UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALLIANCE LAUNDRY SYSTEMS, LLC,
Petitioner,

v.

PAYRANGE LLC,
Patent Owner.

IPR2025-00950
U.S. Patent No. 10,891,608

DECLARATION OF DR. B. CLIFFORD NEUMAN UNDER 37 C.F.R. § 1.68 IN SUPPORT OF PETITION FOR POST-GRANT REVIEW

Mail Stop Patent Board
Patent Trial and Appeal Board
P.O. Box 1450
Alexandria, VA 22313-1450

TABLE OF CONTENTS

TABLE OF EXHIBITS[1]

Exhibit No.[2]	Description	Publication Date (unless otherwise noted)	Type of Prior Art
1001	USPN 11,891,608 (the '608 Patent) (Patent submitted for *Inter Partes* Review)	Dec. 18, 2013 (earliest possible priority date based on filing of provisional application)	N/A
1002	File History for USPN 10,891,608	N/A	N/A
1003	Declaration of Dr. B. Clifford Neuman Under 37 C.F.R. § 1.68 in Support of Petition for *Inter Partes* Review of the '608 Patent	N/A	N/A
1004	*Curriculum Vitae* of Dr. B. Clifford Neuman	N/A	N/A
1005	USPN 9,092,768 ("*Breitenbach*")	Jan. 11, 2011	§ 102(a)
1006	USPN 5,734,150 ("*Brown*")	Oct. 16, 1995	§ 102(a)

[1] For the Board's convenience, this Table of Exhibits includes all references cited in this Declaration and in the corresponding Petition. Accordingly, the Table of Exhibits in the Declaration and the Petition are identical.

[2] For ease of review, I adopt the following citation convention for this Declaration. U.S. patent references are cited by the reference's internal column:line, page:line, or ¶ number (not stamped pagination). Supporting papers (file history, definitions, C.V.) are cited by stamped pagination number.

Exhibit No.[2]	**Description**	**Publication Date (unless otherwise noted)**	**Type of Prior Art**
1007	USPN 5,036,966 ("*Kaspar*")	June 12, 1989	§ 102(a)
1008	Redline comparison of Claim 1 of the '608 Patent to Claims 7, 13, and 19 of the '608 Patent	N/A	N/A
1009	USPN 3,457,391 ("*Yamamoto*")	July 19, 1965 (issuance date)	§ 102(a)(1)
1010	USPN 3,931,497 ("*Gentile*")	Jan. 6, 1976 (issuance date)	§ 102(a)(1)
1011	USPN 6,810,234 ("*Räsänen*")	Oct. 26, 2004	§ 102(a)(1)
1012	US Patent Pub. No. 2003/0130902 ("*Athwal*")	Nov. 4, 2002	§ 102(a), (d)
1013	Michael L. Kasavana et al., *Innovative VDI Standards: Moving an Industry Forward*, 4 J. INT'L MGMT STUDIES 3 (2009).	December 2009	N/A
1014	Multi-Drop Bus / Internal Communication Protocol (National Automatic Merchandising Association, Version 3.0, March 26, 2003)	March 26, 2003	N/A

I, Dr. B. Clifford Neuman, hereby declare as follows:

I. INTRODUCTION

1. I am making the present Declaration at the request of Alliance Laundry Systems LLC ("Petitioner") in support of the Petition for *Inter Partes* of Claims 1–20 ("the Challenged Claims") of U.S. Patent No. 10,891,608 ("the '608 Patent," Ex. 1001).

2. I am being compensated for my work on this matter and for reasonable and customary expenses associated with my work and testimony in this proceeding. My compensation is not contingent on the outcome of this matter or the specifics of my testimony, and I have no other interest in this proceeding or the parties thereto.

3. I have been asked to provide my opinions regarding whether the Challenged Claims of the '608 Patent are unpatentable insofar as they would have been obvious to a person having ordinary skill in the art ("POSA") at the time of the alleged invention, in view of the prior art.

4. It is my opinion that all of the Challenged Claims would have been obvious to a POSA at the time of the alleged invention.

II. DOCUMENTS RELIED UPON

5. In reaching my opinions in this case, I reviewed the currently filed Petition for *Inter Partes* Review of U.S. Patent No. 10,891,608 ("the IPR Petition") and the various exhibits referenced therein, such as, for example, the '608 Patent

itself and the prior art references cited in the IPR Petition. I agree with the contents of the IPR Petition for at least the reasons expressed in this Declaration, and I believe my opinions expressed below are consistent with the contents of the IPR Petition.

6. I also reviewed each of the documents listed in the Table of Exhibits at the beginning of this Declaration (which is identical to the Table of Exhibits in the IPR Petition).

7. In forming the opinions expressed below, I have also considered the relevant legal standards, including the standard for obviousness, any additional authoritative documents as cited in the body of this Declaration, and my own knowledge and experience based upon my work in the field of electronic payments and distributed networks as described below.

8. Unless otherwise noted, all emphasis in any quoted material has been added.

III. QUALIFICATIONS AND PROFESSIONAL EXPERIENCE

9. My complete qualifications and professional experience are described in my *Curriculum Vitae*, a copy of which can be found in Exhibit 1004. The following is a summary of my relevant qualifications and professional experience.

10. I received a Ph.D. in Computer Science in 1992 and an M.S. in Computer Science in 1988 from the University of Washington, and an S.B.

(Bachelor's) in Computer Science and Engineering in 1985 from the Massachusetts Institute of Technology.

11. Since receiving my doctorate, I have devoted my career to the field of distributed computer systems development and research with a significant portion of my experience in the area of electronic commerce and internet payments. I have studied, taught, practiced, and researched in the field of computer science for over forty years.

12. I am currently an Associate Professor of Computer Science Practice in the Department of Computer Science at the University of Southern California (USC), where I have taught since 1992. I am also the Director of the Center for Computer Systems Security, an affiliated Scientist at USC's Information Sciences Institute, and I direct the Computer Security Curricula within the Data Science Program at USC.

13. I teach and have taught numerous courses at USC, including advanced courses in computer science for upper-level undergraduates and graduate students, on topics such as distributed systems and computer and network security.

14. As part of my research at USC, I have worked in a number of areas, including research in distributed computer systems with emphasis on scalability and computer security, especially in the areas of authentication, authorization, policy, electronic commerce, and protection of cyber-physical systems and critical

infrastructure such as the power grid. I have worked on the design and development of scalable information, security, and computing infrastructure for the Internet. I am also the principal designer of the Kerberos system, an encryption-based authentication system used among other things as the primary authentication method for most versions of Microsoft's Windows, as well as many other systems. I developed systems which used Kerberos as a base for more comprehensive computer security services supporting authorization, accounting, and audit.

15. In addition to my academic experience, I have many years of practical experience designing computer security systems. For example, from 1985-1986, I worked on Project Athena at MIT, to produce a campus-wide distributed computing environment. I also served as Chief Scientist at CyberSafe Corporation from 1992¬2001. I have designed systems for network payment which build upon security infrastructure to provide a secure means to pay for services provided over the Internet. For example, I designed the NetCheque and NetCash systems, which are suitable for micropayments (payments on the order of pennies where the cost of clearing a credit card payment would be prohibitive). In 2000 and 2001, I was on the advisory board for NetResearch Inc, d/b/a BayBuilder, which was a company developing online auction platforms.

16. As part of my research on computer security and electronic payment systems, I was involved with the integration of portable electronic devices such as

smart cards and PCMCIA cryptographic processors with other computer devices such as card readers and personal computers.

17. I have authored or co-authored over 50 academic publications in the fields of computer science and engineering. In addition, I have been a referee or editor for the following academic journals: ACM Transactions on Information and Systems Security and the International Journal of Electronic Commerce. My *Curriculum Vitae* includes a list of publications on which I am a named author.

18. I am also a member of the Institute of Electrical and Electronics Engineers (IEEE), Association for Computer Machinery (ACM), and the Internet Society (ISOC), among others. I have also served as program and/or general chair of the following conferences: The Internet Society Symposium on Network and Distributed System Security and the ACM Conference on Computer and Communications Security.

19. In 2023, I submitted four declarations in support of four separate petitions filed by CSC Serviceworks, Inc. for *Inter Partes* Review of the following patents owned by PayRange, Inc.: (1) U.S. Pat. No. 10,891,608 (IPR2023-01188); (2) U.S. Pat. No. 10,438,208 (IPR2023-01187); (3) U.S. Pat. No. 8,856,045 (IPR2023-01186); and (4) U.S. Pat. No. 11,481,772 (IPR2023-01449). My opinions herein are independent of those expressed in my prior declarations, but none of my opinions herein are inconsistent with those prior opinions.

IV. LEVEL OF ORDINARY SKILL IN THE ART

20. I understand there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including (1) the levels of education and experience of persons working in the field at the time of the alleged invention; (2) the sophistication of the technology; (3) the types of problems encountered in the field; and (4) the prior art solutions to those problems.

21. It is my understanding that the earliest possible priority date for the '608 Patent is December 18, 2013.

22. A person of ordinary skill in the art ("POSA") in the field of the '608 Patent, as of December 18, 2013, would have had a bachelor's degree in electrical engineering, computer engineering, computer science, or equivalent training, and approximately three years of experience with electronic payment systems, vending machine technologies, or distributed network systems. Lack of work experience can be remedied by additional education, and vice versa.

23. I understand that KioSoft Technologies, LLC previously brought a Petition for Post-Grant Review of the '608 Patent. *See KioSoft Technologies, LLC v. PayRange Inc.*, PGR2021-00084, Decision Denying Institution (Paper 12) (PTAB Dec. 16, 2021) ("the '608 PGR"). I understand that the Board adopted the Petitioner's definition of a POSA in its decision denying institution of the '608 PGR, which was:

> A [POSA], as of the date of the alleged invention, would have had an education background of, or practical experience providing an equivalent to, a Bachelor of Science in Electrical Engineering, Computer Science, Information Technology, or a related/equivalent field and at least three years of work experience in electronic payment systems, vending machine technologies, or telecommunication solutions.

PGR2021-00084, Paper 12 at 7.

24. The definition of a POSA that was adopted by the Board in the '608 PGR is consistent with the definition of a POSA that I have offered here. Specifically, both definitions include an education background in electrical engineering, computer science, or a similar field, such as information technology or computer engineering. Further, both definitions include approximately three years of experience in a related field, such as electronic payment systems and vending machine technologies. In addition, distributed network systems and telecommunication solutions are related fields, as a distributed network system is one form of a telecommunication solution.

25. Based upon my education and experience as set forth above, I believe that I would qualify as at least a POSA in the relevant time frame. At the time of the alleged invention, I had a sufficient level of knowledge, experience, and education to provide an expert opinion in the field of the '608 Patent.

26. For purposes of this Declaration, in general, and unless otherwise noted, my statements and opinions, such as those regarding my experience and the understanding of a POSA generally (and specifically related to the references I consulted herein), reflect the knowledge that existed in the field as of the alleged priority date of the ’608 Patent (i.e., December 18, 2013). Unless otherwise stated, when I provide my understanding and analysis below, it is consistent with the level of a POSA as of the alleged priority date of the ’608 Patent.

V. RELEVANT LEGAL STANDARDS

27. I am not an attorney. In preparing and expressing my opinions and considering the subject matter of the ’608 Patent, I am relying on certain basic legal principles that counsel have explained to me. These principles are discussed below.

28. I understand that prior art to the ’608 Patent includes patents and printed publications in the relevant art that predate the priority date of the alleged invention recited in the ’608 Patent.

29. I have been informed and understand that a patent claim may be invalid as “anticipated” under 35 U.S.C. § 102 if each element of that claim is disclosed either explicitly or inherently in a single prior art reference. I understand that a disclosure is “inherent” if the missing element is necessarily present in view of the explicit disclosure. The fact that the reference might possibly practice or contain a claimed limitation is insufficient to establish that the reference inherently teaches

the limitation. For anticipation by a prior art publication or document, I further understand that the reference's description must enable a POSA to practice the claimed invention without undue experimentation.

30. I have been informed that a claimed invention is unpatentable under 35 U.S.C. § 103 if the differences between the invention and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. I have also been informed by counsel that the obviousness analysis takes into account factual inquiries including the level of ordinary skill in the art, the scope and content of the prior art, and the differences between the prior art and the claimed subject matter.

VI. BACKGROUND OF THE '608 PATENT AND THE PRIOR ART

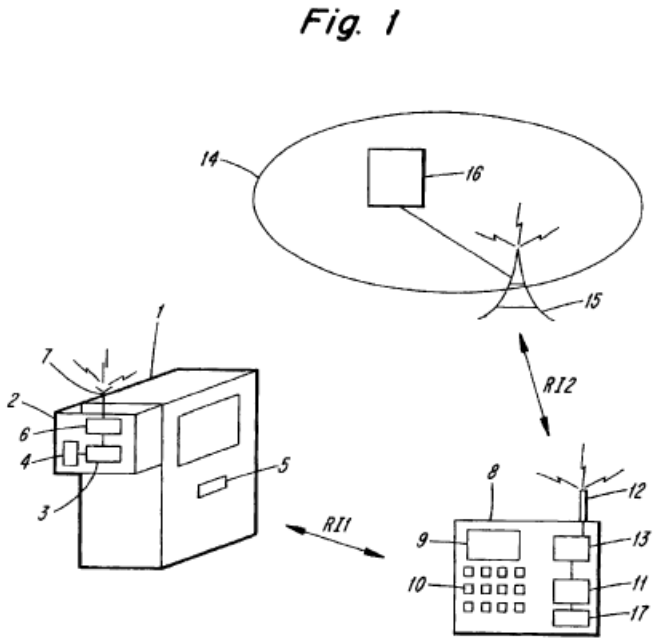
A. The State of the Art Prior to December 2013

31. The '608 Patent states that "[v]ending machines (or 'automatic retailing' machines), in the broadest sense, have been around for thousands of years." Ex. 1001, 1:32–33. "The first simple mechanical coin operated vending machines were introduced in the 1880s." *Id.*, 1:33–35. By the time of the earliest possible priority date of the '608 Patent, vending machines had become ubiquitous. *Id.*, 1:39–40.

32. Vending machines that enable cashless transactions existed long before the earliest possible priority date of the ’608 Patent. For instance, a 1969 patent, entitled “Vending Apparatus for use with Credit Cards” (“*Yamamoto* et al.”), discloses a vending machine that accepts payment by credit card for various articles. *See generally* Ex. 1009. As another example, a 1976 patent entitled “Automated Fuel Dispenser” (“*Gentile* et al.”) discloses an automated fuel dispensing system that authorizes credit and billing via direct connection to a credit center over communication lines. *See generally* Ex. 1010.

33. Using a personal mobile device, such as a mobile phone, to conduct a cashless transaction was also well-known before the earliest possible priority date for the ’608 Patent. For example, a patent that was filed in 1999 entitled “Mobile Telephone Network Access” (“*Räsänen* et al.”) discloses a method of conveying information from a vending machine to a mobile phone to conduct a transaction. *See generally* Ex. 1011.

34. *Räsänen* teaches that “a mobile telephone 8 which may be thought of as a ‘smart phone’” communicates with the control unit 2 of a vending machine 1 using local radio air interface protocol (RI1) and with the cellular telephone network 14 using an antenna 12 and transceiver 13 to conduct a transaction. *See id.*, 3:43–49, 3:50–65. *See also id.*, Fig. 1, reproduced below:



Ex. 1011, Figure 1.

35. The concept of enabling mobile payment to an offline vending machine was also introduced long before the earliest possible priority date for the '608 Patent. For example, U.S. Publication No. 2003/0130902 ("*Athwal* et al."), entitled "Short Range Wireless System," published on July 10, 2003, describes a method for transacting a payment that does not require the vending machine (referred to as an "electronic retail system") to be connected to a wireless network. Ex. 1012, ¶ 19. Like the '608 Patent, *Athwal* uses a short-range wireless transceiver to communicate between a vending machine (or other electronic retail system) and a mobile device to conduct a cashless transaction. *See id.*, ¶ 22; *see also* Fig. 1:

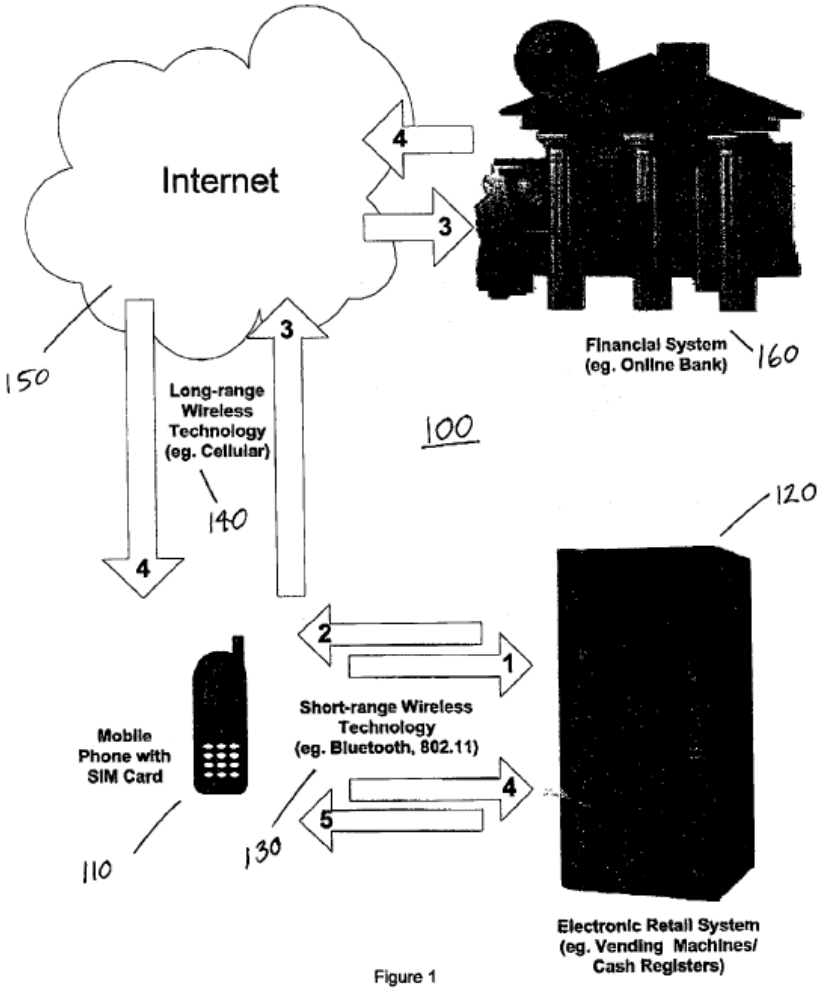


Figure 1

Ex. 1012, Figure 1.

36. More than two decades ago, the National Automatic Merchandising Association (NAMA) and European Vending Association (EVA) collaborated to develop an internal communication protocol designed to ensure that coin mechanisms, bill validators, and cashless payment devices could effectively interface with a vending machine controller (VMC) regardless of the vending machine manufacturer's specifications. *See* 1013 at 3–5; *see also* Ex. 1014 at 7, 20. In 1998, NAMA and EVA published Version 1.0 of this protocol, titled The Multi-

Drop Bus / Internal Communication Protocol (the MDB Protocol). *See* Ex. 1014 at 12. The MDB Protocol defines a serial bus interface for electronically controlled vending machines. *Id.* at 18. The MDB Protocol sets a global standard governing communication between the VMC and payment system peripheral devices of the vending machine. *Id.*; 1013 at 3. The '608 Patent states that "most vending machines made since 1995 have this industry standard MDB technology[.]" Ex. 1001, 6:21–22.

37. The MDB Protocol enables a VMC to determine "what coins the coin changer, and what bills a bill validator, can accept as payment." Ex. 1013 at 4. It also enables the vending machine to determine the amount of credit available through a cashless device, such as a payment card reader or a mobile phone. Ex. 1014 at 20, 94–166; *see also* Ex. 1013 at 4–5.

38. Recording and exporting operation information from a vending machine was also well-known prior to the earliest priority date of the '608 Patent. Before the creation of the MDB Protocol, NAMA and EVA developed the Data EXchange (DEX) standard, a protocol that captures machine operation information, such as "cash in/out data, product movement data, and financial audit data." *See* Ex. 1013 at 2, 6. The data originating from the DEX standard ("DEX data") includes sales mix, cash collection, product movement, and malfunction alerts. *Id.* at 6. DEX data, which was designed to assist vending machine operators with product

replenishment strategies, product mix rotations, and cash management safeguards, plays an important role in productivity and profitability analysis for vending machines. *Id.* at 2. Along with the DEX standard, a Data Transfer Standard (DTS) was created so that the DEX data could be exported from the payment-operated machine. *Id.* at 2.

B. Overview of the Alleged Invention of the '608 Patent

39. The '608 Patent is entitled "Method and System for an Offline-Payment Operated Machine to Accept Electronic Payments." Ex. 1001. The specification explains that, historically, vending machines required "coins, bills, or payment cards," but "[a]s the number of people with Internet-connected mobile devices proliferates . . . . [m]obile payment is a logical extension." *Id.*, 1:53–66.

40. The '608 Patent discloses systems and methods for retrofitting an offline-payment operated machine, such as a coin-operated vending machine, to accept electronic payments. *See generally* Ex. 1001, 39:38–46:5; Figs. 28A–B, 29A–B, 30. Figure 28A of the '608 Patent, shown below, depicts a block diagram of an offline-payment operated machine 1500. *Id.* at 39:38–40.

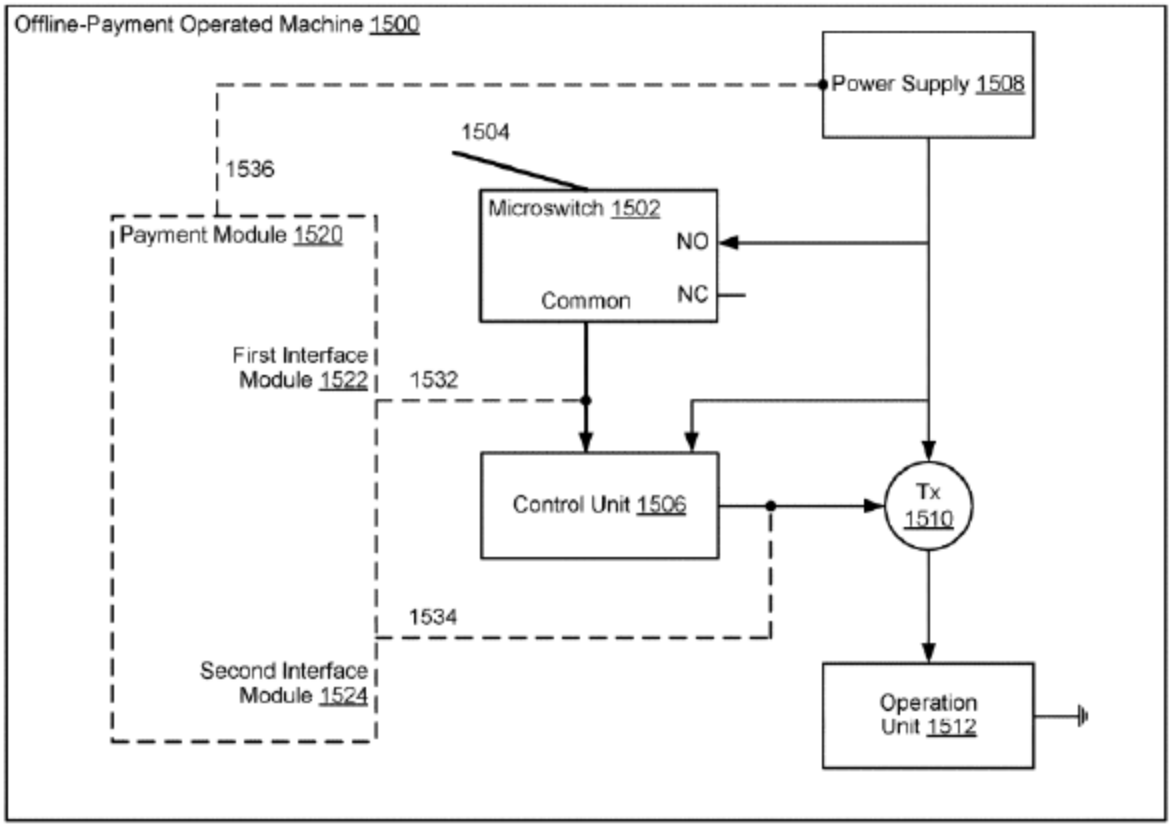


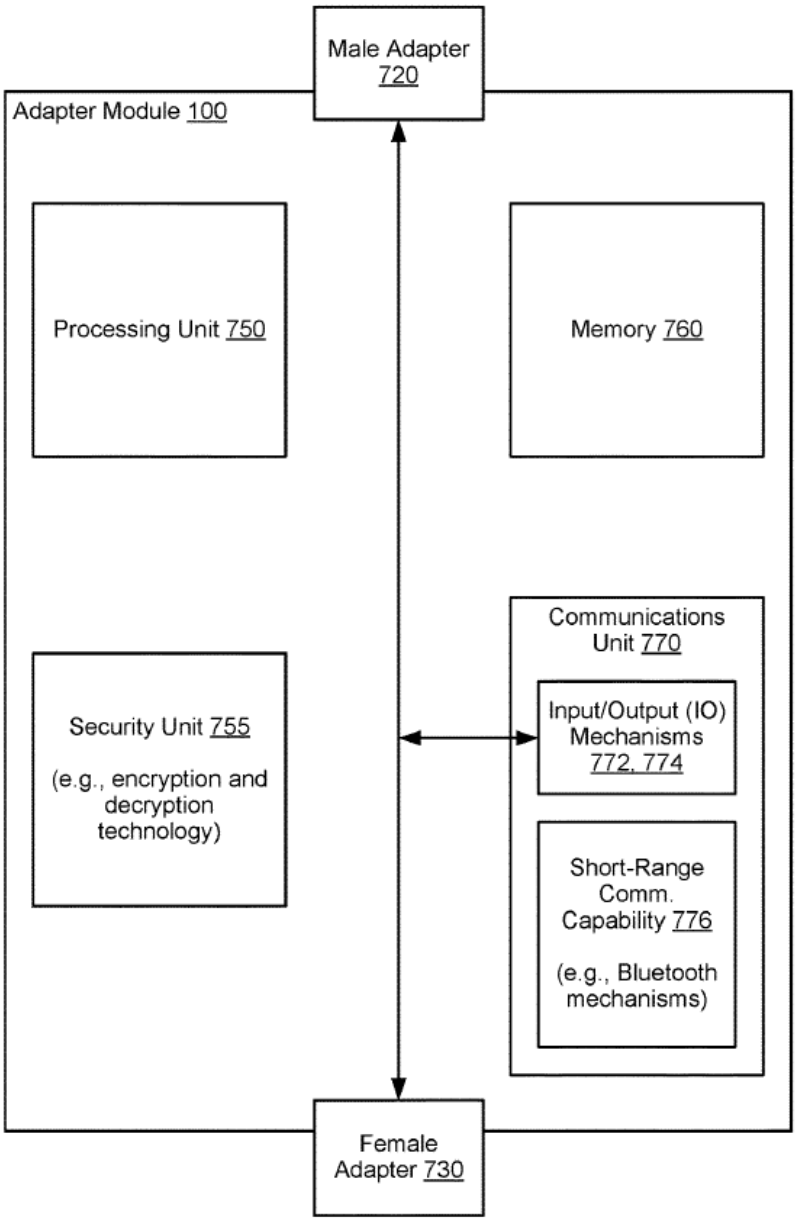
Figure 28A

41. "[O]ffline payment operated machine 1500 . . . 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)." *Id.* at 39:40–44. Offline-payment operated machine 1500 has a microswitch 1502, control unit 1506, and operation unit 1512. *Id.* at 39:49–51. Microswitch 1502 has a lever 1504 in the offline-payment operated machine 1500's coin slot. *Id.* at 39:57–65. When a coin slides down the coin slot, lever 1504 is depressed, closing microswitch 1502 and sending a pulse to control unit 1506. *Id.* at 39:61–40:6. "[W]hen the control unit 1506 receives a preset sequence of payment acceptance signals indicative of a preset

number of coins being received by the microswitch 1502, the control unit 1506 initiates the operation of the offline-payment operated machine 1500." *Id.* at 40:7–11.

42. Offline-payment operated machine 1500 is retrofitted to accept electronic payments by installing payment module 1520. *Id.* at 40:22–26. Payment module 1520 has first interface module 1522 and second interface module 1524, which sample payment acceptance signals from microswitch 1502 and control signals from control unit 1506 to initiate operation of machine 1500. *Id.* at 40:35–49. "By sampling and storing these signals, the payment module 1520 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." *Id.* at 41:43–48, 42:55–65.

43. Figure 20 of the '608 Patent, reproduced below, depicts a block diagram of a payment module (also referred to as an adapter module). *See, e.g.*, *id.*, 40:22–34.



Ex. 1001, Figure 20.

44. The payment module "is a relatively low cost hardware component that is pre-configured to work with the industry standard multi-drop bus (MDB)" or, on machines without MDB technology, the adapter module "can be configured or designed to work with other serial protocols or activate a switch." *Id.*, 15:56–62.

C. Summary of the Prosecution History

45. The earliest patent application to which the ’608 Patent claims priority is U.S. Provisional Application No. 29/477,025, filed on December 18, 2013 (“the ’183 Provisional”). Ex. 1002 at 15.

46. The prior art relied upon herein pre-dates the earliest alleged priority date of the ’608 Patent.

47. The application that issued as the ’608 Patent was filed on January 23, 2018. *Id.* at 2.

48. The only Office Action rejecting the claims on the merits for the ’608 Patent application rejected all pending claims under 35 U.S.C. § 101 “because the claimed invention is directed to an abstract idea without significantly more.” *Id.* at 179. The claims were also rejected under double patenting over claims of USPN 9,875,473 (“the ’473 Patent”). *Id.* at 184–87. The Examiner remarked that “there is no apparent reason why applicant would be prevented from presenting claims corresponding to those of the instant application in the other copending application.” *Id.* at 187. In response to the Section 101 rejection, the Applicant amended the claims to add subject matter that was determined in the parent application (the ’473 Patent) to be eligible under Section 101. *Id.* at 504. In response to the double patenting rejection, the Applicant filed a terminal disclaimer. *Id.* at 505.

VII. SUMMARY OF THE ASSERTED PRIOR ART

A. *Breitenbach*: U.S. Patent No. 9,092,768 (Ex. 1005)

49. U.S. Patent No. 9,092,768 to Breitenbach et al. ("*Breitenbach*") is titled "Machine Retrofits and Interactive Soda Fountains." *Breitenbach* issued on July 28, 2015 from an application filed on January 11, 2011 and I understand, based on discussions with counsel, that it is therefore prior art to the '608 Patent under 35 U.S.C. § 102(a).

50. *Breitenbach* teaches systems, apparatus, methods, and articles of manufacture for a retrofit device which may be coupled to a conventional vending machine to facilitate remote, wireless, and/or cashless sales. *See* Ex. 1005, 2:16–22. In some embodiments, a wireless or cellular telephone "may communicate directly with the retrofit device 120 . . . to place an order and/or request a function to be performed by the machine[.]" *Id.*, 3:1–15, 7:25–29. The retrofit device may then "transmit a signal that causes the machine to dispense the desired unit of product—such as by sending a signal indicative of payment to a payment acceptance device of the machine[.]" *Id.*, 8:53–58.

51. *Breitenbach* discloses various embodiments which may consist of or include a retrofit device. Specifically, *Breitenbach* teaches: (1) systems 100, 400, and 500 which may include retrofit devices 120, 420, and 520 respectively (*id.*, 4:11–29, 12:44–50, 15:45–50), (2) an apparatus 320 which "may be similar in

configuration and/or functionality to the retrofit device 120" (*id.*, 9:30–35), (3) a process 700 which may be "performed, facilitated, and/or implemented by and/or otherwise associated with one or more specialized computerized processing devices (e.g., . . . retrofit device 120 of FIG. 1, the apparatus 320 of FIG. 3, and/or the retrofit devices 420, 520…)" (*id.*, 17:22–30), (4) a soda fountain 708 which may include a retrofit device 720 (*id.*, 17:48–59), and/or (5) an apparatus 900 which "may be similar in configuration and/or functionality to the controller 102, 702, the mobile customer devices 104*a-n*, 704, and/or retrofit device 120, 720 of FIG. 1 and/or FIG. 7, the apparatus 320 of FIG. 3, and/or the retrofit devices 420, 520, and/or the processing devices 410, 510 of FIG. 5 and/or FIG. 5" and may "execute, process, facilitate, and/or otherwise be associated with the methods 200, 300, 800 of FIG. 2, 3, and/or FIG. 8 and/or with the process 700 of FIG. 7." *Id.*, 23:14–36. My discussion of *Breitenbach* refers generally to all of these embodiments, though only specific embodiments may be referenced in a given example.

B. *Brown*: U.S. Patent No. 5,734,150 (Ex. 1006)

52. U.S. Patent No. 5,734,150 to Brown et al. ("*Brown*") is titled "Electronic Funds Acceptor for Vending Machines." *Brown* issued on March 31, 1998 from an application filed on October 16, 1995 and I understand, based on discussions with counsel, that it is therefore prior art to the '608 Patent under 35 U.S.C. § 102(a).

53. *Brown* teaches an electronic funds acceptor that replaces the mechanical coin acceptor mechanism of a standard vending machine. *See* Ex. 1006, 4:47–5:33, 5:65–6:1. The acceptor includes a funds controller circuit which outputs coin deposit signals to the vending machine. *Id.*, 5:17–33. The funds controller determines whether the customer has sufficient funds to make the requested purchase and, once verified, "outputs in a serial fashion coin deposit signal pulses . . . in order to signal to [the vending machine] that the maximum purchase value has been received." *Id.*, 6:5–25. "The exact nature of which coin signals are to be generated may be predetermined and stored in memory" on the funds controller. *Id.*, 6:25–28.

C. *Kaspar*: U.S. Patent No. 5,036,966 (Ex. 1007)

54. U.S. Patent No. 5,036,966 to Kaspar et al. ("*Kaspar*") is titled "Newspaper Vending Rack Coin Box Incorporating a Retrofit Electronic Coin Mechanism." *Kaspar* issued on August 6, 1991 from an application filed June 12, 1989 and I understand, based on discussions with counsel, that it is therefore prior art to the '608 Patent under 35 U.S.C. § 102(a).

55. *Kaspar* teaches a retrofit coin measuring apparatus for a newspaper vending rack. Ex. 1007, 1:7–11. The retrofit can be installed on preexisting newspaper racks to capture data related to newspaper sales. *Id.*, 1:24–47. The retrofit includes a coin inspector which confirms the coins are legitimate and counts

the correct purchase price. *Id.*, 1:50–60. While the newspaper is dispensed, the apparatus stores the time of day in memory. *Id.*, 1:61–64. The retrofit may also store the price of each sale. *Id.*, 2:19–22.

VIII. CLAIM CONSTRUCTION: 37 C.F.R. § 42.104(B)(3)

56. It is my understanding that in order to properly evaluate the ’608 Patent, the terms of the claims must first be interpreted. It is my understanding that for the purposes of this *inter partes* review, the claims are to be construed under the so-called *Phillips* standard, under which claim terms are given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in view of the specification and prosecution history, unless the inventor has set forth a special meaning for a term.

57. For purposes of my analysis below, I do not believe any claim terms require explicit construction.

IX. CONCLUSIONS REGARDING PATENTABILITY

58. It is my opinion that the Challenged Claims of the ’608 Patent are not patentable for at least the reasons proposed in Grounds 1 and 2 of the IPR Petition:

Ground	35 U.S.C. Basis	Challenged Claims	References
1	§ 103	1–3, 5–9, 11–15, 17 and 18	*Breitenbach* in view of *Brown*
2	§ 103	4, 10, 16, 19, and 20	*Breitenbach* in view of *Brown* further in view of *Kaspar*

59. Ground 1 shows how a POSA would have modified the retrofit device (i.e., payment module) of *Breitenbach* to include instructions to store in the memory of the retrofit device the number of electrical pulses that must be received by the control unit to initiate an operation, as taught by *Brown*.

60. Ground 2 builds on Ground 1 and further shows how a POSA would have modified the retrofit device (i.e., payment module) of *Brown* to include a second interface module configured to store an output of the control unit corresponding to an operation of the offline payment-operated machine, as taught by *Kaspar*.

A. Ground 1: Claims 1–3, 5–9, 11–15, 17 and 18 are Rendered Obvious Under 35 U.S.C. § 103 Over *Breitenbach* in View of *Brown*

1. Obviousness Standards and Analysis

61. I have been informed by counsel that questions of obviousness under 35 U.S.C. § 103 are resolved on the basis of underlying factual determinations,

including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; and (3) the level of skill in the art.

a. Differences Between the Claimed Subject Matter and Breitenbach

62. *Breitenbach* teaches almost every limitation of independent Claims 1, 7, and 13. *See infra* §§ IX.A.2, IX.A.7, IX.A.12. Specifically, *Breitenbach* teaches "a retrofit device [that] may be coupled to a conventional vending machine, visi-cooler, and/or soda fountain to facilitate remote, wireless, cashless, and/or account-based sales." Ex. 1001, 2:18–22. The retrofit device may include a retrofit processing device, e.g., 474. *Id.*, 15:31–40. *Breitenbach* discloses that the "retrofit processing device 474 may, for example, store instructions." *Id.*, 15:34–40. *Breitenbach* further teaches that "[t]ypically, a processor . . . will receive instructions from a memory or like device and execute those instructions[.]" *Id.*, 29:66–30:6.

63. *Breitenbach* further teaches that the stored instructions are executed based on input, data, indications, and/or commands that are received. Ex. 1005, 15:34–40. For instance, the retrofit processing device may execute a variety of instructions, "such as instructions specially programmed into and/or for the electronic processing device 374" which may "enable and/or facilitate the apparatus to operate in accordance with embodiments described herein" (*id.*, 12:8–14);

"instructions that are executed based on indications of input received from the input device 412, based on data received via the first data management port 440 (e.g., from the processing device 410), and/or based on indications and/or commands received via the retrofit communication device 460." *Id.*, 15:34–40.

64. *Breitenbach* also teaches an apparatus 900 which may be similar in configuration and/or functionality to retrofit devices 120, 420, and 520, apparatus 320, and/or retrofit device 720. *Id.*, 23:14–21. The apparatus 900 may include a memory device 940 which "may comprise any appropriate information storage device that is or becomes known or available[.]" *Id.*, 24:39–41. The memory device may "store one or more of purchase instructions 942-1 and/or social networking instructions 942-2." *Id.*, 24:45–48.

65. The purchase instructions of apparatus 900 "may be operable to cause the processor 910 to access and/or process personal data 944-1" which may be used "by the processor 910 to facilitate and/or conduct processes and/or methods in accordance with the purchase instructions 942-1 to facilitate and/or effectuate a customer's purchase of products and/or services from (or via) a machine[.]" *Id.*, 24:54–66. The purchase instructions also may "interface with an application stored on and/or executed by a customer's mobile phone . . . to facilitate the purchase and/or dispensing of refreshments from vending machines, visi-coolers, and/or soda fountains[.]" *Id.*, 24:66–25:5.

66. *Breitenbach* also teaches that the retrofit device may "transmit an indication of a proper payment/credit amount sufficient to cause a provision of a desired product" by "replicating a 'coin-in' signal indicative of the proper payment amount[.]" Ex. 1005, 14:60–15:2, 8:47–62; *see also infra* § IX.A.2.d.

67. In my opinion, a POSA would have understood that, in a coin-operated machine, the retrofit device "replicates" the coin-in signal indicative of the proper payment amount by generating the electrical pulses that must be received by the control unit to initiate an operation of the offline payment-operated machine. More specifically, a POSA would have understood that a coin-operated machine generates one or more electrical pulses in response to receiving one or more coins. Therefore, a retrofit device on a coin operated machine would replicate the coin-in signal by generating the one or more electrical pulses that would be generated in response to receiving one or more coins.

68. In my opinion, a POSA would understand that *Breitenbach* may store, in the memory of the payment module, the number of electrical pulses that must be received by the control unit to initiate an operation of the offline payment-operated machine because the payment module would need to know the number of electrical pulses that must be received in order to replicate the coin-in signal indicative of the proper payment amount.

69. However, to the extent that *Breitenbach* does not explicitly teach that the programs on the retrofit processing device include instructions for storing, in the memory of the payment module, the number of electrical pulses that must be received by the control unit to initiate an operation of the offline payment-operated machine, *Brown*, which is in the same field of endeavor as *Breitenbach*—vending machine retrofits to enable cashless transactions at a conventional machine—does.

70. Specifically, *Brown* expressly discloses "the one or more programs including instructions for: storing, in the memory of the payment module, a number of the electrical pulses that must be received by the control unit to initiate an operation of the offline payment operating machine" and a POSA would have found it obvious to modify *Breitenbach* to include this feature with a reasonable expectation of success as discussed in additional detail *infra* at Sections IX.A.1.b–c.

71. Specifically, *Brown* discloses an electronic funds acceptor (i.e., payment module) which includes a "memory 22" and a "funds controller 21." Ex. 1006, 5:13–21. The funds controller "outputs in a serial fashion coin deposit signal pulses" to signal to the vending machine dispensing controller "that the maximum purchase value has been received." *Id.*, 6:21–25. "The exact nature of which coin signals are to be generated may be predetermined and stored in memory 22 to improve the speed of the transaction[.]" *Id.*, 6:25–27. Thus, a POSA would have understood that *Brown* expressly teaches instructions for storing, in the memory of

the payment module, a number of the electrical pulses that must be received by the control unit to initiate an operation of the offline payment-operated machine.

72. *Breitenbach* in view of *Brown* also teaches all the elements of challenged Claims 2, 3, 5–9, 11–15, 17, and 18. *See infra* §§ IX.A.3–IX.A.16.

b. Obviousness Rationale for Why a POSA Would Have Modified *Breitenbach* with *Brown* to Arrive at the Claimed Subject Matter

73. As discussed in the preceding section, in my opinion, a POSA would understand that *Breitenbach* may store, in the memory of the payment module, a number of electrical pulses that must be received by the control unit to initiate an operation of the offline payment-operated machine because the payment module would need to know the number of electrical pulses that must be received in order to replicate the coin-in signal indicative of the proper payment amount.

74. However, to the extent that *Breitenbach* does not explicitly teach this limitation, in view of the collective teachings of *Breitenbach* and *Brown*, it would have been obvious to a POSA to modify the retrofit processing device 374/474 of *Breitenbach* to include instructions for storing in the memory of the payment module (i.e., retrofit device), a number of electrical pulses that must be received by the control unit to initiate an operation of the offline payment-operated machine, including by storing in the memory of the payment module "[t]he exact nature of

which coin signals are to be generated. . . to improve the speed of the transaction" as taught by *Brown*. Ex. 1006, 6:25–27.

75. A POSA would have found it obvious to modify *Breitenbach* with *Brown* based on, at a minimum, the express teachings in *Breitenbach*.

76. *Breitenbach* discloses that the electronic processing device 374/474 "may be or include any type, quantity, and/or configuration of electronic and/or computerized processor that is or becomes known." Ex. 1005, 12:1–4. "[T]he electronic processing device 374 may execute instructions . . . specially programmed into and/or for the electronic processing device" which may "enable and/or facilitate the apparatus 320 to operate in accordance with embodiments as described herein[.]" *Id.*, 12:7–14.

77. *Breitenbach* further teaches that the retrofit processing device includes a memory device: "[t]he retrofit processing device 474 may, for example, store instructions that are executed based on indications of input received from the input device 412, based on data received via the first data management port 440 . . . and/or based on indications and/or commands received via the retrofit communication device 460." *Id.*, 15:34–40.

78. *Breitenbach* further teaches that the retrofit device 420 may obtain "pricing and/or other data" from the first data management port and then "satisfy payment requirements" by "emulating a payment processing device." *Id.*, 14:41–

55. The retrofit device may derive this pricing data using the MDB protocol. *See, e.g.*, *id.*, 14:40–15:2. Specifically, *Breitenbach* teaches that the retrofit device may derive pricing data by using the MDB protocol to "ping" the processing device "utilizing a small monetary amount such as a five cent ($0.05) 'ping' to retrieve a deficiency amount" and then use the "derived pricing data to transmit an indication of a proper payment/credit amount." *See id.*, 14:40–15:2.

79. A POSA would have understood that the retrofit device, using the MDB protocol, derives pricing data in the form of electrical pulses. This is because the MDB protocol uses electrical pulses for communication and payment transactions, with each pulse representing a certain amount of credit. The vending machine counts these pulses to determine the total payment received.

80. *Breitenbach* further teaches that the retrofit device 420 may satisfy payment requirements "by acting as and/or emulating a payment processing device." *Id.*, 14:50–55. "The retrofit device may, in some embodiments, 'fool' the machine by replicating a 'coin-in' signal indicative of the proper payment amount for the desired unit of product[.]" *Id.*, 8:58–62. A POSA would have understood that the coin-in signal is an electrical pulse indicative of the payment amount.

81. These disclosures indicate that *Breitenbach*, to the extent it does not expressly do so, provides—under the former, more rigid "TSM" standard—a teaching, suggestion, or motivation to a POSA to modify the retrofit processing

device to store in the local memory of the retrofit processing device the number of electrical pulses that must be received by the control unit to initiate an offline payment-operated machine based on the pricing data obtained via the data management port.

82. Specifically, in my opinion, a POSA would have understood that storing the number of electrical pulses in the local memory of the retrofit processing device would make the retrofit device more efficient, for example, by eliminating the need for the retrofit device to determine the number of electrical pulses that are needed every time a transaction is conducted.

83. For instance, a POSA would have understood that the process taught by *Breitenbach* to derive the pricing data using the MDB protocol would be costly and intensive on the processing hardware of *Breitenbach*. A POSA would have understood that storing the number of electrical pulses in local memory would reduce the load on the hardware because it would reduce the need for the retrofit processing device to "ping" the machine every time it needs to determine the proper payment amount.

84. As another example, a POSA would be motivated to modify *Breitenbach* to improve the speed of the transaction because speed of transactions is a known desire in the art. *See* Ex. 1006, 6:25–27. A POSA would have understood that one way to increase the speed of the transaction would be to store the pricing

data directly on the memory of the retrofit processing device rather than storing the pricing data, for example, remotely on a server or other network device. This is because a POSA would have understood that, if the pricing data were stored on a remote device, the retrofit processing device would need to re-query the remote device every time it needed to derive pricing data, which would negatively increase the amount of time required to obtain such information thus slowing down the speed of any given transaction. A POSA would have understood that this would be a less efficient process, requiring more hardware, than where the retrofit processing device stores the data locally.

85. In addition to *Breitenbach* expressly describing the retrofit processing device as being capable of executing and storing instructions in the memory of the retrofit device, there are a variety of other rationales for why a POSA would have been motivated to modify the retrofit processing device of *Breitenbach* to include instructions for storing in the memory of the payment module, a number of electrical pulses that must be received by the control unit to initiate an operation of the offline payment-operated machine.

86. For instance, *Brown* teaches that storing the "exact nature of which coin signals are to be generated" will "***improve the speed of the transaction***." Ex. 1006, 6:25–27. Thus, insofar as *Breitenbach* does not expressly teach storing the number of electrical pulses that must be received, this feature was well-known in the art and

a POSA would have been motivated to modify *Breitenbach* based on the teachings of *Brown* to "improve the speed of the transaction." Moreover, in my opinion, enhancing *Breitenbach* based on *Brown*'s teachings would have been "obvious to try" because *Brown*'s teachings could speed up the transaction.

87. In addition, modifying *Breitenbach*'s memory device to include *Brown's* instructions for storing electrical pulses in the memory of the processing device is merely applying a known technique (*Brown*'s instructions for storing electrical pulses) to a known device (the retrofit device of *Breitenbach*) to yield predictable results. In my opinion, a POSA would have understood that storing the number of electrical pulses that must be received by the control unit would eliminate the need for the payment module to determine the number of electrical pulses every time a transaction is conducted, thereby increasing the speed of the transaction, a known goal in the art. Ex. 1006, 6:25–27.

c. Obviousness Rationale for How a POSA Would Have Modified *Breitenbach* with *Brown* to Arrive at the Claimed Subject Matter

88. Once motivated to modify *Breitenbach* with *Brown*, a POSA would have (i) readily understood how to do so with a reasonable expectation of success and (ii) found it obvious and routine to implement any modifications needed to make the combination work.

89. For example, a POSA would have understood that the retrofit processing device of *Breitenbach* could include various forms of instructions in memory based on *Breitenbach*'s express teachings that the retrofit processing device 374/374 may "store instructions" (15:34–39), using a variety of media such as "hard-wired circuity or custom hardware," or "software instructions." *Id.*, 30:6–13.

90. In my opinion, modifying the retrofit device 120/320/420 of *Breitenbach* to include instructions for storing in the memory of the payment module the number of electrical pulses would have been a simple and routine task by a POSA to include in the memory of the retrofit device of *Breitenbach* instructions for storing "the exact nature of which coin signals are to be generated," as taught by *Brown*.

2. Claim 1

a. [1.P] A payment module for an offline payment-operated machine including a coin receiving switch

91. *Breitenbach* teaches "systems, apparatus, methods, and articles of manufacture for machine retrofits[.]" Ex. 1005, 2:16–18. The "retrofit device may be coupled to a conventional vending machine, visi-cooler, and/or soda fountain to facilitate remote, wireless, cashless, and/or account-based sales." *Id.*, 2:18–22. The machine can be a "standard machine [that] does not comprise a device capable of and/or configured for external and/or remote communications." *Id.*, 15:9–14. In my

opinion, a POSA would have understood that a machine lacking a device capable of external/remote communications is, by definition, offline.

92. In my opinion, a POSA would have understood that many standard vending machines, at least as of the earliest priority date of the ’608 Patent, include a coin receiving switch. This is because a coin receiving switch is a standard component to a coin operated vending machine which signals when a coin has been successfully inserted and accepted. For instance, the MDB Protocol, which the ’608 Patent recognizes has been incorporated into many vending machines made since 1995 (Ex. 1001, 6:21–23), defines requirements for a coin changer (i.e., coin receiving switch). *See* Ex. 1014 at 20.

93. Thus, *Breitenbach* teaches a payment module (retrofit device) for an offline payment-operated machine including a coin receiving switch (a standard vending machine).

94. Additionally, *Breitenbach* teaches that the “machine 108” may include a “function device 114” (shown in blue below) which may “comprise a vending and/or dispensing mechanism or a payment acceptance mechanism[.]” Ex. 1005, 6:38–44. The “retrofit device 120” (shown in red below) may send a signal to the function device 114 (blue) that causes the machine to undertake a desired function. *See id.*, 8:47–53.

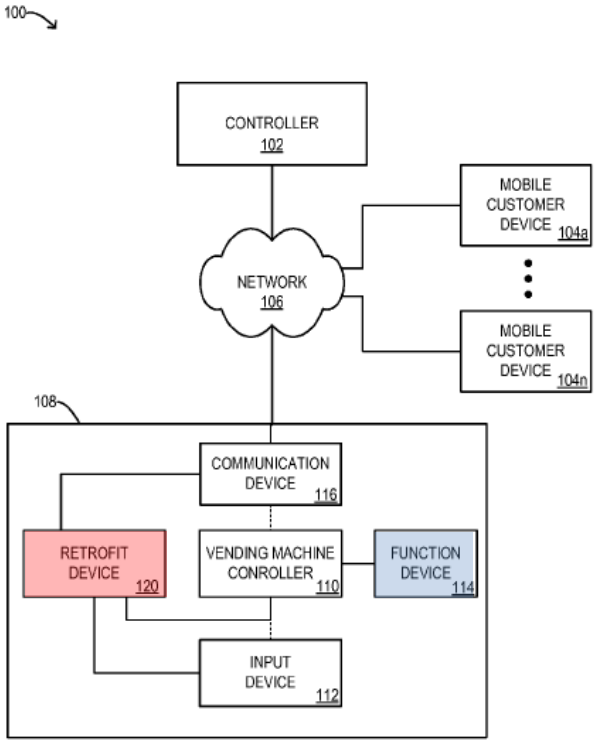


FIG. 1

Ex. 1005, Figure 1 (annotated).

95. *Breitenbach* also teaches that "[t]he retrofit device may, in some embodiments, 'fool' the machine by replicating a 'coin-in' signal indicative of the proper payment amount for the desired unit of product, causing the machine to dispense the unit of product." *Id.*, 8:53–62. A POSA would have understood that the "coin-in" signal indicative of the proper payment amount is a signal that replicates the signal delivered by a coin-receiving switch. Thus, a POSA would have understood that a function device 114 comprising a payment acceptance mechanism

which, in response to a "coin-in" signal, causes the machine to dispense the desired product, is a coin receiving switch.

96. Thus, *Breitenbach* teaches a payment module (e.g., retrofit device 120) for an offline payment-operated machine (e.g., machine 108) including a coin receiving switch (e.g., function device 114).

b. [1.1] the payment module comprising: a short-range wireless transceiver configured to communicate with one or more mobile devices

97. *Breitenbach* teaches "a first customer device 104*a* may communicate directly with the retrofit device 120[.]" Ex. 1005, 7:26–27. A customer device is a type of "network device" which may include "a wireless or cellular telephone." *Id.*, 3:2–14. The "mobile customer devices 104*a-n* may, for example, communicate with the controller 102 via the network 106. . . . The network 106 may, according to some embodiments, comprise a LAN (wireless and/or wired), cellular, telephone, Bluetooth®, and/or RF network[.]" *Id.*, 5:9–14. In my opinion, a POSA would have considered that at least some of these network types—such as Bluetooth® and RF network—employ short-range wireless technology.

98. *Breitenbach* additionally teaches a "system 400 which may be similar in configuration and/or functionality to the system 100" and which may include a "retrofit device 420[.]" Ex. 1005, 12:38–50. "[T]he retrofit device 420

may comprise . . . a retrofit communication device 460" (shown in green below). *Id.*, 13:2–7.

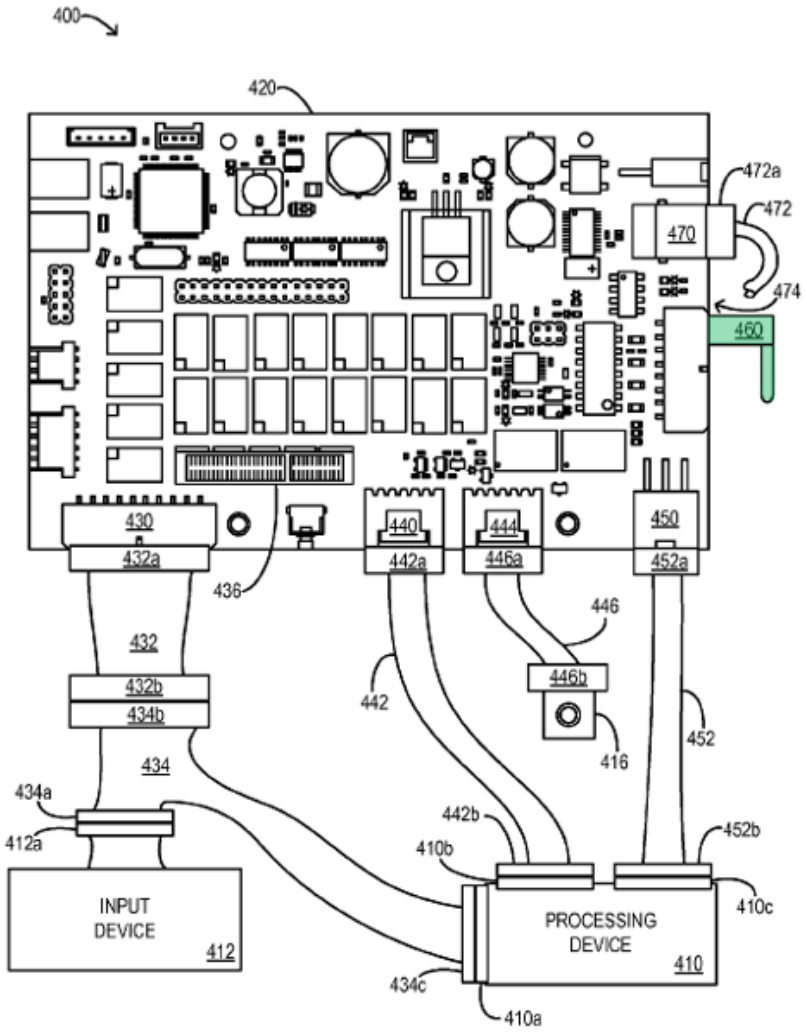


FIG. 4

Ex. 1005, Figure 4 (annotated).

99. The retrofit communication device may be "a wireless communication device." *Id.*, 15:3–9. The retrofit device 420 may "receive indications of machine input via the retrofit communication device 460 (e.g., from a customer device and/or

controller)[.]" *Id.*, 15:24–30. In my opinion, a POSA would have understood that the retrofit communication device that is configured to communicate with a customer device, as taught by *Breitenbach*, includes a short-range wireless transceiver.

100. Thus, *Breitenbach* teaches the payment module comprising a short-range wireless transceiver (retrofit communication device 460), configured to communicate with one or more mobile devices (mobile customer device 104).

c. [1.2] the payment module comprising…one or more processors

101. *Breitenbach* teaches an "apparatus 320 [that] may be similar in configuration and/or functionality to the retrofit device 120." Ex. 1005, 9:29–33. The apparatus may include an "electronic processing device 374," which is contained on the circuit board shown in yellow below. *Id.*, 9:35–52.

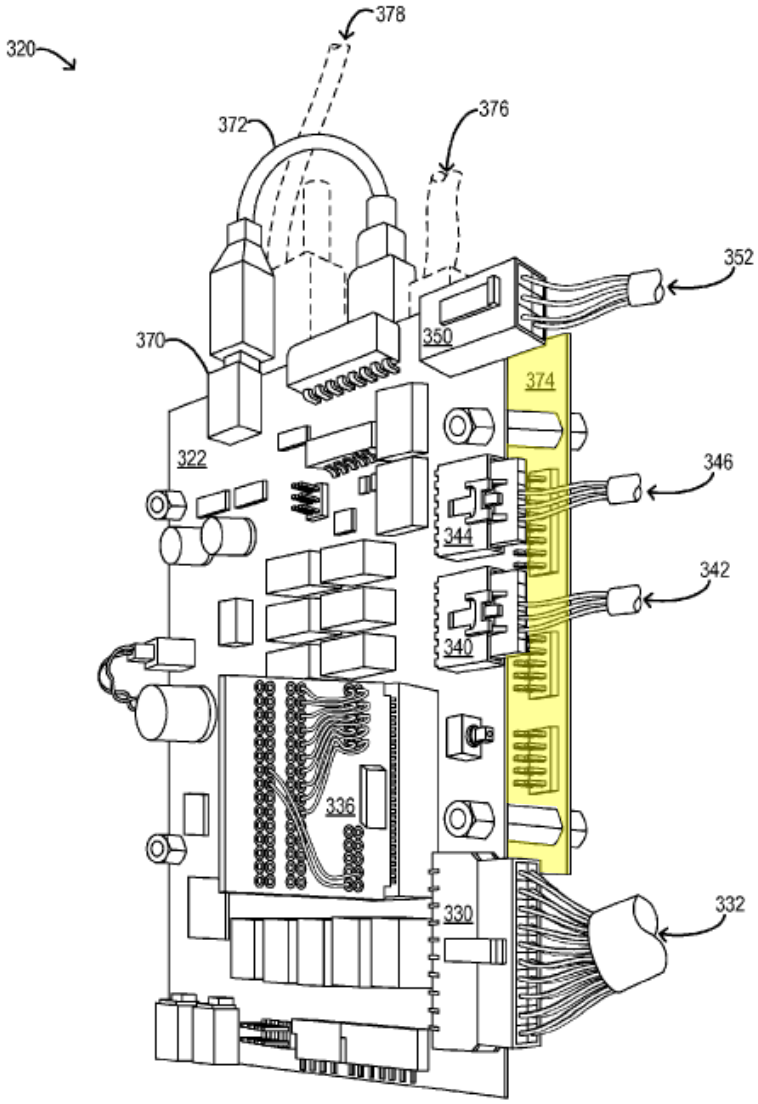


FIG. 3

Ex. 1005, Figure 3 (annotated).

102. "[T]he electronic processing device 374 may be or include any type, quantity, and/or configuration of electronic and/or computerized processor that is or becomes known." *Id.*, 12:1–5. "The retrofit processing device 474 may, for example, store instructions that are executed based on indications of input received

from the input device 412 . . . and/or based on indications and/or commands received via the retrofit communication device 460." *Id.*, 15:34–40.

103. Thus, *Breitenbach* teaches the payment module comprising one or more processors (e.g., electronic processing device 374).

d. [1.3] the payment module comprising . . . a first interface module configured to output to a control unit of the offline payment-operated machine one or more electrical pulses, each of the one or more electrical pulses emulating an analog signal generated by the coin receiving switch of the offline payment-operated machine in response to insertion of a single coin of a predetermined type in the offline payment-operated machine; and

104. *Breitenbach* teaches that the retrofit device may "cause[] the machine to execute the desired function[.]" *Id.*, 8:47–49. "The retrofit device may, based on the received indication of the desired function for example, send a signal to the machine (e.g., to the VMC 110 and/or the function device 114 of FIG. 1) that causes the machine to undertake the desired function." *Id.*, 8:49–53. For instance, if the desired function is dispensing a product, "the retrofit device may transmit a signal that causes the machine to dispense the desired unit of product—such as by sending a signal indicative of payment to a payment acceptance device of the machine." *Id.*, 8:53–58. "The retrofit device may, in some embodiments, 'fool' the machine ***by replicating a 'coin-in' signal indicative of the proper payment amount for the desired unit of product***[.]" *Id.*, 8:47–62.

105. In my opinion, a POSA would have understood that a "coin-in" signal is an electrical pulse emulating an analog signal generated by the coin receiving switch of the offline payment-operated machine in response to insertion of a coin of a predetermined type. Specifically, a POSA would have understood that, when connected to a conventional coin-operated machine, the retrofit device emulates the number of coins that would need to be deposited in the machine for the VMC to determine full payment and initiate an operation. The retrofit device does this by generating a "coin-in" electrical pulse which emulates the analog signal generated by the coin acceptance mechanism (e.g., 114) of the standard coin-operated vending machine in which the retrofit device is installed.

106. *Breitenbach* also teaches that the retrofit device (e.g., 420) may include a payment port 450 (shown in orange below) which may be "coupled, via the payment cable 452, to the processing device 410 [shown in gray below] such that the retrofit device 420 is capable [to] function as and/or emulating a payment acceptance device for the machine." *Id.*, 14:41–45.

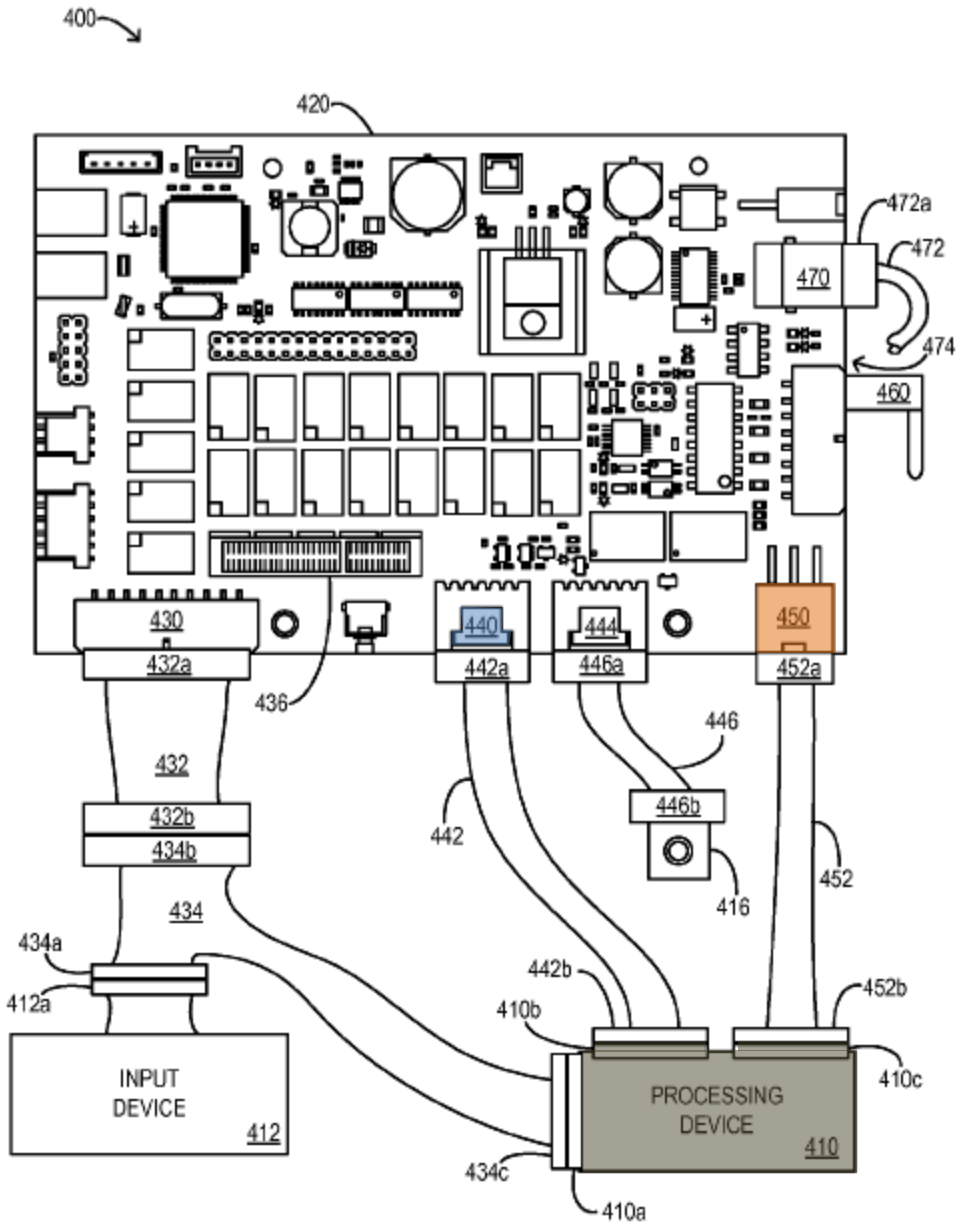


FIG. 4

Ex. 1005, Figure 4 (annotated).

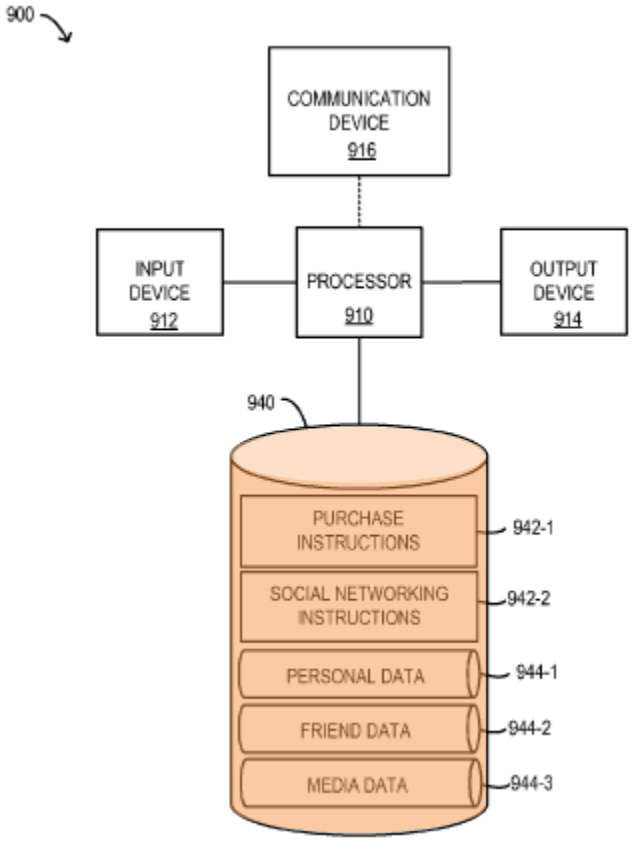
107. For instance, "the payment port 450 may be utilized to communicate with the processing device 410 via the MDB protocol. . . . [T]he retrofit device 420 may satisfy payment requirements for desired products and/or services . . . by acting

as and/or emulating a payment processing device." *Id.*, 14:48–55. In my opinion, a POSA would understand that, in the case of a coin-operated machine, "emulating a payment processing device" means replicating coin-in electrical pulses to "fool" the VMC into determining that the coin-acceptance mechanism has detected receipt of the appropriate payment for a machine operation. Moreover, a POSA would have understood that the "retrofit processing device 474," which may "store instructions that are executed based on indications of input received from the input device 412 . . . and/or based on indications and/or commands received via the retrofit communication device 460" communicates via the payment port 450 with the processing device 410 to satisfy payment requirements by emulating a payment processing device. *Id.*, 15:34–40.

108. Thus, *Breitenbach* teaches the payment module comprising a first interface module (e.g., processing device 374/474 executing instructions to output to processing device 410 via payment port 450 one or more electrical pulses) configured to output to a control unit of the offline payment-operated machine (e.g., processing device 410) one or more electrical pulses emulating an analog signal (e.g., "coin-in" signal) generated by the coin receiving switch (e.g., function device 114) of the offline payment-operated machine in response to insertion of a single coin of a predetermined type (e.g., "coin-in" signal) in the offline payment-operated machine.

e. [1.4] the payment module comprising . . . memory with one or more programs for execution by the one or more processors

109. *Breitenbach* discloses an apparatus 900 which may "be similar in configuration and/or functionality to the . . . retrofit device 120, 720 of FIG. 1 and/or FIG. 7, the apparatus 320 of FIG. 3, and/or the retrofit devices 420, [and] 520[.]" Ex. 1001, 23:14–21. The apparatus 900 "may comprise a processor 910, an input device 912, an output device 914, a communication device 916, and/or ***a memory device*** 940[,]" shown in orange. *Id.*, 23:25–28.



110. *Breitenbach* further discloses that various forms of instructions may be stored on memory device 940, such as purchase instructions (e.g., 942-1) which "may be utilized by the processor 910[3] to provide output information via the output device 914 and/or the communication device 916[.]" *Id.*, 24:48–53. In addition, "personal data 944-1 may be utilized by the processor 910 to facilitate and/or conduct processes and/or methods in accordance with the purchase instructions 942-1 to facilitate and/or effectuate a customer's purchase of products and/or services from (or via) a machine as described herein." *Id.*, 24:61–66. *Breitenbach* further teaches that data storage devices may be used "to store instructions and/or data such as the purchase instructions 942-1, the social networking instructions 942-2, the personal data 944-1, the friend data 944-2, and/or the media data 944-3[.]" *Id.*, 26:28–35. Instructions stored on the data storage devices may, "when executed by a processor (such as . . . retrofit device 120 . . .) cause the implementation of and/or facilitate any of the various methods 200, 800, . . . and/or the process 700[.]" *Id.*, 26:35–44.

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3 The numeral "x10," e.g., 110, 210, 310, etc. is used in FIGs. 1, 4 and 5 to refer to the vending machine controller or processing device of a machine or apparatus which comprises a retrofit device. Ex. 1005, 4:12–29, 12:44–50, 15:45–50. The numeral 910, as used in FIG. 9, refers to the processing device of a (1) controller 102, 702, (2) mobile device (104, 704), (3) **and/or** retrofit device 120/320/420/520 (i.e., a retrofit processing device). *See* Ex. 1005, 23:15–21.

111. In my opinion, a POSA would have understood, based on these disclosures of *Breitenbach*, that the memory device includes one or more programs for execution by the one or more processors of the retrofit device.

112. Thus, *Breitenbach* teaches the payment module comprising memory (e.g., memory device 940) with one or more programs (e.g., purchase instructions 942-1) for execution by the one or more processors (e.g., processor 910, retrofit processing device 374/474).

f. [1.4(a)] the one or more programs including instructions for: storing, in the memory of the payment module, a number of the electrical pulses that must be received by the control unit to initiate an operation of the offline payment operating machine

113. *Breitenbach* teaches that the memory device may store purchase instructions 942-1 which may be used to "facilitate and/or effectuate a customer's purchase[.]" Ex. 1005, 24:48–25:5; *see supra* § IX.A.2.e. *Breitenbach* also teaches that "***[i]n some embodiments*** . . . the retrofit device and/or central controller device do ***not*** store and/or otherwise have direct access to prices of products and/or services available at (and/or via) the machine[.]" Ex. 1005, 9:9–27. In my opinion, a POSA would have understood this to mean that that in some embodiments, the retrofit device ***does*** store prices. Further, based on these teachings, a POSA would have understood that the retrofit device includes memory storing data and instructions for executing a remote, wireless, or cashless payment on a vending machine.

114. However, to the extent that Patent Owner may argue that *Breitenbach* does not expressly teach this limitation, *Brown* does, and a POSA would have found it obvious to modify the one or more programs of *Breitenbach* to include instructions for storing, in the memory of the payment module, a number of electrical pulses that must be received by the control unit, as taught by *Brown*, with a reasonable expectation of success. *See supra* § IX.A.1.

115. *Brown* teaches an electronic funds acceptor (outlined in red below), which operates as "a replacement to a mechanical coin acceptor mechanism[.]" *Id.*, Ex. 1006, 5:24–30, 65–67. The acceptor includes a "funds controller circuit 21 [shown in orange] which may comprise suitable programmed microprocessor[.]" *Id.*, 5:17–19. The funds controller circuit has "an output bus 24 of coin deposit signals and an input bus 25 of coin return signals" which are "connected to a dispensing controller 40 of the vending machine electronics 12." *Id.*, 5:29–33. The dispensing controller outputs to the "dispensing motor and/or solenoid control circuit 45 [which] is used for activating the appropriate dispensing motors or solenoids for controlling the release of product[.]" *Id.*, 5:34–47.

116. The acceptor also "comprises memories 22, 26, 27, 28 and 29." *Id.*, 5:18–20. "The memory 22 [shown in blue] stores a predetermined maximum value of a product to be purchased from the vending machine." *Id.*, 6:1–3.

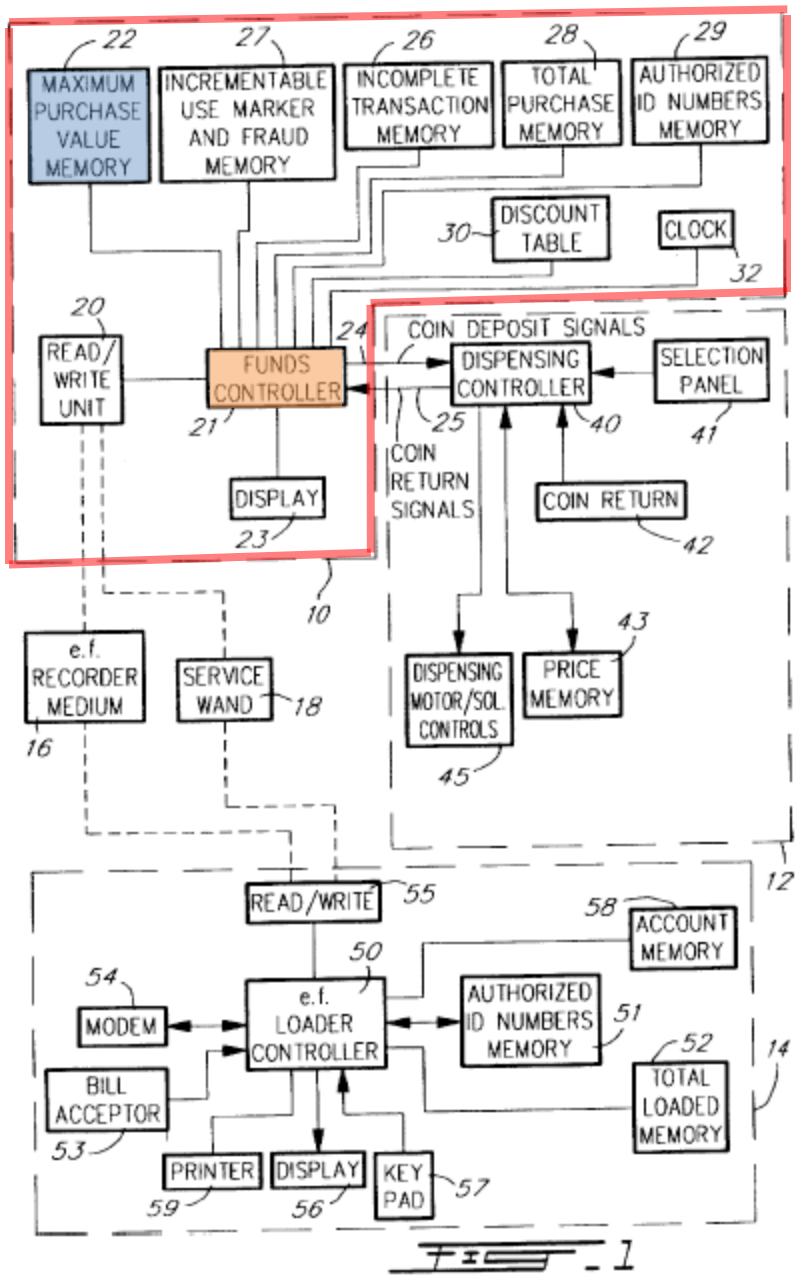


Fig. 1

Ex. 1006, Figure 1 (annotated).

117. When a customer inserts a payment card (i.e., recording medium 16) into the "read/write unit 20" of the acceptor, the funds controller determines whether the funds available on the card "exceeds the maximum purchase value in memory

22." *Id.*, 6:5–18. In the case that it does, the "funds controller 21 then outputs in a serial fashion coin deposit signal pulses on the appropriate lines of bus 24 in order to signal to controller 40 that the maximum purchase value has been received. The exact nature of which coin signals are to be generated may be predetermined and stored in memory 22[.]" *Id.*, 6:15–32.

118. I have already explained why and how a POSA would have modified *Breitenbach* with *Brown*. *See supra* § IX.A.1. Thus, in my opinion, a POSA would have understood that *Breitenbach* in view of *Brown* teaches the one or more programs including instructions for: storing, in the memory of the payment module, a number of the electrical pulses that must be received by the control unit to initiate an operation of the offline payment operating machine (e.g., *Breitenbach*'s memory device including instructions to store the number of electrical pulses that must be received to initiate an operation, such as instructions to "predetermine[] and store in memory 22" the "exact nature of which coin signals are to be generated," as taught by *Brown*).

g. [1.4(b)] the one or more programs including instructions for . . . receiving a wireless request via the short-range wireless transceiver from a respective mobile device of the one or more mobile devices to initiate a cashless operation of the offline-payment operated machine

119. *Breitenbach* teaches that a "retrofit device may be coupled to a conventional vending machine, visi-cooler, and/or soda fountain to facilitate remote, wireless, cashless, and/or account-based sales." Ex. 1005, 2:18–22. A "customer device 104*a* may communicate directly with the retrofit device 120 (e.g., via the communication device 116) to place an order and/or request a function to be performed by the machine 108." Ex. 1005, 7:25–29. *Breitenbach* teaches that a customer device is a type of "network device," which "generally refer[s] to any device that can communicate via a network" such as a "wireless or cellular telephone." *Id. Id.*, 3:2–14. The network may include short-range communication capabilities such as Bluetooth® and/or an RF network. *Id.*, 5:9–14. "The retrofit device 420 may, for example, receive indications of machine input via the retrofit communication device 460 (e.g., from a customer device and/or controller), map the input utilizing the input mapping connector 435, and/or transmit representative input signals to the processing device 410[.]" *Id.*, 15:24–30. In my opinion, a POSA would have understood that the retrofit communication device 460 that receives indications of machine input from a customer device that has Bluetooth® communication capabilities includes a short-range transceiver.

120. *Breitenbach* further teaches that the retrofit device includes a memory device that may store purchase instructions 942-1, which may be used to "facilitate and/or effectuate a customer's purchase[.]" Ex. 1005, 24:48–25:5; *see supra* § IX.A.2.e. For instance, *Breitenbach* teaches that the purchase instructions may "interface with an application stored on and/or executed by a customer's mobile phone, for example, to facilitate the purchase and/or dispensing of refreshments from vending machines, visi-coolers, and/or soda fountains as described herein." Ex. 1005, 24:66–25:5. In my opinion, a POSA would have understood that the purchase instructions 942-1 may include instructions for receiving a wireless request via the short-range wireless transceiver of the customer device to facilitate the purchase and/or dispensing of product.

121. Thus, *Breitenbach* in view of *Brown* teaches the one or more programs including instructions for receiving a wireless request (e.g., "place an order and/or request a function to be performed" or "receive indications of machine input") via the short-range wireless transceiver from a respective mobile device of the one or more mobile devices (e.g., retrofit communication device 460 that receives indications of machine input from a customer device having, e.g., Bluetooth® capabilities) to initiate a cashless operation of the offline-payment operated machine (e.g., "cashless . . . sales" of a "conventional vending machine, visi-cooler, and/or soda fountain").

h. [1.4(c)(i)] in response to the wireless request: determining a first number of electrical pulses to output via the first interface module to the control unit of the offline payment-operated machine in order to initiate the requested cashless operation of the offline payment-operated machine

122. *Breitenbach* teaches that the "retrofit device may discern the actual price of the product" or "calculate the actual price of the desired product and/or service." *Id.*, 9:18–27, 11:32–35. For example, the retrofit device may "transmit a credit signal for a specific monetary amount . . . to the machine, along with an identifier of a product and/or service desired for purchase." *Id.*, 11:20–23. In response, the machine may transmit to the retrofit device "an indication of the amount by which the credited funds are deficient" for the desired purchase. *Id.*, 11:27–33. The retrofit device may then "***calculate the actual price of the desired product and/or service***" and transmit "a second credit signal to the machine (e.g., via the MDB connector and MDB cable 352) representing the determined actual price," thereby causing the machine to provide the desired purchase. *Id.*, 11:32–39. "In other words, the apparatus 320 may utilize the MDB connector 350 and MDB cable 352 to 'ping' the machine to ***derive any actual price metrics***." *Id.*, 11:44–47.

123. *Breitenbach* also teaches that the retrofit device may "replicat[e] a 'coin-in' signal indicative of the proper payment amount for the desired unit of product, causing the machine to dispense the unit of product." Ex. 1005, 8:58–62.

In my opinion, a POSA would have understood that a "coin-in" signal indicative of the proper payment amount for the desired unit of product constitutes a particular number of electrical pulses associated with the price of an item. *See also supra* § IX.A.2.d. Moreover, a POSA would have understood that, when connected to a conventional coin-operated machine, the retrofit device determines a particular "coin in" signal constituting a particular number of electrical pulses associated with the price of a unit of product before it transmits such "coin in" signal to the machine to cause the machine to dispense the product.

124. In my opinion, a POSA would have understood that these functions are performed in response to the wireless request. Specifically, by teaching that the retrofit device may "calculate the actual price of the ***desired product and/or service***," *Breitenbach* is teaching that the retrofit device determines the number of electrical pulses in response to a request for a specific (i.e., desired) product and/or service. This is because the retrofit device receives the wireless request for the desired product or service before the retrofit device can calculate the actual price of the desired product or service.

125. In addition, *Breitenbach* teaches a method 200 wherein the retrofit device may "receive, intercept, interrupt, and/or otherwise determine input entered into (and/or via) a machine." *Id.*, 7:60–66. In some embodiments, a customer may enter input via their customer device and the retrofit device may then "cause the

machine to function as desired by replicating the remotely and/or externally-received inputs (directly from the customer device . . .) as input signals such as would be generated had the inputs been received via the standard input device of the machine." *Id.*, 8:63–9:8. A POSA would have understood that the retrofit device is "causing the machine to function as desired" (such as by determining the number of electrical pulses required to purchase a given unit of product) in response to the input entered via the customer device (i.e., in response to the wireless request).

126. Thus, *Breitenbach* in view of *Brown* teaches in response to the wireless request: determining a first number of electrical pulses to output via the first interface module to the control unit of the offline payment-operated machine in order to initiate the requested cashless operation of the offline payment-operated machine (e.g., determine a particular "coin in" signal constituting a particular number of electrical pulses associated with a the price of a unit of product).

i. [1.4(c)(ii)] in response to the wireless request . . . causing the offline payment-operated machine to initiate the requested cashless operation by issuing the first number of electrical pulses to the control unit via the first interface module

127. *Breitenbach* teaches that the "[t]he retrofit device may, in some embodiments, 'fool' the machine by replicating a 'coin-in' signal indicative of the proper payment amount for the desired unit of product, causing the machine to dispense the unit of product[.]" Id., 8:47–62. In my opinion, a POSA would have

understood that a "coin-in" signal indicative of the proper payment amount constitutes a particular number of electrical pulses required to cause the offline payment-operated machine to initiate the requested cashless operation. *See supra* § IX.A.2.d.

128. In my opinion, a POSA would have understood that these functions are performed in response to the wireless request. A POSA would understand that the retrofit device received the request for the desired unit of product before the retrofit device could cause the offline payment-operated machine to initiate the operation corresponding to that desired product. In addition, as I explained in Section IX.A.2.h, *Breitenbach* teaches that a retrofit device may, in response to receiving a customer request via a customer's mobile device, "cause the machine to function as desired by replicating the remotely and/or externally-received inputs . . . as input signals such as would be generated had the inputs been received via the standard input device of the machine." *Id.*, 8:63–9:8. A POSA would have understood that the retrofit device is "causing the machine to function as desired" in response to the input entered via the customer device (i.e., in response to the wireless request).

129. Thus, *Breitenbach* in view of *Brown* teaches in response to the wireless request causing the offline payment-operated machine to initiate the requested cashless operation by issuing the first number of electrical pulses to the control unit

via the first interface module (e.g., "replicating a 'coin-in' signal indicative of the proper payment amount").

j. [1.4(c)(iii)] in response to the wireless request . . . sending operation information corresponding to the initiated operation of the offline payment-operated machine to the respective mobile device via the short-range wireless transceiver.

130. *Breitenbach* teaches that "a customer utilizing the customer device 704 may, for example, utilize communication functionality such as Bluetooth®, IR, RF, and/or Wi-Fi® . . . to communicate a desire to purchase an amount of beverage from . . . the interactive soda fountain 708." *Id.*, 18:13–25. The transmission may be sent directly from the customer mobile device to the retrofit communication module. *See id.*, 18:26–29. Where the transmission indicates a desired transaction, "the retrofit device 720 may cause, ***in response to the indication***, the interactive fountain 708 to operate in accordance with the desired transaction (e.g., provide the desired product)." *Id.*, 18:35–46.

131. The "retrofit device 720 and/or the retrofit communication module 760 thereof may transmit and the controller 702 (and/or the customer device 704) may receive, information descriptive of various parameters and/or metrics associated with the interactive soda fountain 708, at 790-4." Ex. 1005, 19:32–37. "The transmission at 790-4 may comprise, for example, a confirmation of the dispensing of the desired beverage, sales data associated with the transaction . . . sales data from

other transactions, inventory levels . . . and/or settings and/or maintenance conditions or diagnostics[.]" *Id.*, 19:37–44. In some embodiments, "the controller 702 may transmit and the customer device 704 may receive, an indication of the transaction, ***such as a confirmation of the dispensing of a desired product, a transaction receipt, and/or another indication that the customer has properly acquired the desired beverage***." *Id.*, 19:44–52. In my opinion, POSA would have understood that the information transmitted to the customer device may be transmitted via the short-range wireless transceiver of the retrofit communication module.

132. Thus, *Breitenbach* in view of *Brown* teaches in response to the wireless request sending operation information corresponding to the initiated operation of the offline payment-operated machine (e.g., "a confirmation of the dispensing of the desired beverage") to the respective mobile device (e.g., customer device 104/704) via the short-range wireless transceiver (e.g., retrofit communications device 760).

3. Claim 2

a. [2.1] The payment module of claim 1, wherein the one or more programs further comprise instructions for: prior to sending the operation information and after causing the offline payment-operated machine to initiate operation by issuing the first number of electrical pulses to the control unit, obtaining a notification from the offline payment-operated machine indicating initiation of the operation of the offline payment-operated machine

133. As discussed in Section IX.A.2.j, *Breitenbach* teaches that the retrofit device or retrofit communication module may transmit "information descriptive of various parameters and/or metrics associated with the interactive soda fountain 708, at 790-4," including "a confirmation of the dispensing of the desired beverage[.]" Ex. 1005, 19:32–52.

134. In my opinion, a POSA would have understood that the retrofit device obtains the notification confirming dispensing of the desired product (i.e., notification indicating initiation of the operation) from the interactive soda fountain (i.e., from the offline payment-operated machine). For example, *Breitenbach* teaches that the "retrofit device 720 may transmit and the solenoids 714-3, 714-8 may receive an indication to activate product flow" in response to an indication of a desired transaction from a customer device. *Id.*, 18:39–57. The indication received by the solenoids "may, for example, cause the desired beverage to be dispensed into the beverage cup 780." *Id.*, 18:57–61. The retrofit device may then transmit "information descriptive of various parameters" such as a "confirmation of the dispensing of the desired beverage." *Id.*, 19:32–52. In order to confirm dispensing of the desired beverage, the retrofit device obtains a notification from the offline payment-operated machine itself indicating that the solenoids were in fact triggered. *See id.*, 20:34–36 (a beverage is dispensed upon triggering a solenoid activation lever). In other words, because it is the offline payment-operated machine itself that

does the dispensing, the notification to the retrofit device comes from the offline payment-operated machine.

135. It is also my opinion that a POSA would have understood that the notification is obtained after causing the offline payment-operated machine to initiate operation by issuing a first number of electrical pulses. As discussed in Section IX.A.2.i, *Breitenbach* teaches that the retrofit device may cause the offline payment-operated machine to initiate operation (i.e., activate product flow or cause the desired beverage to be dispensed) by issuing a first number of electrical pulses to the control unit. In my opinion, a POSA would have understood that, before the interactive soda fountain may obtain a notification indicating dispensing of the desired beverage, the fountain causes the desired beverage to be dispensed by triggering the solenoid(s). This is because the retrofit device cannot receive a confirmation that the beverage was dispensed until the beverage is actually dispensed. A POSA would therefore have understood that *Breitenbach* discloses a payment module which first causes the offline payment-operated machine to initiate operation (i.e., dispense the desired beverage) by issuing a first number of electrical pulses (i.e., trigger the solenoids).

136. In my opinion, a POSA would also have understood that the retrofit device must obtain a confirmation of the dispensing of the desired beverage from the interactive soda fountain prior to sending the confirmation to the customer

device. This is because the retrofit device cannot transmit a confirmation of the dispensing of the beverage until the retrofit device receives the confirmation of the dispensing of the beverage. Thus, a POSA would have understood that *Breitenbach* discloses a payment module which obtains a notification from the offline payment-operated machine indicating initiation of the operation of the offline payment-operated machine prior to sending the operation information.

137. Thus, *Breitenbach* in view of *Brown* teaches the payment module of Claim 1, wherein the one or more programs further include instructions for: prior to sending the operation information and after causing the offline payment-operated machine to initiate operation by issuing the first number of electrical pulses to the control unit, obtaining a notification from the offline payment-operated machine (i.e., obtaining a notification from the offline payment-operated machine in order to confirm to the retrofit device "dispensing of the desired beverage") indicating initiation of the operation of the offline payment-operated machine (e.g., "a confirmation of the dispensing of the desired beverage").

b. [2.2(a)] in response to receiving the notification: generating the operation information based at least in part on the notification

138. As discussed in Section IX.A.2.j, *Breitenbach* teaches that the "retrofit device 720 and/or the retrofit communication module 760 thereof may transmit . . . information descriptive of various parameters and/or metrics[.]" Ex. 1005, 19:32–

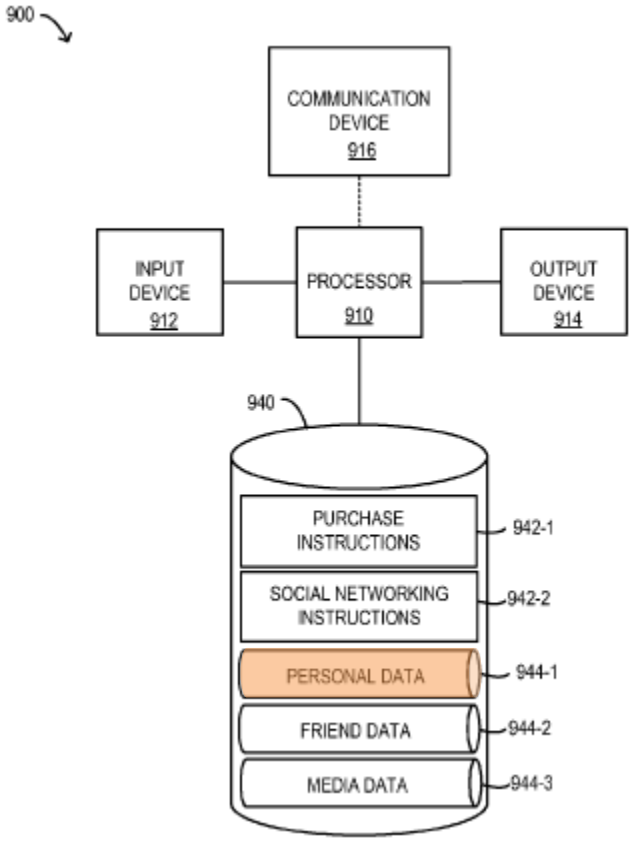
37. For example, the transmission may include "a confirmation of the dispensing of the desired beverage, sales data associated with the transaction . . . sales data from other transactions, inventory levels of syrup, carbon dioxide, and/or ice, and/or settings and/or maintenance conditions or diagnostics of the interactive soda fountain 708 (and/or components thereof)." *Id.*, 19:37–44. A POSA would have understood that the retrofit device transmits such information based at least in part on the notification indicating initiation of the operation of the offline payment-operated machine.

139. Thus, *Breitenbach* in view of *Brown* teaches in response to receiving the notification: generating the operation information based at least in part on the notification (e.g., "a confirmation of the dispensing of the desired beverage, sales data . . . inventory levels" etc.).

c. [2.2(b)] in response to the notification . . . storing the generated operation information in the memory of the payment module.

140. In my opinion, a POSA would have understood that the retrofit device stores the operation information in the memory of the payment module. As discussed in Section IX.A.2.e, *Breitenbach* includes "a memory device 940" which may store "personal data 944-1," shown in orange below. *Id.*, 23:26–28, 25:26–28. "[T]he personal data 944-1 may comprise data descriptive of the customer ***that is acquired via transactions conducted with the customer***" such as "sales history,

customer 'worth' (e.g., expected value), frequency of purchases, and/or previous or typical ordering locations." *Id.*, 25:35–40.



141. Thus, *Breitenbach* in view of *Brown* teaches in response to the notification storing the generated operation information (e.g., storing personal data 944-1) in the memory of the payment module (e.g., memory 940).

4. Claim 3: The payment module of claim 2, wherein the notification obtained from the offline payment-operated machine includes inventory information

142. I have already explained that *Breitenbach* in view of *Brown* teaches all limitations of dependent Claim 2. *See supra* § IX.A.3. *Breitenbach* in view of *Brown* also teaches the elements of Claim 3, which depends from Claim 2.

143. *Breitenbach* teaches that the retrofit device or retrofit communication module may transmit "information descriptive of various parameters and/or metrics associated with the interactive soda fountain 708, at 790-4," including "inventory levels of syrup, carbon dioxide, and/or ice[.]" Ex. 1005, 19:37–44.

144. In my opinion, a POSA would have understood that the retrofit device obtains the inventory information from the offline payment-operated machine because the information regarding inventory levels of syrup, carbon dioxide, and/or ice comes from the offline payment-operated machine and not the retrofit device.

145. Thus, *Breitenbach* in view of *Brown* teaches wherein the notification obtained from the offline-payment operated machine includes inventory information (e.g., "inventory levels").

5. Claim 5: The payment module of claim 1, wherein the offline payment-operated machine is not connected to any networks

146. *Breitenbach* teaches the vending machine 108/708 can be a "standard machine [that] does not comprise a device capable of and/or configured for external

and/or remote communications, for example, the retrofit device 420 may comprise the retrofit communication device 460 as an upgrade in the communication functionality of the standard machine." Ex. 1005, 15:9–14. In my opinion, a POSA would have understood that a machine lacking a device capable of external/remote communications is, by definition, offline.

147. Thus, *Breitenbach* in view of *Brown* teaches the payment module of Claim 1, wherein the offline payment-operated machine is not connected to any networks (e.g., "does not comprise a device capable of . . . external and/or remote communications").

6. Claim 6: The payment module of claim 1, wherein the offline payment-operated machine is a coin-operated laundry machine, a vending machine, or a kiosk

148. *Breitenbach* teaches that the "retrofit device may be coupled to a conventional vending machine . . . to facilitate remote, wireless, cashless, and/or account-based sales." Ex. 1005, 2:18–22.

149. Thus, *Breitenbach* in view of *Brown* teaches the payment module of Claim 1, wherein the offline payment-operated machine is a coin-operated laundry machine, a vending machine, or a kiosk (i.e., "conventional vending machine").

7. Claim 7

a. [7.P] A method for accepting electronic payments at an offline payment-operated machine

150. To the extent the preamble is limiting, *Breitenbach* teaches a method for accepting electronic payments at an offline payment-operated machine (e.g., transaction using retrofit device 120 at machine 108). *See supra* § IX.A.2.a.

b. [7.1] the method comprising: at a payment module with one or more processors, memory, a short-range wireless transceiver configured to communicate with one or more mobile devices,

151. As discussed in Sections IX.A.2.b, IX.A.2.c, and IX.A.2.e, *Breitenbach* teaches various methods performed by a payment module (e.g., retrofit device 120) having one or more processors (e.g., electronic processing device 374/474), memory (e.g., memory device 940), and a short-range wireless transceiver configured to communicate with one or more mobile devices (e.g., retrofit communication device 460).

152. Thus, *Breitenbach* teaches the method comprising: at a payment module (e.g., retrofit device 120/320/420) with one or more processors (e.g., processing device 374/474), memory (e.g., memory device 940), a short-range wireless transceiver (e.g., retrofit communication device 460) configured to communicate with one or more mobile devices (e.g., customer device 104). *See also supra* §§ IX.A.2.b, IX.A.2.c, and IX.A.2.e.

c. [7.2] the method comprising . . . a first interface module configured to output to a control unit of the offline payment-operated machine one or more electrical pulses, each of the one or more electrical pulses

emulating an analog signal generated by a coin receiving switch of the offline payment-operated machine in response to insertion of a single coin of a predetermined type in the offline payment-operated machine

153. *Breitenbach* teaches this limitation for the same reasons stated *supra* § IX.A.2.d.

d. [7.3] storing, in the memory of the payment module, a number of the electrical pulses that must be received by the control unit to initiate an operation of the offline payment operated machine

154. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.2.f. Furthermore, in my opinion, a POSA would have been motivated to modify *Breitenbach/Brown* to perform the functions recited in limitation [7.3] for the same reasons set forth in Section IX.A.

e. [7.4] receiving a wireless request via the short-range wireless transceiver from a respective mobile device of the one or more mobile devices to initiate a cashless operation of the offline-payment operated machine

155. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.2.g.

f. [7.5(a)] in response to the wireless request: determining a first number of electrical pulses to output via the first interface module to the control unit of the offline payment-operated machine in order to initiate the requested cashless operation of the offline payment-operated machine

156. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.2.h.

g. [7.5(b)] in response to the wireless request . . . causing the offline payment-operated machine to initiate the requested cashless operation by issuing the first number of electrical pulses to the control unit via the first interface module

157. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.2.i.

h. [7.5(c)] in response to the wireless request . . . sending operation information corresponding to the initiated operation of the offline payment-operated machine to the respective mobile device via the short-range wireless transceiver

158. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.2.j.

8. Claim 8

159. *Breitenbach* in view of *Brown* teaches all limitations of Claim 8 for the same reasons stated *supra* § IX.A.3.

9. Claim 9

160. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.4.

10. Claim 11

161. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.5.

11. Claim 12

162. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.6.

12. Claim 13

a. [13.P] An offline payment-operated machine

163. *Breitenbach* teaches "the machine 108 may comprise any type or configuration of mechanical, electrical, and/or electro-mechanical device or system that is or becomes known or desirable. The machine 108 may, for example, comprise a vending machine, a visi-cooler . . . , and/or soda fountain." Ex. 1005, 5:50–53. The machine can be a "standard machine [that] does not comprise a device capable of and/or configured for external and/or remote communications." *Id.*, 15:9–14.

164. Thus, *Breitenbach* discloses an offline payment-operated machine (e.g., machine 108).

b. [13.1] An offline payment-operated machine comprising: a coin receiving switch that generates analog signals in response to insertion of a single coin of a predetermined type in the offline payment-operated machine

165. In my opinion, a POSA would have understood that many standard vending machines, at least as of the earliest priority date of the ’608 Patent, include a coin receiving switch that generates analog signals in response to insertion of a single coin or a predetermined type in the offline payment-operated. This is because a coin receiving switch is a standard component to a coin-operated vending machine which, using analog signals, indicates when a coin has been successfully inserted and accepted. For instance, the MDB Protocol, which the ’608 Patent recognizes has been incorporated into many vending machines made since 1995 (Ex. 1001, 6:21–23), defines requirements for a coin changer (i.e., coin receiving switch).

166. In addition, *Breitenbach* teaches that the machine may include a “function device 114” which may “comprise a . . . ***payment acceptance mechanism***[.]” Ex. 1005, 6:38–42. The retrofit device may send a signal to the function device 114 that causes the machine to undertake a desired function. *See id.*, 8:47–53. In some embodiments, the retrofit device may “‘fool’ the machine by replicating a ‘coin-in’ signal indicative of the proper payment amount,” thereby causing the machine to dispense the desired product. Ex. 1005, 8:42–46.

167. In my opinion, a POSA would have understood that a function device 114 comprising a payment acceptance mechanism which, in response to a “coin-in” signal, causes the machine to dispense the desired product, constitutes a coin receiving switch. This is because a POSA would have understood that a retrofit

device would only replicate a coin-in signal to initiate dispensing of a product in a vending machine where the standard method to initiate dispensing of a product is by inserting the necessary number of coins. Moreover, a POSA would have understood that the function device is a payment acceptance mechanism that includes a coin receiving switch that generates analog signals in response to insertion of a single coin.

168. Thus, *Breitenbach* teaches a machine comprising a coin-receiving switch that generates analog signals (e.g., function device 114) in response to insertion of a single coin of a predetermined type (e.g., "coin-in signal") in the offline payment-operated machine (e.g., machine 108).

c. [13.2] An offline payment-operated machine comprising . . . a control unit

169. *Breitenbach* teaches the "machine 108 may comprise a Vending Machine Controller (VMC) 110[.]" Ex. 1005, 4:17–18. "[T]he VMC 110 of the machine 108 may be or include any type, quantity, and/or configuration of electronic and/or computerized processor that is or becomes known." *Id.*, 5:64–67.

170. Thus, *Breitenbach* teaches an offline payment-operated machine comprising a control unit (vending machine controller 110).

d. [13.3] An offline payment-operated machine comprising . . . a payment module

171. *Breitenbach* teaches that "the machine 108 may comprise a retrofit device 120." Ex. 1005, 4:26–29. "[T]he retrofit device 120 may comprise any type or configuration of device coupled to allow transactions . . . to occur at the machine 108[.]" *Id.*, 7:15–18.

172. Thus, *Breitenbach* teaches an offline payment-operated machine comprising a payment module (retrofit device 120). *See also supra* § IX.A.2.a.

e. [13.4] a payment module that includes: a short-range wireless transceiver configured to communicate with one or more mobile devices

173. *Breitenbach* teaches this limitation for the same reasons stated *supra* § IX.A.2.b.

f. [13.5] a payment module that includes . . . one or more processors

174. *Breitenbach* teaches this limitation for the same reasons stated *supra* § IX.A.2.c.

g. [13.6] a payment module that includes . . . a first interface module configured to output to a control unit of the offline payment-operated machine one or more electrical pulses emulating an analog signal generated by the coin receiving switch of the offline payment-operated machine in response to insertion of a single coin of a predetermined type in the offline payment-operated machine

175. *Breitenbach* teaches this limitation for the same reasons stated *supra* § IX.A.2.d.

h. [13.7] memory storing one or more programs to be executed by the one or more processors

176. *Breitenbach* teaches this limitation for the same reasons stated *supra* § IX.A.2.e.

i. [13.7(a)] the one or more programs comprising instructions for: storing, in the memory of the payment module, a number of the electrical pulses that must be received by the control unit to initiate an operation of the offline payment-operating machine

177. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.2.f. Furthermore, in my opinion, a POSA would have been motivated to modify *Breitenbach/Brown* to perform the functions recited in limitation [13.7(a)] for the same reasons set forth in Section IX.A.1.

j. [13.7(b)] the one or more programs comprising instructions for . . . receiving a wireless request via the short-range wireless transceiver from a respective mobile device of the one or more mobile devices to initiate a cashless operation of the offline payment-operated machine

178. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.2.g.

k. [13.7(b)(i)] in response to the wireless request: determining a first number of electrical pulses to output via the first interface module to the control unit of the offline payment-operated machine in order to initiate the requested cashless operation of the offline payment-operated machine

179. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.2.h.

l. [13.7(b)(ii)] in response to the wireless request . . . causing the offline payment-operated machine to initiate the requested cashless operation by issuing the first number of electrical pulses to the control unit via the first interface module

180. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.2.i.

m. [13.7(b)(iii)] in response to the wireless request . . . sending operation information corresponding to the initiated operation of the offline payment-operated machine to the respective mobile device via the short-range wireless transceiver.

181. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.2.j.

13. Claim 14

182. *Breitenbach* in view of *Brown* teaches all limitations of Claim 14 for the same reasons stated *supra* § IX.A.3.

14. Claim 15

183. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.4.

15. Claim 17

184. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.5.

16. Claim 18

185. *Breitenbach* in view of *Brown* teaches this limitation for the same reasons stated *supra* § IX.A.6.

B. Ground 2: Claims 4, 10, 16, and 19–20 are Rendered Obvious Under 35 U.S.C. § 103 Over *Breitenbach* in view of *Brown* further in view of *Kaspar*

1. Obviousness Standards and Analysis

186. *See supra* § IX.A.1.

a. Differences Between the Claimed Subject Matter and *Breitenbach*

(1) Claims 4, 10, and 16

187. *Breitenbach* in view of *Brown* teaches almost every element of dependent Claims 4, 10 and 16. *See infra* §§ IX.B.2–IX.B.4. However, *Breitenbach* in view of *Brown* does not expressly disclose a second interface module configured to store control signals from the control unit of the offline payment-operated machine that initiate operation of the offline payment-operated machine, as recited by Claim 4. However, *Kaspar*, which is in the same field of endeavor as *Breitenbach* and *Brown*—vending machine retrofits—teaches this limitation and, in my opinion,

a POSA would have found it obvious to modify *Breitenbach*/*Brown* to include this feature.

188. *Kaspar* teaches a retrofit coin measuring apparatus comprising a "coin reject mechanism 60." Ex. 1007, 11:8–20. As a coin falls through the "coin reject mechanism" of *Kaspar*, the coin reject mechanism determines the value of the coin, "provides a signal which is indicative of the monetary value" of the coin, and that signal forms an ouput to the transaction register. Ex. 1007, 11:8–20. "The transaction register [then] stores the total of the transaction for the moment." *Id.*, 11:20–22. The transaction register also "totals up the sum that has been input in [a] particular transaction[.]" *Id.*, 11:10–13. For instance, where the newspaper costs thirty-five cents, the transaction register totals up the sum to thirty-five cents. *See id.*, 11:10–15. In addition, "[a]s each transaction occurs, incremental inputs to the total sales register 183 and the paper sold register 184 are made." *Id.*, 11:40–43. "These are advanced with each transaction" and "the time and date are input to the memory 182 and the data is stored." *Id.*, 11:42–44. This data is captured "over a period of time such as one week." *Id.*, 12:14–15. The data "is in the form of line entries listing the time and date of each transaction. The price can optionally be included." *Id.*, 12:15–17.

189. In my opinion, a POSA would have understood that *Kaspar* teaches storing data from the vending machine that indicates initiation of operation of the

vending machine. Specifically, a POSA would understand that the incremental inputs that reflect the time, date, and optionally, the price, are data from the vending machine that indicate initiation of operation of the vending machine (i.e., vending of a newspaper in response to receiving the required payment amount).

190. In my opinion, a POSA would have further understood that *Kaspar*'s teaching of storing data from the vending machine that indicates initiation of operation of the vending machine is the way that *Kaspar* stores control signals from the control unit of the vending machine that initiate operation of the vending machine. Specifically, *Kaspar* teaches that the coin reject mechanism "provides a signal which is indicative of the monetary value" of an inserted coin, which forms an output to the transaction register. *Id.*, 11:8–20. The transaction register then, based on the provided signal "totals up the sum that has been input in [a] particular transaction[.]" *Id.*, 11:10–13. As each transaction occurs, the incremental inputs indicating time, date, and price of the transaction are made. *Id.*, 11:40–43. In my opinion, a POSA would have understood that the way that *Kaspar* teaches storing a control signal that initiates operation of the vending machine is by storing data reflecting information regarding initiation of vending machine operation.

191. Moreover, in my opinion, a POSA would have understood that the retrofit coin measuring apparatus of *Kaspar* is configured to store control signals from the control unit of the machine that initiate operation of the machine (e.g.,

stored data reflecting information regarding initiation of operation of the vending machine).

192. Additionally, *Breitenbach* in view of *Brown* does not expressly disclose (a) a second interface module configured to ***sample*** control signals from the control unit of the offline payment-operated machine (as recited in Claims 10 and 16) or (b) wherein obtaining the notification from the offline payment-operated machine includes ***sampling*** the control signals from the control unit via the second interface module (as recited in Claims 4, 10, and 16). However, *Kaspar* expressly discloses these limitations.

193. *Kaspar* teaches as the coin falls through the coin reject mechanism, the coin reject mechanism "provides a signal which is indicative of the monetary value and that is input to the transaction register." *Id.*, 11:3–22. "The transaction register totals up the sum that has been input in [a] particular transaction[.]" *Id.*, 11:10–13. "As each transaction occurs, incremental inputs to the total sales register 183 and the paper sold register 184 are made." *Id.*, 11:3–22; 11:40–42.

194. In my opinion, a POSA would have understood that the retrofit coin measuring apparatus of *Kaspar* is configured to sample control signals from the control unit of the offline payment-operated machine that initiate operation of the offline payment-operated machine (e.g., provide signals indicative of the monetary value of the coin that is inserted).

195. A POSA would have also understood that the "incremental inputs to the total sales register 183 and 184" are notifications from the offline payment-operated machine which are obtained by sampling the control signals. Specifically, *Kaspar* teaches that incremental inputs are made by the retrofit coin measuring apparatus "[a]s each transaction occurs," i.e., as the newspaper rack initiates operation. A POSA would have understood that obtaining each incremental input (i.e., notification) includes the retrofit coin measuring apparatus receiving a signal indicative of the monetary value of the coin (i.e., sampling the control signals) from the control unit.

(2) Claims 19 and 20

196. *Breitenbach* in view of *Brown* teaches almost every element of Claims 19 and 20. *See infra* § IX.B.5, IX.B.6. However, *Breitenbach* in view of *Brown* does not expressly disclose a second interface module configured to count one or more electrical pulses generated by the coin receiving switch of the offline payment-operated machine in response to the insertion of a single coin of a predetermined type in the offline payment-operated machine. However, *Kaspar* expressly teaches this limitation and a POSA would have found it obvious to modify *Breitenbach*/*Brown* to include this feature.

197. As discussed *supra* in Paragraph 188, *Kaspar* teaches a retrofit coin measuring apparatus comprising a coin reject mechanism which determines the

value of a coin and "provides a signal which is indicative of the monetary value" of the coin. In my opinion, a POSA would have understood that the "signal which is indicative of the monetary value" that is provided by the coin reject mechanism is an electrical pulse generated by the coin receiving switch. The retrofit apparatus then uses that signal (e.g., electrical pulse) to form an output to the transaction register. Ex. 1007, 11:8–20. The transaction register, based on the provided signal, "totals up the sum that has been input in [a] particular transaction." *Id.*, 11:10–13.

198. In my opinion, POSA would have understood that the retrofit coin measuring apparatus of *Kaspar* is configured to count one or more electrical pulses (e.g., "total[] up the sum that has been input in [a] particular transaction" based on the signal provided by the coin reject mechanism) generated by the coin receiving switch (e.g., coin reject mechanism) in response to the insertion of a single coin of a predetermined type (e.g., determining the value of an inserted coin) in the offline payment-operated machine. *See supra* ¶ 188.

199. *Breitenbach* in view of *Brown* also does not disclose wherein the second interface module is configured to store an output of the control unit corresponding to an operation of the offline payment-operated machine. However, *Kaspar* expressly teaches this limitation and, in my opinion, a POSA would have found it obvious to modify *Breitenbach*/*Brown* to include this feature.

200. As described in Paragraphs 188–189, *Kaspar* teaches a retrofit coin measuring apparatus that stores data from the vending machine indicating initiation of operation of the vending machine. For instance, *Kaspar* teaches that the retrofit coin measuring apparatus may store data related to the time, date, and price of a transaction. *See supra* ¶¶ 188–89.

201. In my opinion, a POSA would have understood that the stored data is an output of the control unit of the machine corresponding to an operation of the machine (i.e., a vending transaction).

202. *Breitenbach* in view of *Brown* also does not expressly disclose the operation information including a value of the requested cashless operation corresponding to a number of coin insertions associated with a total number of the pulses counted by the second interface module to initiate the operation of the offline payment-operated machine (i.e., the cost of the selected item for vending). However, *Kaspar* expressly teaches this limitation and, in my opinion, a POSA would have found it obvious to modify *Breitenbach/Brown* to include this feature.

203. As discussed above, *Kaspar* discloses that the coin measuring apparatus "provides a signal which is indicative of the monetary value" of an inserted coin, and that signal forms an output to the transaction register of the coin measuring apparatus which then "totals up the sum that has been input in [a] particular transaction such as thirty-five cents to purchase a daily newspaper." Ex. 1005, 11:8–

20; *see supra* ¶ 188. In my opinion, a POSA would have understood that the total sum that has been input in a particular transaction, which is determined based on the signal provided by the coin reject mechanism, is a value of the requested cashless operation corresponding to a number of coin insertions associated with a total number of the pulses counted by the second interface module to initiate the operation of the offline payment-operated machine.

204. *Breitenbach* in view of *Brown* and further in view of *Kaspar* also teaches all the elements of challenged dependent Claim 20. *See infra* § IX.B.6.

b. Obviousness Rationale for Why a POSA Would Have Modified *Breitenbach* with *Brown* and *Kaspar* to Arrive at the Claimed Subject Matter

(1) Modifying Breitenbach with Brown

205. I have explained why a POSA would modify *Breitenbach* with *Brown*. *See supra* § IX.A.1.

(2) Modifying *Breitenbach/Brown* with *Kaspar*

(a) Claims 4, 10, and 16

206. In view of the collective teachings of *Breitenbach*, *Brown*, and *Kaspar*, it would have been obvious to a POSA to include in the retrofit device of *Breitenbach* a second interface module configured to store or sample control signals from the control unit of the offline payment-operated machine that initiate operation of the offline payment operated machine.

207. For instance, modifying the instructions stored in the payment module of *Breitenbach/Brown* to include instructions for storing or sampling control signals from the control unit that initiate operation of the machine, as taught by *Kaspar* reflects application of known techniques to known devices to yield predictable results.

208. Specifically, *Kaspar* teaches a retrofit coin measuring apparatus that is configured to store control signals from the control unit of the machine that initiate operation of the machine (e.g., stored data reflecting information regarding initiation of operation of the vending machine). *See supra* ¶¶ 188–191.

209. *Kaspar* additionally teaches a retrofit coin measuring apparatus that is configured to sample control signals from the control unit of the machine that initiate operation of the machine (e.g., signals indicative of the monetary value of the coin that is inserted). *See supra* ¶¶ 192–195.

210. In my opinion, a POSA would have been motivated to modify *Breitenbach/Brown* to store and/or sample the control signals from the control unit that initiate operation of the machine, as taught by *Kaspar*, by using the existing hardware of *Breitenbach*. Specifically, *Breitenbach* discloses an apparatus which includes a DEX connector/first data management port, e.g., 340/440 (blue) that may be used to send and/or receive machine data via the first DEX cable, e.g., 342/442. Ex. 1005, 10:44–51, 12:61–65. The DEX connector may be connected to a VMC or

processing device and "may be utilized to poll and/or query a machine to determine various sales information such as prices, costs, sales data, [etc.]" *Id.*, 10:53–57; *see also id.*, 14:50–55. In my opinion, a POSA would have understood that the retrofit processing device 374/474 (on the circuit board shown in yellow) may be configured to sample or store control signals received from the DEX connector 340/440.

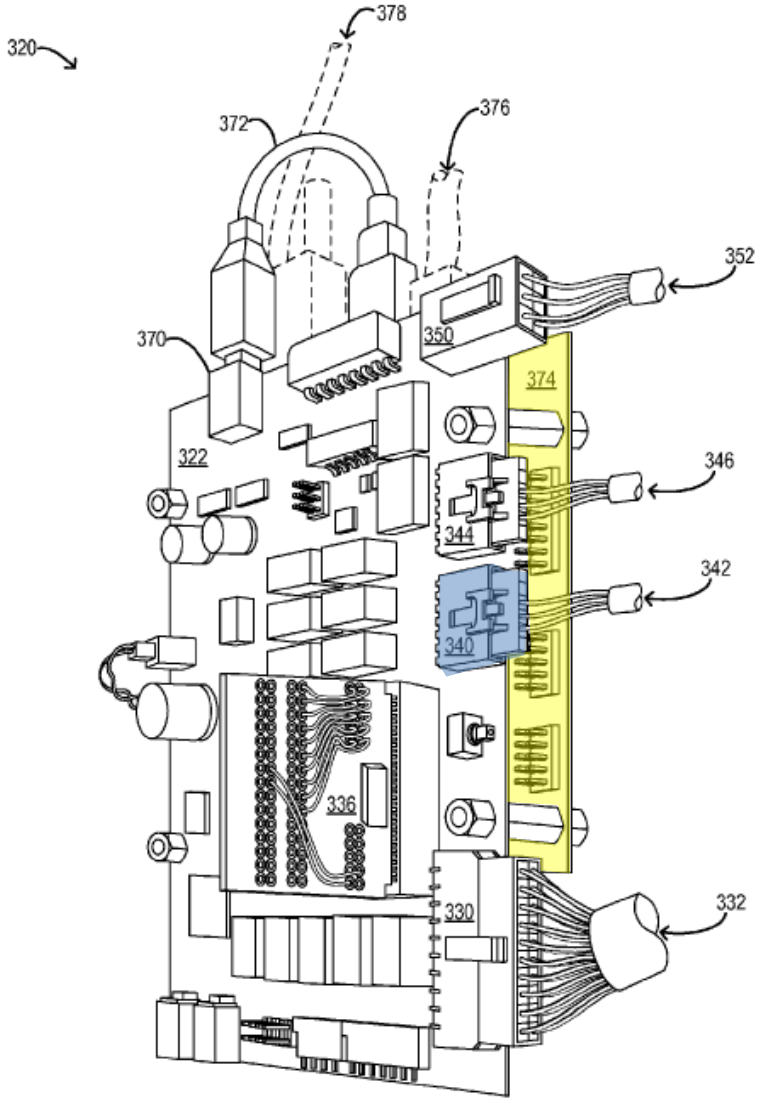


FIG. 3

Ex. 1005, Figure 3 (annotated).

211. Further, in my opinion, it would have been obvious to a POSA to include instructions in the retrofit processing device to store or sample control signals from the controller of the offline payment-operated machine via the DEX connector because this would merely involve programming the retrofit processing device to use the DEX connector in accordance with its typical operating procedures.

212. A POSA would have been motivated to modify the retrofit device to store control signals from the control unit, as recited by limitation [4.1], because a POSA would have understood from *Breitenbach* that storing the control signals could be used "to perform revenue management, restocking, and/or marketing analysis based on products sold[.]" Ex. 1005, 22:35–40. In addition, *Kaspar* teaches that "[i]nformation on the time and frequency of sales would be very useful" because, as one example, this could inform the vending machine operator of the "optimum number of newspapers" to provide at a given time or day. Ex. 1007, 1:31–36, 12:14–28. Thus, in my opinion, a POSA would have been motivated to modify *Breitenbach/Brown* to include instructions to store control signals in view of the teachings of *Breitenbach* and *Kaspar*.

213. In addition, in my opinion, a POSA would have been motivated to modify the retrofit device to sample control signals from the control unit, as recited in limitations [10.1] and [16.1], because this would merely involve applying a known

technique to a known device ready for improvement to yield predictable results. Specifically, a POSA would have understood from *Breitenbach/Brown* that the retrofit device may transmit "information descriptive of various parameters and/or metrics[,]" such as "a confirmation of the dispensing of the desired beverage[.]" Ex. 1005, 19:32–52. A POSA would have understood that one way to obtain the notification confirming dispensing of the desired beverage would be to total up the sum that is input in a particular transaction based on signals that are indicative of the monetary value of the coin that is inserted, as taught by *Kaspar*. *See supra* ¶¶ 192–195. Thus, in my opinion, a POSA would have been motivated to modify *Breitenbach/Brown* to include instructions to sample control signals in view of the teachings of *Breitenbach* and *Kaspar*.

214. Once motivated to modify *Breitenbach/Brown* with a second interface module that is configured to store or sample control signals, it is my opinion that a POSA would have been further motivated to include instructions in the payment module to obtain the notification from the offline payment-operated machine indicating initiation of the operation of the offline payment-operated machine by sampling those control signals, as recited by Claims 4, 10, and 16 This would merely involve applying a known technique (sampling control signals from the control unit and obtaining notifications based on these control signals, as taught by *Kaspar*, *see supra* ¶ 195) to a known device (the retrofit processing device of

Breitenbach/Brown, configured to sample control signals from the control unit via the DEX connector and provide a notification based on these control signals).

215. In addition, as discussed in Section IX.A.3, a POSA would have understood that a notification indicating initiation of a transaction comes from the machine because it is the machine that initiates the operation. A POSA would have understood that the most efficient way to obtain such a notification would be to obtain the notification based on the control signals that must be received by the machine to initiate operation.

(b) Claim 19

216. In view of the collective teachings of *Breitenbach*, *Brown*, and *Kaspar*, it would have been obvious to a POSA to include in the retrofit device of *Breitenbach/Brown* a second interface module configured to store an output of the control unit corresponding to an operation of the offline payment-operated machine. For example, *Breitenbach* discloses that the retrofit device may store information from the control unit of an offline payment-operated machine, such as dispensing data. Ex. 1005, 22:26–40. These teachings indicate that *Breitenbach/Brown*, to the extent it does not expressly do so, provides—under the former, more rigid "TSM" standard—a teaching, suggestion, or motivation to a POSA to include a second interface module that stores an output of the control unit (i.e., sales and/or dispensing data). In my opinion, a POSA would have understood that the retrofit device could

"perform revenue management, restocking, and/or marketing analysis based on products sold" (Ex. 1005, 22:35–40) by tracking an output of the machine corresponding to an operation of the machine, such as dispensing of a product.

217. In addition to *Breitenbach*'s express teachings, there are a variety of other rationales for why a POSA would have been motivated to modify the retrofit device of *Breitenbach/Brown* to include a second interface module configured to store an output of the control unit corresponding to an operation of the offline payment-operated machine. These rationales are the same as those discussed *supra* in Section IX.B.1.b(2)(a).

218. Once motivated to modify *Breitenbach/Brown* with a second interface module configured to store an output of the control unit corresponding to an output of the offline payment-operated machine, a POSA would be further motivated to configure the second interface module to count one or more electrical pulses generated by the coin receiving switch of the offline payment-operated machine in response to the insertion of a single coin of a predetermined type. This is because *Kaspar* presents a POSA with one of a finite number of identified, predictable solutions by which the output of the control unit can be obtained, i.e., the retrofit coin measuring apparatus is configured to "total[] up the sum that has been input in [a] particular transaction" based on the signal provided by the coin reject mechanism. Ex. 1007, 11:10–22; *see supra* ¶¶ 196–198.

219. Once motivated to modify *Breitenbach/Brown* with a second interface module configured to count one or more electrical pulses and to store an output of the control unit corresponding to an output of the offline payment-operated machine, a POSA would be further motivated to send operation information corresponding to the initiated operation of the offline payment-operated machine to the respective mobile device, the operation information including a value of the requested cashless operation (i.e., the cost of the selected item for vending) corresponding to a number of coin insertions associated with a total number of the pulses counted by the second interface module to initiate the operation of the offline payment-operated machine. Ex. 1001, Claim 19.

220. A POSA would be motivated to modify *Breitenbach/Brown* with *Kaspar* in this manner based on, at a minimum, the express teachings in *Breitenbach*. *Breitenbach*'s disclosure that the transmission may include "sales data associated with the transaction" or a "transaction receipt" (Ex. 1005, 19:37–52) indicates that *Breitenbach*, to the extent it does not explicitly do so, provides—under the former, more rigid "TSM" standard—a teaching, suggestion, or a motivation to a POSA to modify the operation information to include a value of the requested cashless operation (i.e., the cost of the selected item for vending) corresponding to a number of coin insertions associated with a total number of pulses counted. In my opinion, a POSA would have understood that providing the "total of the transaction" based

on the "signal which is indicative of the monetary value that is input to the" retrofit coin measuring apparatus, as taught by *Kaspar* (Ex. 1007, 11:15–22) is a type of "sales data associated with the transaction" or a "transaction receipt" as taught by *Breitenbach/Brown*. Further, in my opinion, a POSA would have understood that including this in the operation information would make the payment module more convenient because it would allow a user to identify the transaction amount that was submitted to initiate the transaction.

221. In addition, modifying the operation information of *Breitenbach/Brown* to include a value of the requested cashless operation corresponding to a number of coin insertions associated with a total number of the pulses counted reflects a simple combination of prior art elements (i.e., *Breitenbach*'s retrofit device 720 transmitting "information descriptive of various parameters and/or metrics" to the mobile customer device 704 wherein the information is *Kaspar*'s total sum that has been input in a particular transaction (i.e., the cost of the selected item for vending), which is determined based on the signal provided by the coin reject mechanism) to yield predictable results. This is because a POSA would have understood that transmitting the monetary amount that is input into the transaction register, as taught by *Kaspar*, would predictably allow the payment module to notify the user that the required transaction amount has been received.

c. Obviousness Rationale for How a POSA Would Have Modified *Breitenbach* with *Brown* and *Kaspar* to Arrive at the Claimed Subject Matter

222. I have explained how a POSA would modify *Breitenbach* with *Brown*. *See supra* § IX.A.1. Once motivated to modify *Breitenbach/Brown* with *Kaspar*, a POSA would have (i) readily understood how to do so with a reasonable expectation of success and (ii) found it obvious and routine to implement any modifications needed to make those combinations work.

223. For example, in my opinion, a POSA would have understood that the retrofit device of *Breitenbach* would be able to monitor and store sales, transaction, dispensing, and other output from the offline payment-operated machine. *See* Ex. 1005, 22:26–40, 7:37–64, 14:20–24. A POSA would have understood that including instructions in the retrofit processing device of *Breitenbach/Brown* to monitor and store data based on control signals from the control unit of the machine, as taught by *Kaspar*, would be a simple and routine task. Sampling these control signals and obtaining the notification from the offline payment-operated machine by sampling these control signals would likewise be simple and routine tasks employing the existing, prior art technology of *Breitenbach/*Brown, modified to include the instructions taught by *Kaspar*.

224. A POSA would also understand that including instructions in the retrofit processing device of *Breitenbach/Brown* to monitor data by counting one or

more electrical pulses and to store an output based the counted electrical pulses, as taught by *Kaspar* would be a simple and routine task involving the existing, prior art technology of *Breitenbach/*Brown, modified to include the instructions taught by *Kaspar*. *See supra* § IX.B.1.a, IX.B.1.b. Including in the operation information a value corresponding to a number of coins associated with a total number of the pulses counted would likewise be a simple and routine task employing the same existing technology.

2. Claim 4

a. [4.1] The payment module of claim 2, further comprising a second interface module configured to store control signals from the control unit of the offline payment-operated machine that initiate operation of the offline payment-operated machine

225. *Breitenbach* in view of *Brown* discloses all elements of Claims 1 and 2, from which Claim 4 depends. *See supra* §§ IX.A.2, IX.A.3.

226. To the extent that Patent Owner argues that *Breitenbach* in view of *Brown* does not explicitly teach this limitation, *Kaspar* does and, in my opinion, a POSA would have found it obvious to modify the retrofit processing device of *Breitenbach/Brown* such that the payment module comprises a second interface module configured to store control signals that initiate operation of the offline payment-operated machine.

227. As I discussed *supra* in Paragraphs 188–191, a POSA would have understood that *Kaspar* teaches a storing control signals from the control unit of the offline payment-operated machine that initiate operation of the offline payment-operated machine. *See supra* ¶¶ 188–191.

228. I have already explained why and how a POSA would modify *Breitenbach* with *Brown*. *See supra* § IX.A.1. I have already explained why and how a POSA would modify *Breitenbach/Brown* with *Kaspar*. *See supra* § IX.B.1. Thus, *Breitenbach* in view of *Brown* in further view of *Kaspar* teaches the payment module of Claim 2, further comprising a second interface module (e.g., retrofit processing device 374/474 of *Breitenbach/*Brown including instructions to store control signals as recited by limitation [4.1]) configured to store control signals (e.g., store data reflecting information regarding initiation of operation of the vending machine as taught by *Kaspar*) from the control unit of the offline payment-operated machine that initiate operation of the offline payment-operated machine.

b. [4.2] wherein obtaining the notification from the offline payment-operated machine includes sampling the control signals from the control unit via the second interface module

229. *Breitenbach* in view of *Brown* further in view of *Kaspar* teaches this limitation. As I discussed *supra* in Paragraphs 192–195, *Kaspar* teaches a retrofit coin measuring apparatus that is configured to sample control signals from the

control unit of the offline payment-operated machine that initiate operation of the offline payment-operated machine (e.g., signals indicative of the monetary value of the coin that is inserted) and obtaining notifications (e.g, incremental inputs to the total sales register 183 and 184) which are obtained by sampling the control signals (e.g., obtaining each incremental input includes the retrofit coin measuring apparatus receiving a signal indicative of the monetary value of the coin). In my opinion, a POSA would have found it obvious to modify *Breitenbach/Brown* in further view of *Kaspar* to include instructions in the retrofit processing device to obtain the notification indicating initiation of the operation of the offline payment-operated machine by sampling control signals (e.g., obtaining each incremental input includes the retrofit coin measuring apparatus receiving a signal indicative of the monetary value of the coin as taught by *Kaspar*).

230. Thus, *Breitenbach* in view of *Brown* further in view of *Kaspar* teaches wherein obtaining the notification from the offline payment-operated machine (e.g., obtaining a notification from the offline payment-operated machine in order to confirm "dispensing of the desired beverage") includes sampling the control signals (e.g., obtaining each incremental input includes the retrofit coin measuring apparatus receiving a signal indicative of the monetary value of the coin as taught by *Kaspar*) from the control unit via the second interface module (e.g., retrofit processing device

374/474 of *Breitenbach/Brown* including instructions to sample control signals from the control unit, as taught by *Kaspar*).

3. Claim 10

a. [10.1] The method of claim 8, wherein the payment module includes a second interface module configured to sample control signals from the control unit of the offline payment-operated that initiate operation of the offline payment-operated machine

231. *Breitenbach* in view of *Brown* discloses all elements of Claims 7 and 8, from which Claim 10 depends. *See supra* §§ IX.A.7, IX.A.8.

232. To the extent that Patent Owner argues that *Breitenbach* in view of *Brown* does not explicitly teach this limitation, *Kaspar* does and, in my opinion, a POSA would have found it obvious to modify the payment module of *Breitenbach/Brown* to include instructions to sample control signals that initiate operation of the offline payment-operated machine. As discussed in Paragraphs 192–195, a POSA would have understood that *Kaspar* teaches a retrofit coin measuring apparatus which is configured to sample control signals from the control unit of the offline payment-operated machine that initiate operation of the offline payment-operated machine (e.g., provide signals indicative of the monetary value of the coin that is inserted).

233. Thus, *Breitenbach* in view of *Brown* in further view of *Kaspar* teaches the payment module of Claim 8, further comprising a second interface module (e.g.,

retrofit processing device 374/474 including instructions to sample control signals, as taught by *Kaspar*) configured to sample control signals (e.g., sampling a signal "indicative of the monetary value," as taught by *Kaspar*) from the control unit of the offline payment-operated machine that initiate operation of the offline payment-operated machine.

b. [10.2] wherein obtaining the notification from the offline payment-operated machine includes sampling the control signals from the control unit via the second interface module.

234. *Breitenbach* in view of *Brown* further in view of *Kaspar* teach this limitation for the same reasons stated *supra* § IX.B.2.b.

4. Claim 16

235. *Breitenbach* in view of *Brown* discloses all elements of Claims 13 and 14, from which Claim 16 depends. *See supra* §§ IX.A.12, IX.A.13. *Breitenbach* in view of *Brown* further in view of *Kaspar* teach all of the limitations of Claim 16 for the same reasons stated *supra* § IX.B.3.

5. Claim 19

a. [19.P] A payment module for an offline payment-operated machine including a coin receiving switch

236. *Breitenbach* teaches this limitation for the same reasons stated *supra* § IX.A.2.a.

b. [19.1] the payment module comprising: a short-range wireless transceiver configured to communicate with one or more mobile devices

237. *Breitenbach* teaches this limitation for the same reasons stated *supra* § IX.A.2.b.

c. [19.2] the payment module comprising . . . one or more processors

238. *Breitenbach* teaches this limitation for the same reasons stated *supra* § IX.A.2.c.

d. [19.3] the payment module comprising . . . a first interface module configured to communicate with a control unit of the offline payment-operated machine using a serial interface to send one or more commands to the control unit

239. *Breitenbach* teaches that "the payment port 450 may be coupled, via the payment cable 452, to the processing device 410[.]" Ex. 1005, 14:41–43. "[T]he payment port 450 may be utilized ***to communicate*** with the processing device 410 ***via the MDB protocol***." *Id.*, 14:48–50.

240. In my opinion, a POSA would have understood that a payment port that is configured to communicate via the MDB protocol is a serial interface. This is because the Multi-Drop Bus is, by definition, a serial bus. *See* Ex. 1014 at 18 ("This document defines a serial bus interface for electronically controlled vending machines.").

241. *Breitenbach* further teaches that the retrofit device may transmit a credit signal via payment port 350/450 representing the actual price of the product, "such that the machine may be caused to provide the desired product and/or service[.]" Ex. 1005, 11:35–40.

242. Thus, *Breitenbach* teaches a first interface module (e.g., processing device 374/474 including instructions to communicate with the processing device 410 via the payment port 450) configured to communicate with a control unit (e.g., processing device 410) of the offline payment-operated machine using a serial interface (e.g., payment port 350/450 communicating via the MDB protocol) to send one or more commands to the control unit (e.g., transmit signal representing actual price of the product "such that the machine may be caused to provide the desired product and/or service[.]").

e. [19.4] the payment module comprising . . . a second interface module configured to count one or more electrical pulses generated by the coin receiving switch of the offline payment-operated machine in response to the insertion of a single coin of a predetermined type in the offline payment-operated machine and to store an output of the control unit corresponding to an operation of the offline payment-operated machine

243. To the extent that Patent Owner argues that *Breitenbach* in view of *Brown* does not explicitly teach this limitation, *Kaspar* does and a POSA would have found it obvious to modify *Breitenbach* in view of *Brown* and further in view of

Kaspar to include this limitation. As discussed in Paragraphs 196–198, *Kaspar* teaches that a retrofit that includes a "coin reject mechanism 60" which determines the value of a coin, provides a signal which is indicative of the monetary value of the coin, (e.g., an electrical pulse), and based on the provided signal, the retrofit apparatus totals up the sum that has been input in a particular transaction. In my opinion, a POSA would have understood that the retrofit coin measuring apparatus of *Kaspar* is configured to count one or more electrical pulses (e.g., total up the sum, based on the provided signal) generated by the coin receiving switch (e.g, coin reject mechanism) in response to insertion of a single coin of a predetermined type (e.g., determine the value of an inserted coin) in the offline payment-operated machine. *See also supra* ¶¶ 196–198.

244. In addition, as discussed in Paragraphs 199–201, *Kaspar* teaches a retrofit coin measuring apparatus that stores data from the vending machine indicating initiation of the transaction, such as data related to the time, date, and price of a transaction. Further, in my opinion, a POSA would have understood that the captured data is an output of the control unit of the machine corresponding to an operation of the machine (i.e., a vending transaction).

245. I have already explained how and why a POSA would have modified *Breitenbach* with *Brown* and *Breitenbach/Brown* with *Kaspar*. *See supra* §§ IX.A.1, IX.B.1. Thus, *Breitenbach* in view of *Brown* in further view of *Kaspar* teaches a

second interface module (e.g., retrofit processing device 374/474 of *Breitenbach* including instructions to count one or more electrical pulses, as recited by limitation [19.4], as taught by *Kaspar*) configured to count one or more electrical pulses generated by the coin receiving switch of the offline payment-operated machine (e.g., total up the sum, based on the provided signal, as taught by *Kaspar*) in response to the insertion of a single coin of a predetermined type in the offline payment-operated machine (e.g., determine the value of an inserted coin) and to store an output of the control unit corresponding to an operation of the offline payment-operated machine (e.g., store data related to the time, date, and price of a transaction as taught by *Kaspar*).

f. [19.5] the payment module comprising . . . memory with one or more programs for execution by the one or more processors

246. *Breitenbach* in view of *Brown* further in view of *Kaspar* teaches this limitation for the reasons stated *supra* § IX.A.2.e.

g. [19.5(a)] the one or more programs including instructions for: storing, in the memory of the payment module, a number of electrical pulses that must be received by the control unit to initiate an operation of the offline payment-operating machine

247. *Breitenbach* in view of *Brown* further in view of *Kaspar* teaches this limitation for the reasons stated *supra* § IX.A.2.f.

h. [19.5(b)] the one or more programs including instructions for . . . receiving a wireless request via the short-range wireless transceiver from a respective mobile device of the one or more mobile devices to initiate a cashless operation of the offline payment-operated machine

248. *Breitenbach* in view of *Brown* further in view of *Kaspar* teaches this limitation for the reasons stated *supra* § IX.A.2.g.

i. [19.5(c)(i)] in response to the wireless request: determining a first number of electrical pulses to output via the first interface module to the control unit of the offline payment-operated machine in order to initiate the requested cashless operation of the offline payment-operated machine

249. *Breitenbach* in view of *Brown* further in view of *Kaspar* teaches this limitation for the reasons stated *supra* § IX.A.2.h.

j. [19.5(c)(ii)] in response to the wireless request . . . causing the offline payment-operated machine to initiate the requested cashless operation by issuing the first command to the control unit via the first interface module

250. *Breitenbach* teaches that the retrofit device may "'fool' the machine by replicating a 'coin-in' signal indicative of the proper payment amount for the desired unit of product, causing the machine to dispense the unit of product[.]" Id., 8:47–62. *See supra* § IX.A.2.i. In my opinion, a POSA would have understood that the retrofit device replicating a 'coin-in' signal indicative of the proper payment amount for the desired unit of product, causing the machine to dispense the unit of product, is a first

command issued to the control unit of the offline payment-operated machine that causes the machine to initiate the requested cashless operation. *See supra* § IX.A.2.i.

251. Thus, *Breitenbach* in view of *Brown* further in view of *Kaspar* teaches in response to the wireless request (e.g., "place an order and/or request a function to be performed" or "receive indications of machine input") causing the offline payment-operated machine to initiate the requested cashless operation (e.g., "cashless . . . sales" of a "conventional vending machine") by issuing the command (e.g., "coin-in" signal indicative of the proper payment amount) to the control unit (e.g., 410) via the first interface module (e.g., processing device 374/474 including instructions to communicate with the processing device 410 via the payment port 450).

k. [19.5(c)(iii)] in response to the wireless request . . . sending operation information corresponding to the initiated operation of the offline payment-operated machine to the respective mobile device via the short-range wireless transceiver,

252. *Breitenbach* in view of *Brown* further in view of *Kaspar* teaches this limitation for the reasons stated *supra* § IX.A.2.j.

l. [19.5(c)(iv)] . . . the operation information including a value of the requested cashless operation corresponding to a number of coin insertions associated with a total number of the pulses counted by the second interface module to initiate the operation of the offline payment-operated machine

253. As discussed above, *Breitenbach* teaches that the "retrofit device 720 and/or the retrofit communication module 760 thereof may transmit and the controller 702 (***and/or the customer device 704***) may receive, information descriptive of various parameters and/or metrics associated with the interactive soda fountain 708, at 790-4." Ex. 1005, 19:32–37. *See supra* § IX.A.2.j.

254. "The transmission at 790-4 may comprise, for example, . . . sales data associated with the transaction[.]" *Id.*, 19:37–44. In some embodiments, "the controller 702 may transmit and the customer device 704 may receive, an indication of the transaction, ***such as . . . a transaction receipt***[.]" *Id.*, 19:44–52.

255. In addition, *Kaspar* teaches that the coin measuring apparatus "totals up the sum that has been input in [a] particular transaction" based on the signals which are provided by the coin reject mechanism in response to insertion of one or more coins. Ex. 1007, 11:8–20. A POSA would have understood that the total sum that has been input in a particular transaction (i.e., the cost of the selected item for vending), which is determined based on the signal provided by the coin reject mechanism, is a value of the requested cashless operation (i.e., the cost of the selected item for vending) corresponding to a number of coin insertions associated with a total number of pulses counted by the second interface module to initiate the operation of the offline payment-operated machine. *See supra* ¶¶ 202–204.

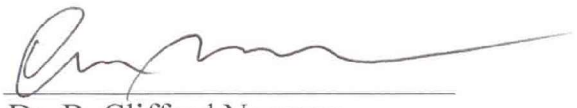
256. I have already explained why and how a POSA would have modified *Breitenbach/Brown* with *Kaspar*. *See supra* § IX.B.1. Thus, *Breitenbach/Brown* further in view of *Kaspar* teaches the operation information including a value of the requested cashless operation corresponding to a number of coin insertions associated with a total number of the pulses (e.g., "sales data" or a "transaction receipt" of *Breitenbach/Brown* consisting of the total sum that has been input in a particular transaction, as determined by *Kaspar*) counted by the second interface module (e.g., retrofit processing device 374/474 of *Breitenbach/*Brown including instructions to count one or more electrical pulses as taught by *Kaspar*) to initiate the operation of the offline payment-operated machine (e.g., machine 108 of *Breitenbach/Brown*).

6. Claim 20

257. *Breitenbach* in view of *Brown* further in view of *Kaspar* teaches this Claim for the reasons stated *supra* § IX.A.3.

X. CONCLUSION

This declaration and my opinions herein are made to the best of my knowledge and understanding, and based on the material available to me, at the time of signing this declaration. I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 or Title 18 of the United States Code.

By: 
Dr. B. Clifford Neuman

Date: 26 April 2025