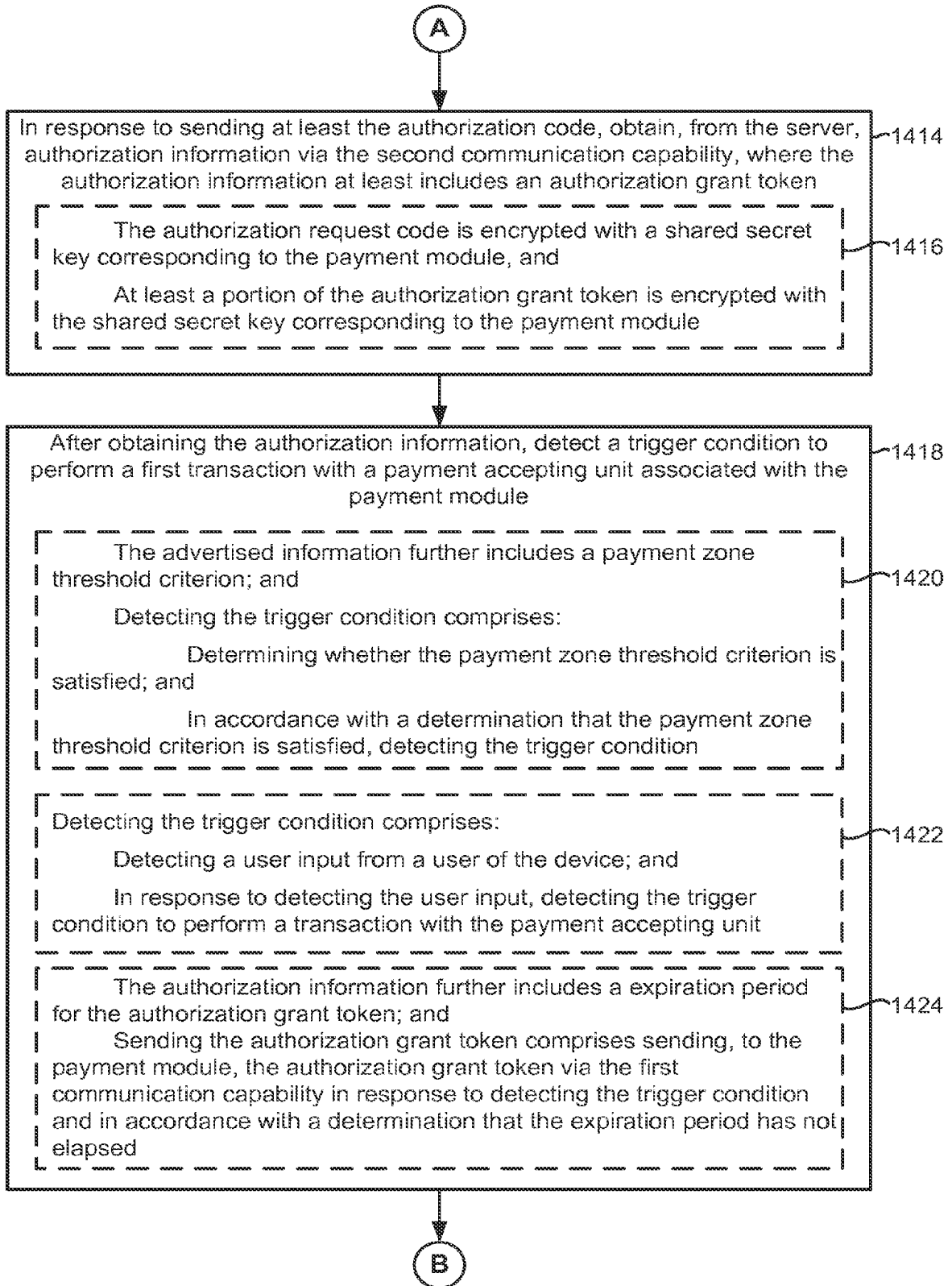
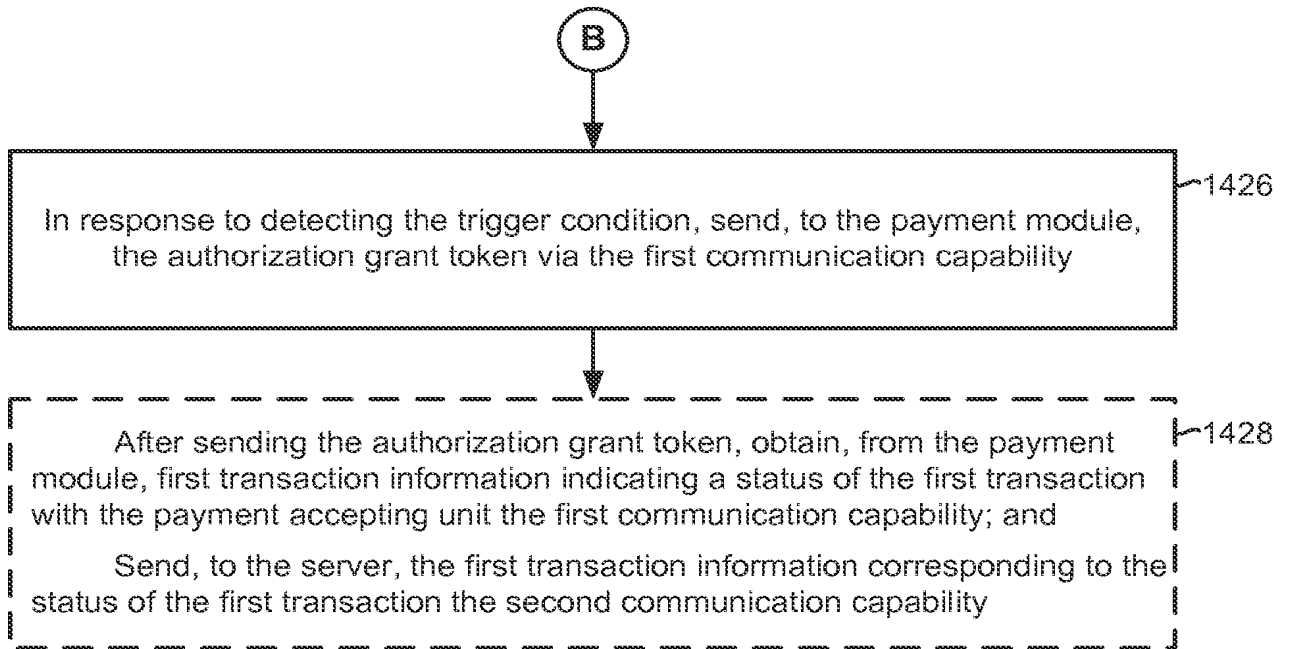


Figure 27B



**Figure 27C**

1500

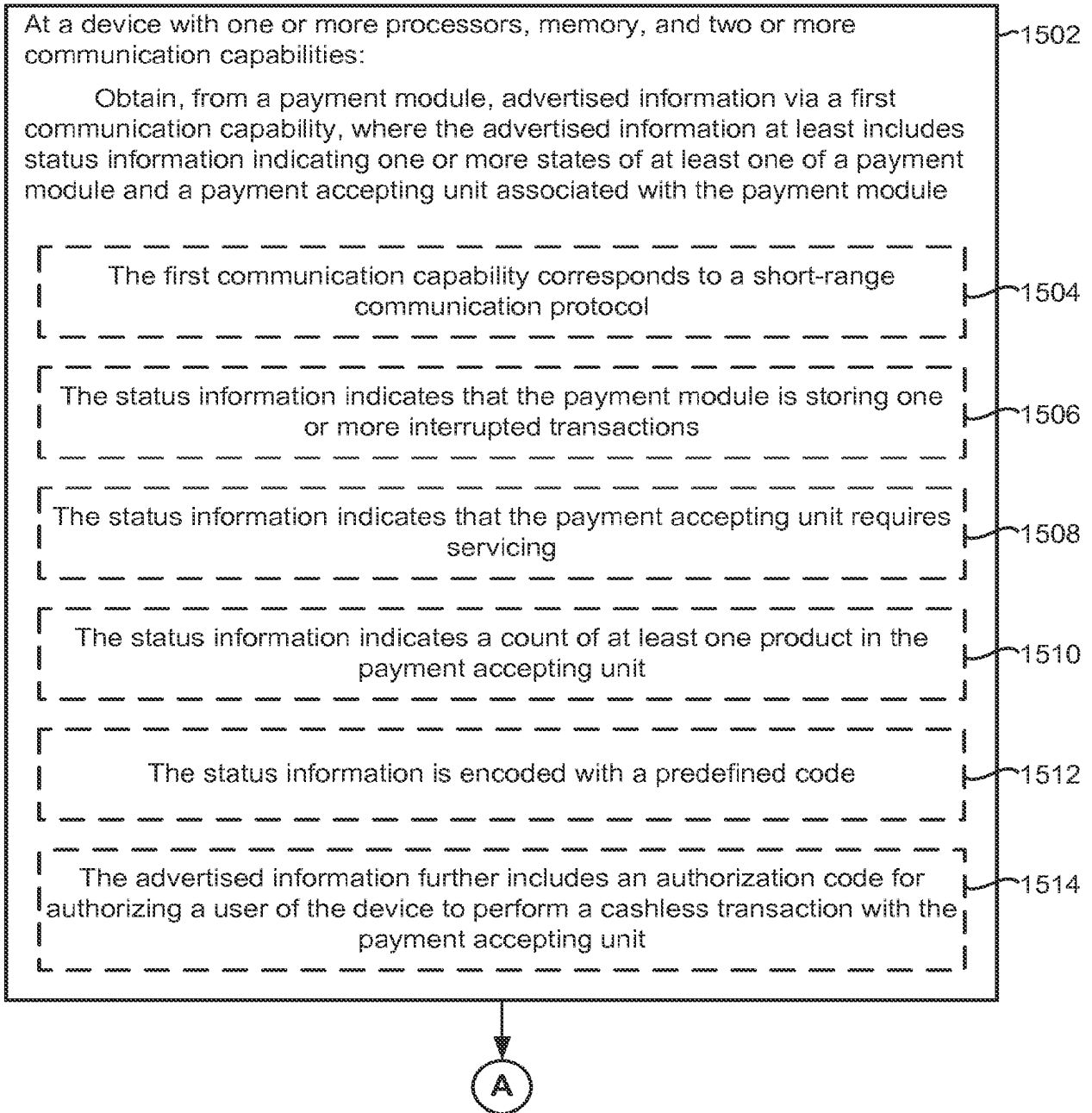


Figure 28A

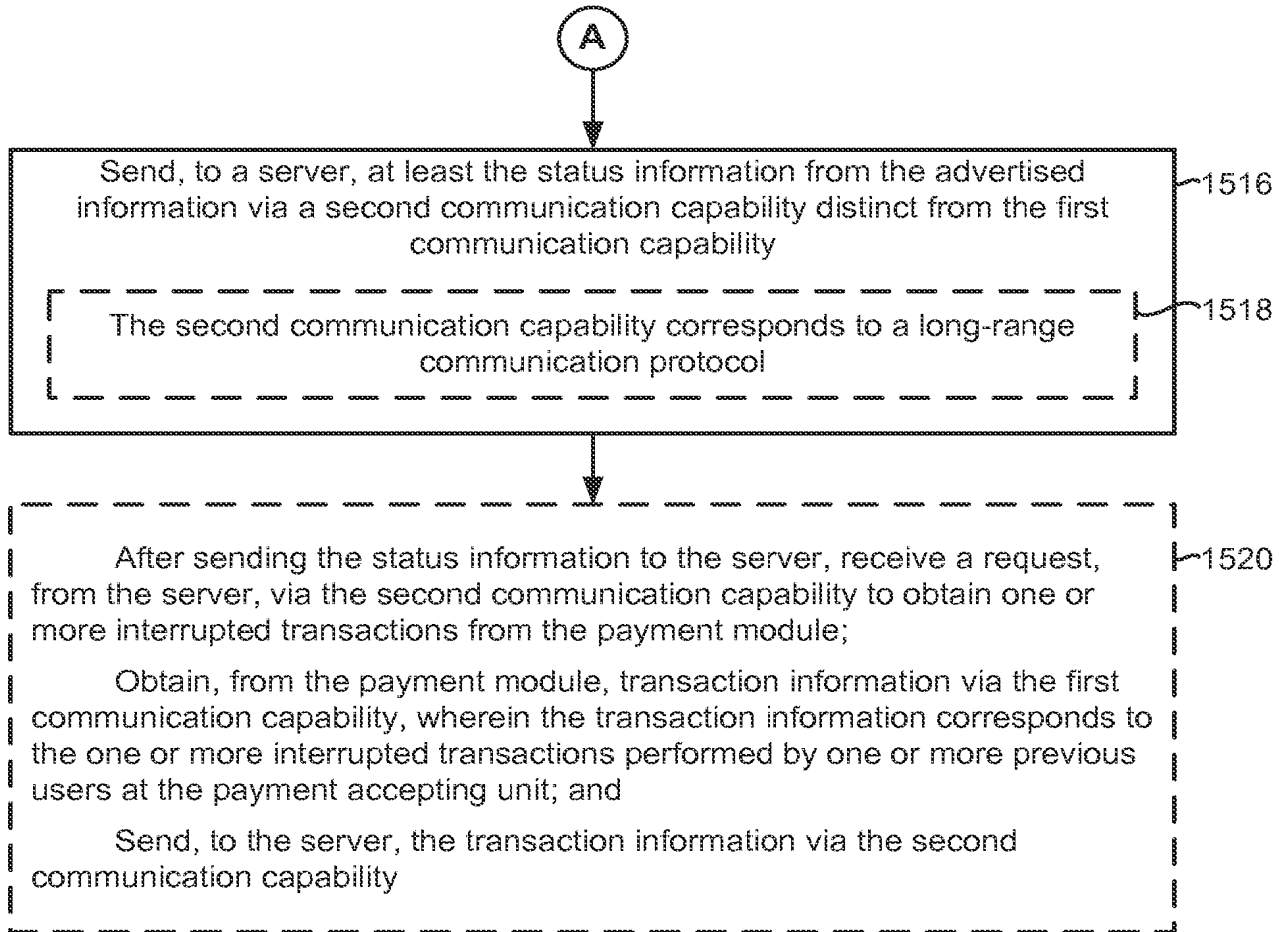


Figure 28B

1600

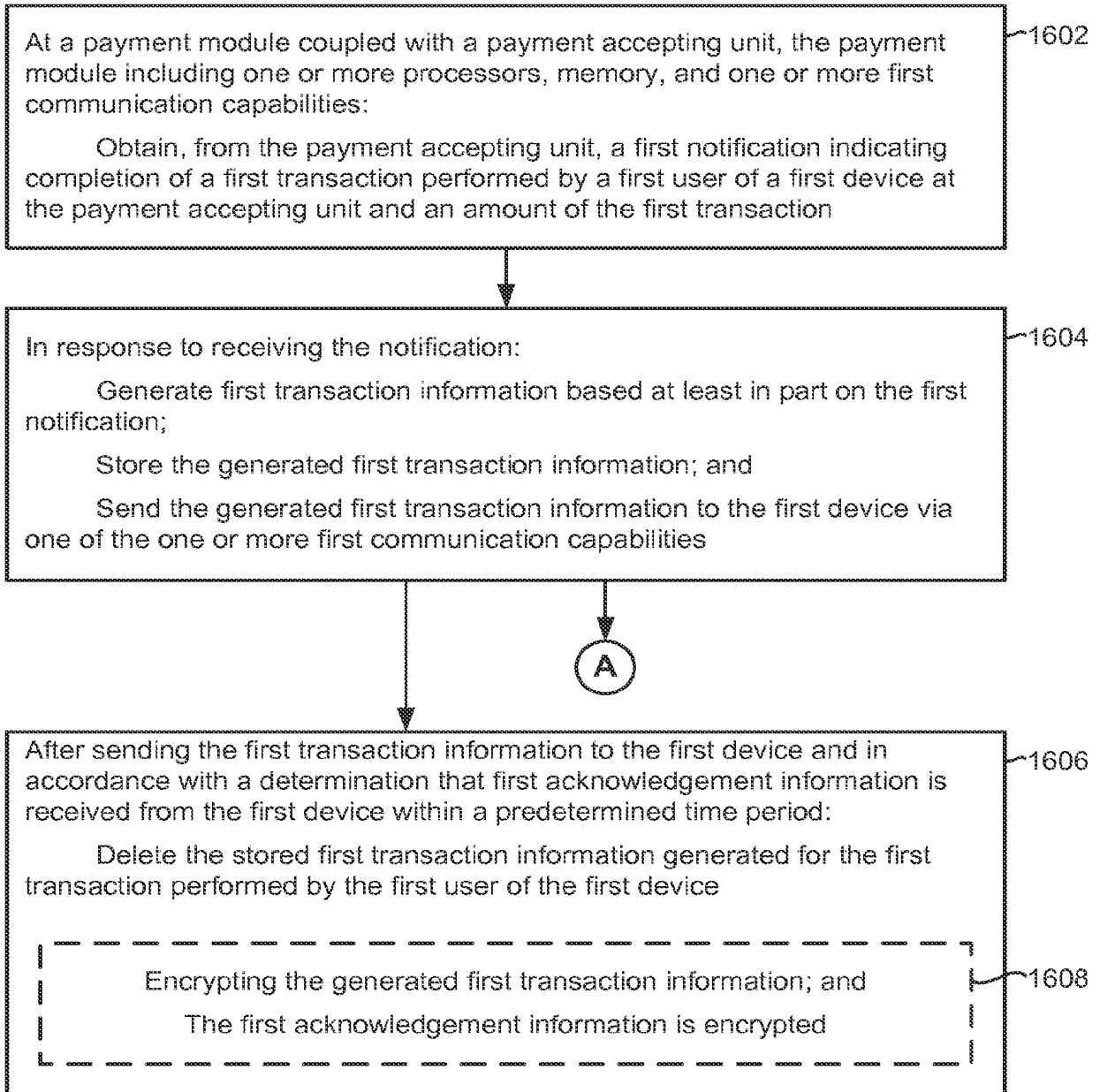


Figure 29A



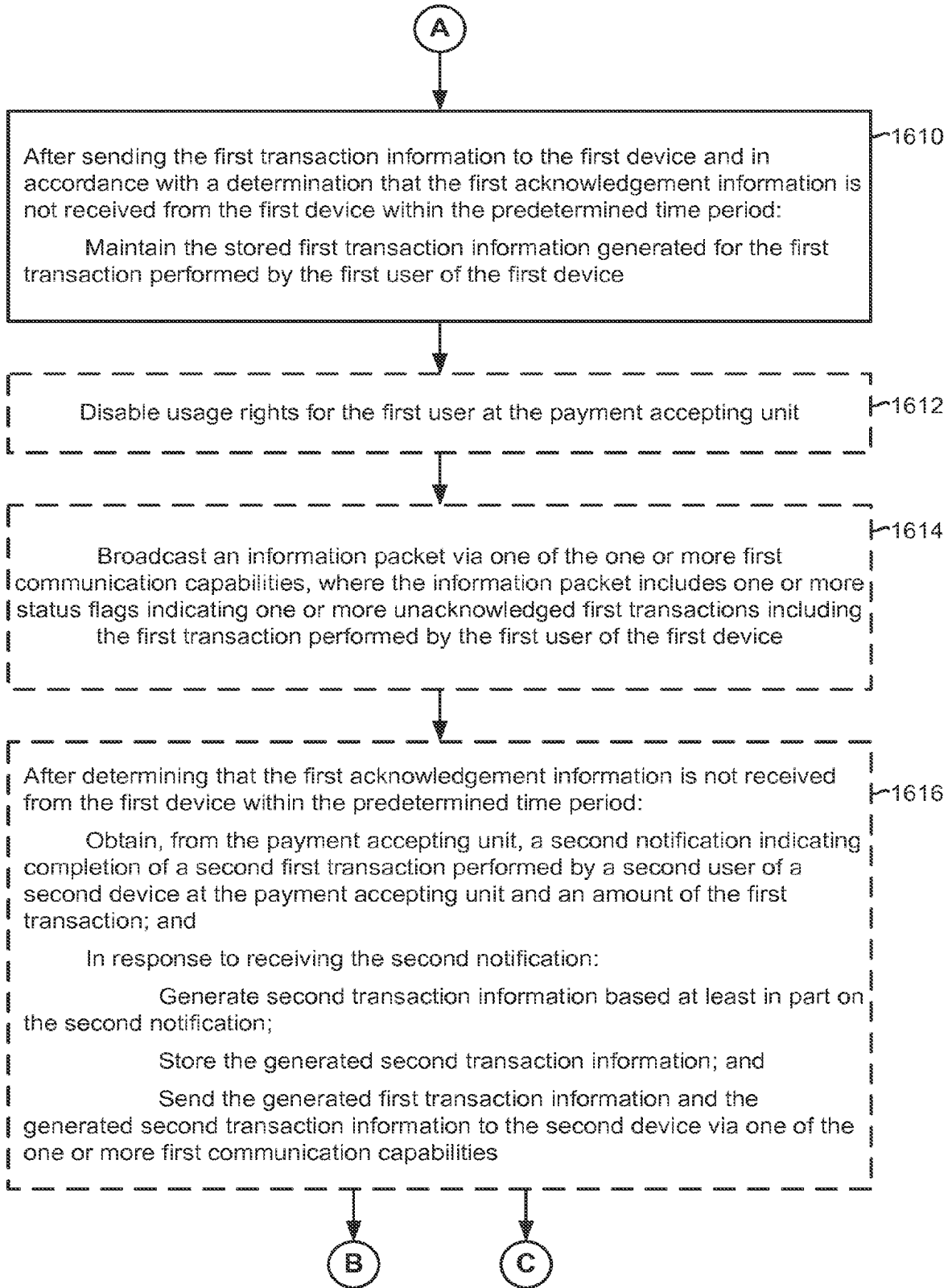


Figure 29B

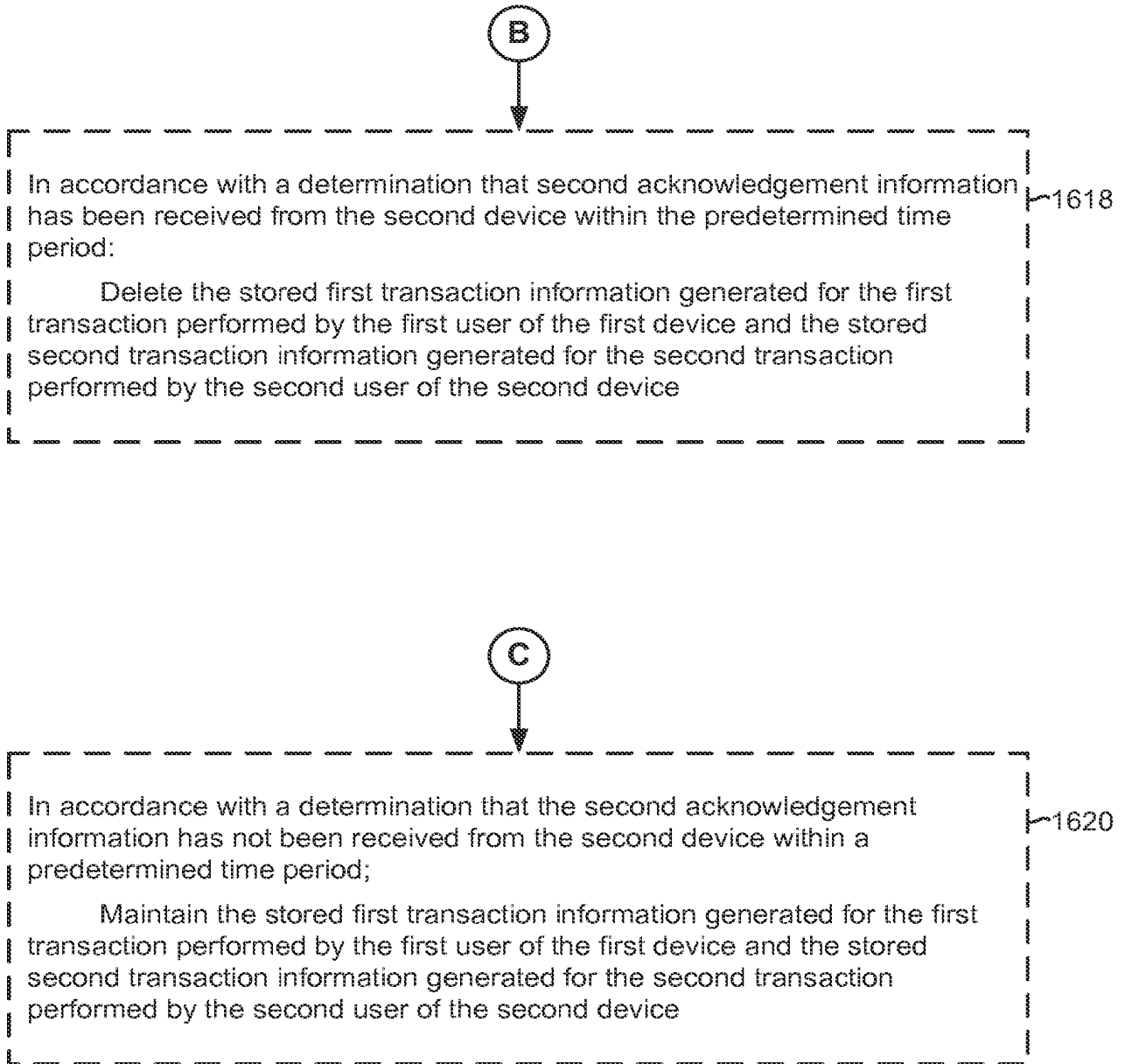


Figure 29C

1700

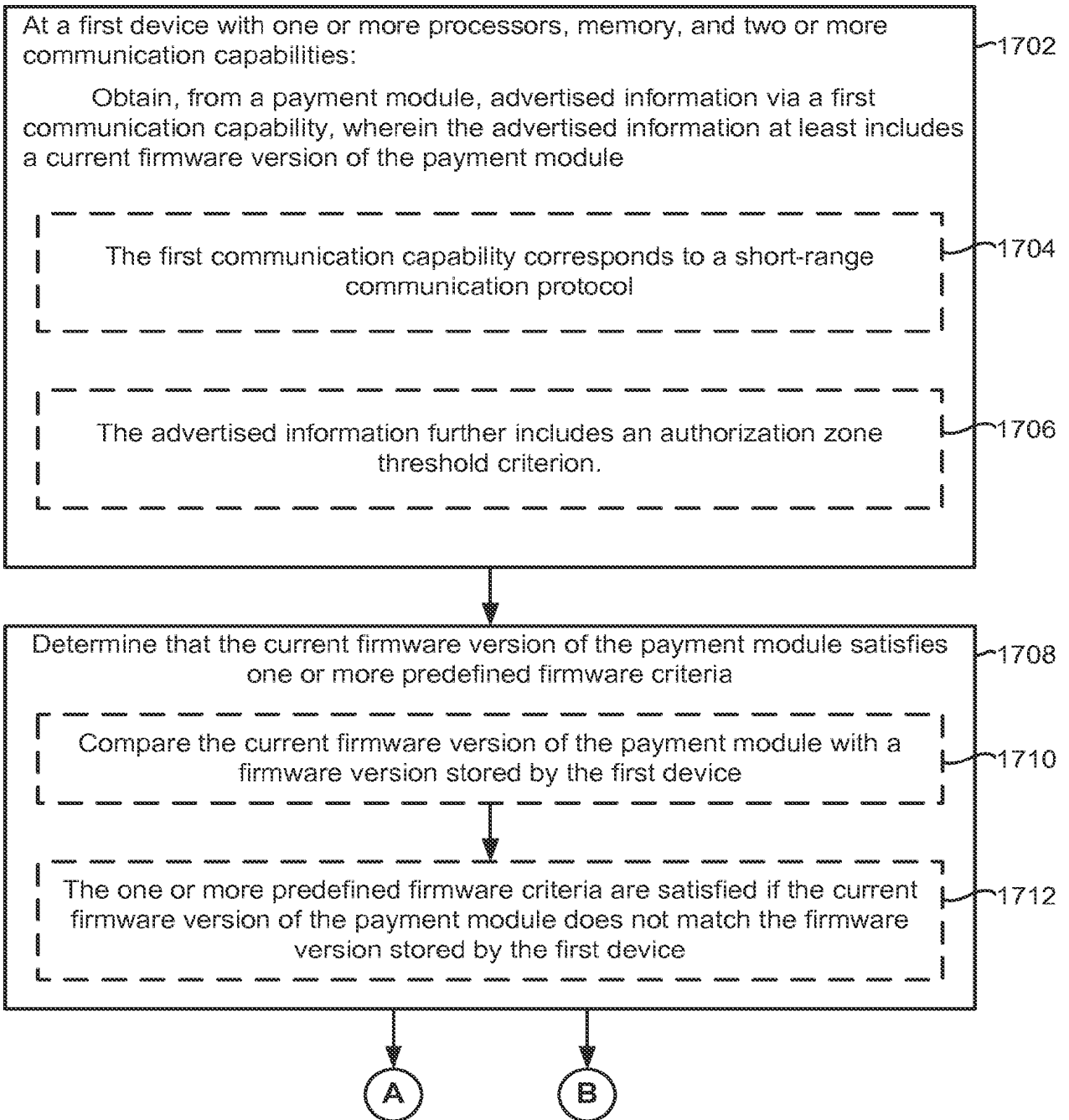


Figure 30A

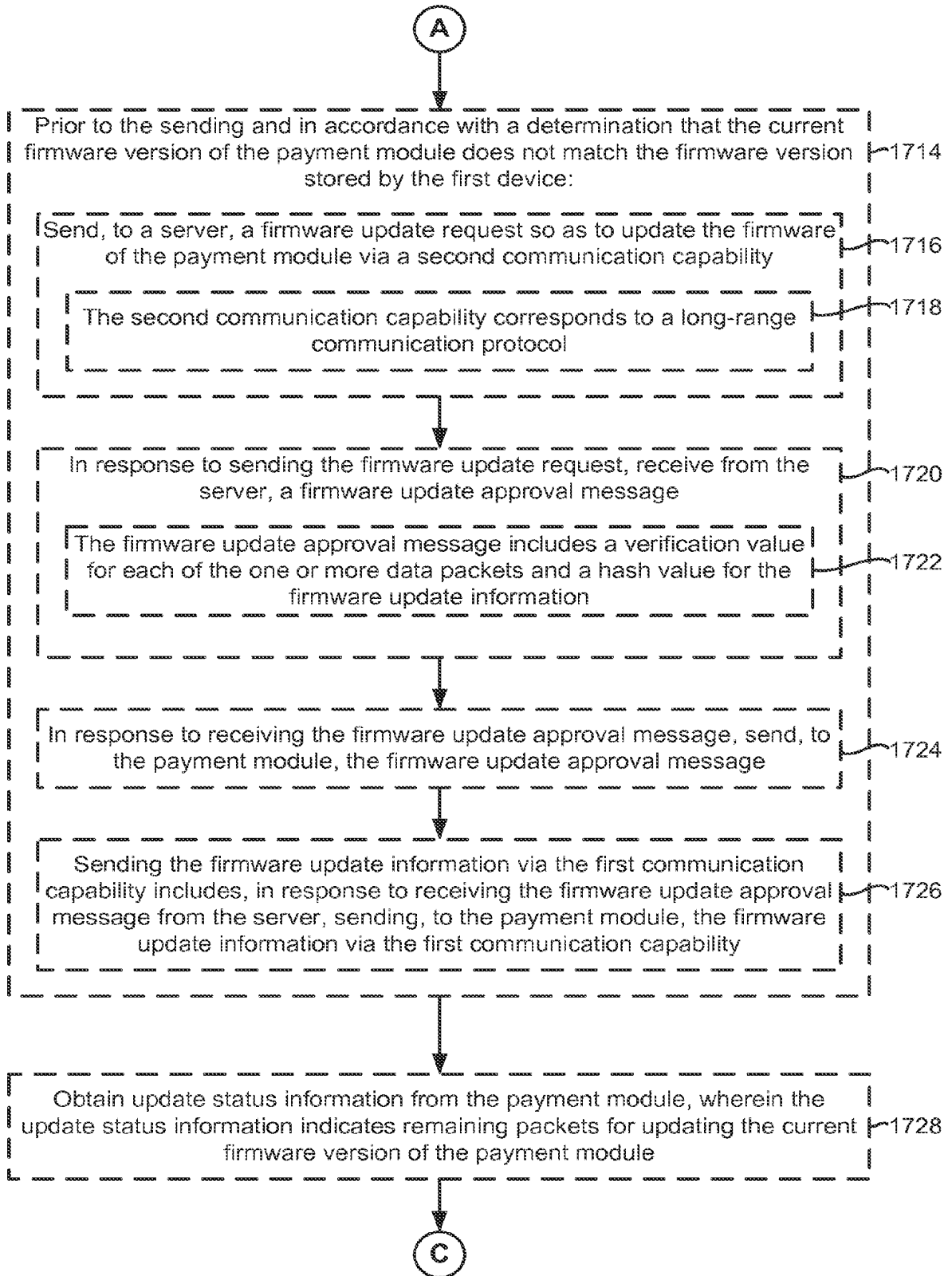


Figure 30B

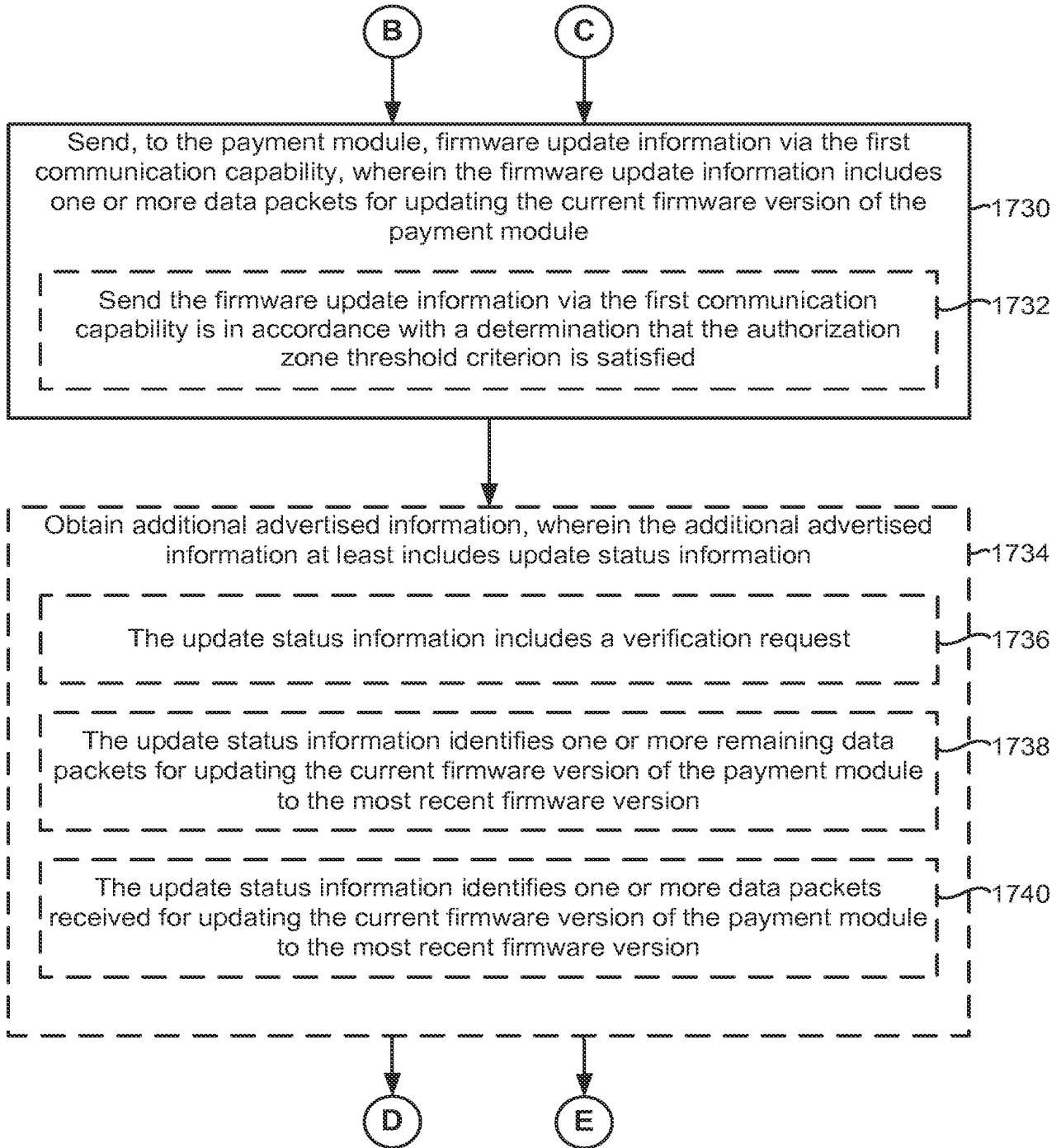
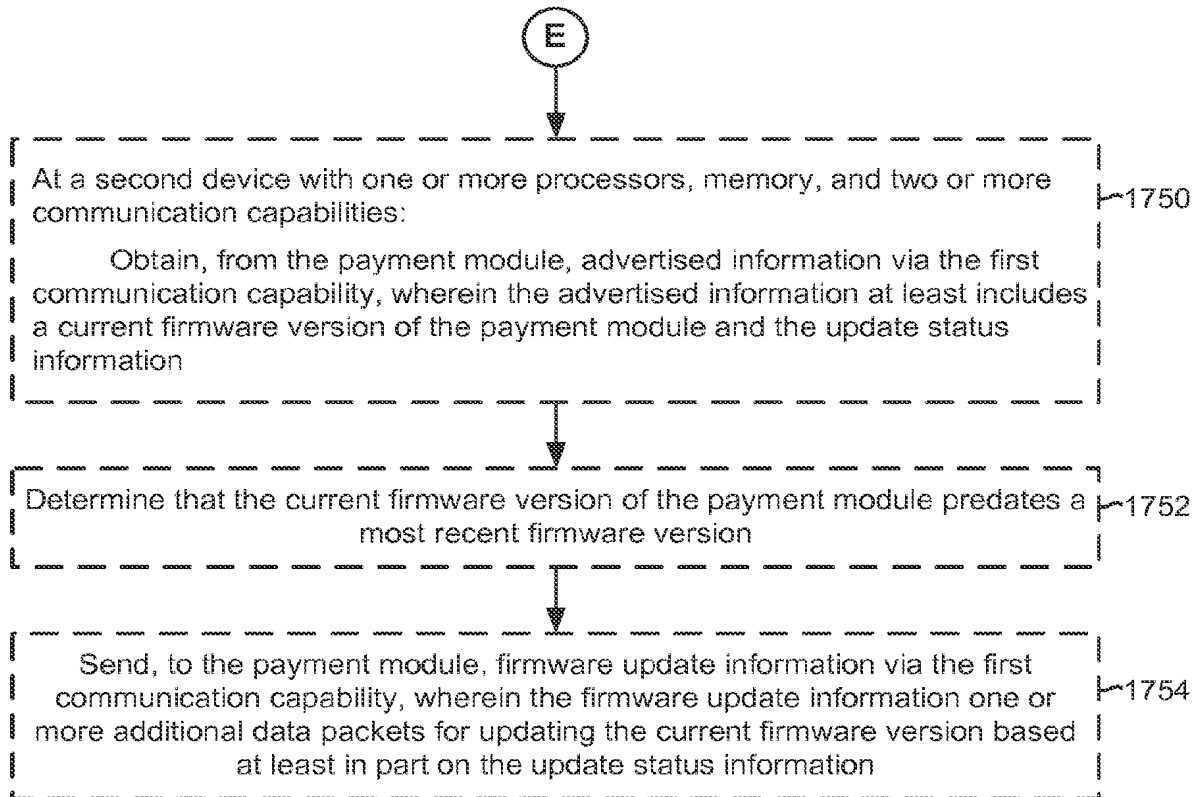
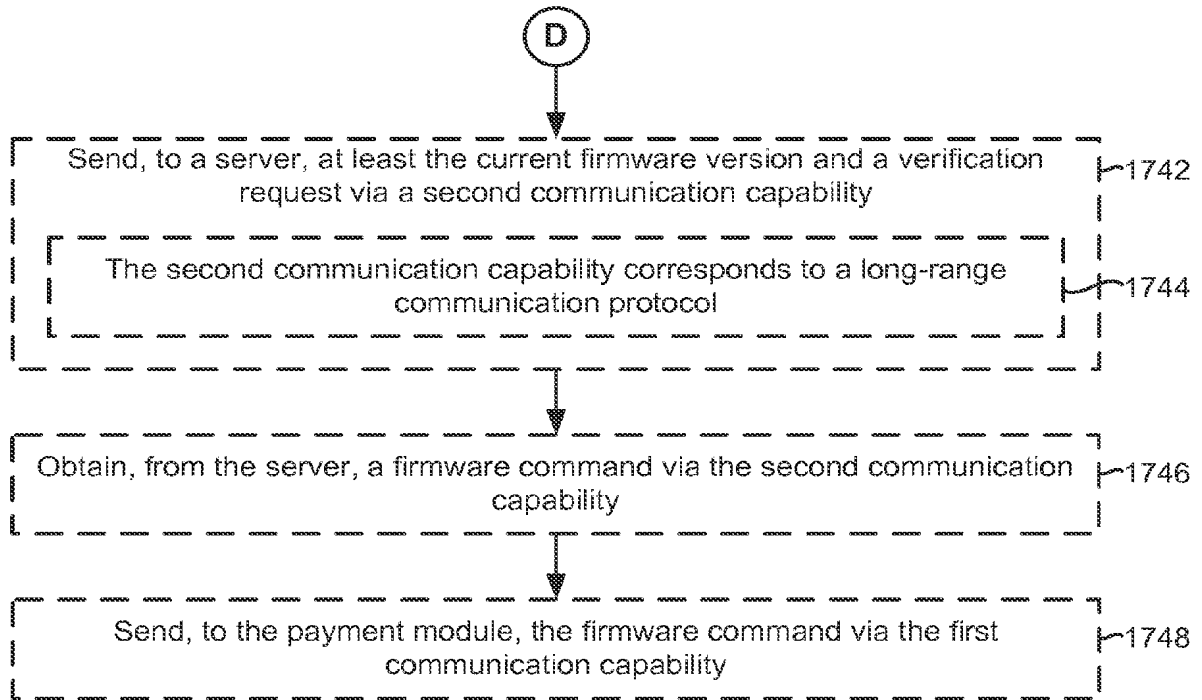


Figure 30C



**Figure 30D**

1800

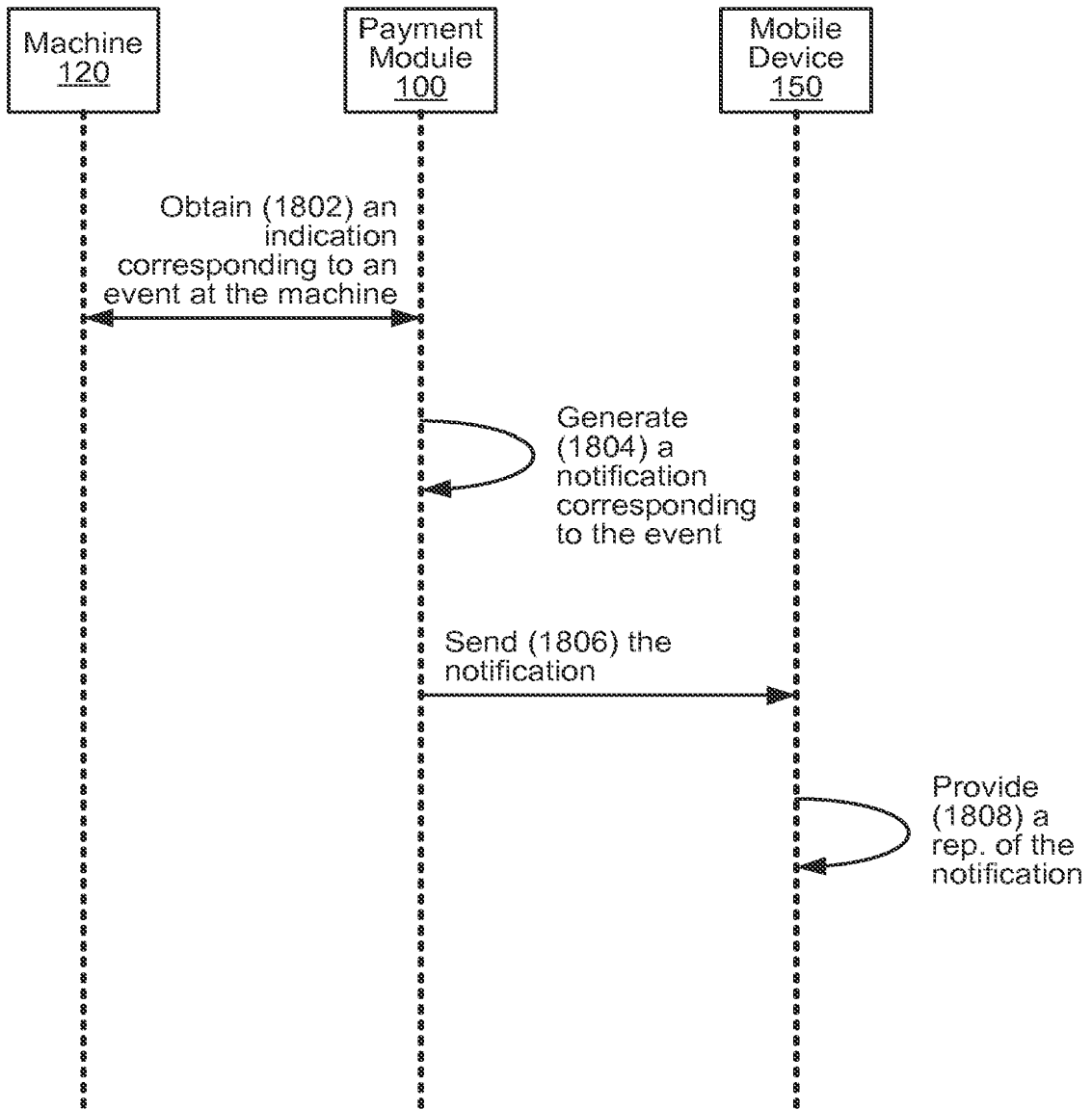


Figure 31A

1850

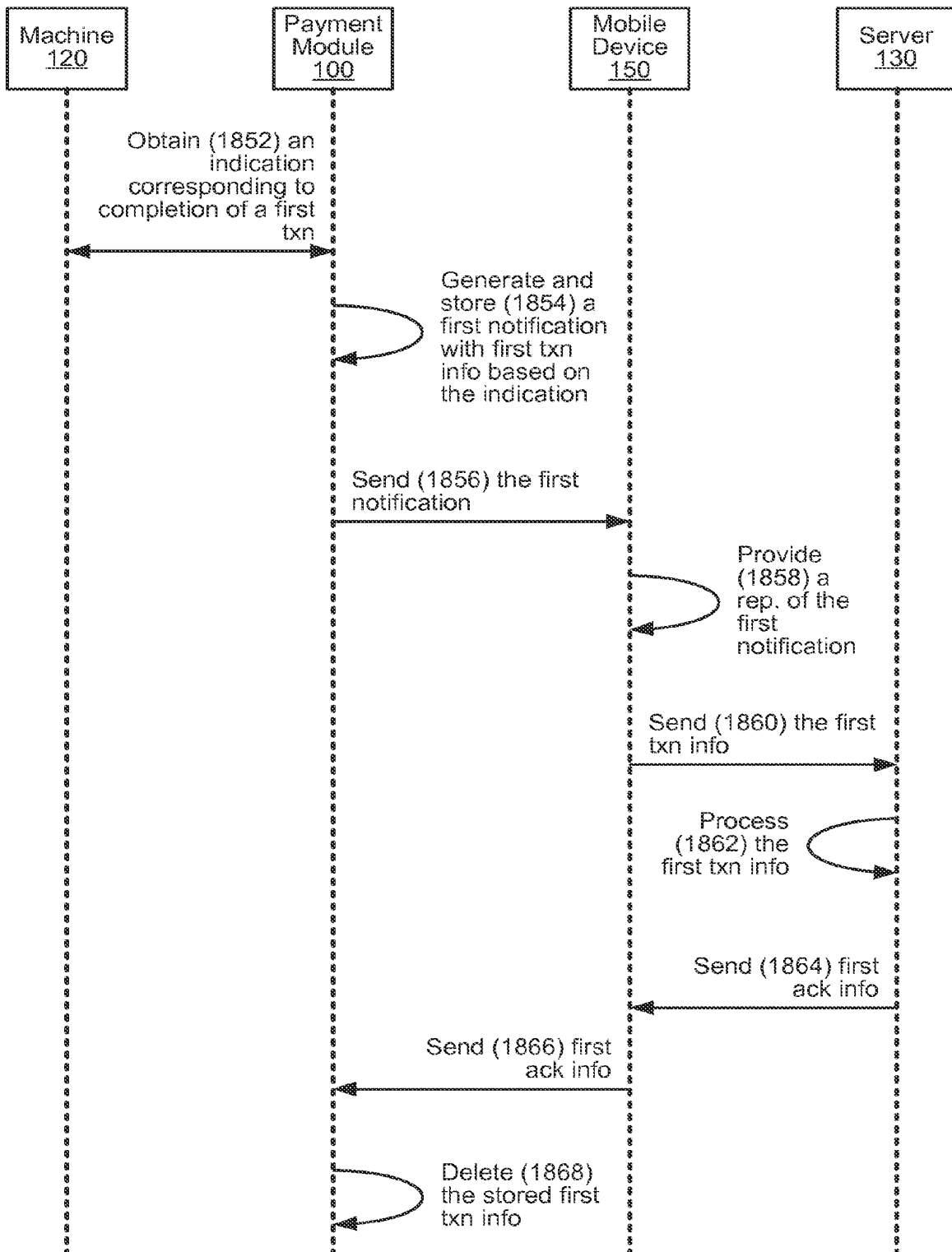


Figure 31B



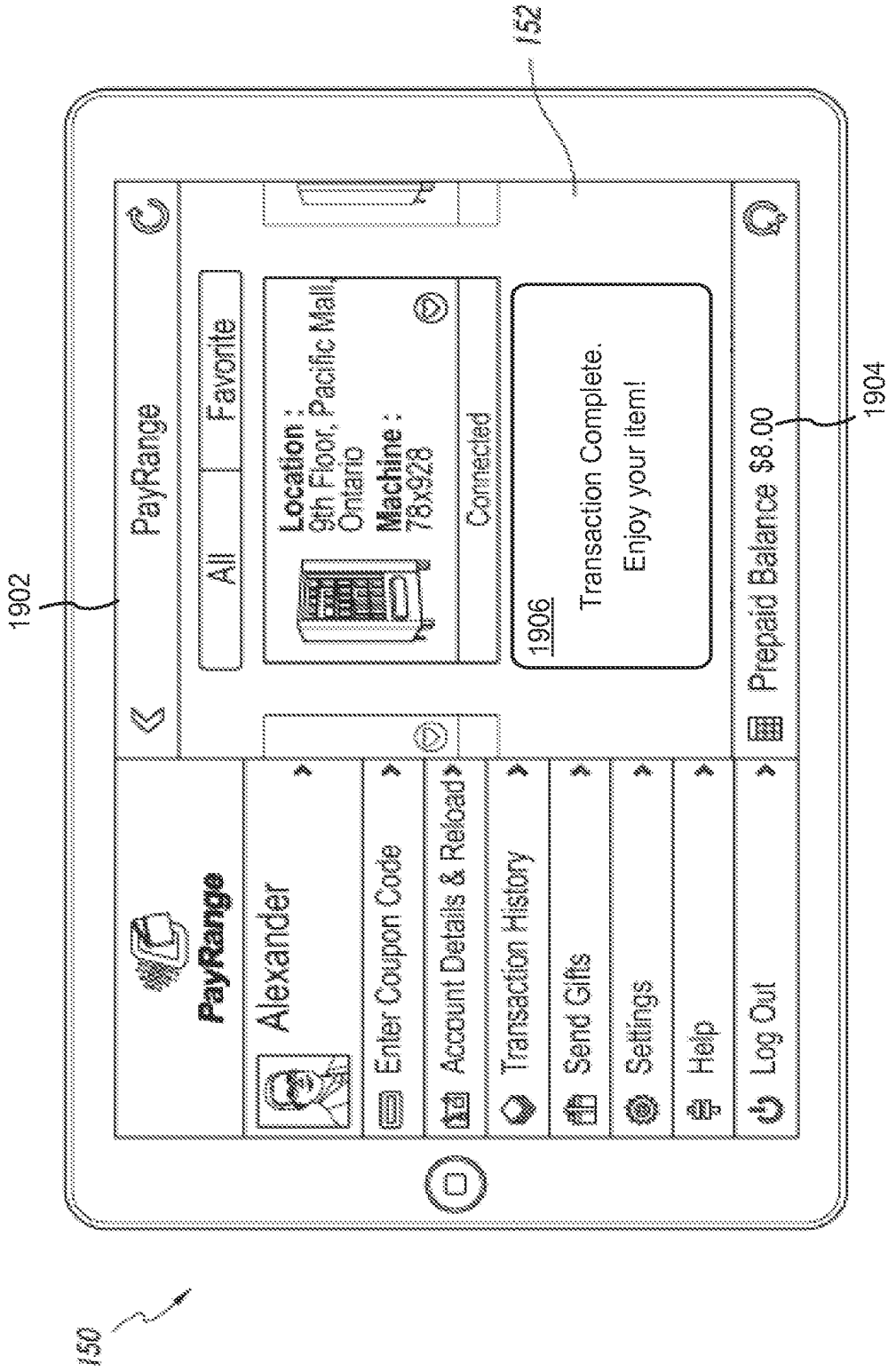


Figure 32A

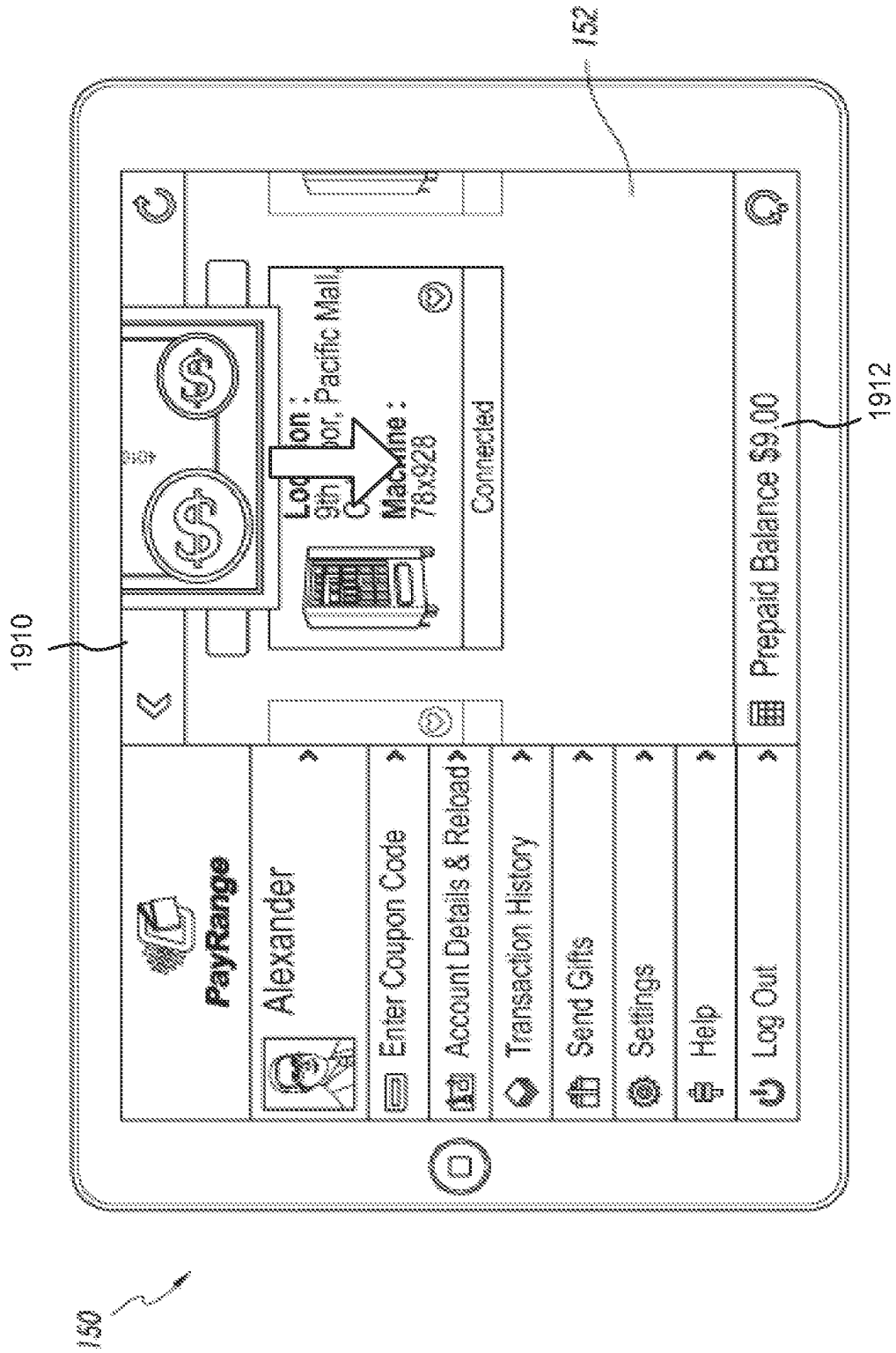


Figure 32B

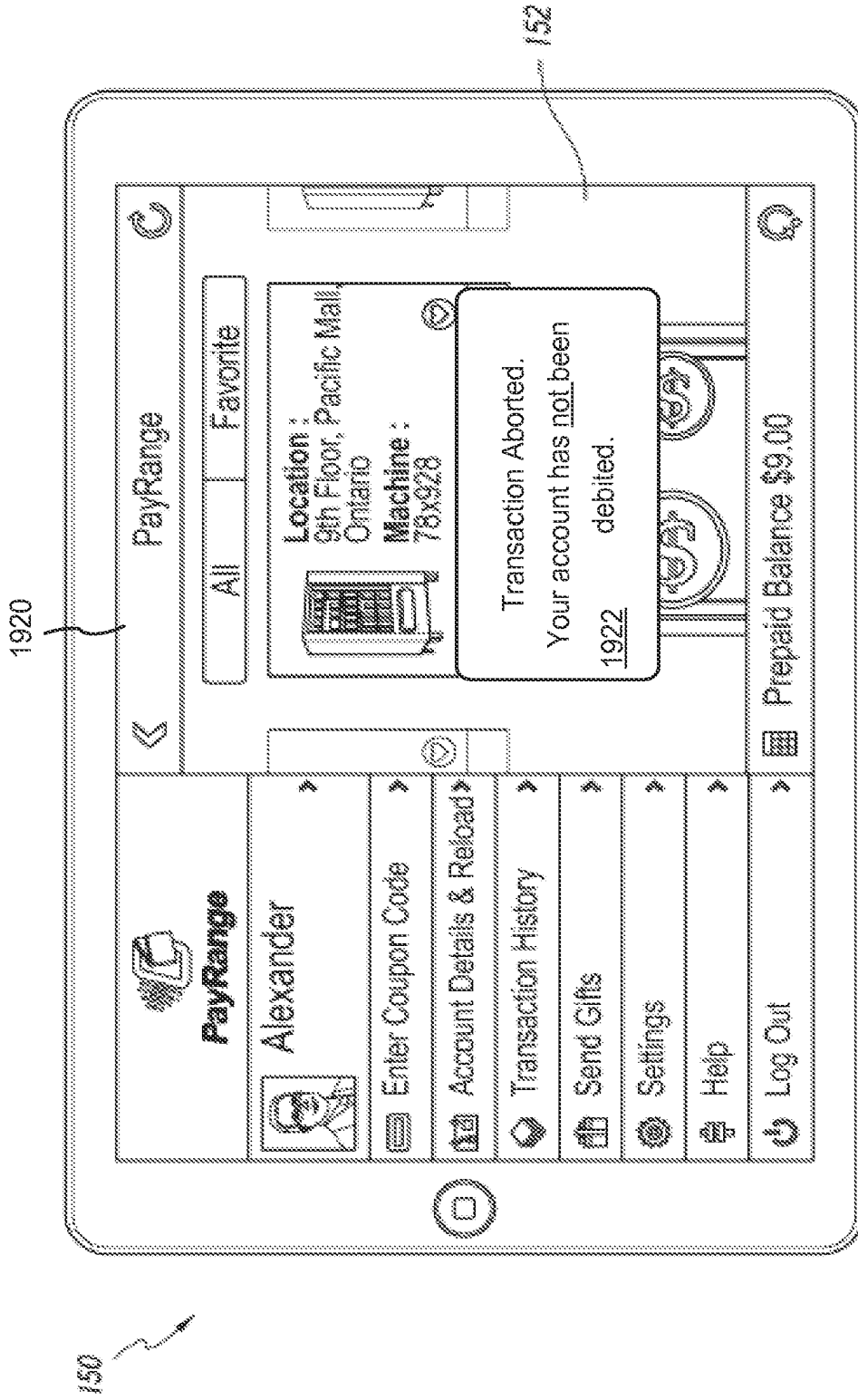


Figure 32C

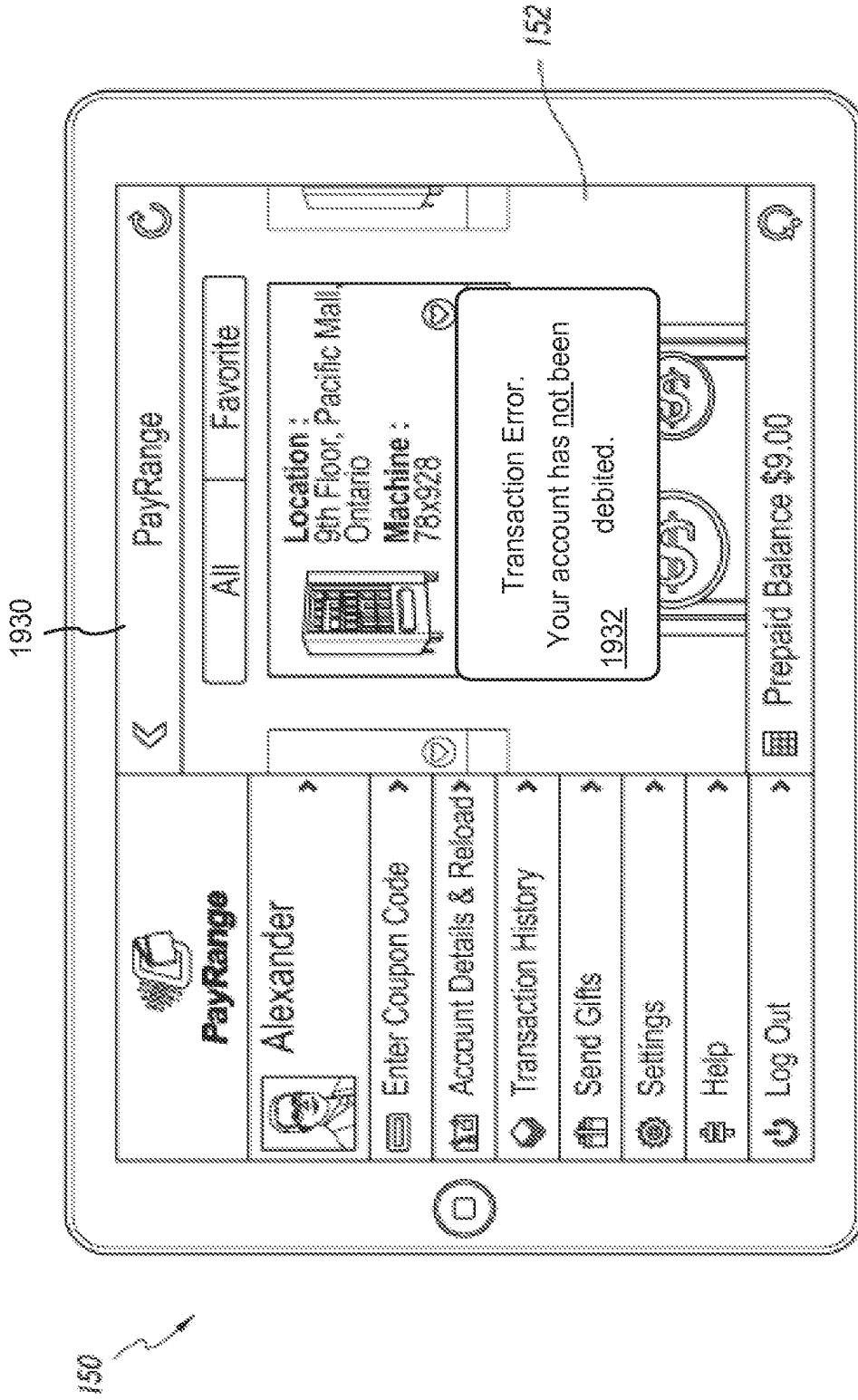


Figure 32D

2000

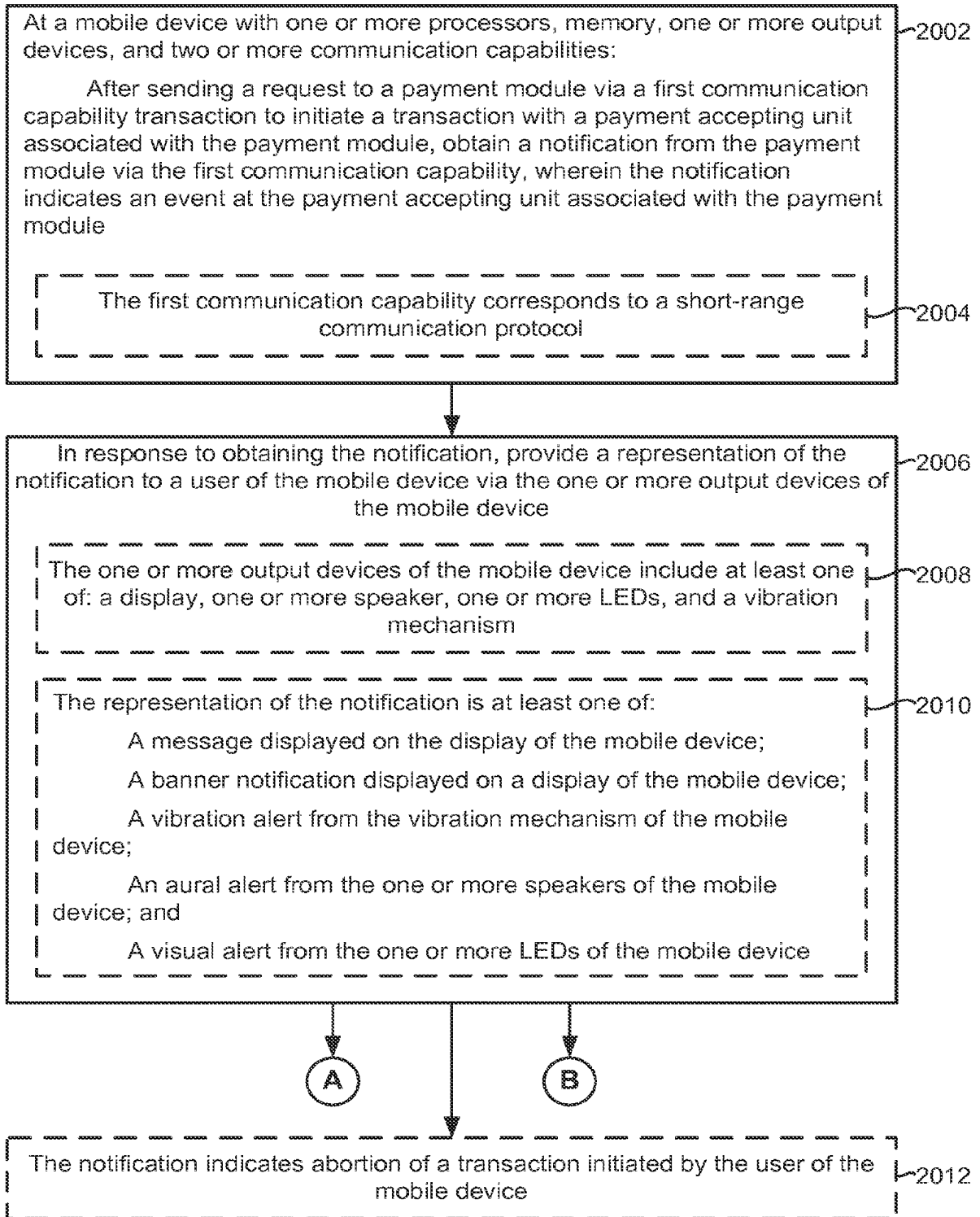


Figure 33A

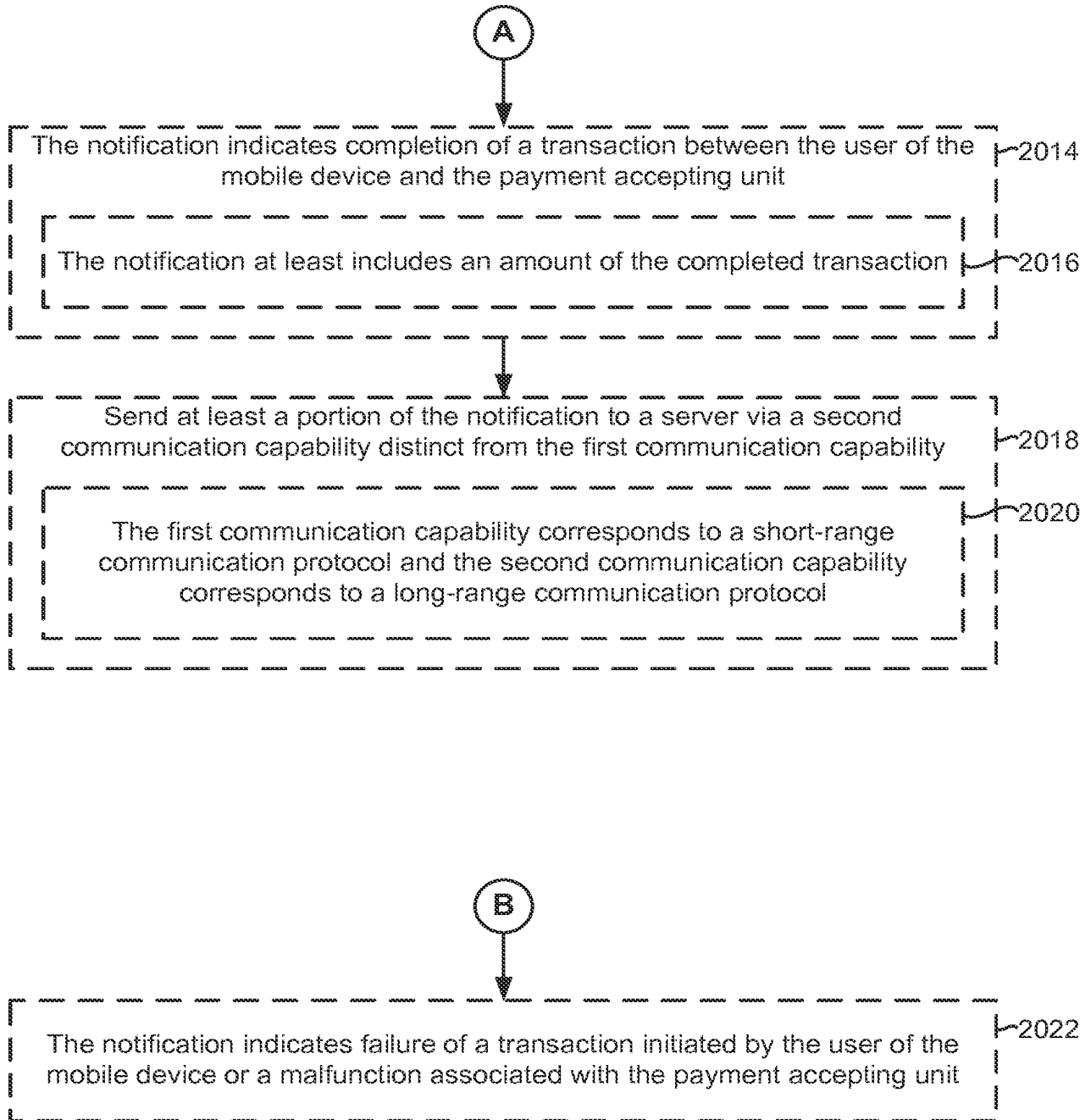


Figure 33B

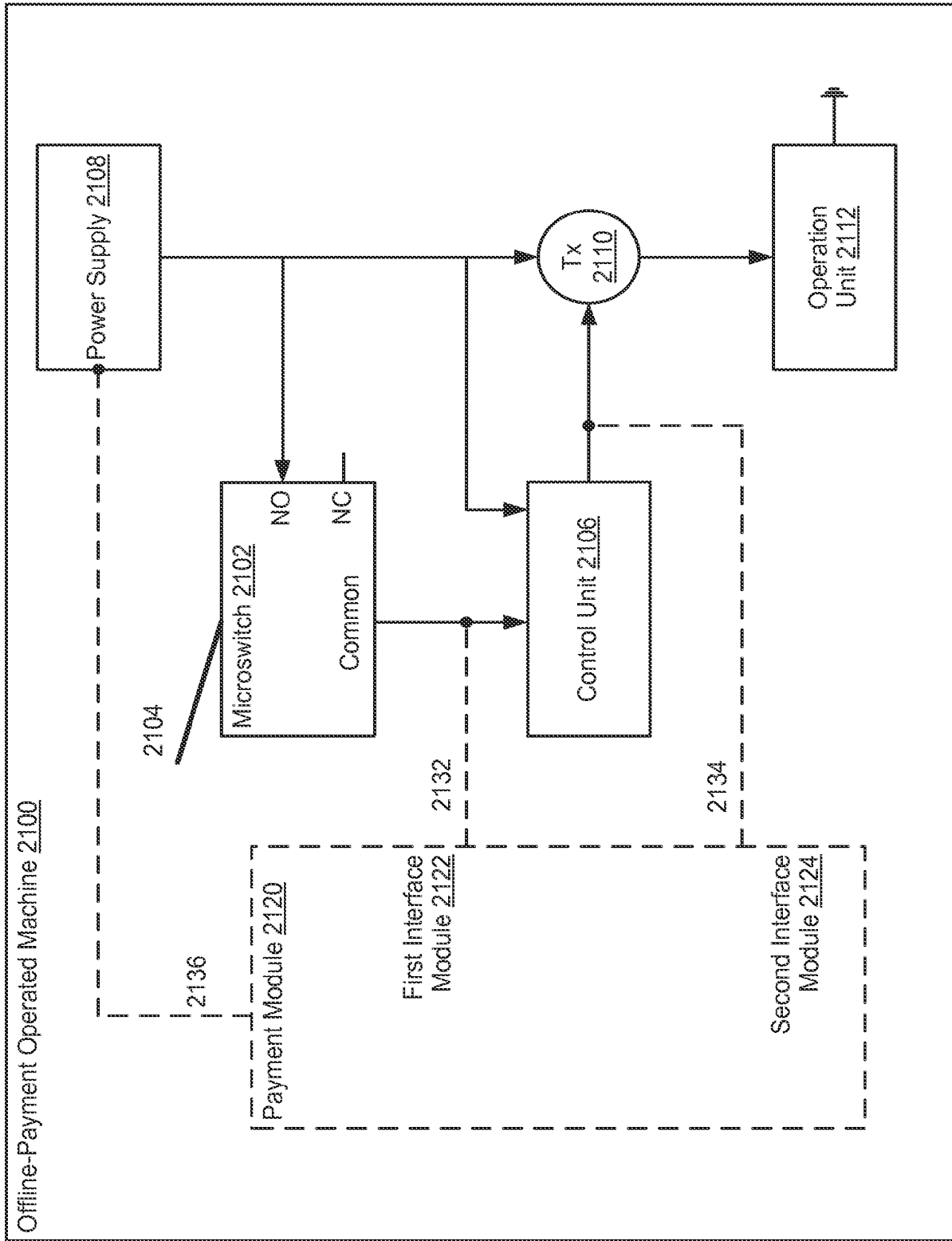


Figure 34A

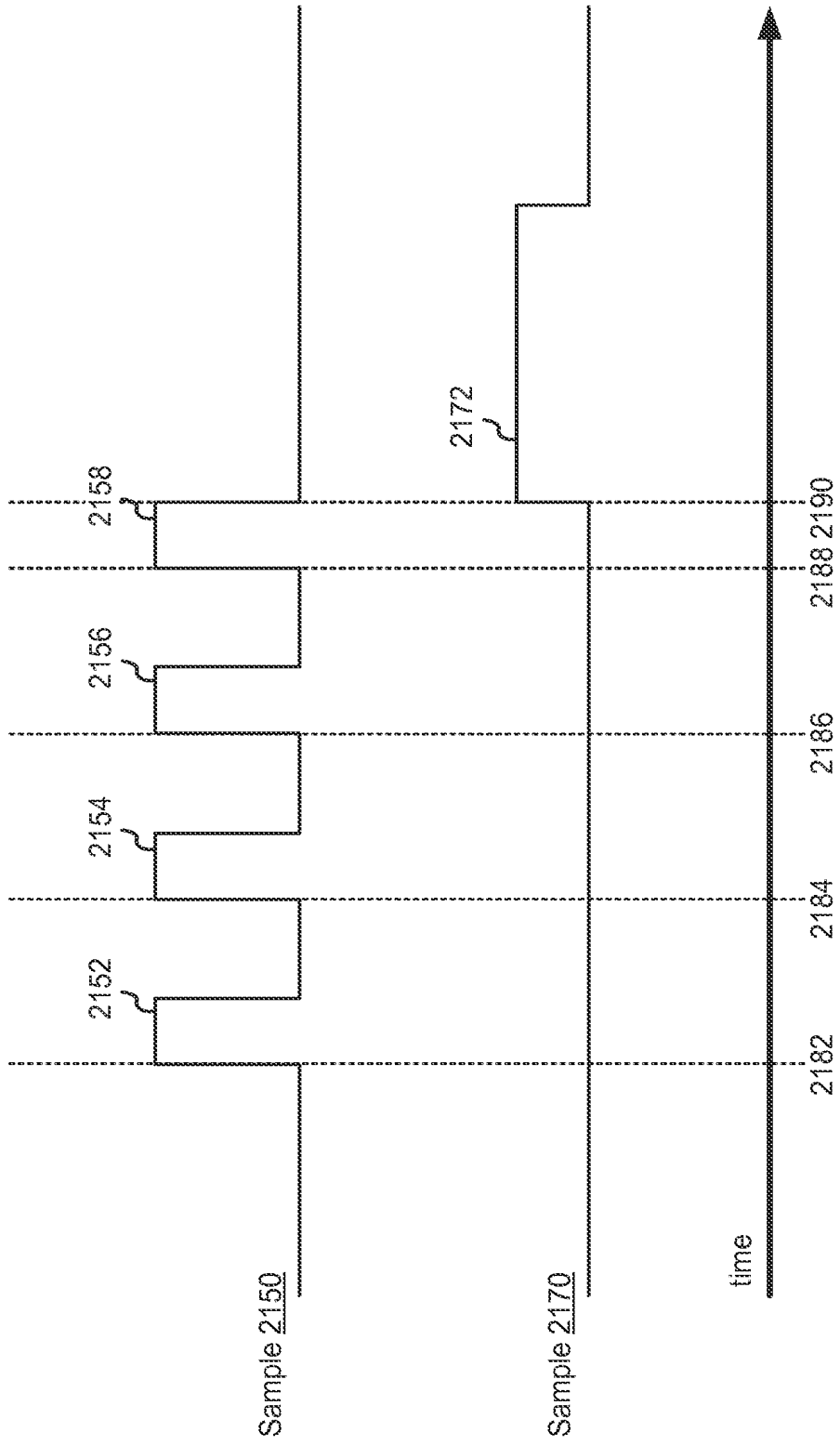


Figure 34B



2200

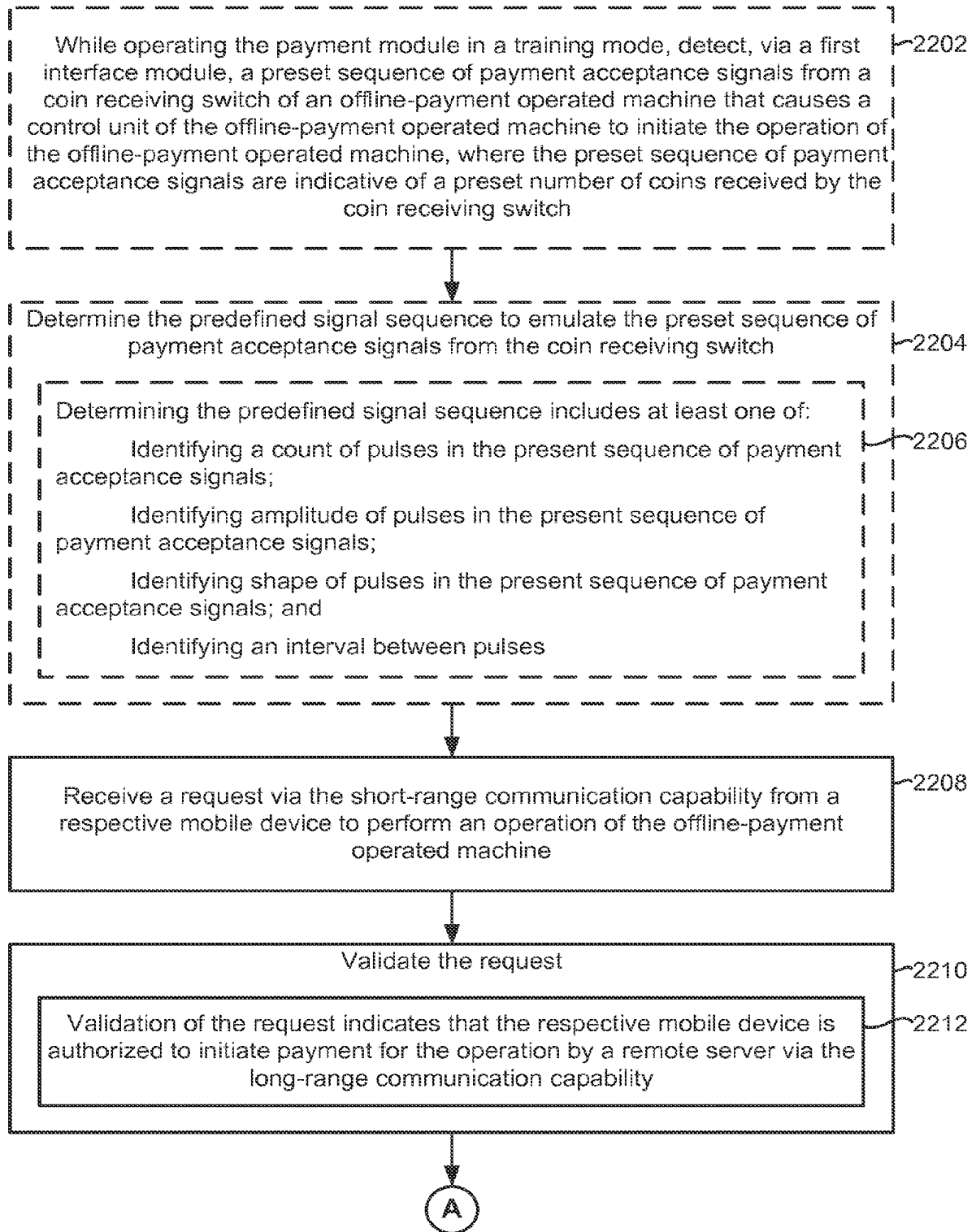


Figure 35A

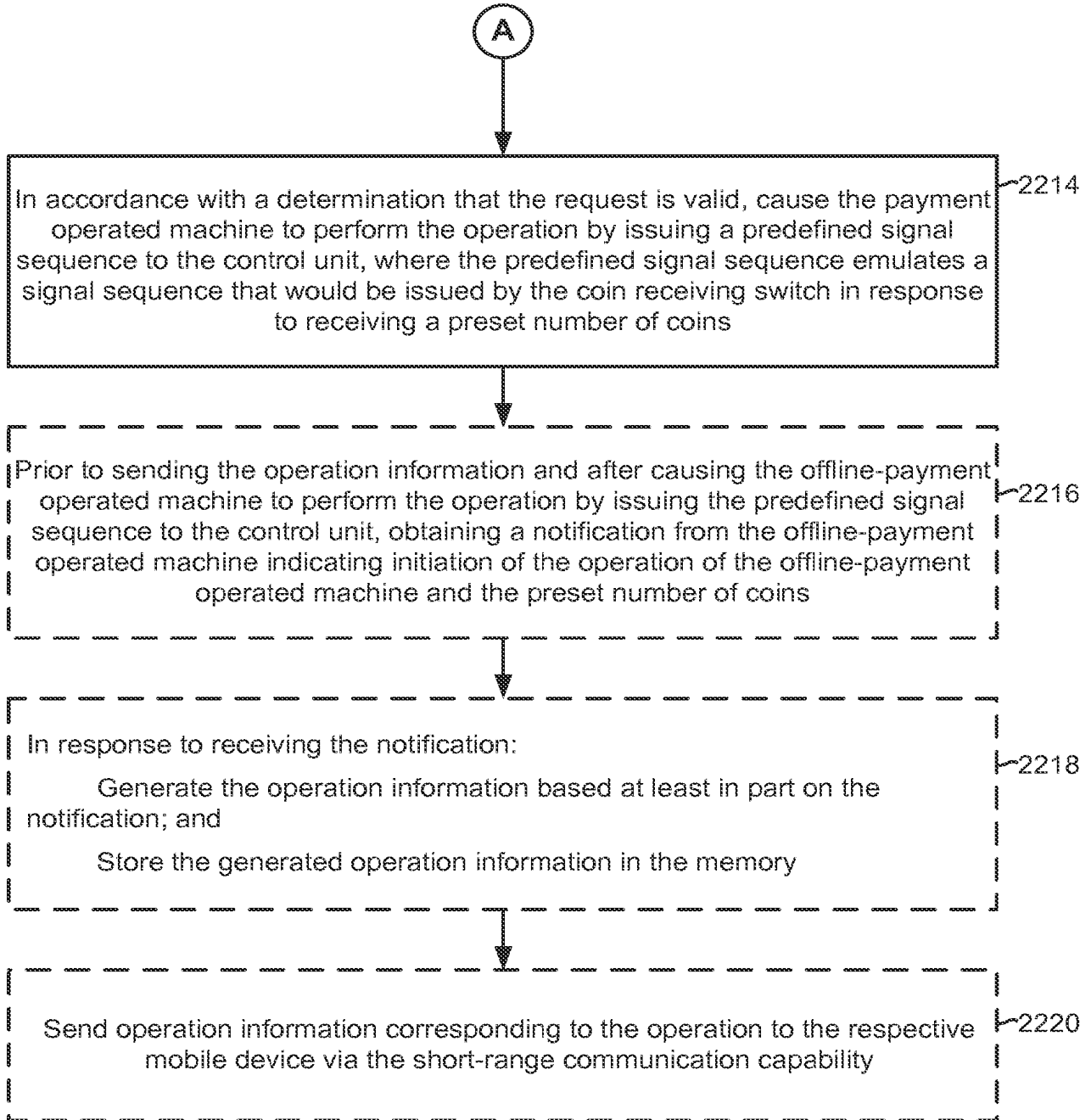


Figure 35B

2300

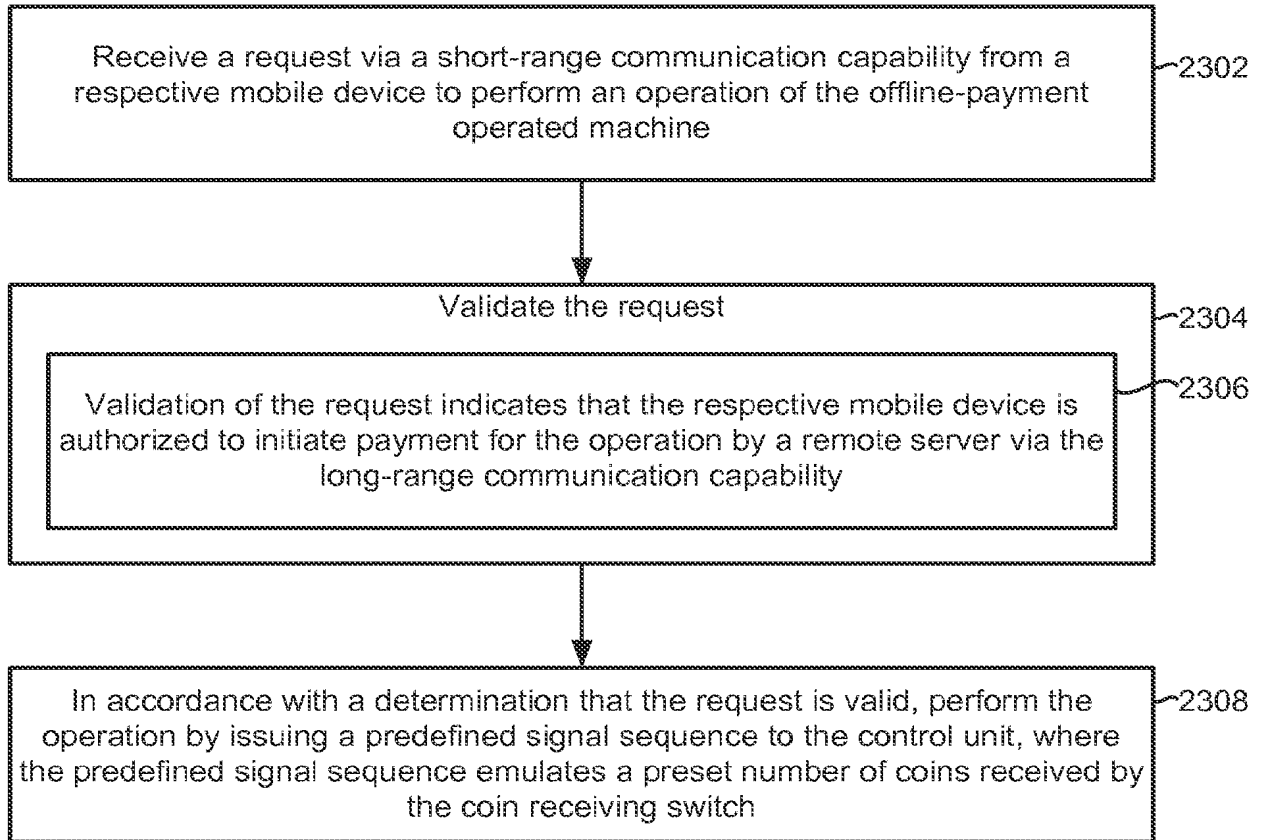


Figure 36

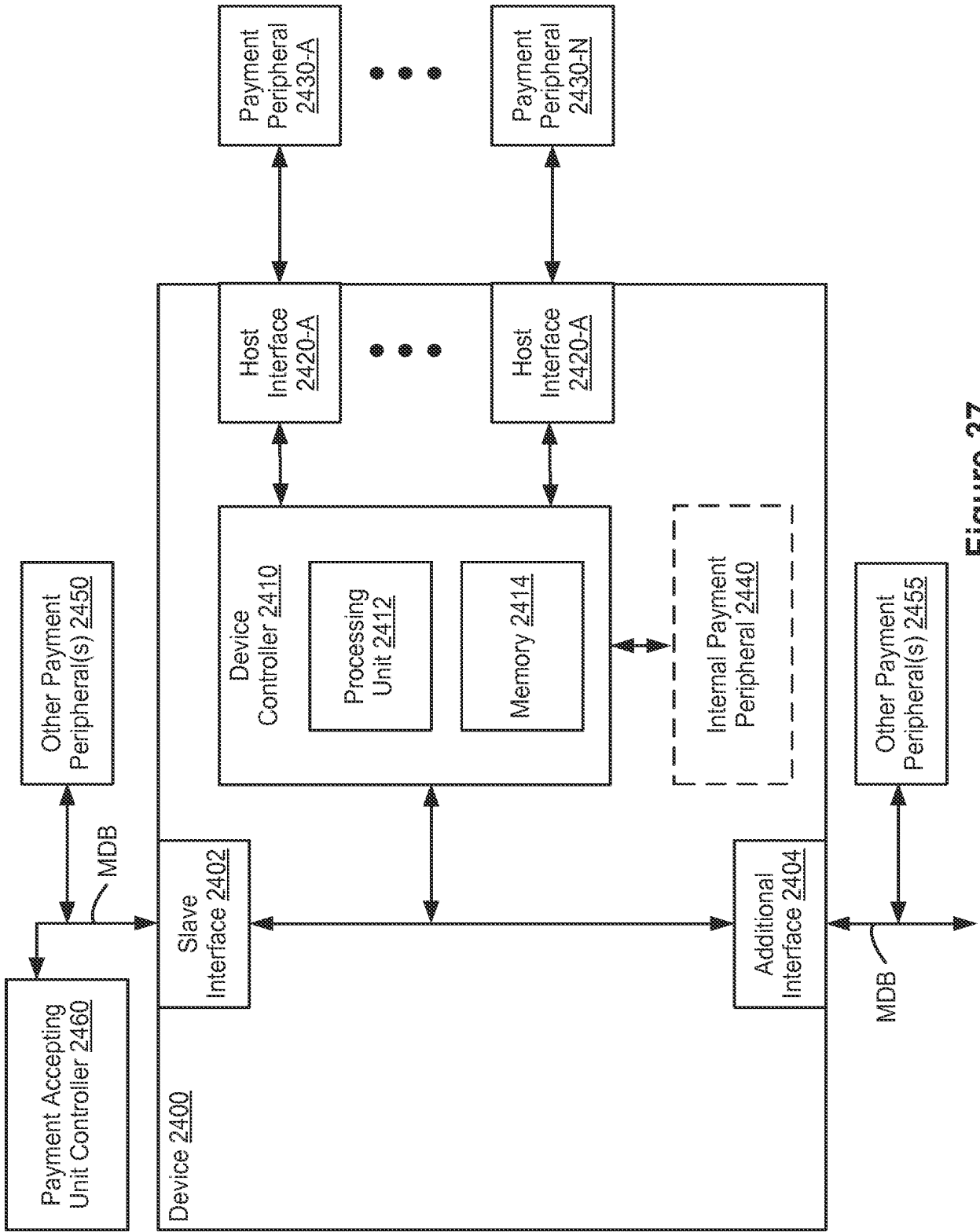


Figure 37

2500

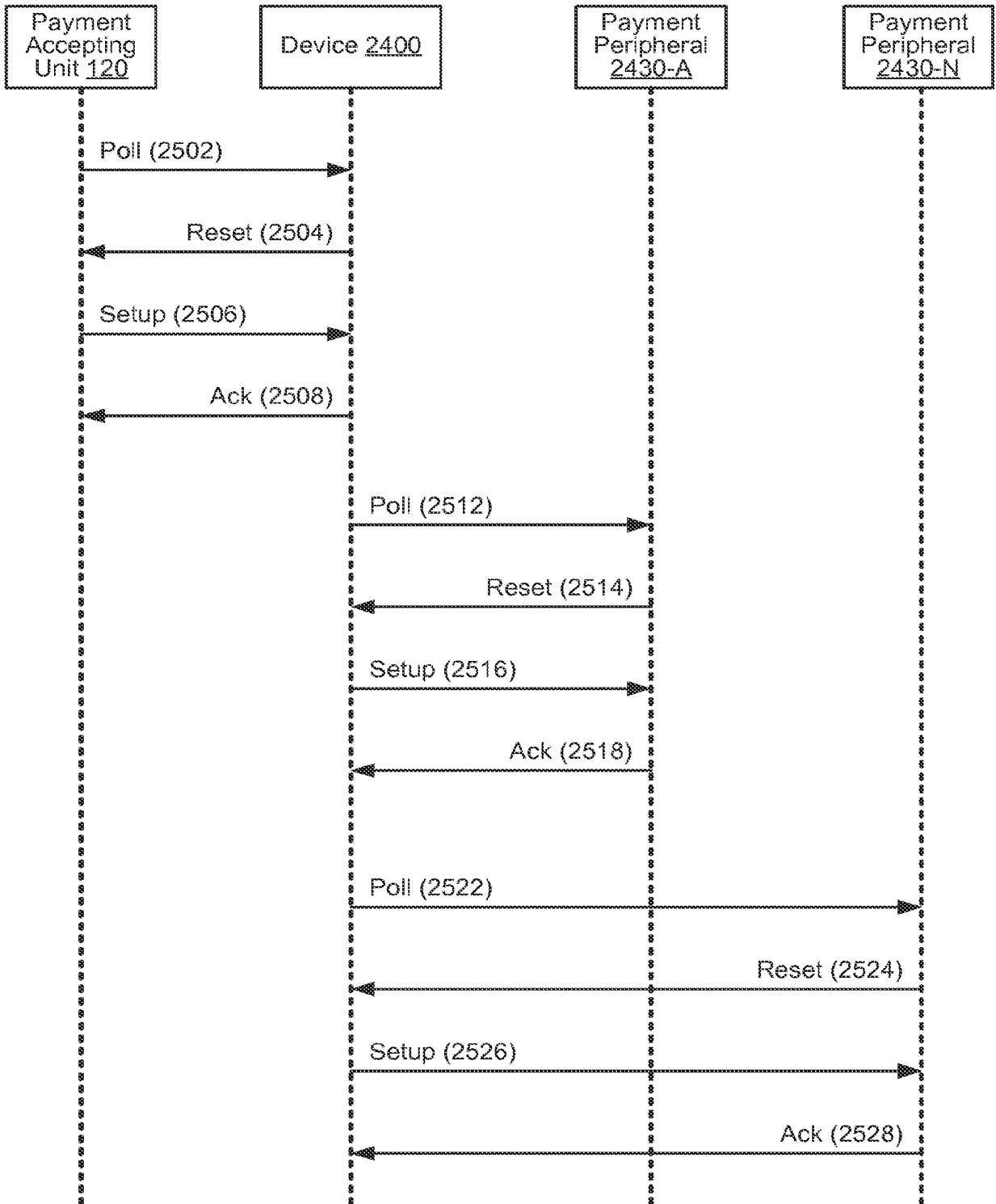
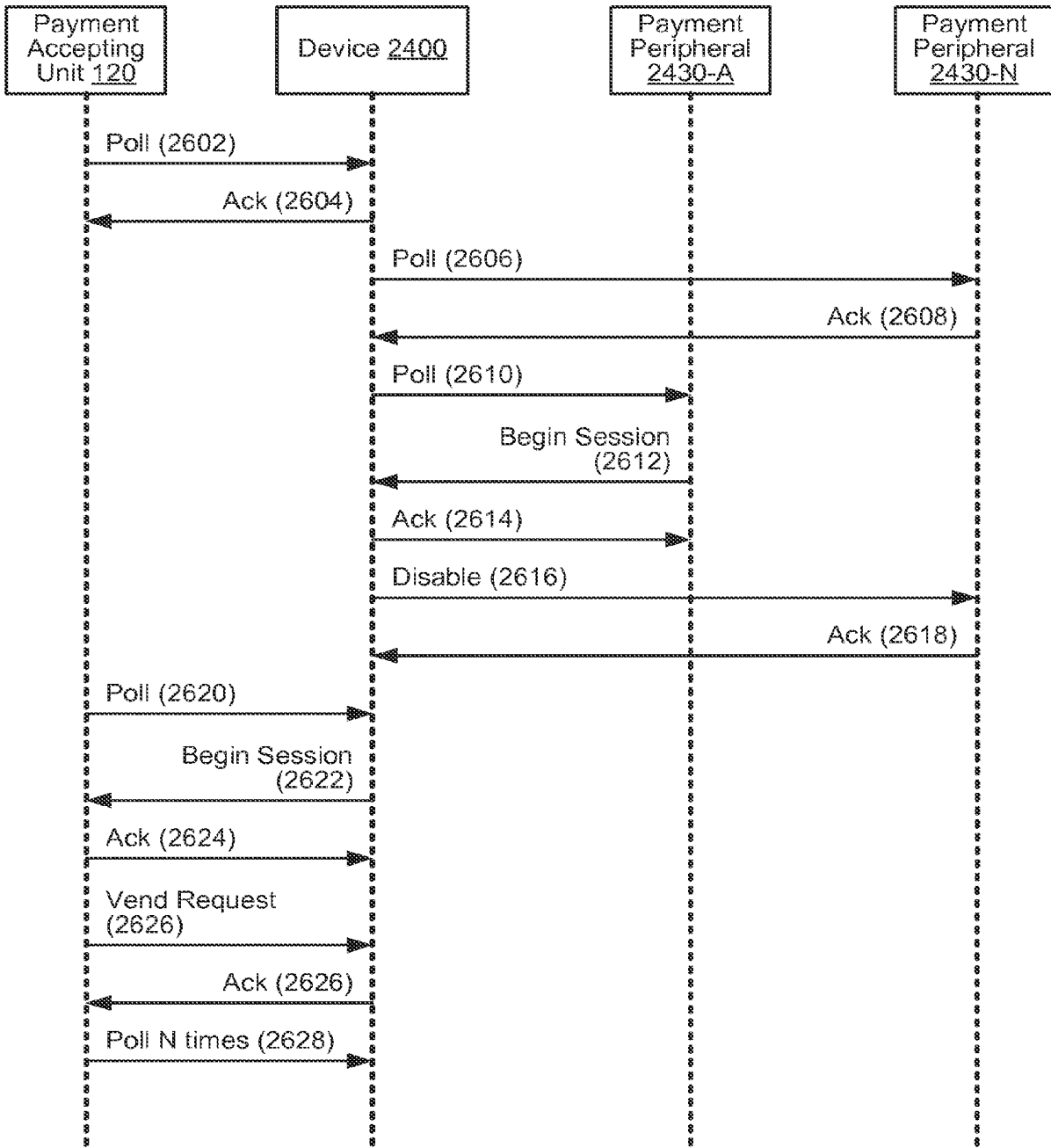


Figure 38

2600



A



Figure 39A

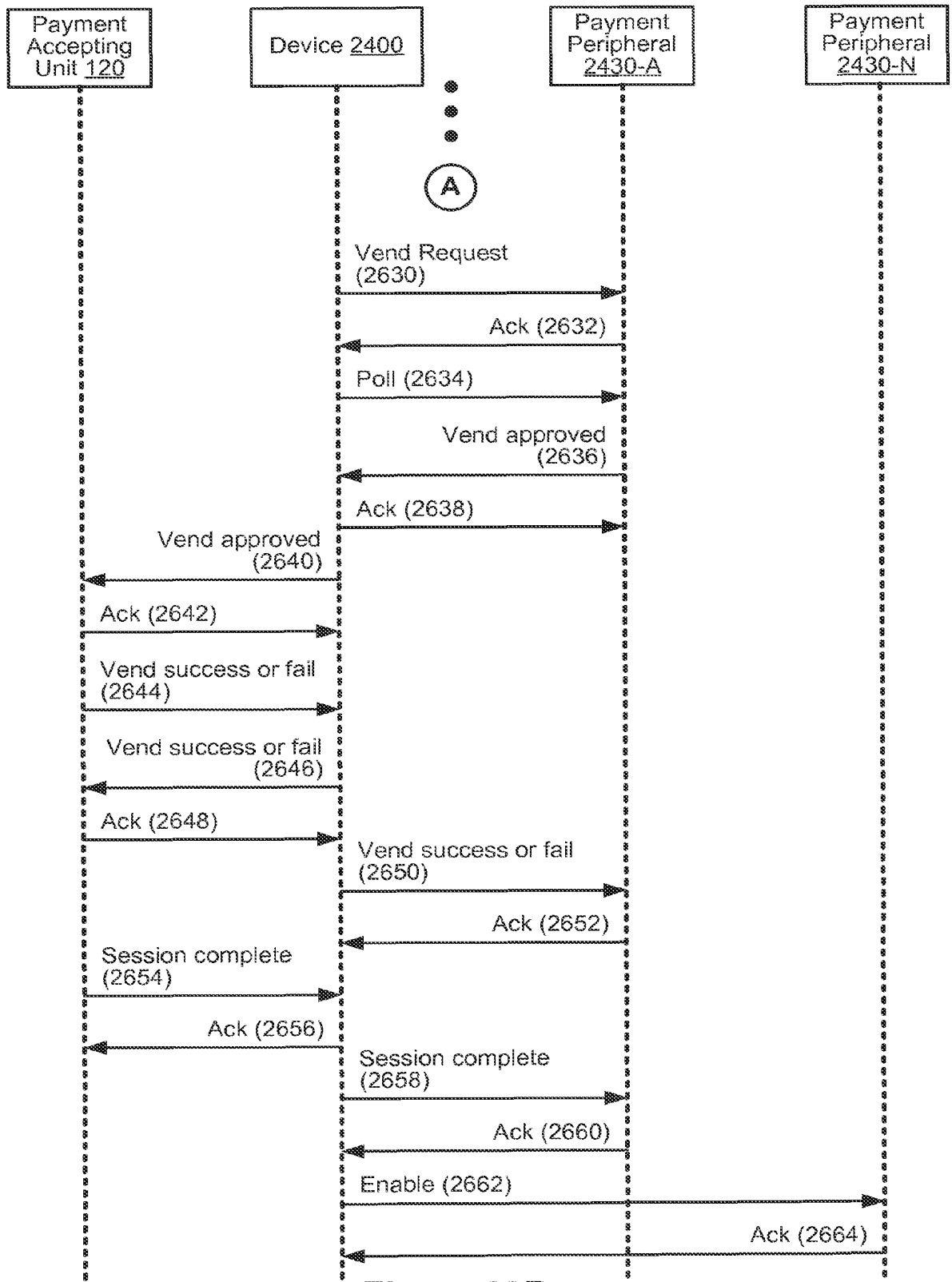


Figure 39B

2700

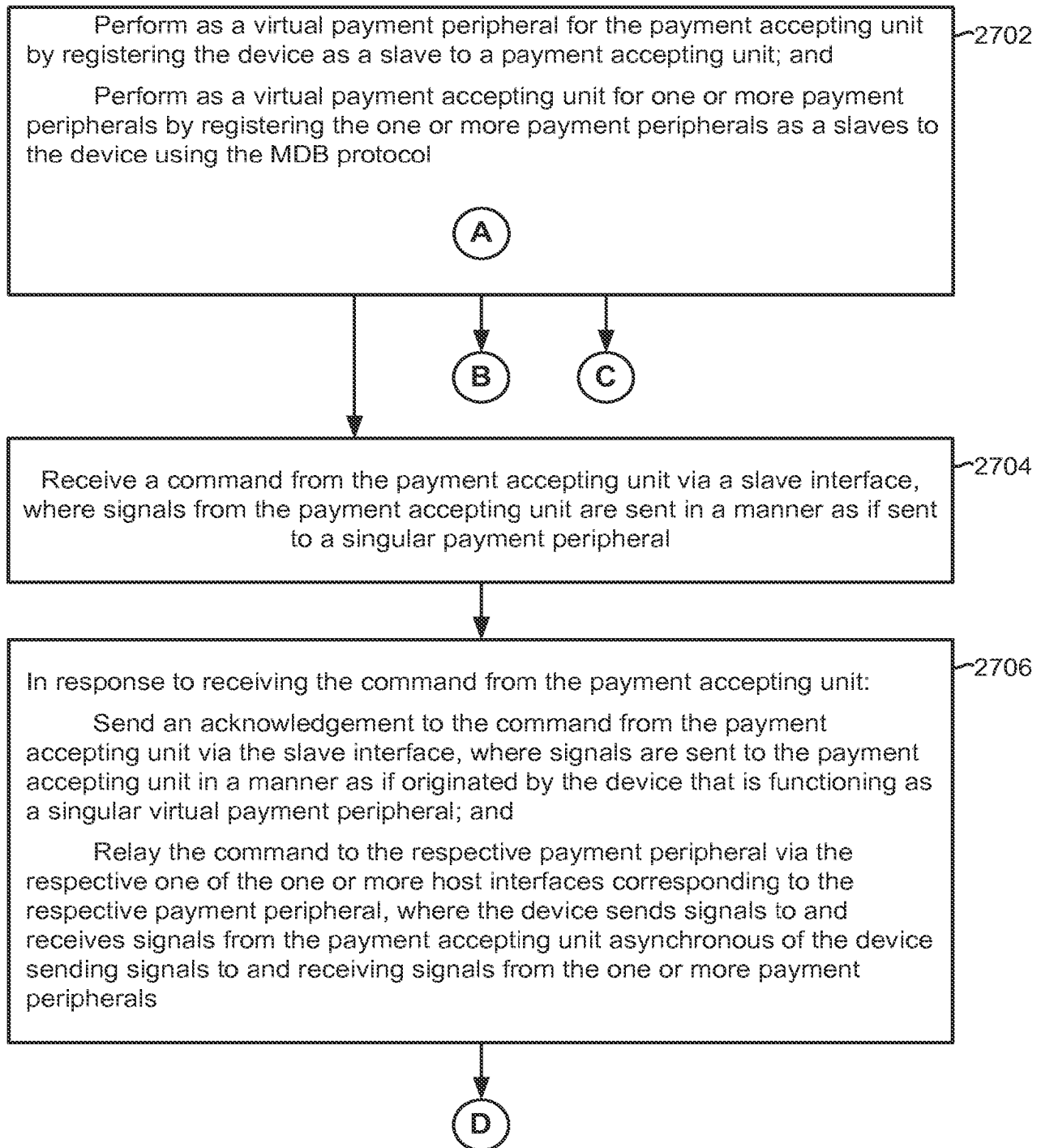
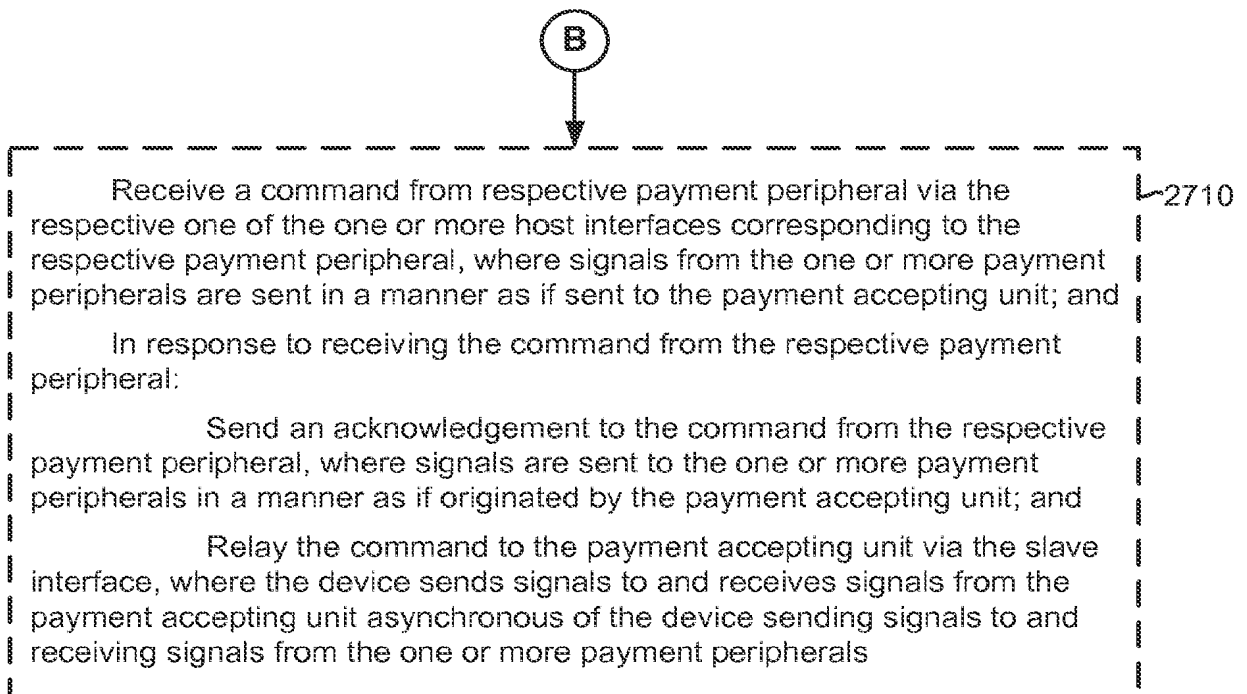
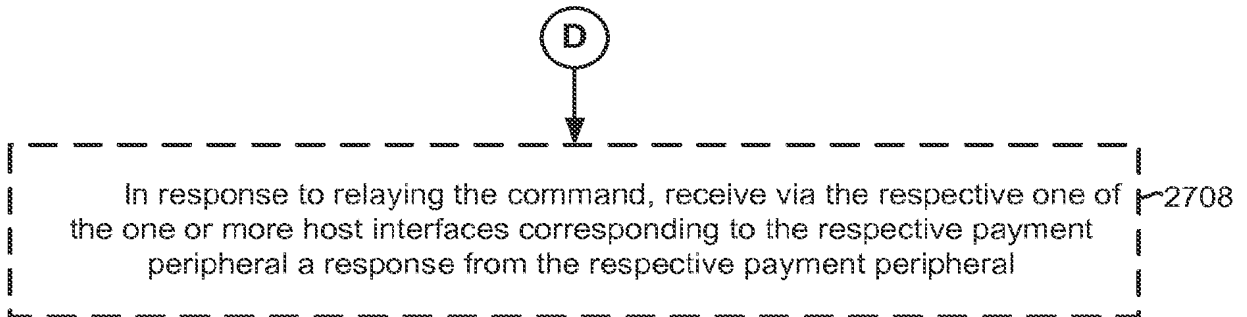
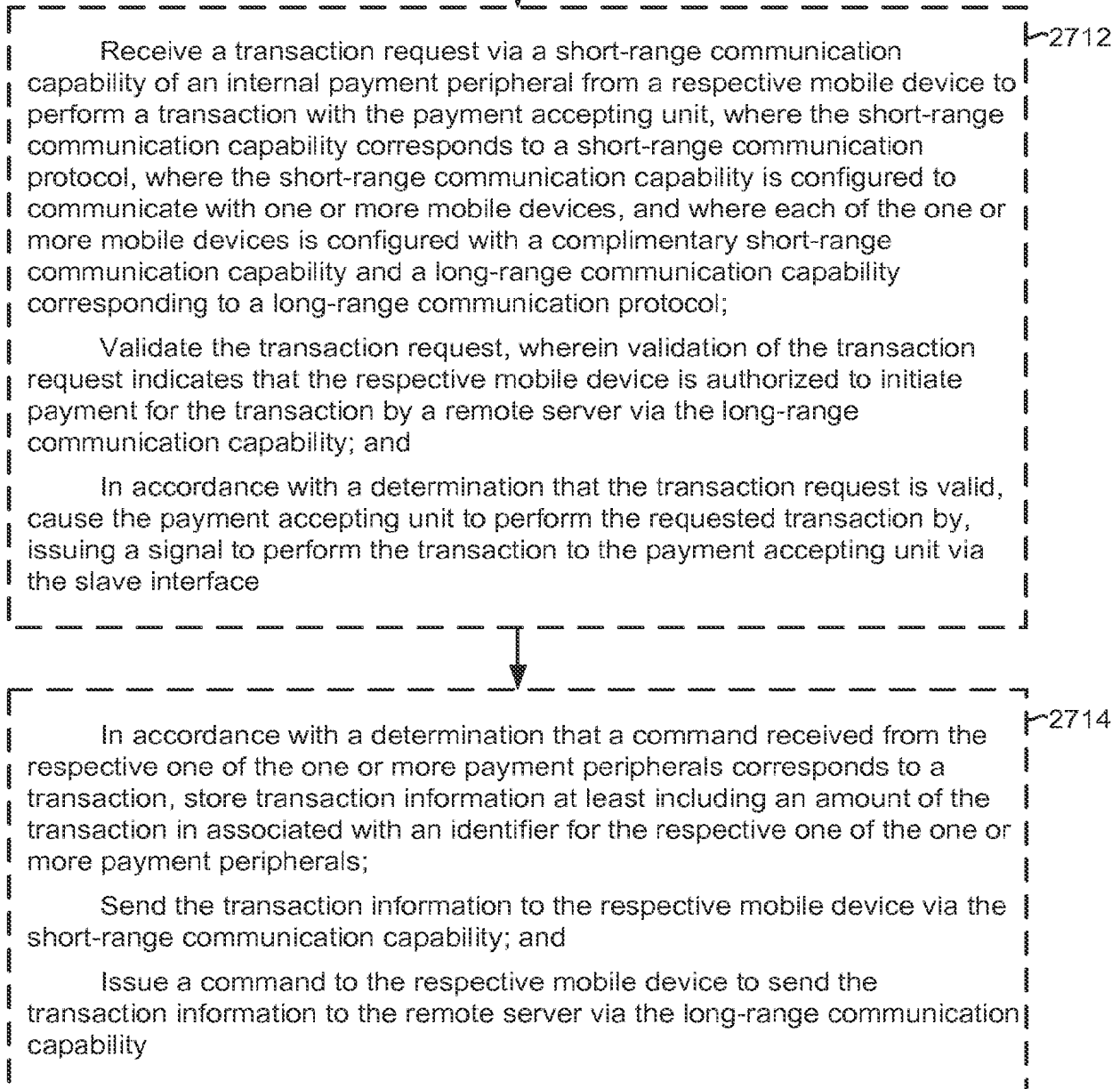


Figure 40A





**Figure 40B**



**Figure 40C**

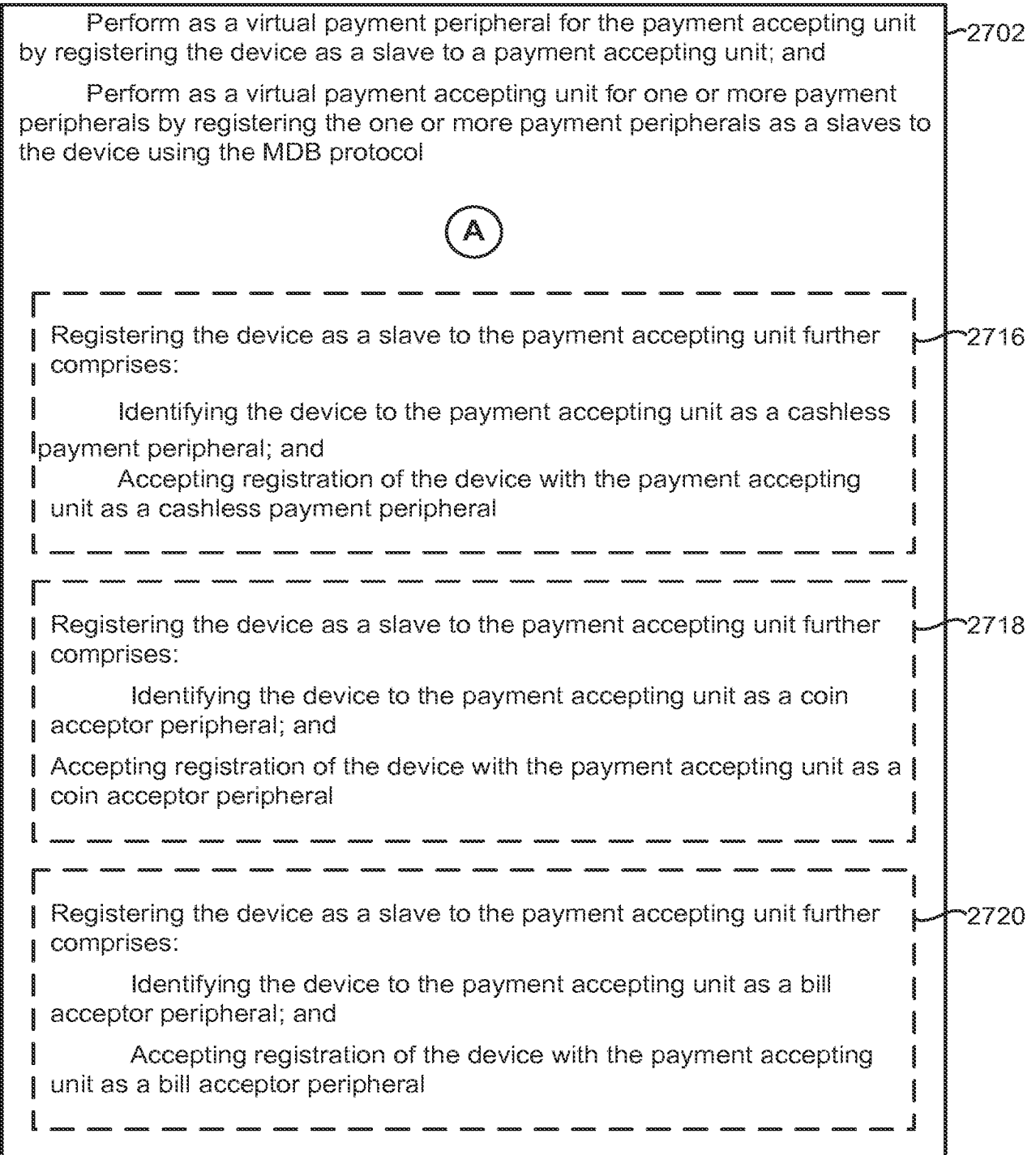


Figure 40D



EUROPEAN SEARCH REPORT

Application Number  
EP 21 16 5692

5

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
10 X	US 7 690 495 B1 (KOLLS H BROCK [US] ET AL) 6 April 2010 (2010-04-06) * column 4, line 35 - column 115, line 10 * * figures *	1-13	INV. G06Q20/32 G06Q20/36 G06Q20/40 G06Q30/06 G06Q20/18 G06Q20/38 G07F9/00 G07F9/02
15 A	US 2013/267176 A1 (HERTEL PHILIPP [US] ET AL) 10 October 2013 (2013-10-10) * paragraph [0015] - paragraph [0063] * * figures *	1-13	
20 A	US 2011/251910 A1 (DIMMICK JAMES [US]) 13 October 2011 (2011-10-13) * page 3, paragraph 32 - page 4, paragraph 48 * * page 4, paragraph 50 - page 5, paragraph 53 * * page 5, paragraph 55 - page 6, paragraph 62 * * page 6, paragraph 68-69 * * page 7, paragraph 73 - page 8, paragraph 86 * * figure 1 *	1-13	
25 A	WO 2013/132995 A1 (SONY CORP [JP]) 12 September 2013 (2013-09-12) * page 7, paragraph 18 - page 36, paragraph 122 * * figure 1 *	1-13	
30 A	US 2005/101295 A1 (RUPP STEPHAN [DE] ET AL) 12 May 2005 (2005-05-12) * page 2, paragraph 19 - page 4, paragraph 37 * * figures *	1-13	TECHNICAL FIELDS SEARCHED (IPC)  G06Q G07F
35 A			
40 A			
45	The present search report has been drawn up for all claims		
50	Place of search The Hague	Date of completion of the search 6 September 2021	Examiner Rachkov, Vassil
55	CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document		



EUROPEAN SEARCH REPORT

Application Number  
EP 21 16 5692

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	US 2012/316963 A1 (MOSHFEGHI MEHRAN [US]) 13 December 2012 (2012-12-13) * page 2, paragraph 22 - page 15, paragraph 127 * -----	1-13	
A	US 2012/108173 A1 (HAHM SEONG-IL [KR] ET AL) 3 May 2012 (2012-05-03) * paragraph [0030] - paragraph [0108] * * figures * -----	1-13	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
Place of search <b>The Hague</b>		Date of completion of the search <b>6 September 2021</b>	Examiner <b>Rachkov, Vassil</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 21 16 5692

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06-09-2021

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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# Motion sensing comes to mobile phones

The technology made popular by Nintendo's Wii game controller is adding new utility--and excitement--to the cell phone. Photos: Motion-sensing phones



Marguerite Reardon June 11, 2007 6:02 a.m. PT



**The same technology used in Nintendo's popular Wii video game console that lets you bowl strikes and hit tennis volleys like you're Venus Williams is also making its way into mobile handsets.**

Responding to a flick of the wrist or sweep of the arm, tiny sensors called accelerometers, which measure linear acceleration in the Wii mote game controller, translate motion into action on the screen. When the technology is added to a cell phone, the handset's utility changes in several intriguing ways. It can, for example, function as a motion-sensing mouse that lets you browse the mobile Internet by tilting the device left, right, up or down. It even can allow you to monitor a fitness workout by measuring the number of steps you take, your speed and the calories burned.

Experts say this is just the beginning. As accelerometers advanced from one-axis to two-axis to three-axis measurement capabilities, their accuracy has improved dramatically. And some companies, such as the 3-year-old start-up Invensense, are taking the technology a step further by combining three-axis accelerometers with gyroscopes, which measure rotation speed, to create even-more accurate sensors that could be used to improve photo stabilization and location and navigation services.

Analog Devices, one of the largest manufacturers of accelerometers, has already supplied more than 300 million of the devices to consumer electronics makers over the past decade, but Christophe Lemaire, the company's marketing manager, said the market is set to explode as more of these components make their way into cell phones.

"My sense is we are on the edge of seeing an explosion of more and more devices using motion sensors, and specifically MEM



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Accelerometers—especially those based on MEM systems, which combine electrical and mechanical components—have been used for years in airbag deployment in automobiles. For those applications the accelerometers are used to detect the rapid negative acceleration of the vehicle to determine when a collision has occurred and its severity.

But in the last few years the technology has also been incorporated into personal electronic devices, such as mobile phones, digital cameras, media players and handheld gaming devices. Several handset manufacturers including, Nokia, Samsung Electronics, LG Electronics, and even newcomer Apple have used accelerometer technology to provide some kind of motion-sensing capability in a handful of handset models.

**Not in the U.S.—yet**

Most of these phones have been available only in South Korea or Japan, where cutting-edge cell phone features typically originate. In the U.S., Apple's iPhone will be one of the first phones to use accelerometer technology.

The iPhone, set to debut in June on AT&T's wireless network, detects when the device is rotated, so it can tell whether to display what's on the screen in portrait (vertical) or landscape (horizontal) format. That allows the user to determine which format is best for viewing whatever is on the screen, be it a Web page, video or photo. The phone also can detect when it's being lifted to the ear, and responds by immediately turning off the display light to save power and preventing changes to the display image due to inadvertent contact with the touch-sensitive screen. The system restores screen power when the iPhone is moved away from the ear.

Lemaire said applications such as the ones employed by the iPhone are likely to become popular. He predicts handset makers will include accelerometers to detect if a phone is resting facedown, so that it can turn off the ringer or power down the display to conserve battery power. Accelerometers also could be used to shut off power on phones that have been left idle.

Those are a few basic applications for accelerometers. They can also be used to help people operate their phones without using a keypad. The Samsung SCH-S310, introduced in Asia in 2005, uses a three-axis accelerometer that allows a user to dial the phone by "writing" numbers in the air.

The Sharp V603SH, sold by Vodafone in Japan since 2005, also uses three-axis accelerometers to allow users to scroll through menus by moving the handset up, down, left or right. Users can also use the motion-sensing technology to turn their phone into a controller for



While many of the cool new applications can be done using three-axis accelerometers, experts agree that combining that technology on a single chip with a gyroscope, which can be used to measure rotational speed, could provide even finer sensory control.

### **An opening for gyroscopes?**

Gyroscopes are important for providing stabilization, said Steve Nasiri, CEO of Invensense. Like accelerometers, gyroscopes have been used for years in the automotive industry, where they are used to help stabilize cars so they don't roll over. Gyroscopes are also used in devices that require accurate balance sensing, such as the Segway.

Invensense is already supplying digital-camera companies with its tiny, MEM-based gyroscopes to help stabilize cameras and improve picture quality, especially on higher-megapixel cameras. This application alone could provide a huge opportunity to companies like Invensense, which is trying to combine gyroscopes with accelerometers.

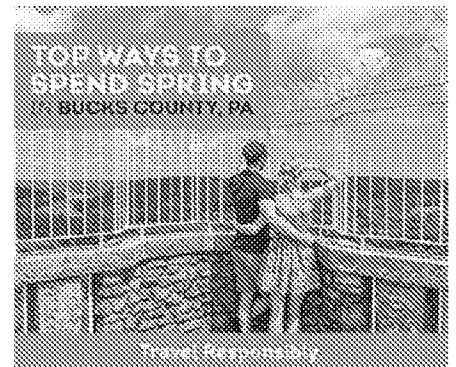
"The mobile handset market is the ultimate market to be in," Nasiri said. "With 700 million camera phones sold each year and over 50 percent of them with 3 megapixels or more, there is a real need for this technology."

In addition to image stabilization, gyroscopes used in combination with three-axis accelerometers could also help deliver more-accurate location and navigational services. Today, GPS receivers use internal compasses to help get a fix on which direction the phone is pointing. So if you are using a navigation service to get directions to the closest Starbucks, the phone will know if you are facing north, south, east or west. But the compasses work better when the devices are held perfectly horizontal--a position that can be difficult to maintain. A combination accelerometer and gyroscope could help stabilize the device to get a better read.

While Lemaire of Analog Devices agrees that integrating gyroscopes into a chipset that also has an accelerometer could improve accuracy, he also said that much of the improved functionality can be achieved with three-axis accelerometers alone, especially since gyroscopes are expensive, consume a lot of power and add bulkiness to devices.


"Gyroscopes provide greater range of motion, that's true," he said. "But the jury is still out on whether you can make a suitable gyroscope/accelerometer chip. Handset makers are looking for cheaper, lower-power and smaller components. That is their priority rather than adding more functionality, especially when it only adds marginal value."

But Invensense says it is developing a combined three-axis accelerometer and gyroscope that will meet price, power consumption and size constraints appropriate for mobile devices. Commercial products are at least a year away, but the company is already talking to major handset manufacturers, Nasiri said. In December, Invensense

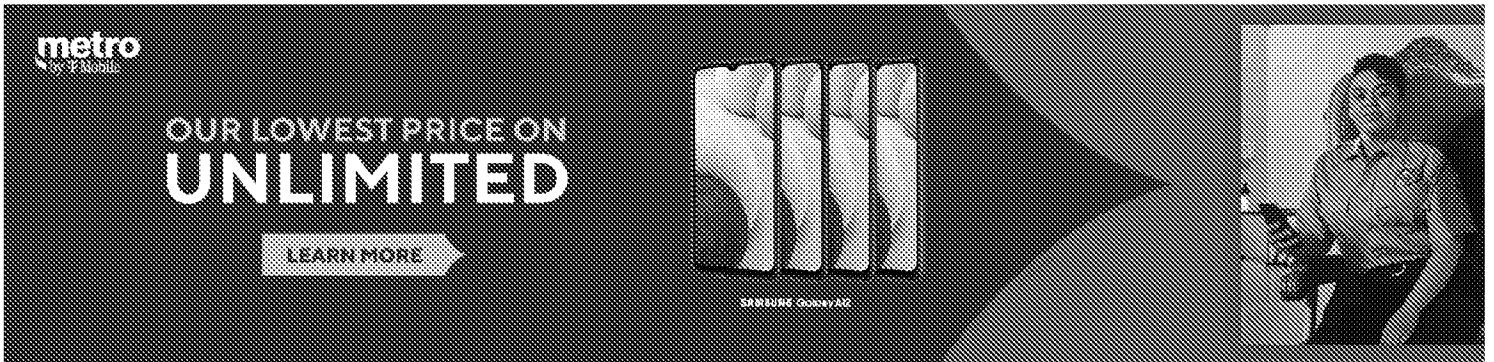


whether handset makers use three-axis accelerometer chips only or a combination chip that has both an accelerometer and gyroscope, experts agree that the best way to ensure the technology is adopted and the market takes off is to enable applications that help mobile operators generate revenue.

"I don't think that handset makers will integrate a \$2 sensor simply to allow people to scroll through screens better," said Marlene Bourne, president and principal analyst for Bourne Research. "But using it to improve picture quality, so that I actually want to send pictures I've taken on my phone to friends and family, which generates traffic on a carrier's network, might be worth it."

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Mobile



## Stimulus checks, tracking your money, plus-up payments: Everything to know

Another batch of stimulus payments is going out this week from the IRS. We'll explain the schedule, rules, timelines and other key details.



Clifford Colby May 26, 2021 2:00 p.m. PT



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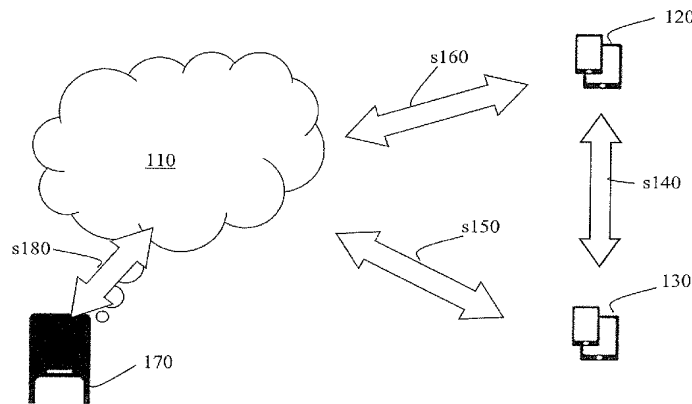


FIG. 1

(57) **Abstract:** A system and method for facilitating a refund to a user is disclosed. The system comprises a mobile device having means to communicate with a central processor for the generation of a refund account and a unique identifier; the unique identifier associated with the user; a computer device operable to access the unique identifier for verification upon receipt of a refund qualifying transaction associated with the user, the computer device further operable to send information relating to the refund qualifying transaction and generate a refund request upon successful verification; and the central processor operable to be in data communication with the computer device to receive and process the refund request, the central processor further configured to generate an electronic ticket to be sent to the mobile device for the generation of a refund upon successful process of the refund request.



## SYSTEM AND METHOD FOR FACILITATING REFUNDS

### FIELD OF THE INVENTION

The present invention relates to a system and method for facilitating refunds, such as but not limited to a tax refund for purchases made by tourists while  
5 travelling within their destination countries ("tourist refund").

### BACKGROUND ART

The following discussion of the background to the invention is intended to facilitate an understanding of the present invention only. It should be appreciated that the discussion is not an acknowledgement or admission that  
10 any of the material referred to was published, known or part of the common general knowledge of the person skilled in the art in any jurisdiction as at the priority date of the invention.

In line with tax principle while at the same time attracting tourists, jurisdictions that levy a Value-Added Tax (VAT) or Goods and Services Tax (GST) or  
15 similar would allow individuals such as tourists to claim a tax refund on the goods purchased within a country. This tax refund would be administered upon the departure of the tourists from the country; provided certain criteria are met such as the goods are unopened, unused and exported out of the country.

20 The Revenue/Customs authorities of the country can administer tourist refund scheme(s), although it is increasingly popular for commercial contractors to be appointed to administer on their behalf. These commercial contractors typically work in cooperation with the Revenue/Customs authorities to ensure that the appropriate amount of tax refunds is paid out to the tourist(s). A  
25 service or commission fee will be charged which would form the bulk of the revenue model for the commercial contractor.

Two methods of administration of tourist refund schemes are currently being operated in the world. One is based on the authentication of paper forms and mandatory checks including physical checks at the point of departure by

Revenue/Customs officials, and the other that is based on the electronic capture of transaction data by static devices at a participating retailer's shop and the use of this data to perform a risk-based selection of transactions for physical checks at the point of departure by Revenue/Customs officials.

- 5 For example, in Singapore the GST paid for purchases at the shops can be refunded via an electronic Tourist Refund Scheme (eTRS). The eTRS scheme starts when a tourist makes a purchase at a participating retailer and shows his passport at the point of purchase to prove his eligibility. Some non-exhaustive examples of the criteria that the tourist must fulfill in order to be
- 10 eligible for the GST tax refund include:
- i. the tourist is not a Singapore citizen or permanent resident of Singapore;
  - ii. the tourist had not spent more than 365 days in Singapore in the past twenty-four (24) months before the date of purchase;
  - iii. the tourist has not been employed in Singapore at any time in the past six
  - 15 (6) months before the date of purchase;
  - iv. the tourist is sixteen (16) years old or above at the time of purchase; and
  - v. the tourist is not a crew member of any aircraft or international cruise departing Singapore.

When paying for the purchases, the tourist would typically utilize a credit/debit

20 card. Information such as the sixteen-digit primary account number (PAN) related the credit/debit card may be used as an identifier or token for tagging the purchases entitled for refund. The participating retailer (merchant) may also issue a paper eTRS Ticket to the tourist. The eTRS Ticket can also be used as a token instead of the credit/debit card.

25 With this token, the tourist can apply for a GST refund at the eTRS self-help kiosk before checking in at an airport or other immigration departure points such as, but not limited to, an airport or a cruise centre. If approved, the eTRS self-help kiosk would generate a Notification Slip indicating "Approved". Depending on the mode of refund selected by the tourist, the tourist can

obtain the refund (minus a service fee) by a direct credit into a designated refund account, such as credit card account, by a bank cheque or in cash at a central refund counter using the approved Notification Slip. If not approved, the eTRS self-help kiosk would generate a Notification Slip indicating that the refund is "Not Approved". The tourist then brings his purchases to the Customs counter for physical inspection. If the goods pass Customs inspection, a Customs officer would generate a Notification Slip indicating "Approved" to replace the "Not Approved" Notification Slip. During peak hours, these could become bottlenecks in processing the departing tourists as the customs counter is limited by manpower while the self-help kiosks may be overwhelmed by the number of tourists applying for refunds. Departing tourists typically have to arrive at the immigration departure points earlier to locate these static self-help kiosks in anticipation of a queue.

Further, in order to qualify for the GST refund in Singapore, the tourist must meet certain criteria. These criteria include spending at least S\$100 (including GST) that can be accumulated in up to three (3) same-day invoices or receipts from retailers bearing the same GST registration number. Also, the tourist has to depart with the goods via the airport or cruise centre within a predetermined period, such as two (2) months from the date of purchase. The tourist must also depart with the goods within twelve (12) hours after obtaining approval of the GST refund. If the tourist is departing on an international cruise (excluding cruises-to-nowhere, round-trip cruise and regional ferry) from the cruise terminal, he must declare that he is exiting Singapore and will not return via the same voyage on the same ship, using his cruise itinerary as documentary proof of departure, and commit that he will not be returning to Singapore within forty-eight (48) hours. Further additional criteria may be imposed on student pass holders.

The authorities typically require that the purchases are verified against the invoices or receipts, and the goods are unused, unopened and exported out of the country and this is done at a counter either before check in (for goods that are to be checked in) or after immigration, to ensure that the goods are exported. However, the authorities at times do a targeted check instead.

With the proliferation of mobile devices, it is common for tourists to travel with at least one personal mobile device that may be used to connect to the internet either via a wireless fidelity (Wi-Fi) networks or mobile telecommunications networks. Hence, it is envisaged that the functions of the mobile device, in particular smartphones, can be better utilized in allowing electronic tax refunds to be facilitated through the use of a dedicated software application residing on this mobile device together with its onboard camera, geo-location module, wireless communication module (Bluetooth and Wi-Fi), alarm notifications, internet connectivity etc.

10 The present invention seeks to provide a system and method that alleviates the above-mentioned drawbacks or meet the above needs at least in part.

#### **SUMMARY OF THE INVENTION**

Throughout the document, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

Furthermore, throughout the specification, unless the context requires otherwise, the word "include" or variations such as "includes" or "including", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

The present invention seeks to meet the needs of a tax refund system that does not rely on self-help kiosks, and enables users such as tourists to access their tax refunds efficiently and accurately. The invention proposes a system and method of administration by way of an application software installable on mobile devices to verify user identity, facilitate a completely paperless tourist tax refund experience, and enable more types of transaction data to be captured for a more complete risk-based selection.

A technical problem the invention seeks to solve relates to the bottlenecks faced by customs at peak hour. Another technical problem is associated with

the need to verify identities of tourists and transactions, such as purchases against the invoices and receipts in a more effective and efficient manner to reduce identity and transaction frauds.

The above and other problems are alleviated at least in part and an  
5 improvement in the art is made by a system in accordance with this invention. A first advantage of the system in accordance with this invention is that the tourist refund process is completely electronic, thereby eliminating the need to deal with paper refund tickets and paper receipts. A second advantage of the system in accordance with this invention is that the tourist is able to register in  
10 their own time and convenience on their mobile devices and after logging into the system, the tourist is able to view a consolidated list of all the refund claims they have made via the system, the additional spending required in order to fulfil the minimum spending requirement, as well as the amount of intermediate value accumulated and used. Such intermediate value may be  
15 translated into a form of 'rewards points' or the like. An associated third advantage of the system in accordance with this invention is that by having an intermediate value system (in the form of rewards point or the like) that is currency agnostic, there is no need to convert currencies. This mitigates any fluctuations in the exchange rates. Such an arrangement provides more  
20 certainty to the tourist in terms of the amount of tax refund obtainable, which can be spent even before the refund was actually approved. In accordance with an aspect of the invention there comprises a system for facilitating refund to a user comprising: a mobile device having means to communicate with a central processor for the generation of a refund account and a unique  
25 identifier; the unique identifier associated with the user; a computer device operable to access the unique identifier for verification upon receipt of a refund qualifying transaction associated with the user, the computer device further operable to receive and send information relating to the refund qualifying transaction and generate a refund request upon successful  
30 verification; and the central processor operable to be in data communication with the computer device to receive or send information relating to verification of the unique identification and the refund qualifying transaction and process



the verification or refund request, the central processor further configured to generate an electronic ticket to be sent to the mobile device for the generation of a refund upon successful process of the refund request.

5 In some embodiments, the refund may be a tax refund, and be in the form of an intermediate value. The intermediate value may be derived from the actual value of refund based on a conversion rate.

10 In some embodiments, the computer device may be a point-of-sale device, such that the point-of-sale device may be configured to directly send information relating to the refund qualifying transaction to the central processor.

15 In some embodiments, the generated unique identifier may be encoded as a quick response (QR) code and the computer device accesses the unique identifier by scanning the QR code displayed on the mobile device.

20 In some embodiments, the central processor may be operable to send the electronic ticket to a third party server for further verification of the refund qualifying transaction and confirmation of the refund.

25 In some embodiments, the central processor stores the information relating to the refund qualifying transaction in a database before the electronic ticket is generated and sent to the third party server.

In some embodiments, the mobile device may be operable to send an electronic notification related to a requirement being met. The requirement may be a confirmation of departure, or a Declaration of Eligibility.

30 In some embodiments, the mobile device may be operable to receive a notification of refund issued by a third party server once the electronic ticket is processed successfully.

In some embodiments, the central processor is operable to receive a notification of refund issued by a third party server once the at least one electronic ticket is processed successfully and the central processor is operable to send a notification of refund to the mobile device.

5

In some embodiments, the unique identifier associated with the user is generated based on a passport information of the user.

10 In some embodiments, the unique identifier is generated after a registration process.

In some embodiments, the unique identifier is further associated with an image capture of the passport.

15 In some embodiments, the mobile device is integrated with the computing device.

In some embodiments, the central processor is operable to send a notification to the mobile device indicating the success or failure of the refund request.

20

In some embodiments, there comprises another unique identifier associated with a retailer using the computer device.

25 In some embodiments, the another unique identifier is generated after a registration process by the retailer.

In some embodiments, the another unique identifier is further associated with an image capture of one or more account information associated with the retailer.

30

In some embodiments, if the unique identifier is not accessible by the computer device, the computer device is operable to obtain an alternative identifier for verification and send the alternative identifier to the central

processor.

5 In some embodiments, upon receipt of the alternative identifier, the central processor is operable to determine whether a corresponding refund account associated with the user is present and if not, the central processor is operable to generate the refund account and the unique identifier based on the alternative identifier.

10 In some embodiments, the central processor comprises or is in data communication with a database for storing at least one retailer list of goods and services eligible for tax refund.

15 In some embodiments, the central processor is operable to receive a wish-list of goods and services from the mobile device and upon receipt of the wish-list, compare the wish-list with the at least one retailer list of goods and services.

20 In some embodiments, when there is a match between the wish-list and the at least one retailer list, the central processor is operable to provide a matched list to the mobile device.

25 In some embodiments, where the electronic ticket is a provisional electronic ticket, the provisional electronic ticket comprises a plurality of electronic receipts.

In some embodiments, the provisional electronic ticket is converted to a final electronic ticket at an approved departure point.

30 In some embodiments, the central processor arranged in data communication with at least one third party server to retrieve information related to the identity of the user, and sends the information related to the identity of the user to the computer device.

In some embodiments, if the refund request is not successfully processed, the central processor is arranged in data communication with another computer device provided to an authorized personnel to perform further processing.

- 5 In accordance with another aspect of the invention there is a method for facilitating a refund to a user comprising the steps of: communicating via a mobile device with a central processor for the generation of a refund account and a unique identifier, the unique identifier associated with the user; via a computer device, accessing the unique identifier for verification on receipt of a  
10 refund qualifying transaction associated with the user; generating a refund request upon successful verification; sending information relating to the refund qualifying transaction via a central processor; receiving and processing the refund request; wherein the central processor is further configured to generate an electronic ticket to be sent to the mobile device for the generation of a  
15 refund upon successful process of the refund request.

In some embodiments, the method further includes the step of converting the refund to an intermediate value after the generation of the refund.

- 20 In some embodiments, the intermediate value is derived from the actual value of refund based on a conversion rate.

- In some embodiments, the method further comprises the step of exporting the information relating to the refund qualifying transaction via a point-of-sale  
25 (POS) device in data communication with the computer device, the point-of-sale device is configured to directly send information relating to the refund qualifying transaction to the central processor.

- In some embodiments, the computer device accesses the unique identifier by  
30 scanning an image shown on the mobile device.

In some embodiments, the method further comprises the step of sending the electronic ticket to a government server for further verification of the refund

qualifying transaction and confirmation of the refund.

5 In some embodiments, the mobile device is operable to send an electronic notification related to a requirement being met. The requirement may be a confirmation of departure. The requirement may alternatively, or in conjunction, be a Declaration of Eligibility.

10 In some embodiments, the generation of electronic ticket is based upon one or more requirements being met.

In some embodiments, the method further comprises a step of sending an electronic notification to the mobile device indicating the success or failure of the refund request.

15 In some embodiments, the method further comprises a step of obtaining an alternative identifier for verification and sending the alternative identifier to the central processor if the unique identifier is not accessible by the computer device.

20 In some embodiments, upon receipt of the alternative identifier, the central processor is operable to determine whether a corresponding refund account associated with the user is present and if not, the central processor is operable to generate the refund account and the unique identifier based on the alternative identifier.

25 In some embodiments, the central processor comprises a database for storing at least one retailer list of goods eligible for tax refund.

30 In some embodiments, the central processor is operable to receive a wish-list of goods from the mobile device and upon receipt of the wish-list, compare the wish-list with the at least one retailer list of goods or services.

In some embodiments, when there is a match between the wish-list and the at

least one retailer list, the central processor is operable to provide a matched list to the mobile device.

5 In some embodiments, the electronic ticket is a provisional electronic ticket, the provisional electronic ticket comprises a plurality of electronic receipts. The provisional electronic ticket may be converted to a final electronic ticket at an approved departure point.

10 In accordance with another aspect of the invention there is a non-transitory computer readable medium containing executable software instructions thereon wherein when executed on a mobile device and/or a computer device performs the method of facilitating a refund to a user comprising the steps of: communicating via the mobile device with a central processor for the generation of a refund account and a unique identifier, the unique identifier  
15 associated with the user; accessing the unique identifier for verification via a computer device on receipt of a refund qualifying transaction associated with the user; sending information relating to the refund qualifying transaction; generating a refund request upon successful verification; and receiving and processing the refund request by a central processor, wherein the central  
20 processor is further configured to generate an electronic ticket to be sent to the mobile device for the generation of a refund upon successful process of the refund request.

The non-transitory computer readable medium may further comprises a software instruction to send an electronic notification to the mobile device  
25 indicating the success or failure of the refund request.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

The present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

30 Fig. 1 is the overall architecture of an embodiment of the invention showing how the various parts of the system interact;

Fig. 2 is a flowchart of an embodiment of the invention showing how a user is taken through the system when the application is launched;

Fig. 3 is a state machine diagram of an embodiment of the invention; and

Fig. 4 and Fig. 5 show how a single MDCC device may be used for the deployment of tourist refund in accordance with other embodiments of the invention.

Other arrangements of the invention are possible and, consequently, the accompanying drawing is not to be understood as superseding the generality of the preceding description of the invention.

10

## **PREFERRED EMBODIMENTS OF THE INVENTION**

Particular embodiments of the present invention will now be described with reference to the accompanying drawings. The terminology used herein is for the purpose of describing particular embodiments only and is not intended to limit the scope of the present invention. Additionally, unless defined otherwise, all technical and scientific terms used herein have the same meanings as commonly understood by one of ordinary skill in the art to which this invention belongs.

20

In accordance with an embodiment of the present invention and with reference to Fig. 1, there is a system 10 for facilitating refunds. The refund may be in the form of tax refund provided to a tourist and will be described in such a context. It is to be appreciated that the system 10 may be adapted for other types of refunds and not limited to a tax refund. The term 'refunds' include refund in an electronic medium.

The system 10 comprises a central processor 110. Central processor 110 may be in the form of one or more processors and/or servers 110 belonging to an organisation administering the tourist refunds. An example of such an organisation is the Central Refund Agency (CRA). The CRA may be a private organisation, a government organisation, or a quasi-government organisation.

30

The CRA may further be in data communication with a Central Clearing House (CCH) 170 for the purpose of settlement and crediting of refund value.

The one or more servers 110 can include a cloud server or a conventional server with data communications capability. For the ease of discussion, the

5 one or more server will hereinafter be referred to as 'server' or 'servers'.

Server 110 may be connected to one or more databases (not shown). Such database(s) are operable to contain records and information relating to the tourist refunds such as name, addresses and/or pre-generated or generated

unique identifiers associated with the users seeking refunds. Server 110 is  
10 also operable to generate and update refund accounts for facilitating, processing and crediting refunds.

In one embodiment, the system 10 comprises a mobile device 120, preferably endowed with communications and computing capabilities and hereinafter referred to as MDCC 120, and computing device 130 (hereinafter referred to

15 as 'Retailer Device' 130). The Retailer Device 130 can also be an MDCC or other computing device like a desktop/laptop computer. A Point-of-Sale (POS) device/system may be in data communication with the Retailer Device 130, the data communication in wired or wireless, remotely or otherwise. Alternatively, the POS device or its associated function may be  
20 incorporated/integrated with the Retailer device 130 as a module.

To facilitate the refund process, the mobile device 120 and computing device 130 may be installed with dedicated software applications (colloquially known as 'apps'). Such dedicated software applications may be operating system (OS) such as iOS<sup>TM</sup> or Android<sup>TM</sup> specific, and/or device specific.

25 The software application installable on mobile device 120 provides a user interface for user registration and for retrieving or providing information for the refund process. Once installed, the software application is operable to perform at least the following functions:-

- a. receive registration details entered by the user;
- 30 b. communicate with the server 110 to send the registration details;
- c. receive from the server 110 a unique identifier associated with the user (tourist);
- d. receive from the server 110 information related to the refund process;



- e. display notifications/alerts on the MDCC 120 relating to refund process;
- f. provide user interface for user to browse or view account details;
- g. search for necessary communication networks for data communication with the server 110 and the computing device 130 (if necessary); and
- 5 h. store, organise and retrieve information received from various parties.

The MDCC 120 and the Retailer Device 130 can be any mobile electronic device(s) that can connect wirelessly to Wi-Fi networks or conventional telecommunications networks such as 2G, 3G, 4G, or LTE based networks. The mobile electronic devices include, but are not limited to mobile devices  
10 like smartphones, personal digital assistant (PDA) phones and tablets. The devices include mobile devices running on iOS platforms such as the iPhone and the iPad.

The invention will next be described in the context where a user of MDCC 120 (presumably a tourist) downloads a dedicated software application  
15 (hereinafter 'software application') onto the MDCC 120 for registration with the system 10; and usage of the MDCC 120 with the installed software application for facilitating refunds.

During the first usage after downloading the dedicated software application, a registration process is initiated where the tourist is prompted to register by  
20 entering his or her registration details into the application. The tourist may enter the necessary details for registration via manual entry or via imaging the identification documents associated with the tourist, if the MDCC 120 comprises an imaging device or module such as an on-board camera. The identification documents may include passport or other approved identification  
25 papers identifying the user as a tourist. In the case of a passport that comprises a machine readable zone (for example barcode), the MDCC 120 may also be used for reading the readable zone on the passport using the on-board camera or if the MDCC 120 is installed with the necessary hardware and/or software for doing the same.

30 The registration process can further integrate a verification of the authenticity of passports. The registration process can also include a check against records or entries in one or more authorized databases (for example government immigration records) to ascertain the eligibility of the tourist for a

tax refund. Such authorized databases may be public or private databases. With these verifications, the tourist may not need to carry his passport in order for the retailer to verify his tourist status, subject to regulatory acceptance of such method of verifications.

5 Upon receiving the registration information, the MDCC 120 next sends the registration information to the server 110 for the creation of a user account. Once the user account is created, the server 110 then replies to the MDCC 120 with a unique identifier associated with the user account, for the tourist. The unique identifier can be in the form of an assigned account number  
10 and/or encoded into a QR or Quick Response code by the server 110 or software application installed on MDCC 120. The QR code is a type of matrix barcode that is machine readable and can contain information that can quickly be translated into usable data.

Once the unique identifier is generated, the unique identifier can be accessed  
15 on the same MDCC 120 used to register the user or on any other mobile devices 120 that is compatible with the form or physical medium that the unique identifier is encoded. In this regard, the unique identifier is therefore device agnostic. Other types of machine readable codes like barcodes can also be used in place of QR codes, although these may hold less data. This  
20 QR code is tied/tagged to each and every tax refund qualifying transaction made by the tourist.

It is to be appreciated that the unique identifier may include a simple account number, and/or a combination/hybrid of one or more of the above described codes.

25 Once registered and a user account is in place, the tourist user may then make tax refund qualifying transactions such as tax refund qualifying purchases at one or more participating retailers.

After the tax refund qualifying purchase is made at the participating retailer,  
30 the tourist retrieves his or her unique identifier, in the form of a QR code, for display on the MDCC 120. The participating retailer uses the Retailer Device 130 to scan the QR code (s140) for verification on the eligibility for a tax refund by checking against the server 110 to ascertain if the tourist has a

registered account and is eligible for a refund. As an example, the check will include comparing and matching entries with the server 110 and/or its associated processor(s) or database(s) to determine if the passport is a foreign passport and if the tourist is at an age eligible for refund (e.g. 16 years or older). The server 110 can also perform a check against government immigration records via the government server 170 to ascertain the eligibility of the tourist for a tax refund. Alternative ways of unique identifier accessing technology or combinations may be used. Examples of such technologies may include Near Field Communications (NFC), Bluetooth, Wi-Fi, etc. as known to a skilled person. The identification may also be manually entered into the Retailer Device 130. Such a step of verification may include checking the physical passport and the passport information/details submitted, subject to compliance with the necessary regulatory requirements.

Upon scanning of the unique identifier, the participating retailer may enter the purchase/transaction details related to the purchase made by the tourist into the Retailer Device 130. The transaction details may be manually or automatically transmitted. In the latter, the transaction details may be transmitted automatically via a cable or wirelessly from a Point-of-Sale ("POS") system and/or POS device, the POS device configured to send the information relating to the refund qualifying transaction, i.e. purchase/transaction details to the Retailer Device 130 and/or server 110. For example, to facilitate the transmission, a software driver may be installed on the POS system for detecting the Retailer Device 130 as a printer, so that the POS device can print the transaction details to the Retailer Device 130. Alternatively, software may be installed on the POS device or system to capture the transaction details from a payment screen via an Optical Character Recognition (OCR) module. In the case of an Internet-enabled POS system or device, the purchase or transaction details can be directly transmitted to the server 110 via one or more wired or wireless communication means. The transaction details may then be accessible via a web resource locator or link, such as a Uniform Resource Locator (URL).

If a paper receipt is issued for the transaction, the Retailer Device 130 may also be used to image or scan the paper receipt associated with the

transaction for the transaction details to be extracted by an image conversion and/or recognition module, such as, for example the OCR module. Once the retailer has verified the transaction details thus captured, he can transmit the transaction details to the server 110 via the Retailer Device 130. In another  
5 embodiment, the MDCC 120 may be used in place of the Retailer Device 130 to image or scan the paper receipt associated with the transaction. Once the retailer has verified the transaction details thus captured, he can present the tourist with a retailer identifier, which can be another QR code, unique to the retailer, for scanning by the MDCC 120, as a form of retailer  
10 confirmation/receipt.

In another embodiment, if a user is unable to present his unique identifier in the form of a QR code (for example because the user has not yet registered with the server 110), the retailer may scan an alternative identifier, such as but not limited to the Tourist's passport to retrieve his account information. The  
15 scanning device may be the Retailer Device 130 or in the form of a barcode scanner or other imaging device and once the passport has been scanned, the server 110 checks if the tourist has a registered account and eligible for a refund, e.g. if passport is a foreign passport and if tourist is at an age eligible for refund (e.g. 16 years or older). The server 110 can also perform a check  
20 against third party servers or databases, such as government immigration records via the government server 170 to ascertain the eligibility of the tourist for a tax refund. If the tourist is not eligible, the server 110 prompts an authorized personnel (e.g. a cashier) to inform the tourist that he is not eligible for tourist refund. If the tourist is eligible, the server 110 checks for an existing  
25 account by comparing the scanned details with one or more databases of the server 110. If a user account already exists, the app installed on the retailer device 130 is operable to display the user profile or details for validation by the cashier. If the tourist before the cashier matches the user profile, then the cashier confirms the user (customer) identity via a user interface and  
30 proceeds to enter receipt details. If a user account does not exist for the tourist, the server 110 creates a user account and the cashier proceeds to enter receipt details.

The Retailer Device 130 (or the MDCC 120) is operable to send the unique

identifier, as well as the transaction details like the cost, the receipt number, the date and time of the transaction, etc. (see s150) to the server 110. No transaction details can be transmitted without the necessary information associated with the unique identifier (in the form of the QR code) on the MDCC 120 (or on the Retailer Device 130). To minimize fraud, the the Retailer Device 130 can be configured (by the retailer or otherwise) to halt all communications outside of the retailer's opening hours. This would prevent unauthorised tax refunds claims from being entered into the system. The security of the system 10 can be further enhanced by a password management system that requires the cashier to log into the retailer account and may require the password to be changed regularly. Sub-accounts may also be created for individual employees of the retailer who are responsible for collecting payment and their supervisors to create a system of checks-and-balances for approving unusual tax refund claims. Prior to use, the retailer account may undergo a similar registration process as described earlier for the user (tourist) account. In some embodiments, the registration process entails the server 110 assigning or issuing retailers with user identifiers (IDs) and passwords. A manager of the retailer may create sub-accounts. Alternatively the server 110 may assign subaccounts to the retailers, who in turn have administrative rights to manage the sub-accounts. Similar to the registration of the user account, another retailer unique identifier such as a QR code may be generated and assigned to each retailer who registers for an account to participate in the system.

Based on the details sent by the participating retailer, the server 110 sends an electronic ticket for the notification of transaction. Such a notification may be in the form of an eTRS Ticket (containing the details mandated by the Revenue/Customs authorities such as a documentary ID or DOC-ID that uniquely identifies the transaction) directly to the MDCC 120, thus recording the purchase as an eTRS Transaction. The server 110 would also notify the participating retailer via the dedicated software application installed on the Retailer Device 130 of the eTRS Ticket (see s150).

The MDCC 120 is operable to image, store and organise the purchase receipts and invoices issued by the participating retailer, and link these with

the eTRS Transaction for ease of subsequent retrieval by the tourist or by an inspector of the Revenue/Customs authorities. The server 110 will transmit the transaction details as required by the Revenue/Customs authorities to a Central Clearing House (CCH) 170 for lodgement as an eTRS Transaction  
5 180. In another embodiment of the present invention, the server 110 can also request the CCH 170 to perform an instance of risk assessment after each transaction, and communicate 180 the risk assessment results to the server 110. If the result is such that the tourist is selected to present his or her purchases for inspection by an officer of the Revenue/Customs authorities at  
10 the point of departure from the country, the server 110 would then notify the tourist of this requirement via the software application installed on the MDCC 120 either shortly after the transaction itself and/or at the point of departure from the country (s160). This early deterrence would assist to deter potential fraudsters from trying to obtain a tax refund through fraudulent means.

15 With additional tax refund qualifying purchases, multiple eTRS Tickets can be sent to the MDCC 120 in the same direct way (s160).

When the tourist is leaving the country, the MDCC 120 or the dedicated software application installed on the MDCC 120 would request for confirmation of departure from the tourist. Once the tourist confirms his  
20 departure from the country, the tourist can request for a refund together with a Declaration of Eligibility (a requirement by the Singapore Revenue/Customs authorities) or other declarations as required by the Revenue/Customs authorities (s160). The tourist may be guided through the Declaration of Eligibility process by the application on the MDCC 120, which also displays  
25 the passport details of the tourist for his or her confirmation as the person making the Declaration. Purchases recorded as eTRS Transactions are also displayed for the tourist to select those for which he or she would like to submit a claim for tax refund. For those tax refundable purchases made through retailers that do not operate the application, the application on MDCC  
30 120 can scan the paper copy of the eTRS Tickets issued by these retailers so that all the transactions are consolidated. Alternatively, the CCH 170 can also transmit electronically, the details contained in the paper eTRS Tickets, to MDCC 120, upon request by the MDCC 120 or the dedicated software

application installed on the MDCC 120. The tourist would also confirm the preferred refund option – whether in cash or credited back to a credit/debit card or a bank account or even an electronic wallet account – and the application guides the tourist to confirm the relevant details accordingly. The preferred refund option and details may have already been entered at the point of user registration, otherwise the tourist will be prompted to do so. The tourist may also enter the necessary details via manual entry or via imaging the credit card via the on-board camera on MDCC 120, for example.

Once the various fields are completed, the application can allow the tourist to confirm the details one last time before submitting them to the server 110.

In addition to the tourist proactively initiating a request for refund, one way of reminding the tourist to submit the request for refund would be to use a location-based service, such as Global Positioning System (GPS), geofencing, navigation systems etc, to alert the MDCC 120 when the MDCC 120 is detected within range of a departure point installed with a location-based service device, examples of such departure points including an airport or a cruise centre. This would notify and remind the tourist to submit the request for refund. Alternatively, the application on the tourist MDCC 120 can also rely on Wi-Fi networks or cellular base stations at the airport and the cruise centre to remind the tourist when the MDCC 120 accesses these networks. Alternatively, the MDCC 120 can detect transmitters (including but not limited to Bluetooth Low Energy beacons) located at a departure point, such as an airport or a cruise centre, and trigger the application to remind the tourist. This saves the tourist the trouble of having to arrive at the airport early to locate the eTRS self-help kiosk, since the tourist can now submit the request using his or her MDCC 120.

Once the request for refund is submitted (s160) to the server 110, the CCH 170 is notified via s180 and can communicate to the server 110 as to whether the tourist has been selected for inspection by the Revenue/Customs authorities and the server 110 notifies the tourist via the MDCC 120 accordingly (s160).

For tourists who have not been selected for inspection, they would receive a digitised Notification of Approval slip on their MDCC 120. Those who have not received a notification of approval slip and/or have been selected for inspection either at any point of purchase or after the submission of the request for refund would receive a digitised Notification of Inspection slip prompting them to proceed to a counter of the Revenue/Customs authorities for further processing. There, upon presenting the digitised eTRS tickets, invoices/receipts and notification slips stored on the tourists' MDCC 120 together with the goods purchased, passport and plane ticket, as required, an authorized personnel such as the Revenue/Customs officer or inspector updates the record stored at the CCH 170. This may be performed via a separate computing device provided to the customs officer having a dedicated software application installed thereon and arranged in data communication with the server 110 to interact with the server 110. In some embodiments, a 'customs officer' identifier in the form of a QR Code may be provided to the customs inspector to present to the tourist after the customs inspector is satisfied with the eligibility of the tourist and the purchases for a refund. Upon scanning of the QR Code, the server 110 then updates the CCH record as "Approved" and issues a Notification of Approval slip. This Notification of approval may be in paper, or digitised and sent to their MDCC 120.

Cash refunds would be made at a Central Refund Counter (CRC) upon presentation of the Notification of Approval slips, otherwise the monies would be credited to their credit/debit card or bank account as previously indicated, or any payment platforms (e.g. Alipay<sup>TM</sup>, Paypal<sup>TM</sup>) for facilitating the transfer of refund monies to one or more user accounts. The tourists would then proceed to depart Singapore accordingly.

In some embodiments, instead of a cash refund, the refund value may be converted to an intermediate value. Examples of such intermediate value may be coupons, credits, points, or other electronic value etc. One embodiment of



an intermediate value is in the form of 'rewards points'. Such a system of rewards points can also be implemented into the tourist refund process, where the rewards points can be applied towards the purchase of goods and services at participating retailers. Retailers participating in this system of rewards points can be the same ones that are accredited under the tourist refund scheme or retailers that are not accredited but can also be equipped with a Retailer Device 130. Tourists can accumulate rewards points issued by the CRA. In the conversion of tax refund to rewards points, the system may refund the full amount, less than or more than the full amount of tax levied depending on the conversion rate between the tax refund to rewards point, instead of withholding a service fee as in the traditional method, although a service fee can still be offered as an alternative. The system can offer the tourist the option to take the refund in the form of tourist refund (whether as cash or via a credit/debit card) or in the form of rewards points, by way of a prompt either at the point of purchase or at the point of departure from the country. The tourist could even be allowed to convert the tourist refund into rewards points (vice versa) at any point in time, with or without a conversion fee. There may be a point in time where the availability of a tourist refund by way of cash or credit card is reduced or even removed. The rewards points can also be tagged with an expiry date, such that they expire if not used within a certain period of time, or the rewards points may be issued without an expiry date.

With reference to Fig. 2, an embodiment of a process for facilitating a tourist refund, wherein like numerals reference like parts, is described. The process begins when the dedicated software application installed on MDCC 120 is launched (step 210). The process begins with checking whether the tourist is already registered or is a new unregistered user (step 220). If the tourist is not registered, the tourist is walked through with a registration procedure (step 230) where an electronic user account is created with the server 110 and the relevant details are captured by the dedicated software application. Backend, the system 10 performs checks against the details like the passport number, nationality, name and/or other relevant information to ensure duplicate records

are not created. The system can also verify the authenticity of the passports based on their security features or the server 110 may be linked with one or more third party servers. These third party servers may be private, public or government databases for the checking of stolen passports, as well as  
5 checking for other eligibility criteria such as whether the user is in fact a Permanent Resident of a particular jurisdiction and does not fall under the category of 'tourist', therefore ineligible for tourist refund; or whether the user has entered Singapore on a visit pass that may not strictly fall under a 'tourist pass', such as a student pass, etc. whereupon additional criteria have to be  
10 fulfilled. For each user account, a unique identifier like a QR code is created and stored by the application, or created by the server 110 and stored by the application. This process can be integrated with the onboard camera of the mobile device 120 to scan the machine readable zone of the passport to populate the various details or even to scan the passport itself with optical  
15 character recognition, or else manual entry of the details is used. The tourist is also given the option of imaging the passport, guiding him through the process of which page to capture, so that he does not have to carry a physical passport when shopping to claim a refund.

20 At a participating shop, the tourist makes a purchase and the retailer enters or scans the relevant details into the point-of-sale (POS) machine (step 240). After verifying that the purchases qualify for refund and the eligibility of the tourist by checking the tourist's passport, the retailer scans the unique identifier being displayed on the user MDCC 120 by either using the issued  
25 retailer device or the retailer's own mobile device with the application installed (step 250). One method of verifying the status of the tourist would be verification upon scanning the unique identifier or QR code via an onboard camera (where available) if the retailer is using a mobile device as the retailer device 130, whereby upon receipt of the scanned information (which includes  
30 the unique identifier), the server 110 would inform the retailer device whether the user is a tourist or not, which dispenses with the need to check the physical passport. The details of the transaction are then sent to the central server 110 or a processor belonging to the central refund agency (CRA) (step

260), and this may be further sent to CCH 170. Once verified and the records updated, confirmation of the transaction is sent (step 270) together to the retailer and an eTRS Ticket is sent to the tourist either in the application, by email or any other forms of messaging. An electronic image or document of the invoice or receipt issued by the retailer can also be stored in the mobile application for later retrieval.

With some newer POS machines, the purchase details can be transmitted to the retailer device, either wirelessly via Wi-Fi or Bluetooth, or by a cable like a USB or similar, which speeds up the process and reduces the possibility of human error. The purchase details can even be directly transmitted to the server 110 in the form of a central processor. The added security measure of requiring the unique identifier before transmitting means the possibility of non-genuine tourist transactions is reduced. The tourist or the retailer may also use his or her mobile device to image the paper receipt associated with the transaction for the transaction details to be extracted by Optical Character Recognition. The retailer may also be equipped with other devices with imaging or scanning capabilities. Where the details are captured by the tourist's device, once the retailer has verified the transaction details thus captured, he can present the tourist with an identifier, which can be another QR code, unique to the retailer, for scanning by the tourist's device, as a form of retailer confirmation.

The application (and server 110) is also able to track the fulfilment of certain jurisdictional requirements where the purchases made by the tourist are submitted to the server are logged into the system. This feature is available where the tourist images receipts and enters the necessary details relating to the transactions he made. For example, in Singapore in order to qualify for a tax refund, a minimum \$100 must be spent from retailers bearing the same GST registration number and this can be accumulated in up to 3 same-day invoices or receipt, thus the application can immediately alert the user, whether tourist or retailer, if this minimum amount has been reached on the same day. This does away with the current need to check physical receipts

and sum them up.

An additional feature of using a system of intermediate value in the form of rewards points as described in the earlier embodiment can be incorporated into the process. During the purchase (step 240), the tourist informs the retailer that he wishes to use his rewards points, and upon scanning the QR code on the tourist's MDCC (step 250), the rewards points balance is retrieved from the server and displayed to the retailer. Based on this amount and confirmation from the tourist via the tourist's MDCC (step 250) of the number of rewards points to redeem, the retailer would apply the rewards points against the purchase price accordingly and update the server (step 260). In another embodiment, during a purchase (step 240), the tourist who wishes to utilize his intermediate value in the form of rewards points may launch the software application installed on the MDCC 120 to retrieve from the server and display the rewards points balance information. The tourist can inform the retailer of his intention to use his rewards points and scan an identifier, which can be another QR code, unique to the retailer before entering and confirming the number of rewards points he wishes to use, for transmission to the server. The server can then push the number of rewards points to be thus used for display on the issued retailer device or the retailer's own mobile device with the application installed, and the retailer would apply the rewards points against the purchase price accordingly and update the server (step 260). Upon receipt of the eTRS Ticket in the application, the tourist can be prompted to choose whether to convert the amount, with or without a service charge to the CRA, into the rewards points. This raises the possibility of the tourist being able to spend his tourist refund at participating retailers even before leaving the country.

A flowchart shown in Fig. 3 describes an embodiment of how the tax refund is credited/made to the tourist when the tourist is departing the country. At a departing point such as the airport or cruise centre, the installed application on the MDCC 120 is launched by the tourist either on his own volition or reminded by notifications displayed on the mobile device 120. Such

notifications can be triggered by detecting that the tourist is at a departure point such as the airport or cruise centre. The tourist is then prompted to confirm that he is departing the country (step 310), which triggers the system 10 (either via the installed software application or the server 110) to notify the tourist of the purchases made to date, the eTRS Tickets collected, the amount of refund available, as well as the amount of outstanding refunds which may be in the form of an intermediate value as described. The tourist also indicates how the refund is to be made, either in cash or to the credit card account that was used (based on the purchase or transaction details), or to a specified bank account or even to another different credit card account. A further prompt whether to convert the refund available may be triggered to allow the tourist to do so.

Once the list of purchases is confirmed and verified by the tourist, the tourist is guided through the various steps of completing the Declaration of Eligibility and displays the tourist's passport details for confirmation. After confirmation, the declaration of eligibility and refund claims are submitted to the server (step 320) and to the CCH and confirmation is sent to the tourist (step 330), together with either an approval Notification slip or an inspection Notification slip if the tourist has been selected for inspection. If the inspection is verified and cleared, an approval Notification slip is issued to the tourist, and based on the approval Notification slip, a refund can be obtained (step 340) either in cash at the Cash Refund Counter at the airport or cruise centre, or credited back to the specified credit/debit card or bank account. Alternatively, the tourist can also choose to obtain the refund in the form of an intermediate value such as the rewards points, especially if he plans to visit the country again sometime soon. The tourist then departs the country (step 350). The Declaration of Eligibility can be submitted together with the refund claims via the application on the mobile device, which means that process is simplified and the tourist can do so at their own convenience, e.g. while queuing to check in or clearing immigration or even in the transport on the way to the airport.

In another embodiment of the present invention and with reference to Fig. 4

and 5, wherein like numerals reference like parts, the functions associated with the MDCC 120 and retailer device 130 may be integrated into a single MDCC device 420. Such an arrangement is advantageous in the sense that one single MDCC 420 may be utilized for the whole refund process. It is to be

5 appreciated that either:-

the associated functions described for both mobile device 120 and computing device 130 as earlier described would have to be implemented on the MDCC 420, or

10 another dedicated software application incorporating essential functions for mobile device 120 and the computing device 130 would have to be installed on the MDCC 420.

In the single device arrangement, the participating retailer's premises may be equipped with a transmitter and/or receiver (including but not limited to Bluetooth Low Energy 'Bluetooth LE' beacons) 410 operable to transmit  
15 to/receive from a MDCC 420 (used interchangeably with the term 'single device') within range of the transmitter/receiver.

An example of the single device arrangement 400 is shown in Fig. 4. The arrangement 400 comprises one or more Bluetooth LE (BLE) beacons 410 installed within the retailer's shop at a designated location, such as around a  
20 cashier. The BLE beacons 410 can operate in a 'broadcast' or 'advertisement' mode to notify nearby devices of its presence via an address. The address follows a specific format, such as a predefined prefix, followed by a variable UUID, and a major, minor pair. When a user with the MDCC 420, such as a tourist is within the pre-determined range of the designated location, the  
25 MDCC 420 detects the BLE beacons 410 and prompts the user to launch his dedicated software application, or directly launches the software application without prompt once the BLE beacons 410 are detected, which can be programmed to inform the user that he is at a participating retailer based on matching and verifying the broadcast format of the BLE. The retailer specific  
30 information can then be displayed on the MDCC 420.

The user next shops and transacts at the retailer shop. Upon payment for the merchandise, the tourist requests for a tax refund. The cashier then requests

the tourist to send the request for refund from his MDCC 420, together with the refund account number and BLE address to the server 110.

The server 110 opens a session between the user account and the retailer account. The tourist is prompted to scan the transaction receipt using the MDCC 420 via the OCR module as described in previous embodiments, or via  
5 other means including manual or POS system as described. Once scanned, the transaction details are displayed on the MDCC 420.

The tourist presents the transaction details to the cashier or other personnel authorized by the retailer. The cashier verifies the transaction details and  
10 presents a retailer identifier to the tourist. The retailer identifier may be a QR code. The retailer identifier encoded in the form of a QR code may further comprise one or more of the following information:-

- i. Retailer's account number held with the server 110; and
- ii. Sub-accounts created by the retailer for each authorized personnel (e.g.  
15 cashier).

The sub-accounts provide a means for identifying the cashier in case of suspected transaction activity(ies), such as collusion between cashier and tourist.

The tourist scans the retailer QR code and the software application transmits  
20 the same to the server 110 for verification.

Upon receipt of the information related to the retailer identifier, the server 110 matches the QR code with the BLE address to verify that the MDCC 420 is on site. Upon verification, the MDCC 420 transmits the transaction details to the server 110. The server 110 then runs checks on the transaction details. The  
25 checks may include (but not limited to) ensuring that the transaction details are current, i.e. with current date and time, and relate to the correct retailer.

Upon completion of the checks, the server 110 then sends the transaction details to the CCH 170. The CCH 170 then acknowledges the lodgement of the refund claim to the server 110. The server 110 generates the eTRS Ticket,  
30 assigns the DOC-ID and sends the same to MDCC 420.

With reference to Fig. 5, at the point of departure, such as an airport or cruise center, the location of the MDCC 420 is determined by the software application via GPS or other location-based services. Alternatively, the

application on the tourist MDCC 120 can also rely on Wi-Fi networks or cellular base stations at the airport and the cruise centre for detecting the MDCC 420. Once detected, the software application guides the user through the declaration of eligibility as described earlier (see steps 310 to 350). Next  
5 the tourist confirms his departure and eligibility. The MDCC 420 then retrieves the transaction records from the server 110 for the tourist to select for refund. Once the user selects the transaction records, he is prompted to select the refund method (e.g. rewards points, direct credit into specified account etc.). Upon selection, the MDCC 420 sends the declaration of eligibility; selected  
10 refund transaction(s); and refund method to the server 110. The server 110 in turn transmits the information to the CCH 170. The CCH 170 then replies with an approval or non-approval Notification slip to the server 110, which in turn transmit the approval or non-approval Notification to the MDCC 420. If the refund is approved, the CCH 170 further instructs or informs the CRC 430 to  
15 process the refund.

Where the CCH 170 replies with the non-approval notification slip, in some embodiments the tourist may be directed to the customs officer or inspector as described in the earlier embodiment for further inspection. The customs officer may be provided with a separate computer device with a dedicated  
20 software application installed thereon to facilitate inspection by the customs officer. A 'customs officer approval' identifier in the form of a QR Code may be provided to the customs inspector to present to the tourist after the customs inspector is satisfied with the eligibility of the tourist. Upon scanning of the 'customs officer approval' QR Code, the server 110 then updates the CCH  
25 record as "Approved" and issues a Notification of Approval slip. If still not approved, the purchases will not be eligible for tax refunds.

During a purchase (step 240), the tourist who wishes to utilize his intermediate value in the form of rewards points can inform the retailer of his intention to  
30 use his rewards points. He may launch the software application installed on the MDCC 420 to retrieve from the server 110 his rewards points balance and enter and confirm the number of rewards points he wishes to use, before showing to the retailer for verification. Once the retailer has verified the



number of rewards points to be used, he can present the tourist with a retailer identifier, which can be another QR code, unique to the retailer, for scanning by the single device 420 as a form of retailer confirmation, and the server will be updated (step 260). The retailer would apply the rewards points against the purchase price accordingly. Also, upon receipt of the eTRS Ticket in-app, the tourist can be prompted to choose whether to convert the amount, with or without a service charge to the server 110, into the rewards points. This raises the possibility of the tourist being able to spend his tourist refund at participating retailers even before leaving the country.

The single device arrangement is based on the use of a mobile device 420 and eliminates the need for a Retailer Device. Instead of issuing each retailer with a separate device, Bluetooth Low Energy (BLE) beacons (transmitters/receivers) can be placed in each retailer outlet, and each authorized personnel may access the retailer's identifier (which may be in the form of a QR code or otherwise) in a variety of ways. For example an authorized personnel such as a cashier at the retailer shop can be provided with a QR Code Staff Pass, or each retailer outlet can be provided with its own QR Code identifier. The BLE can ensure transactions only take place at participating shops and the QR Code Staff Pass or identifier acts as retailer acknowledgement that the cashier has done her checks. The BLE can also be used to push targeted retailing information to the tourist, e.g. discounts, advertisements, etc. It is to be appreciated that both the QR code and BLE may be utilized in the form of a two-layered check to ensure that the transactions take place within the retailer's shop or premise. Such a two-layered check reduces the risk of any collusion between a member of the retailer's staff and the tourist.

In some embodiments, the server 110 may be operating the system of intermediate value. In such an arrangement, the server 110 may comprise a predictive engine operable to predict which user refund account is likely to be fraudulent so as to be able to take pre-emptive action. Otherwise the system may compromise on account integrity. The predictive engine can be based on at least one criterion of user demographics (e.g. location, countries visited for a past predetermined time frame), transaction profile (e.g. value of

transaction, type of goods, etc.), the type of identifier (e.g. credit card) used to register for a refund account, gender, nationality etc. Based on these criteria, an algorithm can be developed to run in the server 110 to pick out suspicious user accounts. For example, the predictive engine may attribute high risk weights to transactions exceeding certain value arising from certain countries. In some embodiments, in addition to identifying suspicious user accounts, the predictive engine may further be configured to data communicate and send selected details relating to the 'suspicious accounts' to the relevant authorities, which include the customs. The selected details are sent to the authorities for further follow up checks in order to provide a more targeted and focused check. In other embodiments, the system 10 may refuse the registration of any requested refunds accounts deemed not to pass an initial security check based on one or more of the at least one criterion. In yet other embodiments, based on the profile identified by the predictive engine, selected users or tourists may be banned from purchasing certain tax free eligible items. In some embodiments, the predictive engine may be arranged in data communication with one or more database servers, such database servers for maintaining user information.

The above arrangements are advantageous in that more parameters for the selection of tourists for inspection are considered, compared to that considered by the CCH 170 currently. In addition, the selection performed at the servers 110 effectively provide an additional layer of check which is preemptive in nature, as compared to that currently done at the exit point(s) which is 'reactive'. In this regard, it is to be appreciated that the existing system performs selection at the end of a tourist's trip/visit which is deemed less efficient compared to selection performed before the tourist starts his trip. This is because based on the existing structure, the retailers would have already taken the trouble to process the eTRS transactions of a fraudster, only for the transactions to be subsequently found invalid (this is assuming the CCH is able to select the tourist for inspection) when the fraudster attempts to make a claim for a refund as he leaves the country. The above arrangements effectively prevent suspicious transactions from being performed by would-be

fraudsters, saving time and effort for both the retailers as well as the Customs. In another embodiment, the server 110 is configured to link to at least one retailer for the provision of one or more retailer item list(s) available for sale and tax refund. In the app installed on the tourist's MDCC 120, a user interface may then be provided to the tourist which displays the retailer item list of available items for sale and/or tax refund for the tourist to view before the tourist arrives at the country and/or before he/she leaves the country. Once a wish list or checklist of selected items from a tourist is communicated to the server 110 via the app, the server 110 is operable to provide a list of retailer(s) and details of the retailers selling the one or more items, via a data push or pull mechanism that the tourist desire to purchase. The wish list and retailer list may be compared by any compare and match algorithm between the entries on the tourist's wish-list with what the retailers have to offer. The compare and match may be performed at the server 110 side or the app installed on the MDCC 120.

In the creation of the tourist's checklist, the tourist can record a plurality of parameters related to each item. Non-exhaustive examples of these parameters may include the item's name, category, quantity and recipient's name and insert short notes and images (such as pictures) related to each item. Newly created items can be added to a temporary 'pending list' which the tourist can check off to move the items to a completed list whenever a purchase is made. Interfaces for sorting the items in alphabetical or other order may also be provided to the user.

Each time the tourist creates a new item, the app is operable to retrieve a list of retailer(s) selling the item from the server 110, and then provide to the tourist, retailers that sell the item or related items. The tourist can download the names of the recommended retailers to add them to his shopping list (via an interface) or to access the retailer's profile on the app. Through the list and/or a BLE located at the retailer's outlet, the tourist can be notified by the server 110 via the app and/or the retailer that sells the item or related items whenever the tourist is near to the retailer's shop and/or send content e.g. sales voucher from the retailer to the Tourist. This is advantageous to provide

a seamless experience for the tourist and to aid the retailers in selling their products. Further, the arrangement provides an advantageous hybrid between a pure online shopping experience and a real shopping experience where goods can be inspected before it is purchased. Amongst other advantages, the above arrangement reduces the shopping time required for a tourist to look or source for an item and whether that item is eligible for tax refund; provides an alert or other forms of notification when the tourist is nearby a retailer; and provides an informed list on prices and quality before committing to the purchase.

- 5
- 10 In some embodiments, the server 110 is operable to issue one eTRS ticket for each refund claim at each retailer store and charge a service fee for each eTRS Ticket issued. Each eTRS Ticket may comprise more than one sales receipt accumulated at the same store (GSTN), subject to one or more regulations to meet a minimum threshold eligible for refund (e.g. SGD 100).
- 15 For each eTRS ticket issued, the server 110 may also be required to pay a CCH Fee of SGD 1.50.

As an alternative embodiment, instead of issuing an electronic ticket in the form of an eTRS ticket for each transaction, the server 110 is instead operable to issue a provisional eTRS for the first transaction eligible for a refund claim, and add all subsequent transaction receipts to this provisional eTRS ticket. This is akin to a batch mode process and allows multiple retailers' transactions to be combined into a single formal/final eTRS ticket. The formal eTRS ticket will be issued only when the tourist is at an approved departure point. In such a way, both the user and the service provider may save on CCH Fees because only one Refund Ticket per user per trip is issued, instead of one Refund Ticket per user, per store, per trip. This can be performed without compromising on security or authenticity, as the tourist user will have to undergo the verification step at each retailer store.

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30 In some embodiments, users of the system, such as approved retailers, may be provided with a user interface accessible to a portal, the user interface accessible via any computer device such as, but not limited to, a mobile device. The user interface may be used to display business information related to the retailer described as follow. An example of the interface is a