UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner

v.

CHARGE FUSION TECHNOLOGIES LLC,
Patent Owner

Inter Partes Review Case No. IPR2025-00153
U.S. Patent No. 11,631,987

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 11,631,987

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I. INTRODUCTION

Petitioner Tesla Inc. ("Petitioner") requests *inter partes* Review ("IPR") of Claims 1-30 (collectively, the "Challenged Claims") of U.S. Patent No. 11,631,987 ("the '987 Patent"). The Challenged Claims encompass a patchwork of features for managing a vehicle's battery charging—well-known techniques prior to the '987 Patent.

II. THE '987 PATENT

A. Summary

The '987 Patent is directed to an electrical charging system for charging electric vehicles, including "any vehicle that utilizes, stores, and/or provides electrical power (e.g., buses, trains, cars, semi-trucks, ships, submarines, aircraft, dirt bikes, All Terrain Vehicles (ATV), scooters, and/or lawn mowers)." *'987 Patent* (Ex. 1001), 3:37-41, Abstract. The charging system uses charging preferences, including a desired charge level, which are entered by a user via a GUI. *Id.*, 14:20-25, 14:63–15:7, FIG. 7. The charging system then charges the vehicle's battery to the user's desired charging level and displays the charging status on GUI. *Id.*, 23:37-45.

B. Priority

The '987 Patent claims priority to Provisional Application 61/134,646 ("*'646 Provisional*," Ex. 1023). Each of the '987 Patent's independent claims recites a GUI comprising a slider. In IPR2022-01217, the Board determined that the claimed slider in USPN 10,998,753 (a ’987 Patent family member) was not supported by the ’646 Provisional. IPR2022-01217, Paper 11, 8-10. The same finding applies here, such that all claims of the ’987 Patent are only entitled to a priority date of the earliest non-provisional application, July 13, 2009. *Dec.* (Ex. 1003), 48-49.[1]

C. Level of Skill

A person of ordinary skill in the art (POSITA) at the time of the ’987 Patent would have had at least a bachelor’s degree in electrical or mechanical engineering (or an equivalent field) and at least two years of work experience involving automotive systems, including electric vehicle power management. *Dec.*, 14-15. Additional industry experience or technical training may offset less formal education, while advanced degrees or additional formal education may offset lesser levels of industry experience. *Id*.

D. Summary of Unpatentability

Ferro (Ex. 1004) is applied for teaching most of the limitations of Claim 1. The independent claims of the Challenged Claims recite an electrical charging system with several disparate features. For example, Claim 1[a] recites receiving information from a vehicle sensor that the vehicle is present in a parking space. *’987 Patent* (Ex. 1001), 29:39-40. The received information is not tied to any other

[1] References to *Dec.* are to paragraphs of Ex. 1003, Declaration of Scott Andrews.

claimed feature; no other recited step or structure in Claim 1 uses the received information from the vehicle sensor. Oyobe (Ex. 1005) is applied to teach the well-known use of a vehicle sensor for determining the vehicle is present in a parking space. *See* Section V.A.2.

As another example, Claim 1[h] recites transmitting a control signal that starts a charging. To the extent not otherwise explicit in Ferro, Seelig is applied to teach the simple, well-known concept of transmitting a control signal. *See* Section V.A.9.b.

As yet another example, Claim 1[i] recites the various basic features of a GUI element displaying certain information and a slider to select a value. GUIs for use in vehicles, and sliders on GUIs for input selection were known many years prior to the '987 Patent. *Dec.*, 66-74.

Because the Challenged Claims recite numerous known features, Petitioner's proposed Grounds rely on combinations of multiple references. "The criterion [for obviousness], however, is not the number of references, but what they would have meant to a person of ordinary skill[.]" *In re Gorman*, 933 F.2d 982, 986 (Fed. Cir. 1991). As shown in Section V, the claimed features were known, and the motivation to combine the references was extensive. The Challenged Claims are plainly obvious and should be canceled.

III. REQUIREMENTS UNDER 37 C.F.R. § 42.104

A. Grounds for Standing Under 37 C.F.R. § 42.104(a)

Petitioner certifies the ’987 Patent is eligible for IPR.

B. Identification of Challenge Under 37 C.F.R. § 42.104(b)

Petitioner requests the Challenged Claims be found unpatentable on the following grounds.

Proposed Grounds of Unpatentability	Exhibits
Ground 1: Claims 1-4, 6-11, 13-18, 20-27, and 29-30 Are Obvious Under § 103 over Ferro in View of Oyobe, Donnelly, Letendre, and Seelig	1004-1007, 1078
Ground 2: Claims 5, 12, 19, and 28 Are Obvious Under § 103 Over Ferro in View of Oyobe, Donnelly, Letendre, Seelig, and Knockeart	1004-1007, 1078, 1010

C. Claim Construction Under 37 C.F.R. § 42.104(b)(3)

1. “dynamic attribute of an electric charge provider” (Claims 1[g], 8[c], 15[g], 22[f])

The term “dynamic attribute” is not in the ’987 Patent Specification. The closest disclosure is the ’987 Patent’s description of the processor communicating with a power supplying entity (PSE) “to determine time-of-day rates for purchasing electrical energy” and using such rates to determine a cost-effective charging schedule. *’987 Patent* (Ex. 1001), 8:30-38, 10:51-59. Therefore, the claim term is a changing or otherwise fluctuating cost (or price) of electricity for purchase from an electric charge provider.

2. "determine…a charging schedule" (Claims 1[g], 8[c], 15[g], 22[f])

Petitioner submits the term should not be construed under § 112(6). *Cf.* IPR2023-00062, Papers 13, 25 (IPR challenging related USPN 9,853,488, which includes a similar "charging schedule" limitation as the '987 Patent and neither the Parties nor the Board raised § 112(6) issues). The presumption of no application under § 112(6) is not overcome, at least because the term recites an algorithmic step (i.e., structure) for how to "determine" a "charging schedule" based "at least on the one or more charging preferences" and "one current value of a dynamic attribute[.]" *'987 Patent*, Claim 1[g]; *Dyfan, LLC v. Target Corp.*, 28 F.4th 1360, 1368 (Fed. Cir. 2022) ("[W]hen the structure-connoting term … is coupled with a description of the [term's] operations, sufficient structural meaning generally will be conveyed to persons of ordinary skill in the art, and § 112 ¶ 6 presumptively will not apply."). To the extent the Board or PO construes as means-plus-function, the structure is a processor executing computer program instructions for performing the disclosed algorithm of "utiliz[ing] such rate information in combination with the identification and/or preference information[.]" *'987 Patent*, 10:55-59, 17:39-42. The function is the claimed function. The support for the claimed structure and/or function at least includes '987 Patent, 8:33-38, 10:41-44, 10:51-67, 16:62–17:8, 17:39-42.

3. "unitary vehicle charge indicator element" (Claims 1[i], 8[e], 15[l], 22[d])

The term "unitary" is only used in the claims and abstract of the '987 Patent. The '987 Patent describes a vehicle charge indicator element 714 combining portions indicating an amount of charge remaining in a battery, an uncharged capacity of the battery, and a slider in a bar graph, as shown in FIG. 7:

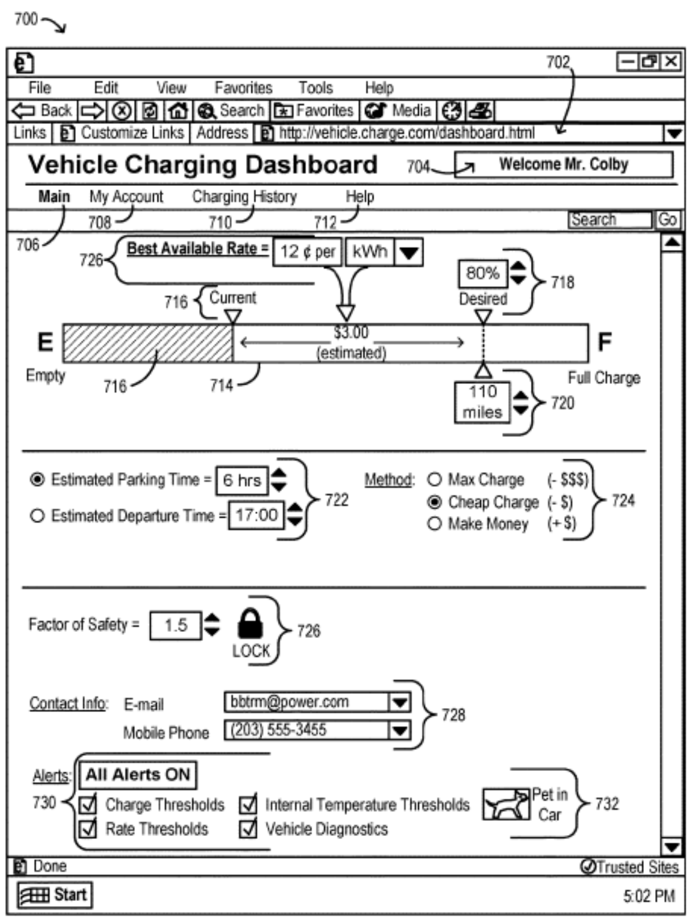


FIG. 7

'987 Patent, 14:56-64, FIG. 7.

Therefore, the claim term "unitary vehicle charge indicator element" at least includes a bar graph comprising the charged, uncharged, and slider portions, such as illustrated in FIG. 7.

4. "(i) a first portion indicative of an amount of charge residing in a battery of the electric vehicle; (ii) a second portion indicative of an uncharged capacity of the battery of the electric vehicle" (Claims 1[i], 8[e], 15[l], 22[d])

Independent Claims 1, 8, and 15 recite "a graphical user interface adapted to display a unitary vehicle charge indicator element comprising: (i) a first portion indicative of an amount of charge residing in a battery of the electric vehicle; (ii) a second portion indicative of an uncharged capacity of the battery of the electric vehicle; and (iii) a third portion comprising a slider by which an amount of charge may be specified." Claim 22 recites substantially similar language. The first and second portions of the graphical user interface (GUI) are not entitled to any patentable weight under the printed matter doctrine.

It has long been recognized "that certain 'printed matter' falls outside the scope of patentable subject matter under U.S. patent law." *C R Bard Inc. v. AngioDynamics, Inc.*, 979 F.3d 1372, 1381 (Fed. Cir. 2020) (citing *AstraZeneca LP v. Apotex, Inc.*, 633 F.3d 1042, 1064 (Fed. Cir. 2010); *In re Chatfield*, 545 F.2d 152, 157 (CCPA 1976)). Although "printed matter" historically referred to claim elements involving actual "printed" material, today, the doctrine has expanded to include any information claimed for its communicative content, regardless of medium. *Id.*

The CAFC applies a two-step test to determine whether a limitation should be accorded patentable weight under the printed matter doctrine. *Praxair Distrib., Inc. v. Mallinckrodt Hosp. Prods. IP Ltd.*, 890 F.3d 1024, 1032 (Fed. Cir. 2018). In the first step, it must be determined whether the claim limitation in question is directed to printed matter, i.e., "if it claims the content of information." *Praxair*, 890 F.3d 1032 (citing *In re DiStefano*, 808 F.3d 845, 848 (Fed. Cir. 2015)). Printed matter is "matter claimed for what it communicates." *Distefano*, 808 F.3d at 850.

Here, the claims recite a GUI requiring communicative content, including "(i) a first portion indicative of an amount of charge residing in a battery of the electric vehicle; (ii) a second portion indicative of an uncharged capacity of the battery of the electric vehicle[.]" These limitations are directed to informational content – i.e., "an amount of charge residing in a battery" and "an uncharged capacity of the battery" – that is displayed on a GUI.

The second step determines whether the printed matter is functionally related to its "substrate," i.e., whether the printed material is "interrelated with the rest of the claim." *Praxair*, 890 F.3d 1032. Printed matter is functionally related to its substrate when the language "interacts with the other elements of the claim to … cause a specific action in a claimed process." *C R Bard*, 979 F.3d 1372, 1381.

Here, the first and second GUI portions merely inform a user of the claimed information (i.e., the current battery charge and the uncharged capacity of the battery). Unlike the third GUI portion, which is "a slider by which an amount of charge may be specified[,]" the first and second GUI portions do not interact with any other elements of the claim. Thus, the first and second GUI portions are not functionally related to the substrate, and these limitations are not entitled to any patentable weight.

IV. THE PRIOR ART IS ANALOGOUS TO THE '987 PATENT

A. Ferro

USPGPub 2009/0313034 to Ferro (Ex. 1004) was filed June 16, 2008, qualifying as prior art under § 102(e). *Ferro*, [0022].

Ferro is directed to an apparatus for generating a dynamic energy transaction plan to manage electric vehicle charging. *Ferro*, Abstract, [0002], [0055], FIGs. 5-8. A "computer-readable medium" includes "program code for carrying out operations[.]" *Ferro*, [0026]-[0030]. The energy transaction plan that "manages every aspect of charging electric vehicle" may be configured via an "input/output device located on-board the electric vehicle to create the preferences." *Ferro*, [0093], [0103], [0139]. Ferro updates the transaction plan in view of dynamic attributes of the charge provider, such as the price of the electricity from a power grid. *Ferro*, [0037].

Ferro is analogous to the claimed invention of the ’987 Patent because Ferro is from a same field of endeavor: managing vehicle systems, including EV charging. *Cf. Ferro*, [0002], [0034]-[0037], *with ’987 Patent*, 3:11-24, 8:15-42; *Dec.*, 83-85.

Ferro is also reasonably pertinent to a particular problem with which the inventor of the ’987 Patent was involved: user-friendly charging schedule generation. *Cf. Ferro*, [0084], *with ’987 Patent*, 16:62–17:8; *Dec.*, 83-85.

B. Oyobe

EP No. 1,920,968 to Oyobe (Ex. 1005) was neither cited nor considered during prosecution of the ’987 Patent. Oyobe was filed August 30, 2006, and published May 14, 2008, qualifying as prior art under § 102(b).

Oyobe describes an electric vehicle battery charging system comprising a vehicle sensor that “detects whether or not hybrid vehicle 100B is parked at the location where charging equipment is installed. *Oyobe*, [0007]-[0009], [0141]-[0143], FIG. 16.

Oyobe is analogous to the claimed invention of the ’987 Patent because Oyobe is from a same field of endeavor: managing vehicle systems, including EV charging. *Cf. Oyobe*, [0007]-[0009], [0141]-[0143], *with ’987 Patent*, 9:57–10:3, 16:37-49; *Dec.*, 90-91.

Oyobe is also reasonably pertinent to a particular problem with which the inventor of the ’987 Patent was involved: facilitating user-friendly EV charging. *Cf. Oyobe*, [0019], [0141]-[0142], *with ’987 Patent*, 9:57–10:3, 16:37-49; *Dec.*, 90-91.

C. Donnelly

USPN 7,124,691 to Donnelly (Ex. 1006) was neither cited nor considered during prosecution of the ’987 Patent. Donnelly issued October 24, 2006, qualifying as prior art under § 102(b).

Donnelly teaches a touchscreen GUI for hybrid vehicles, including cars. *Donnelly*, 21:47-58, 26:6-8, 1:36-38.

Donnelly is analogous to the claimed invention of the ’987 Patent because Donnelly is from a same field of endeavor: managing vehicle systems, including EV controls interfaces. *Cf. Donnelly*, 21:47-58, 26:6-8, *with ’987 Patent*, 3:25-31; *Dec.*, 96-97.

Donnelly is also reasonably pertinent to a particular problem with which the inventor of the ’987 Patent was involved: presenting user-friendly EV controls interfaces. *Cf. Donnelly*, 23:16-33, FIG. 28, *with ’987 Patent*, 14:53-64, FIG. 7; *Dec.*, 96-97.

D. Letendre

Letendre was neither cited nor considered during prosecution of the ’987 Patent. *The V2G Concept, A New Model for Power* by Letendre et al. (Ex. 1007) published February 15, 2002, qualifying as prior art under § 102(b). Strong indicia confirm that Letendre is a printed publication, including copyright, ISSN, evidence of public availability from multiple libraries, and evidence showing that Letendre was cited in the prior art. *Munford Dec.* (Ex. 1086); *Hulu, LLC v. Sound View Innovations, LLC*, No. IPR2018-01039, Paper 29, 18-20 (PTAB Dec. 20, 2019). (precedential).

Letendre teaches a user interface comprising a slider by which a user may specify parameters managing the charge of an electric vehicle's battery. *Letendre*, 18-20.

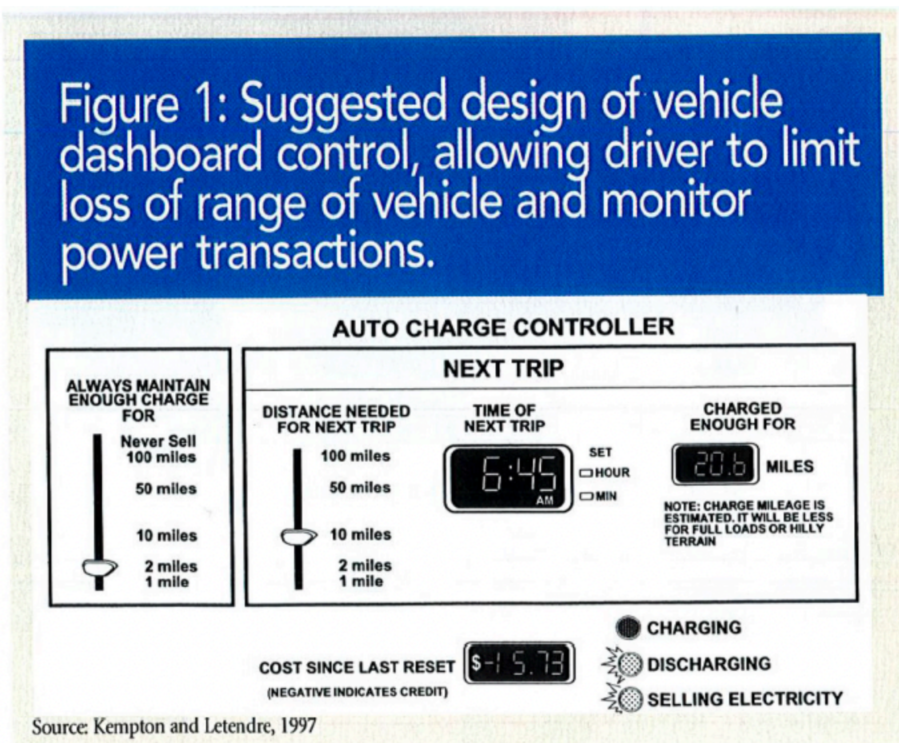


Figure 1: Suggested design of vehicle dashboard control, allowing driver to limit loss of range of vehicle and monitor power transactions.

Source: Kempton and Letendre, 1997

Letendre is analogous to the claimed invention of the '987 Patent because Letendre is from a same field of endeavor: managing vehicle systems, including EV controls interfaces. *Cf. Letendre*, 1-2, *with '987 Patent*, 14:53–15:8, 19:58–20:2, FIG. 7; *Dec.*, 101-102.

Letendre is also reasonably pertinent to a particular problem with which the inventor of the '987 Patent was involved: presenting user-friendly EV controls interfaces, including inputting of user-selected charge preferences. *Cf. Letendre*, 1-2, *with '987 Patent*, 14:30–15:8, FIG. 7; *Dec.*, 101-102.

E. Seelig

USPN 5,654,621 to Seelig (Ex. 1078) was neither cited nor considered during prosecution of the '987 Patent. Seelig issued August 5, 1997, qualifying as prior art under § 102(b).

Seelig describes a system for wirelessly charging an electric vehicle. *Seelig,* Abstract, 1:6-8.

Seelig is analogous to the claimed invention of the '987 Patent because Seelig is from a same field of endeavor: managing vehicle systems, including EV charging. *Cf. Seelig*, 1:6-8, FIG. 1, *with '987 Patent*, 1:33-46, 3:11-24; *Dec.*, 106-108.

Seelig is also reasonably pertinent to a particular problem with which the inventor of the '987 Patent was involved: avoiding overcomplexity and reducing the burden on the user in vehicle systems that provide EV charging. *Cf. Seelig*, 1:17-29, 3:45-61, FIG. 1, *with '987 Patent*, 11:34-12:16, 18:40-20:16, FIG. 5; *Dec.*, 106-108.

F. Knockeart

USPN 6,622,083 to Knockeart (Ex. 1010) was neither cited nor considered during prosecution of the ’987 Patent. Knockeart issued September 16, 2003, qualifying as prior art under § 102(b).

Knockeart describes a system for utilizing a user’s device (e.g., smartphone) to provide a vehicle’s GUI. *Knockeart,* Abstract, 4:49-67.

Knockeart is analogous to the claimed invention of the ’987 Patent because Knockeart is from a same field of endeavor: managing vehicle systems, including communication of a user’s personal device with the vehicle’s information system. *Cf. Knockeart*, 1:39-51, FIG. 7, *with ’987 Patent*, 14:53–15:8, 19:58–20:2, FIGs. 6-7; *Dec.*, 111-112.

Knockeart is also reasonably pertinent to a particular problem with which the inventor of the ’987 Patent was involved: facilitating user-friendly communication with the vehicle’s information system. *Cf. Knockeart*, Abstract, 4:49-67, *with ’987 Patent*, 11:34-49, 19:58–20:2, FIGs. 6-7; *Dec.*, 111-112.

V. GROUND 1: OBVIOUSNESS OF CLAIMS 1-4, 6-11, 13-18, 20-27, AND 29-30

A. Claim 1

1. Claim 1[Pre]: "An electrical charging system, comprising"

Ferro teaches an *electrical charging system*[2], namely "method, apparatus, and computer program product for generating a dynamic energy transaction plan to manage an electric vehicle charging transaction." *Ferro,* Abstract, [0025]. A "data processing system 200" of FIG. 2 implements the "energy transaction infrastructure" of FIG. 3 for charging electric vehicle 116/400 via charging station 118/403, which collectively comprise an *electrical charging system*. *Dec*., 121-122; *Ferro*, [0008], [0039], [0064], [0052], [0034] (describing electric vehicle utilizing electric power and being plugged into charging station), [0025] ("the present invention may be embodied as a system"), [0028] (describing "apparatus" as "systems"), [0076] and FIG. 4 (disclosing relationship of electric vehicle 400 with charging station 403 and dynamic energy transaction planner 402); *Dec*., 113-120 (explaining interrelation between Ferro's figures and teachings).

[2] Claim terms are italicized.

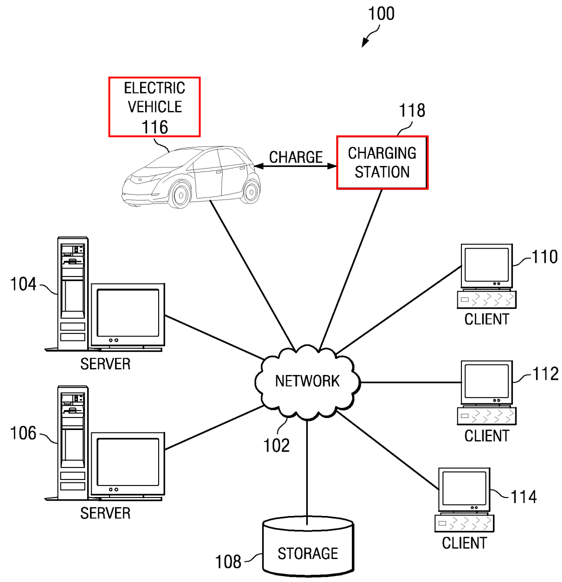


FIG. 1

Ferro, FIG. 1.[3]

Ferro teaches "data processing system 200" "implemented as a computing device on-board an electric vehicle":

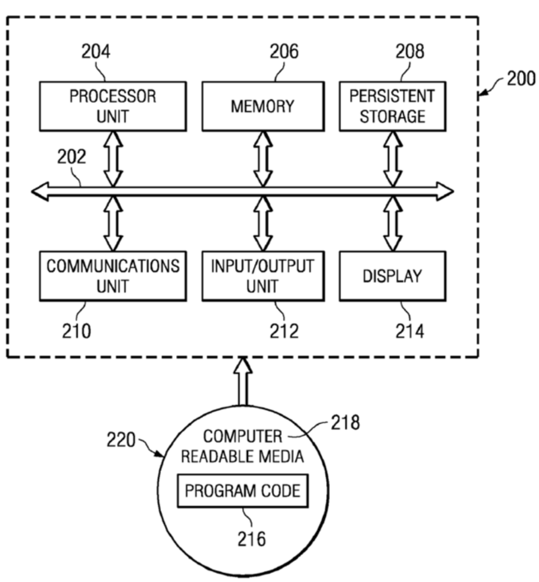


FIG. 2

[3] All annotations to figures and bolded quotations are added.

Ferro, FIG. 2, [0039]. "[A]n energy transaction infrastructure" in FIG. 3 "manag[es] all phases of an electric vehicle charging transaction[,]" and components of the infrastructure 300, such as dynamic energy transaction planner 310, may be implemented within the vehicle. *Ferro*, [0052], [0059], [0072], [0076]; *Dec.*, 115-117.

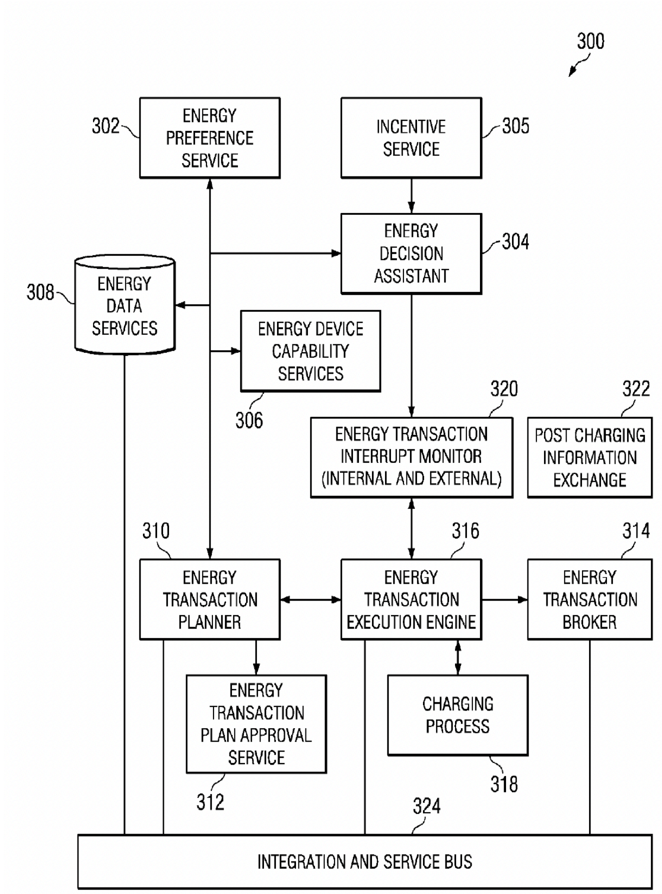


FIG. 3

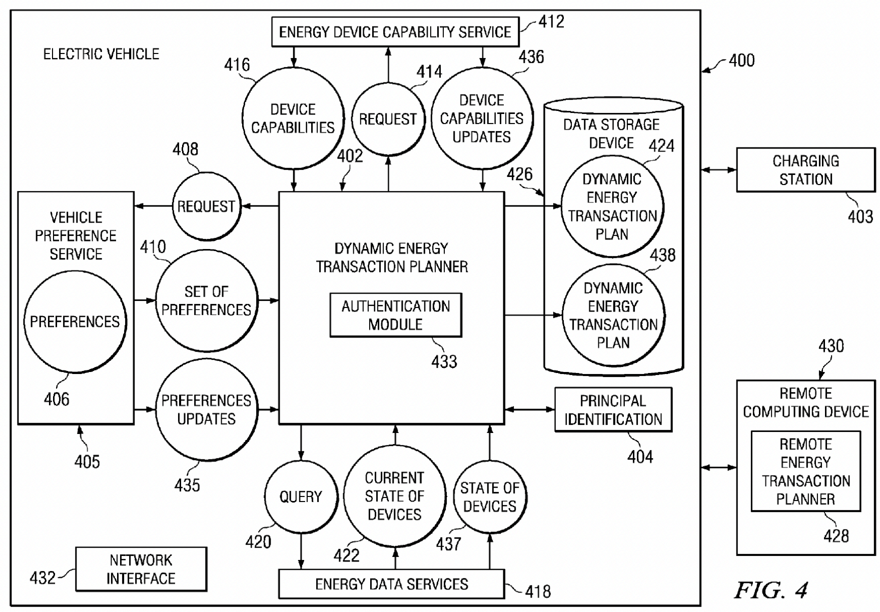


FIG. 4

Ferro, FIGs. 3-4.

2. Claim 1[a]: "a vehicle sensor"

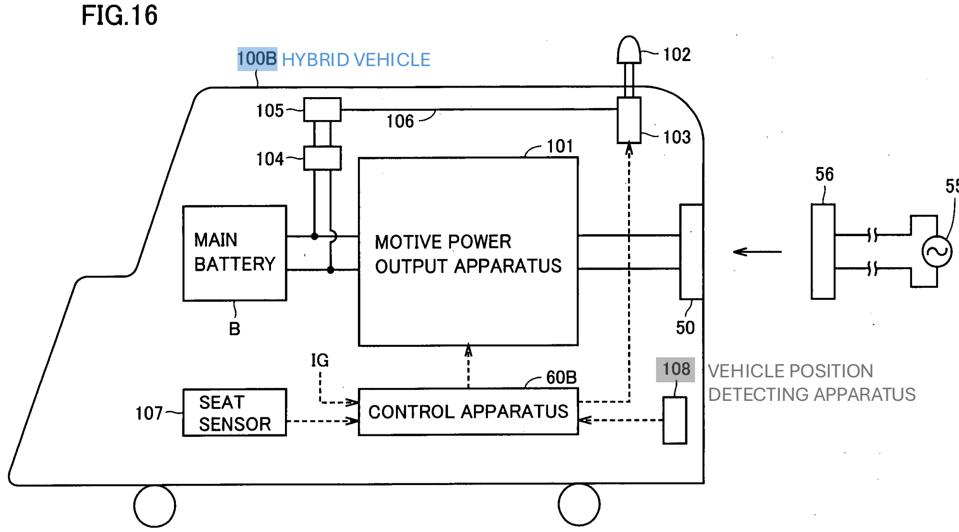
a) Ferro's Teachings

Ferro teaches an electric vehicle arriving at a charging station and indicating "an intention to charge[.]" *Ferro*, [0109]. The vehicle and charging station connect and receive/transmit charging data via a network. *Ferro*, [0037]. A user specifies, via "preferences," that "any time the electric vehicle is parked at a charging station that is at a specified location, the electric vehicle is…to be fully charged[,]" indicating Ferro at least contemplates detecting when a vehicle is at a charging station. *Ferro*, [0121]; *Dec.*, 124.

b) Oyobe's Teachings

Oyobe teaches a *vehicle sensor*, namely vehicle position detecting apparatus 108 located internal to the vehicle that "detects whether or not hybrid vehicle 100B is parked at the location where charging equipment is installed.… Alternatively, it may sense that the vehicle is parked at the location where charging equipment is installed based on the communication with a radio apparatus…provided at the location where the charging equipment is installed." *Oyobe*, [0142], [0143] (disclosing apparatus 108 outputting signal to control apparatus 60B when apparatus 108 detects vehicle is parked at charging station).

FIG.16



Oyobe, FIG. 16.

Like the '987 Patent's wireless interrogation vehicle sensor example, Oyobe's wireless interrogation via detecting apparatus 108 teaches a *vehicle sensor*. *Dec.*, 127.

c) Motivation to Combine

A POSITA would have found it obvious and been motivated to incorporate Oyobe's vehicle position detecting apparatus 108 into Ferro's electric vehicle 116/400 to detect when the vehicle is parked at a charging station, per Oyobe. *Dec.*, 128. The modification combines prior art elements (wireless interrogation, EV charging stations) according to known methods to yield predictable results of allowing the vehicle to indicate "an intention to charge" without an operator having to leave the vehicle to interact with the charging station. *Ferro*, [0109]. Ferro's charging station charges the vehicle through "wireless" charging, allowing a user to remain in the vehicle while charging. *Ferro*, [0036]; *Dec.*, 129. Providing Oyobe's wireless detecting apparatus 108 to detect the vehicle parked at the charging station advantageously allows a user to instruct charging without exiting vehicle and without physically interacting with an external charging station or display. *Dec.*, 129-130.

The modification would have had a reasonable expectation of success (hereinafter "REOS"), as Ferro already teaches the charging station and vehicle communicating via a network. *Ferro*, [0037]; FIG. 4, RN 432 (Network Interface). Oyobe teaches the charging station including a radio apparatus for wirelessly communicating with the vehicle. *Oyobe*, [0142]. Therefore, the combination entails Ferro's charging station including a similar radio apparatus to wirelessly communicate with the modified Ferro electric vehicle including Oyobe's detecting apparatus 108. Given Ferro teaches the charging station already communicating via a network, and that wireless communication via a network interface (such as Ferro's network interface 432) was well known, the combination is straightforward and simple to implement. *Dec.*, 131-132.

3. Claim 1[b]: "a communication device;"

Ferro teaches a *communication device*, namely the collective:

(1) communications unit 210, which may be a network interface card and where an exemplary network interface card is network interface 432; and

(2) communications fabric 202 that may comprise one or more busses, where unit 210 and fabric 202 are components of data processing system 200 that may be "implemented as a computing device on-board an electric vehicle," and where an exemplary bus is integration and service bus 324. *Ferro*, [0040], [0042], [0039] (disclosing "[d]ata processing system 200 is an example of a computer"), [0049], [0064], [0076], [0106], FIGs. 2-4.

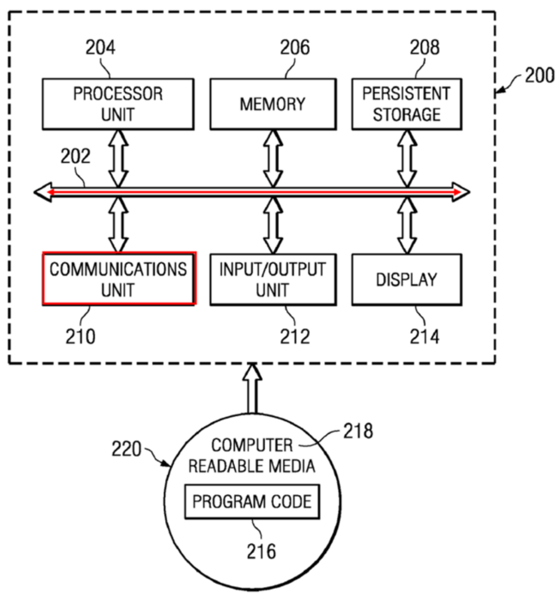
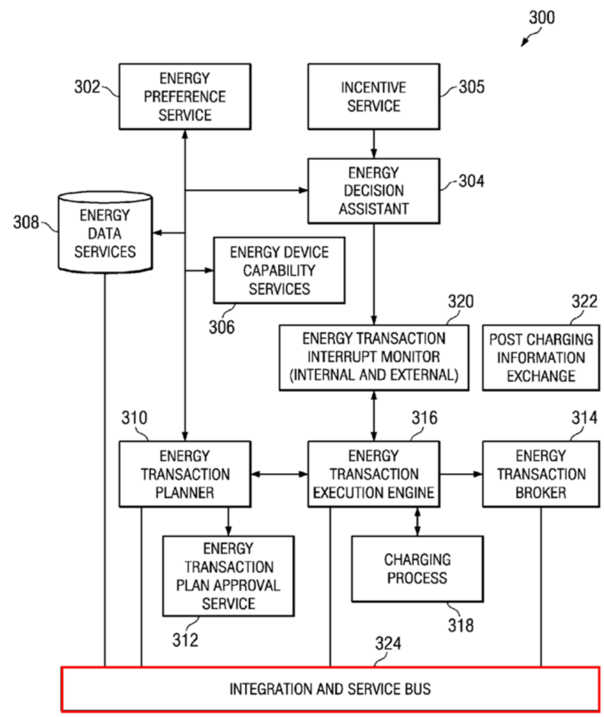


FIG. 2



Ferro, FIGs. 2-3.

a) Communications Unit 210, Including Network Interface 432

"Communications unit 210…provides for communications with other data processing systems or devices[,]" and may be a network interface card, providing communications via both physical and wireless communication links. *Ferro*, [0042].

"Network interface 432 is any type of network access software known or available for allowing electric vehicle 400 to access a network." *Ferro*, [0106]. Figure 4 is "a block diagram of a dynamic energy transaction planner [402] on-board an electric vehicle" 400. *Ferro*, [0076]. Planner 402 is a software component for controlling a charging transaction for the electric vehicle, such as planner 310. *Id.*

Because (1) communications unit 210 may be a network interface card; (2) FIG. 4 illustrates a planner 402/310 implemented on-board the electric vehicle; and (3) network interface 432 provides network communication for the vehicle, a POSITA would have understood or found obvious that an exemplary network interface card of communications unit 210 is network interface 432. *Ferro*, [0042], [0106]; *Dec.*, 134-137.

b) Communications Fabric 202, Including Bus 324

Communications fabric 202 provides communications between the various components of data processing system. *Ferro*, [0040]. "[A] bus system may be used to implement communications fabric 202 and may be comprised of one or more buses, such as a system bus or an input/output bus." *Ferro*, [0049] (also disclosing communications fabric 202 may be other devices to transmit/receive data, such as a modem or network adapter).

"Integration and service bus 324 is an internal communication system within the electric vehicle, such as any wired or wireless communication system[,]" including a data bus or USB. *Ferro*, [0064]. Figure 3 is a "block diagram of an energy transaction infrastructure[,]" where the components "may be implemented on a data processing system associated with an electric vehicle." *Ferro*, [0052], [0028], [0064]. When the data processing system 200 is associated with an electric vehicle, communication occurs through bus 324. *Ferro*, [0064].

Because (1) communications fabric 202 is a bus system for facilitating communications amongst components attached to the bus and part of data processing system 200; (2) integration and service bus 324 is an internal communication system within the vehicle; and (3) the components of FIG. 3 are implemented on a data processing system (such as system 200), a POSITA would have understood or found obvious that an exemplary bus of communications fabric 202 is integration and service bus 324. *Ferro*, [0049], [0054], [0039]; *Dec.*, 138-140.

4. Claim 1[c]: "a processor in communication with the vehicle sensor and the communication device; and"

Ferro teaches a *processor*, namely processor unit 204:

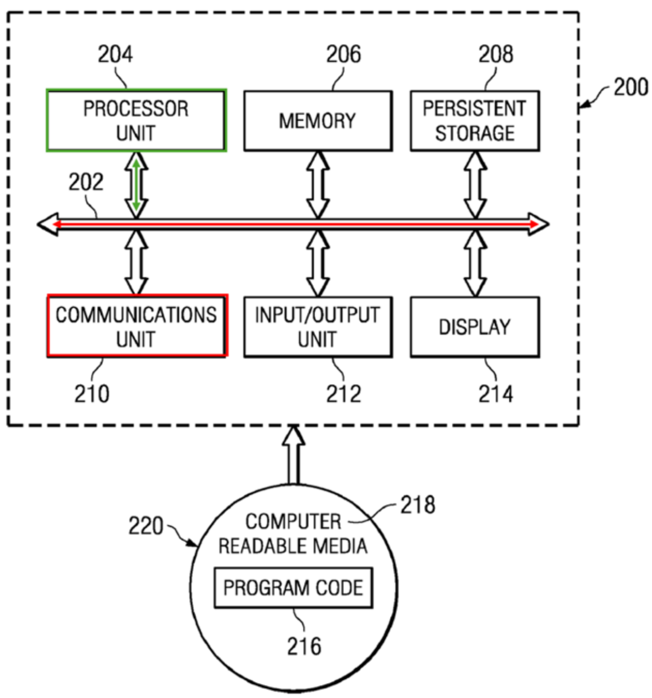


FIG. 2

Ferro, [0040] (disclosing processor unit 204 may be "a set of one or more processors or may be a multi-processor core"), [0044] (disclosing execution of code by processor unit 204), [0161] (disclosing "data processing system…will include at least one processor coupled directly or indirectly to memory elements through a system bus"), FIG. 2. Data processing system 200 includes processor unit 204, which "serves to execute instructions for software that may be loaded into memory 206." [0040].

Ferro teaches *processor* (processor unit 204) is *in communication with…the communication device*, namely communications fabric 202. Communications fabric 202, which is a bus system, provides communication between the processor 204 and other data processing system components, such as memory. *Ferro*, [0040], [0049], [0161]; *see* Claim 1[b][4] (mapping bus 324 as an exemplary bus of communications fabric 202); *Dec.*, 141-142 (opining that a bus, such as communications fabric 202, is commonly used to facilitate communications amongst various hardware components in a computer system).

Processor unit 204 is also *in communication with…the communication device*, namely communications unit 210. Processor unit 204 executes software instructions, and communications unit 210 provides wired/wireless communications. Therefore, processor unit 204 would instruct communications unit to perform a wired/wireless

[4] All citations to a claim are to the section in this Petition mapping the claim.

communication per executed software instructions. *Ferro*, [0072], FIG. 3; *see* Claim 1[b] (mapping network interface 432 as a network interface card of communications unit 210); *Dec.*, 143-144 (opining that processor unit 204 instructs communications with various remote servers to transmit/receive information associated with the dynamic energy transaction plan).

Per Claim 1[a]'s mapping, the Ferro-Oyobe system includes a *vehicle sensor*. It would have been obvious to further modify Ferro such that Ferro's processor unit 204 is *in communication with the vehicle sensor*, i.e., Oyobe's vehicle position detecting apparatus 108. *Dec.*, 145. Oyobe teaches detecting apparatus 108 outputting a signal to a control apparatus 60B, which is internal to the car, along with communicating with an external charging station. *Oyobe*, [0142]-[0143], FIG. 16. Thus, Oyobe teaches detecting apparatus 108 in communication with a processor internal to the vehicle. *Dec.*, 146.

Similarly, it would have been obvious for Ferro's processor unit 204 to be *in communication with* Oyobe's detecting apparatus 108 to allow for communicating to processor unit 204 that "the vehicle is parked at the location where charging equipment is installed[.]" *Oyobe*, [0142]; *Dec.*, 147. Communication between Oyobe's detecting apparatus 108 and Ferro's processor unit 204 would have been desirable so that the "process for generating dynamic energy transaction plan" may begin "when electric vehicle 400 arrives at charging station 403 and indicates an intention to charge….” *Ferro*, [0109]; *Dec.*, 148. There would have been a REOS at least because detecting apparatus 108 already includes the necessary hardware and software to send signals to both an in-vehicle control and the external charging station. *Dec.*, 149-150.

5. *Claim 1[d]: "a memory in communication with the processor, the memory storing instructions that when executed by the processor cause the processor to"*

Ferro teaches *a memory*, namely collective memory 206 and persistent memory 208. Ferro's data processing system 200 on-board the vehicle includes memories 206, 208. *Ferro*, [0039]-[0041]. "**Instructions for the operating system and applications or programs are located on persistent storage 208**. These **instructions may be loaded into memory 206 for execution by processor unit 204**. The processes of the different embodiments may be performed by processor unit 204 using computer implemented instructions, which may be located in a memory, such as memory 206." *Ferro*, [0044], [0040] ("Processor unit 204 serves to execute instructions for software that may be loaded into memory 206."), [0161]; *see* Claim 1[c]'s Mapping (mapping processor unit 204 as *processor*); *Dec.*, 151-154.

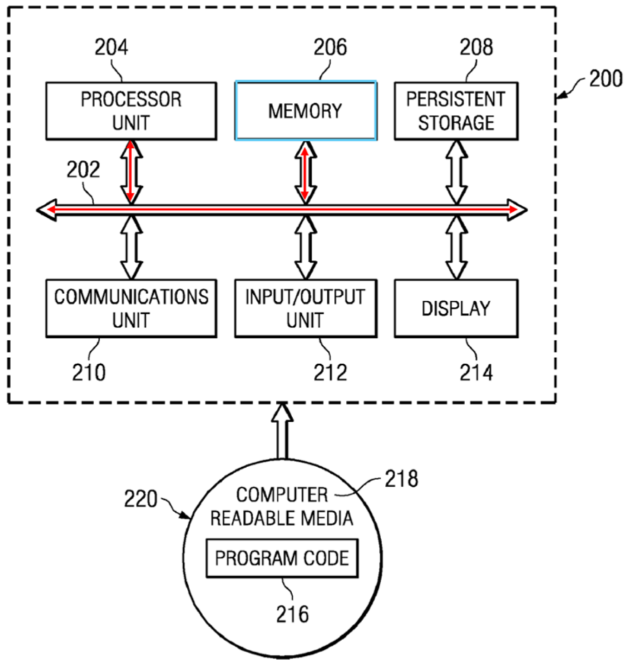


FIG. 2

Ferro, FIG. 2 (illustrating processor in communication with memory 206 via at least fabric 202).

Ferro teaches data processing system 200 is an in-vehicle computing device that implements "program code or instructions" for the energy transaction planning system. *Ferro*, [0039]. Because (1) instructions for the operating system and applications/programs are loaded into memory 206 and persistent storage 208; and (2) the processes are performed by processor unit 204 using such computer-implemented instructions, a POSITA would have understood the memory 206 and persistent storage 208 are *in communication with* the processor unit 204 and that memories 206/208 are *storing instructions* that, when *executed by the processor[,]* *cause the processor to* operate the energy transaction plan system. *Ferro*, [0044], [0076] (disclosing planner 402 is a "software component"); *Dec.*, 152-155.

Storage device 426 in FIG. 4 is an example of memory 206 and persistent storage 208 (i.e., *memory*). *Dec.*, 151, 153; *Ferro*, [0100], FIG. 4.

6. Claim 1[e]: "receive, from the vehicle sensor, information indicative of a presence of a vehicle in a parking space"

Ferro-Oyobe renders obvious Claim 1[e]. Oyobe teaches a processor, namely control apparatus 60B, receiving a signal from vehicle position detecting apparatus 108 (*vehicle sensor*, per Claim 1[a]) when detecting apparatus 108 "detects that the vehicle is parked at the location where charging equipment is installed[.]" *Oyobe*, [0143], [0144] ("Control apparatus 60B also receives a detection signal from vehicle position detecting apparatus 108."). Therefore, Oyobe teaches a processor (e.g., control apparatus 60B) receiving a signal from a *vehicle sensor* (detecting apparatus 108). *Dec.*, 156.

In the Ferro-Oyobe combination, Ferro's processor unit 204 (*processor*) receives, from Oyobe's detecting apparatus 108 (*vehicle sensor*), a signal (*information indicative of*) indicating the apparatus 108 "detect[ed] that the vehicle is parked at the location where charging equipment is installed" (*presence of an electric vehicle*). *Oyobe*, [0143]; *Dec.*, 157. The combination's motivation provided for Claim 1[a] and 1[c]'s mappings are incorporated.

A POSITA would have understood Oyobe teaches or renders obvious the vehicle is *in a parking space*. Charging equipment is commonly installed proximate a parking space so the vehicle may park proximate the charging station. *Dec.*, 158. Indeed, any space proximate the charging station is a *parking space*, at least because a location proximate the charging station and designated for where the car may park to access the charging station is a parking space. *Dec.*, 159. Because it was well known that charging locations were positioned proximate parking spaces, a POSITA would have understood Oyobe's teaching of detecting the vehicle **parked** at the location where charging equipment is **installed**, at the least, implicitly teaches *a presence of an electric vehicle in a parking space*. *Dec.,* 158-159.

7. Claim 1[f]: "receive, from the communication device, information indicative of one or more charging preferences corresponding to a desired charging of the vehicle, wherein the one or more charging preferences are defined by an operator of the vehicle"

Ferro teaches *charging preferences*, namely preferences 406 including "electric vehicle charging preferences" 500, such as an amount of charge or a time of day for charging the vehicle. *Ferro*, [0082], [0084], [0118], [0120], [0122]-[0123].

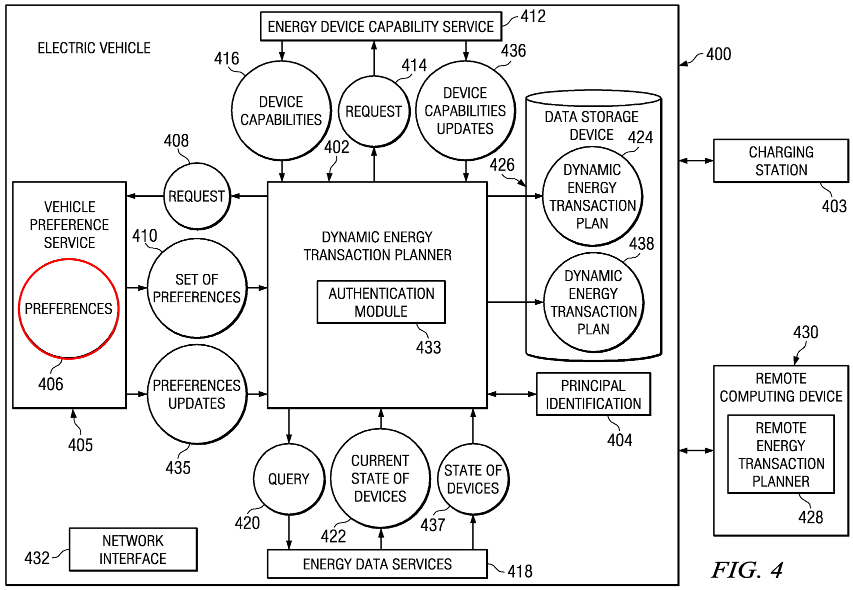


FIG. 4

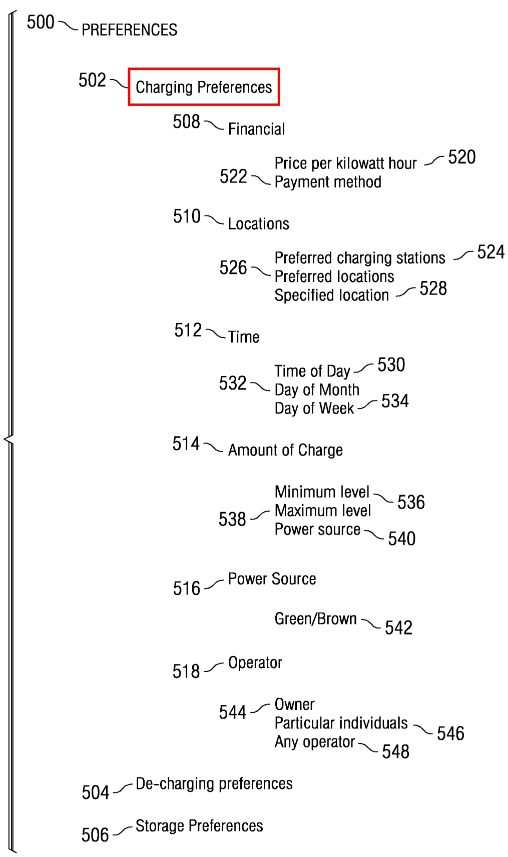


FIG. 5

Ferro, FIGs. 4-5. "Preferences 406 are choices selected by one or more principals setting preferences for managing, governing, and/or controlling one or more parameters of an electric vehicle charging transaction. Dynamic energy transaction planner 402 utilizes one or more preferences of interest to a particular charging transaction to create a charging transaction plan to control the charging, de-charging, or storing of electric power associated with electric vehicle 400." *Ferro*, [0084]. "Preferences 500 are types of preferences that may be included within preferences for one or more users, such as preferences 406 in FIG. 4." *Ferro*, [0118].

Ferro teaches preference types, including a price 520 "the user is willing to pay to charge the electric vehicle," a time 512 of day to charge the vehicle, and minimum/maximum levels of charge 536/538. *Ferro*, [0120], [0122]-[0123]. *Cf. '987 Patent*, 10:20-25, 10:59-67 (describing similar types of charging preferences). "Preferences 500 may be charging preferences 502 for governing energy transaction to charge an energy storage device associated with the electric vehicle…." *Ferro*, [0118]. Because Ferro's charging preferences 406/500 are choices for "managing, governing, and/or controlling one or more parameters of an electric vehicle charging transaction[,]" the charging preferences *correspond[] to a desired charging of the electric vehicle*. *Ferro*, [0084]; *Dec.*, 160-162.

Ferro teaches the processor unit 204 *receive[s]…information indicative of one or more charging preferences*. Ferro discloses vehicle preference service 405 and energy preference service 302 are both responsible for maintaining, generating, and storing charging preferences. *Ferro*, [0054], [0082]-[0083], [0090]; *Dec.*, 164 (explaining service 405 is "included within or bolted on" the vehicle, whereas service 302 is available from a remote computing device, and service 302 communicates with planner 402 wired or wirelessly). Ferro teaches various methods for the dynamic energy transaction planner 402 implemented by the data processing system 200 to receive the preferences (or set of preferences 410). *Ferro*, [0090]-[0091]. "Dynamic energy transaction planner 402 requests preferences of interest for a particular charging transaction by sending request 408 to vehicle preference service 405 and/or one or more energy preference services located remotely from electric vehicle 400." *Ferro*, [0090], [0092], [0105].

Ferro teaches the dynamic energy transaction planner 310/402 requesting and receiving the preferences service 405/302:

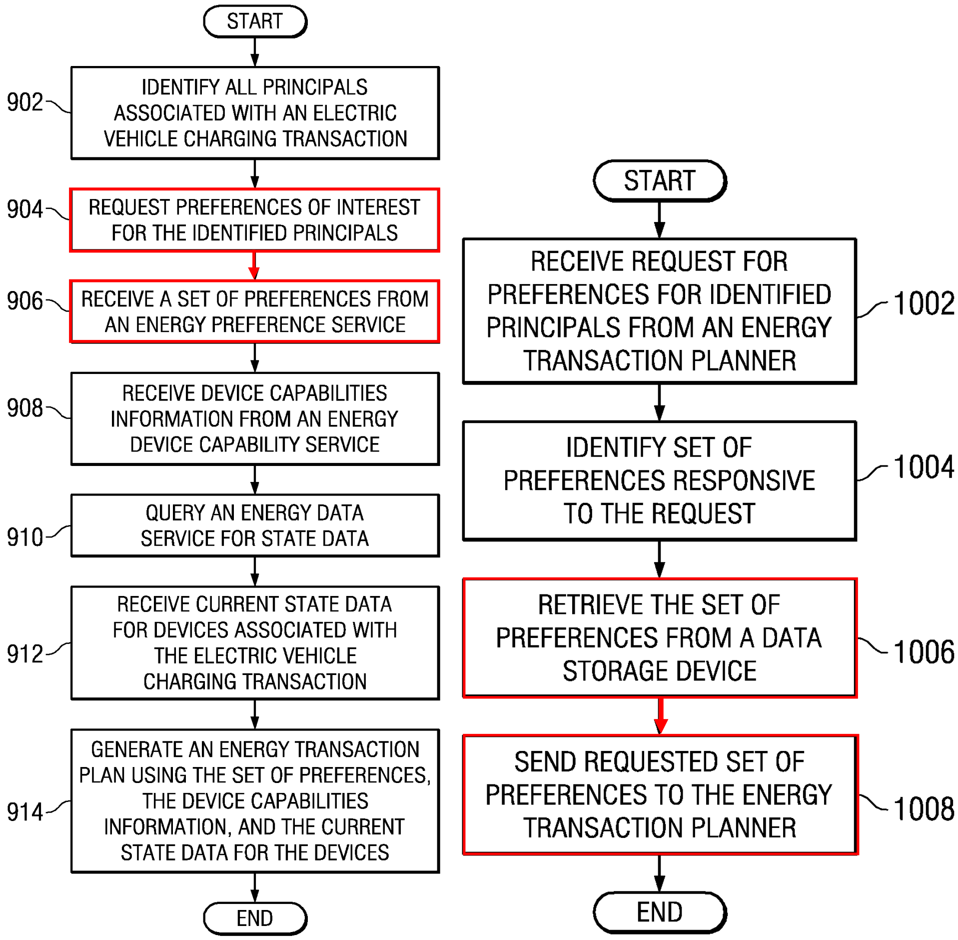


FIG. 9 *FIG. 10*

Ferro, FIGs. 9-10 (Steps 904-906, 1006-1008), [0143]-[0145], [0110].

Per Claim 1[d]'s mapping, processor unit 204 executes computer instructions stored in memory 206. *Ferro*, [0044]. Dynamic energy transaction planner 310/402 is implemented on a data processing system, such as system 200, that includes processor unit 204, associated with an electric vehicle. *Ferro*, [0064], [0076]; Claim 1[Pre]. Therefore, processor unit 204, executing energy transaction planner 310/402, requests and receives the charging preferences. *Dec.*, 165-166.

Processor unit 204 receives the charging preferences *from the communication device*:

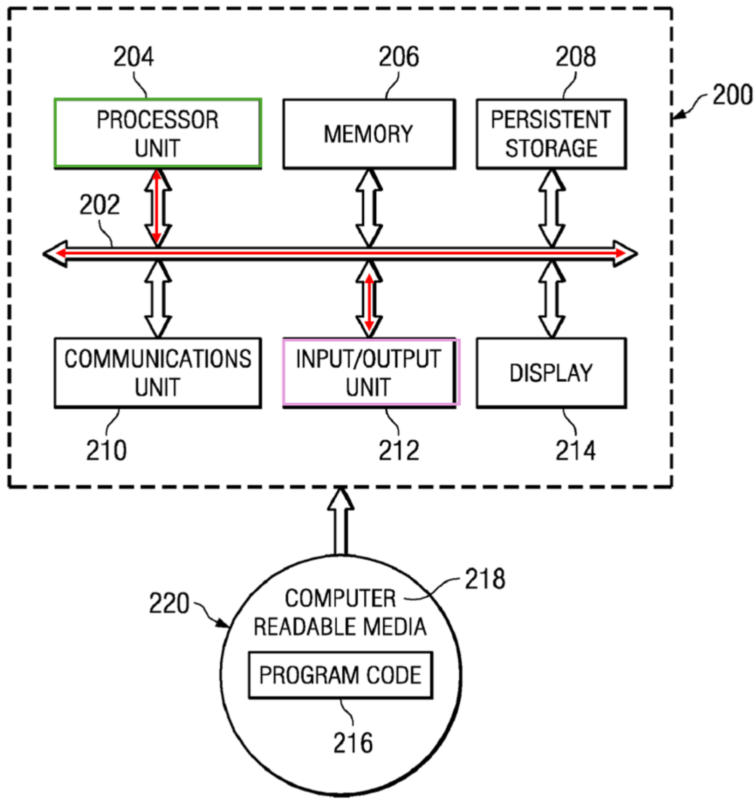


FIG. 2

Ferro, FIG. 2 (illustrating the processor unit 204 communicating with the input/output unit 212). Per Claim 1[b], the *communication device* includes components that enable wired/wireless and on-board/remote communications with processor unit 204, such as communications unit 210 and communications fabric 202. *Dec.*, 167. Ferro teaches sending the preferences to planner 402, which is a software application executed by processor unit, over a USB or "other wired or wireless connection within electric vehicle," from a mobile computer, such as a cellular telephone or laptop, and/or via an "input/output device located on-board the electric vehicle[.]" *Ferro*, [0091], [0093], [0054]. Because the processor unit 204 requests and receives the charging preferences on-board the vehicle from the vehicle preference service 405 or remotely from energy preference service 302, and because communications with the processor unit 204 are enabled via the *communication device* (per Claim 1[b]), Ferro teaches the charging preferences are received by the processor unit 204 and *from the communication device*. *Dec.*, 168-170.

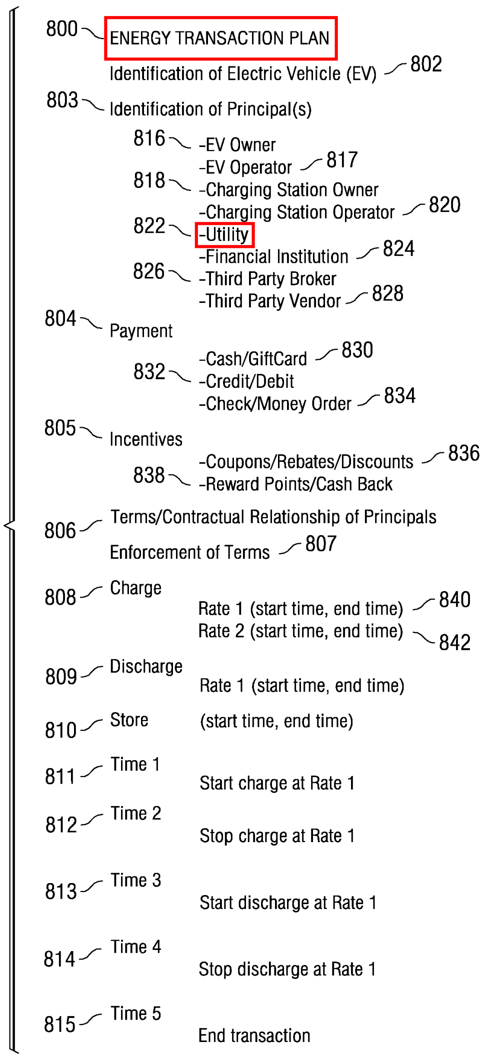
Ferro teaches a "principal" creates or selects the preferences using an "input/output device located on-board the electric vehicle[.]" *Ferro*, [0093], [0084]. A principal includes "the **vehicle operator[**.]" *Ferro*, [0080]. Thus, Ferro teaches the *charging preferences are defined by an operator of the electric vehicle*. *Dec.*, 163.

8. Claim 1[g]: "determine, based at least on the one or more charging preferences and at least one current value of a dynamic attribute of an electric charge provider, a charging schedule for the vehicle"

A *dynamic attribute* is a changing or otherwise fluctuating cost (or price) of electricity for purchase from an electric charge provider. *See* Section III.C.1. Ferro teaches Claim 1[g]. As mapped below, Ferro teaches generating an energy transaction plan (*charging schedule*) based on *charging preferences* (mapped in Claim 1[f]) and a *current value* of a fluctuating cost of electricity received from an electric charge provider (*dynamic attribute*).

Ferro teaches: "Energy transaction plan 800 is a plan for managing an electric vehicle charging transaction, such as energy transaction plan 424 in Fig. 4[,]" and "defines an energy transfer transaction encompassing the charge, discharge, and storage of electric energy in an electric vehicle and the incumbent financial exchanges related to those energy exchanges and storage of electric power in the electric vehicle." *Ferro*, [0136].

FIG. 8



Ferro, FIG. 8 (illustrating fields for plan 800, including times for charging and "utility 822 of the owner; operator; or charging station" (*see* [0137])).

Figure 9 illustrates the steps for generating dynamic energy transaction plan 800/424:

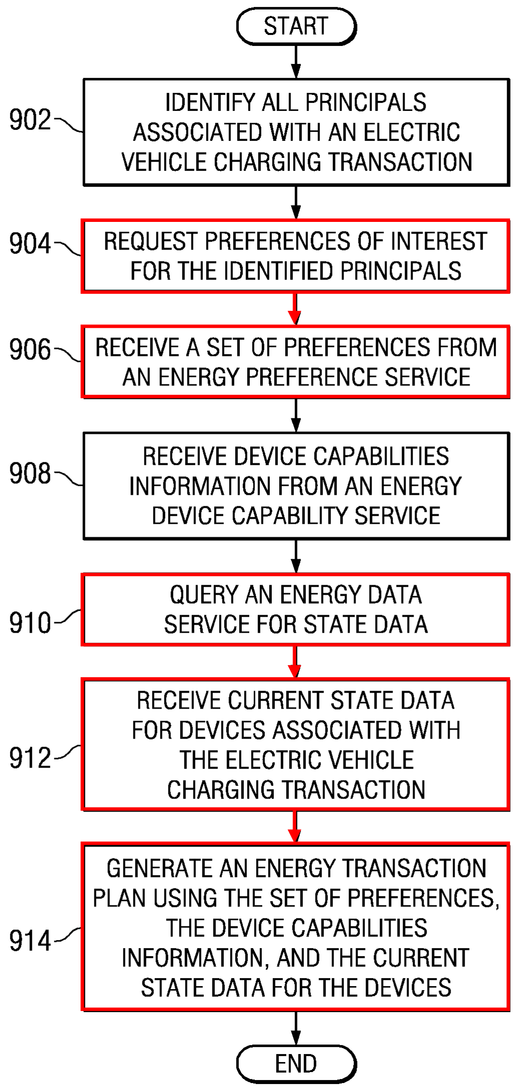


FIG. 9

Ferro, FIG. 9, [0142]. The charging preferences are obtained at Step 904 and received from the energy preference service at Step 906. *Ferro*, [0143]; *see* Claim

1[f]'s Mapping. The planner then queries energy data service at Step 910 and receives current state data at Step 912. *Id.*; *Dec.*, 178 (citing [0101], opining "state data" includes the "charging station prices," i.e., cost of energy at a given time). "The dynamic energy transaction planner **generates** a first set of terms for a dynamic energy transaction plan **using the set of preferences**, the device capabilities information, **<u>and</u> the current state data** from the device (step 914) with the process terminating thereafter." *Ferro*, [0143]. Because processor unit 204 of data processing system 200 executes the planner 402 (Claim 1[d]) and the planner generates the plan based on the user-chosen charging preferences and the current cost of electricity, the *processor determine[s]…the charging schedule*. *Dec.* 174, 178-180.

The generated energy transaction plan is a *charging schedule* because, at the least, it provides start and end times for charging the vehicle: "Energy transaction plan 800 may include…a series of time fields indicating the electric flow direction at each time mark[.]" *Ferro*, [0136], [0138] (explaining FIG. 8, Rates 1-2 are "time interval[s] during which the electric vehicle receives electricity from the charging station"), [0139] ("The time intervals 811-815 optionally indicate start and end times for charging…"); *Dec.*, 175-176.

Regarding the *current value of a dynamic attribute*, Ferro teaches planner 402 receives information from "energy data services[,]" including "the present and projected energy rates" to use in creating the transaction plan. *Ferro*, [0112]-[0113]. The electric vehicle sends/receives data, including "the price of electricity received from a power grid[.]" *Ferro*, [0037], [0036] (disclosing "sell[ing] electricity back to the power grid"). Ferro also teaches planner 402 "optimize[s] the cost of the return trip home given **the <u>current</u> prices of gas and electricity[**,]" indicating the processor 204 receives the current cost of electricity to monitor the cost and optimize the return trip when creating the transaction plan. *Ferro*, [0088]; *Dec.*, 178-180. Ferro teaches planner 402 monitoring the "price of electricity" and using the price of electricity to modify the transaction plan to charge the vehicle at a time "when the price [of electricity] is low." *Ferro*, [0115]. Ferro teaches obtaining a current price of electricity (an exemplary state data in Step 910) and using such current price in generating a charging schedule. *Ferro*, FIG. 9, [0143], [0101]; *Dec.*, 178. Thus, Ferro teaches the price of electricity changes or otherwise fluctuates and that the generated transaction plan (*charging schedule*) uses the current value of the fluctuating cost/price of electricity (*dynamic value*) for purchase from an electric charge provider. *Dec.*, 179.

Ferro also teaches the current price of electricity that fluctuates (*dynamic attribute*) is *of an electric charge provider*. "A utility is an electric energy provider. An electric energy provider typically provides electric power to a charging station via an electric power grid." *Ferro*, [0066], [0132]. Because the price of electricity is received from the power grid, and the electric energy provider provides the power via the power grid, the current electricity price is a dynamic attribute of *an electric charge provider*. *Dec.*, 181-183; *Ferro*, [0052], [0066], FIG. 8 (RN 822, Utility), [0058] (disclosing energy data service 308 is a third-party data source for "charging station price information sources"), FIG. 3.

Thus, Ferro teaches Claim 1[g] because the energy transaction plan (*charging schedule*) is determined based on the user-defined charging preferences <u>and</u> the current cost/price of electricity (*dynamic attribute*) as provided by a third-party provider to enable cost-effective charging. *Dec.,* 183.

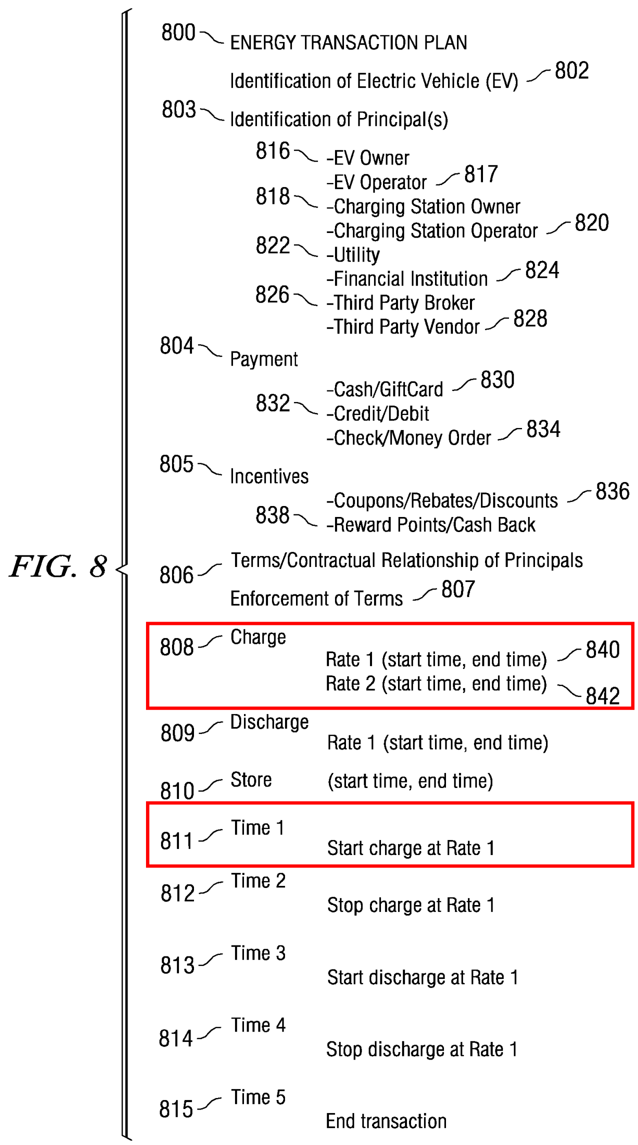
Ferro also teaches *determine…a charging schedule,* should the Board or Patent Owner contend the claim language invokes § 112(6). The structure for performing the *determin[ing]* is a processor performing the described algorithm. *See* Section III.C.2. Because Ferro's processor unit 204 executes the planner 402 to perform the function of determining the charging schedule, Ferro teaches *determine…a charging schedule* under § 112(6). *Dec.*, 184 (comparing *'987 Patent's* processor execution to *Ferro's* processor 204 executing planner 402).

9. Claim 1[h]: "transmit a control signal to a parking space charge device that starts a charging, in accordance with the charging schedule, of the vehicle"

a) Ferro's Teachings

Ferro teaches *charging, in accordance with the charging schedule, of the vehicle*. Ferro teaches the electric vehicle 116 "receives electricity" from "an electric grid at charging station 118[,]" such that charge flows from "charging station 118 into electric vehicle to charge electric vehicle 116." *Ferro*, [0035]-[0036]. Ferro teaches "the process for generating dynamic energy transaction plan 424 begins when electric vehicle 400 arrives at charging station 403 and indicates an intention to charge…." *Ferro*, [0109]. In response to the intention to charge, planner 402 uses the preferences and electricity price to create transaction plan 424. *Ferro*, [0110], [0113]; Claim 1[g]'s Mapping. The planner 402 then submits the transaction plan to an "energy transaction execution engine for implementation once the vehicle is connected" at the charging outlet "at charging station[.]" *Ferro*, [0113]. "[T]he charging phase **begins** when energy transaction execution engine 316 sends the transaction plan" and "**initiates** the request to begin charging the electric vehicle[.]" *Ferro*, [0060], [0051] ("During the charging phase, electricity flows to, from, or is stored in the electric vehicle."); *Dec.*, 185-186.

Ferro also teaches the *charging* is *in accordance with the charging schedule*. Transaction plan 424 includes "charge 808" field that "orders the flow direction of electricity from the charging station into the electric vehicle **during one or more specified time intervals**.” *Ferro*, [0136], [0138]-[0139].



Ferro, FIG. 8. Therefore, the transaction plan 424 executed by the execution engine 316 includes the schedule, i.e., the time intervals 811-815, for charging the vehicle. *Dec.*, 186-187.

Ferro further teaches the memory stores the instructions to cause the processor to *charge* the vehicle. Per Claim 1[d]'s Mapping, processor unit 204 executes all instructions/software for carrying out the dynamic energy transaction plan system. *Ferro*, [0039]; *Dec.*, 188. Thus, a POSITA would have understood or found obvious execution of the stored instructions causes processor unit 204 to *charg[e]…the electric vehicle* by generating plan 424 and causing execution engine 316 to initiate the request to begin charging. *Ferro*, [0060], [0073]; *Dec.*, 188.

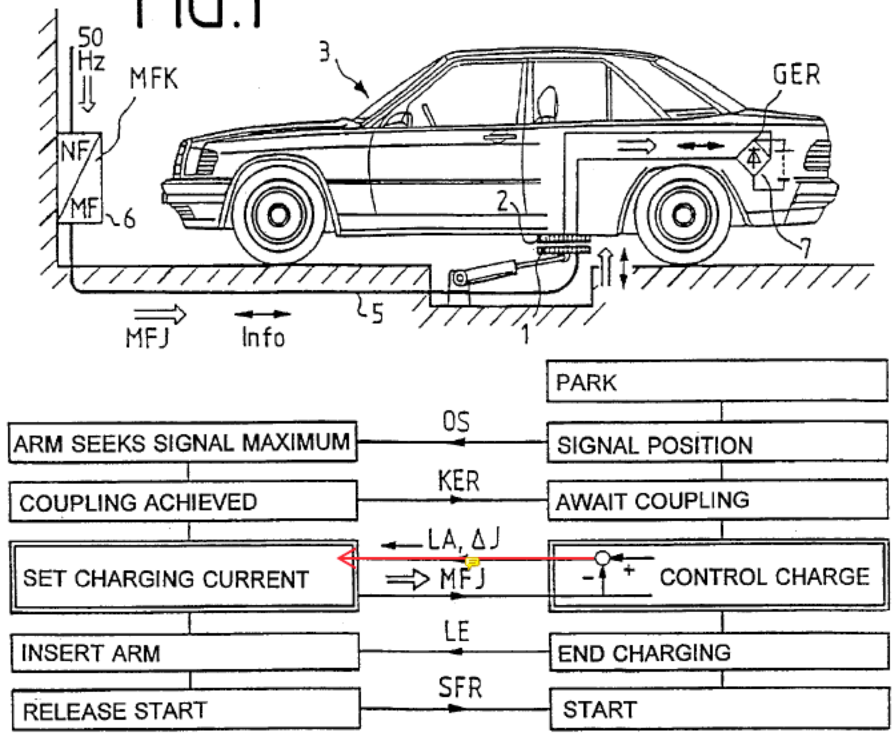
Ferro also teaches *a parking space charge device*, i.e., the charging station 118/403. For example, Ferro teaches the charging station "may be a power outlet in a privately owned garage, an electric outlet in a docking station…or a power outlet in a commercial owned garage[,]" which a POSITA would have understood or found obvious to be a *parking space charge device*. *Ferro*, [0035]; *cf. '987 Patent,* 9:48-51*; Dec.,* 189.

b) Seelig's Teachings

To the extent not explicit in *Ferro*, Seelig teaches *transmit a control signal* to a charge device. Like Ferro, Seelig also teaches a *parking space charge device*. Seelig teaches "[i]t is already known to charge the battery of electric vehicles by means of inductive charging stations (Rhein-Main-Presse, Jul. 18, 1992)." *Seelig* (Ex. 1078), 1:11-13. Seelig proposes "a method of contactless energy transmission during charging of an electric vehicle, the method being simple and convenient for the user with high operating reliability and safety in use." *Seelig*, 1:53-56. In Seelig's method, "the primary element 1 of an inductive transmitter[,]" which is located in a parking space, "is brought into an approach position with respect to the secondary element 2 of the transmitter, which is located on the underside of an electric car 3." *Seelig*, 2:19-23, FIG. 1 (depicting car parking in a space with primary element 1). "Primary element 1 and secondary element 2 of the inductive transmitter are essentially inductive coils which are designed for an energy transmission via an air gap[.]" *Seelig*, 2:60-63. After the car is parked, the primary element 1 is "brought into a predetermined position with respect to the secondary element 2 by means of a sensor-controlled motor." *Seelig*, 2:35-38. "[E]lectrical energy can be transmitted from primary element 1 to secondary element 2 via an air gap of a magnitude of up to approximately 1 cm." *Seelig*, 2:42-44. Because primary element 1 is located in a parking space and is used to charge the electric car 3, it is a *parking space charge device*. *Dec.*, 190.

Seelig teaches that after primary element 1 is coupled to secondary element 2 on the vehicle, a signal "LA" is wirelessly transmitted from the electric vehicle 3 to primary element 1 of charging station to switch on a charging operation, thereby beginning current transmission to the vehicle. *Seelig*, 2:19-45, FIG.1 (primary element 1 of a charging station separated by an "air gap" from primary element 2 located on an electric car), 6:21-38 (*pinpoint* at 6:29-32 describing transmitting control signal LA that starts a charging of the vehicle); *Dec.,* 190-191. Thus, Seelig teaches *transmit a control signal to a parking space charge device that starts charging*. *Dec.*, 190-191.

FIG.1



c) Motivation to Combine

A POSITA would have found it obvious and been motivated to implement the charging initiation action performed as part of Ferro's charge control signaling protocol in the manner taught by Seelig's wireless charge initiation signal LA, i.e., transmitting a control signal to the Ferro charge device, per Seelig, that starts a charging according to transaction plan 424, per Ferro. *Dec.*, 192-196. The modification combines prior art elements (wireless communication, EV charging stations) according to known methods to yield predictable results of allowing the vehicle to indicate "an intention to charge" without an operator having to leave the vehicle to interact with the charging station. *Ferro*, [0109]; *Dec.*, 196. Ferro teaches the charging station 118/403 may charge vehicle through "wireless" charging, which allows a user to remain in the vehicle while charging, increasing user-friendliness of the system and reducing the risk of accidents while charging. *Ferro*, [0036]; *Dec.*, 193. Providing Oyobe's wireless detecting apparatus 108 to detect the vehicle parked at the charging station advantageously allows a user to instruct charging without exiting vehicle and without physically interacting with an external charging station or display. *Dec.*, 195. Seelig expressly extols the benefits of wireless charging (which requires a wireless activation signal) as avoiding a path-impairing cable while providing "mechanical, aerodynamic and aesthetic" advantages, providing an express motivation for the combination. *Seelig*, 1:11-50; *Dec.,* 194.

The modification would have had a REOS, as Ferro already teaches (a) the charging station and vehicle communicating via a network; and (b) instructions causing processor unit 204 charge the vehicle by generating plan 424 and causing execution engine 316 to initiate the request to begin charging. *Ferro*, [0037], [0060], [0073], FIG. 4; *Dec.*, 197. Seelig teaches the charging station and vehicle communicating wirelessly. *Seelig*, 3:45-64. Therefore, the combination entails Ferro's charging station including a similar radio apparatus to wirelessly communicate with the modified Ferro electric vehicle including Seelig's charging activation signal LA. Given that Ferro teaches the charging station already communicating via a network, and that wireless communication via a network interface (such as Ferro's network interface 432) was well known, the combination is straightforward and simple to implement. *Dec.*, 197.

10. Claim 1[i]: "wherein at least one of the one or more charging preferences is defined by user input received via a graphical user interface adapted to display a unitary vehicle charge indicator element comprising: (i) a first portion indicative of an amount of charge residing in a battery of the electric vehicle; (ii) a second portion indicative of an uncharged capacity of the battery of the electric vehicle; and (iii) a third portion comprising a slider by which an amount of charge may be specified"

The claimed "electric" vehicle lacks antecedent basis. For purposes of this IPR, Petitioner interprets the *electric vehicle* as the *vehicle* recited in Claim 1[e]. *'987 Patent*, 29:40.

The modified Ferro in view of Donnelly and Letendre render obvious Claim 1[i]. As discussed below, it would have been obvious to (1) modify Ferro's collective display 214 and input/output unit 212 to be a touchscreen presenting a GUI having the claimed vehicle charge indicator with first and second portions, per Donnelly; and (2) modify the Ferro-Oyobe-Donnelly GUI to include a third portion comprising a slider for inputting the desired charge, per Letendre.

a) Charging Preferences Defined by User Input

Ferro teaches the charging preferences are entered by the vehicle operator via an input/output device on-board the vehicle. *See* Claim 1[f]'s Mapping (citing *Ferro*, [0093], [0084]). Ferro teaches input/output devices include "keyboards, displays, pointing devices, etc." *Ferro*, [0162], [0043]. Therefore, Ferro teaches *at least one of the one or more charging preferences is defined by user input*. *Dec.*, 199.

b) GUI Receiving User Input

(1) <u>Donnelly's Teachings</u>

Donnelly teaches a GUI implemented via a display configured to receive touchscreen commands for a hybrid vehicle, such as trains, cars, and trucks. *Donnelly*, 21:47-58, 26:6-8 (disclosing "various inventive features are applied to vehicles other than locomotives, such as cars…and trucks"), 1:36-38; *cf. '987 Patent*, 3:25-31 (describing trains as exemplary electric vehicles); *Dec.*, 200-201. Donnelly teaches:

> [T]he **control system for the various components of the locomotive requires a Graphical User Interface display ("GUI") to provide a user interface** for viewing the various monitored parameters and the operational states of the various components and **providing operational commands** to the various components. This GUI is preferably implemented using a series of related display screens which are configured to **receive touch screen commands**. This system of screens allows the operator and maintenance crew to monitor and

> control, for example, the **state of the charging generator, the battery pack**, the individual drive axles and other functions.

Donnelly, 21:47-58.

Donnelly thus teaches *user input received via a graphical user interface*, namely the touchscreen commands received via Donnelly's GUI. *Dec.*, 202.

(2) <u>Motivation to Combine</u>

A POSITA would have found it obvious and been motivated to substitute Ferro's display 214 and I/O unit 212 with a touchscreen display for receipt of the charging preferences and other commands or information inputted by the user, per Donnelly. *Dec.*, 203. Ferro already teaches both input/output unit 212 and display 214 communicating with processor 204 via communications fabric 202. *Ferro*, [0040], [0043], [0161]-[0162] (disclosing coupling of I/O devices to data processing system).

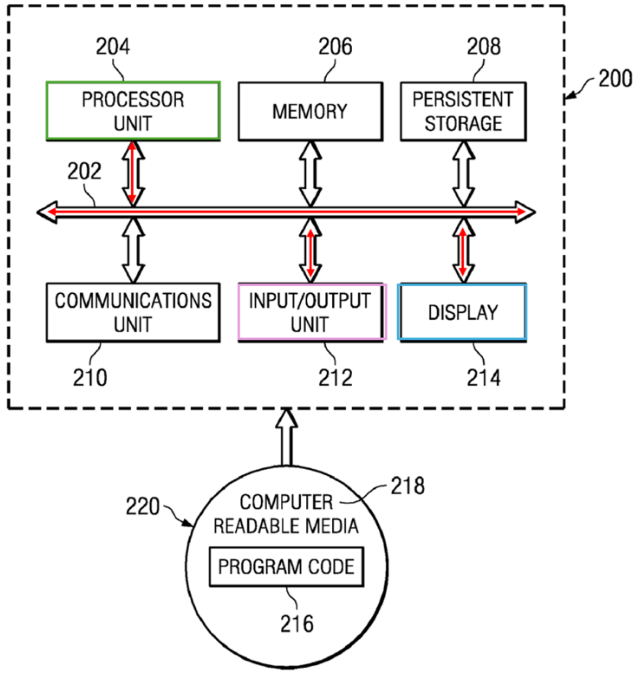


FIG. 2

Ferro, FIG. 2 (illustrating communications fabric 202 providing communication between processor unit 204, input/output unit 212, and display 214). Ferro also already teaches the user inputting charging preferences via I/O unit 212. *See* Claim 1[f]'s Mapping; *Ferro*, [0093], [0084].

GUIs were standard for Human-Computer Interaction long before the '987 Patent. *Dec*., 204. It was well-known GUIs were favorable for facilitating user input because GUIs make "an application easy, practical, and efficient to use" and "allow the user to concentrate on the task at hand." *Id*. (*citing Jansen* (Ex. 1038)). Thus, a POSITA would have understood it would have been advantageous to allow the user to enter Ferro's charging preferences via a GUI presented on a touchscreen because users would have already been accustomed to interacting with GUIs for data entry tasks. *Id*. A POSITA would have known a touchscreen would have been more appropriate for inputting charge preference information while seated in a vehicle than other known user input control options, such as a keyboard and/or mouse. *Id.* A POSITA would have been motivated to implement Donnelly's known touchscreen display presenting a GUI for Ferro's I/O unit 214 and display 212 that otherwise allow the user to enter charging preferences (*Ferro*, [0093]) to yield the predictable result of allowing the user to efficiently enter desired charging preferences in a familiar and user-friendly manner. *Dec*., 205. Given the ubiquity of GUIs and familiarity of users entering information via GUIs, there would have been a REOS in the modification. *Id.*

Touchscreen displays, including in cars, were ubiquitous as of the '987 Patent. *Dec*., 206. Touchscreen displays offered the benefit of both the display and input/output device in a single hardware component (input/output GUI implemented in the touchscreen), thereby forgoing a separate physical keyboard for inputting commands and providing a more streamlined aesthetic. *Dec.,* 207-208. The modification is merely implementation of Donnelly's known device (touchscreens display GUIs) improving similar devices (non-touchscreen displays) in a similar way (avoiding use of separate I/O devices, such as a keyboard). *Id.* The modification would have had a REOS given GUI touchscreen displays ubiquity in vehicles, and a

POSITA would have readily known how to program for receipt of inputs via a GUI on a touchscreen display. *Dec.,* 209.

c) Vehicle Charge Indicator

(1) Ferro's Teachings

Ferro teaches a user-selectable "[a]mount of charge 514 preferences" including a maximum and/or minimum level of charge. *Ferro*, [0123], FIG. 5. Ferro also teaches planner 402 using information from energy data services 418 to create the transaction plan, such as "the present charge state of the batteries on electric vehicle 400[.]" *Ferro*, [0112]-[0113]; *Dec.*, 210. As mapped below, Donnelly teaches displaying a charged/uncharged capacity of the battery.

Regarding *caus[ing] the processor* to perform the functionality of Claim 1[i], because (1) the energy transaction planner 310/402 is implemented on a data processing system; and (2) processor 204 of system 200 executes instructions/software implementing the energy transaction plan, a POSITA would have understood it would have been obvious processor 204 receives information relating to a charged/uncharged battery capacity when combined with Donnelly, as discussed below. *Ferro*, [0076], [0064], [0039]-[0040], [0044]; *Dec.*, 211.

(2) Donnelly's Teachings

Donnelly teaches the GUI is *adapted to display a vehicle charge indicator*, namely the GUI displaying a bar graph depicting the state of charge of the battery.

Donnelly, 21:47-58 (disclosing GUI receiving touchscreen commands and displaying "state of the charging generator, the battery pack"), 23:16-19, 23:31-33, FIG. 28. Donnelly teaches a "Battery Status Screen" that "displays details about the electrical state of the energy storage unit (e.g., battery)" and includes a "Battery State of Charge 28004, which depicts, in a **bar graph** format, the state of charge of the energy storage unit by measuring the amp-hours in and the amp-hours out[.]" *Donnelly*, 23:16-33. The "displayed fields" are shown in Fig. 28:

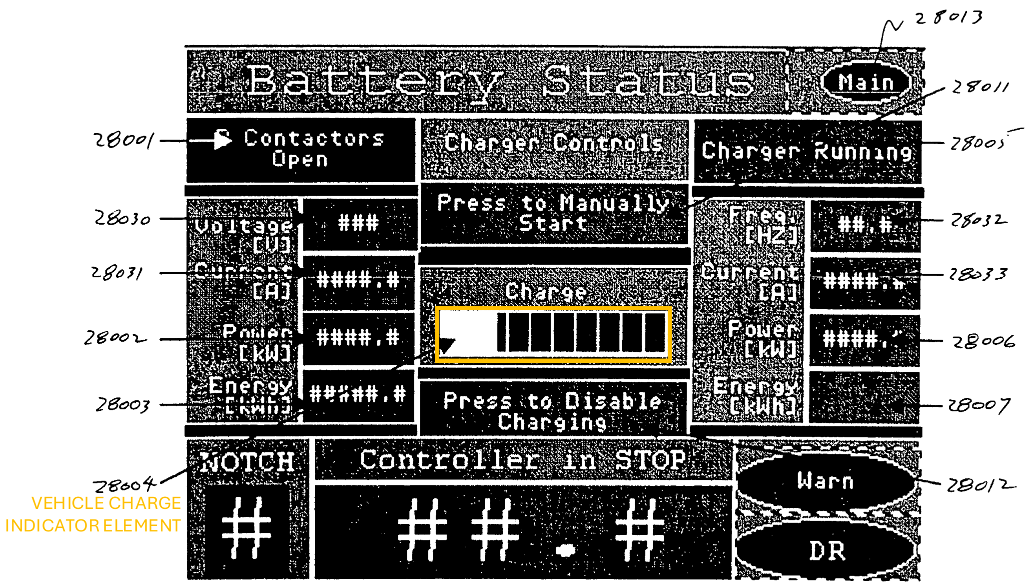


FIG. 28

Donnelly, FIG. 28, 23:19-20.

The displayed field "Battery State of Charge 28004" illustrating a bar graph satisfies a *vehicle charge indicator element* because it is an element or part of the GUI (e.g., it is a displayed field on the GUI) and indicates "the state of charge of the energy storage unit" for the vehicle. *Donnelly*, 23:31-33; *cf. '987 Patent*, FIG. 7 (RN 714), 14:56-58 (identifying "vehicle charge indicator" is RN 714, which illustrates a bar graph); *Dec.*, 212-214.

Donnelly expressly discloses an exemplary "energy storage unit" is a battery, and the header for Fig. 28 is "Battery Status." *Donnelly*, 23:16-19, FIG. 28. Therefore, field 28004 discloses the state of charge for a *battery*. *Dec.*, 215.

The bar graph of field 28004 illustrates two portions: (1) the filled-in portion comprising dark-colored rectangles; and (2) the unfilled portion comprising the white space. A POSITA would have reasonably understood or found obvious that because the bar graph of field 28004 depicts the "state of charge," one of the portions indicates *an amount of charge residing in a battery of the electric vehicle*, and the other of the portions indicates *an uncharged capacity of the battery of the electric vehicle*. *Dec.*, 216-220. Therefore, to the extent that patentable weight should be given to the claimed *first portion* and *second portion*, Donnelly teaches Claim 1[i]'s *first portion* and *second portion*. *See* Section III.C.4.

Additionally, it is common to visually depict a variable level of a fillable object (e.g., a gas tank) via portions of a bar graph that are "filled in" versus "not filled in." *Dec.*, 220. Given that (1) field 28004 is a bar graph depicting the state of charge; (2) visual indicators representing an amount of a filled object were well known and accepted as simple, visually-understandable elements; and (3) Claim 1[i] does not recite any visual characteristics of the first and second portion, other than the information being indicated by the *vehicle charge indicator*, a POSITA would have found obvious one portion of the Donnelly bar graph represents the charged amount of the battery, and the other, visually-contrasting portion represents the uncharged capacity of the battery. *Dec.*, 221-222.

See Section V.A.10.e, below, mapping the claimed *unitary* vehicle charge indicator.

(3) <u>Motivation to Combine</u>

A POSITA would have found it obvious and been motivated to modify the touchscreen input/output display of Ferro-Oyobe-Donnelly to include a GUI that displays both the current uncharged and charged capacity of the battery of the electric vehicle, per Donnelly. *Dec*., 223.

The modification would have simply required combining prior art elements (i.e., a GUI for displaying the state of charge of a vehicle battery and a touchscreen display) according to known methods to yield predictable results of allowing an operator of the vehicle to view the charge level prior to charging the vehicle. *Dec*., 226. Per Section V.A.10.c.1, Ferro already teaches processor 204 receiving information of the charge state of the battery. *Ferro*, [0112]. Donnelly teaches displaying both charged/uncharged levels via the bar graph. Therefore, the combination is simply displaying the charged/uncharged levels (per Donnelly) in a bar graph on a GUI (where Ferro is already modified to include a touchscreen display presenting a GUI, per Section V.A.10.b), advantageously conserving screen space while maintaining or increasing clarity on small in-dash screens of the time. *Dec.*, 223.

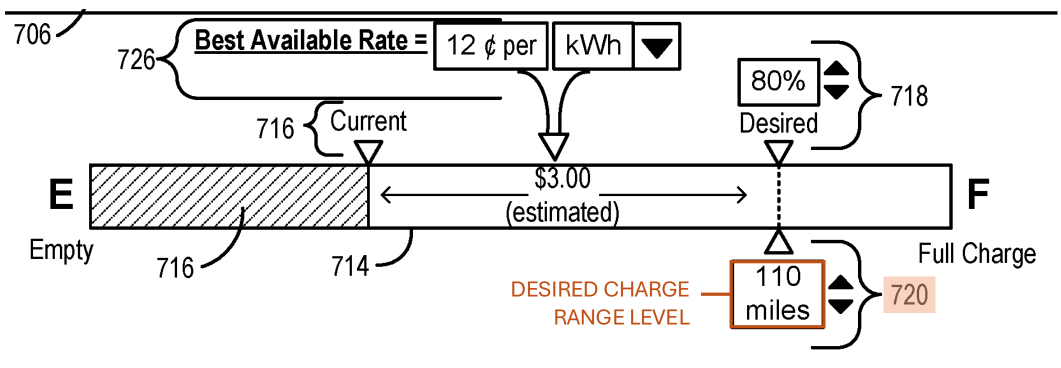
Additionally, a POSITA would have been motivated to ensure a vehicle owner can see the current charge level prior to choosing charging preferences. *Dec.* 224-225. A user would appreciate viewing this displayed information would help them decide the amount of charge to specify in the charging preferences and allow the operator to better estimate how much a charging transaction would cost (based on the current charge). *Id.*

The modification would have had a REOS, as the modified Ferro includes a touchscreen display presenting a GUI (per Donnelly) and Ferro already teaches receiving information on the charge state of the battery. *See* Section V.A.10.b; *Dec.*, 227. The display communicates with processor unit 204 (*Ferro*, [0040], [0162]), users enter charging preferences through the display ([0093]), and the processor unit 204 already receives information about the current level of battery charge ([0112]). Thus, the modification only requires (1) programming processor unit 204 to generate a GUI on the touchscreen display that displays the bar graph showing the uncharged and charged amount of the batteries; and (2) programming the processor unit 204 to use the current charge of battery information when generating the GUI bar graph. *Dec.*, 227.

d) Slider for Specifying an Amount of Charge

(1) ’987 Patent’s Description of a Slider

The ’987 Patent describes that “a desired charging level” may be “based on a desired distance of travel.”



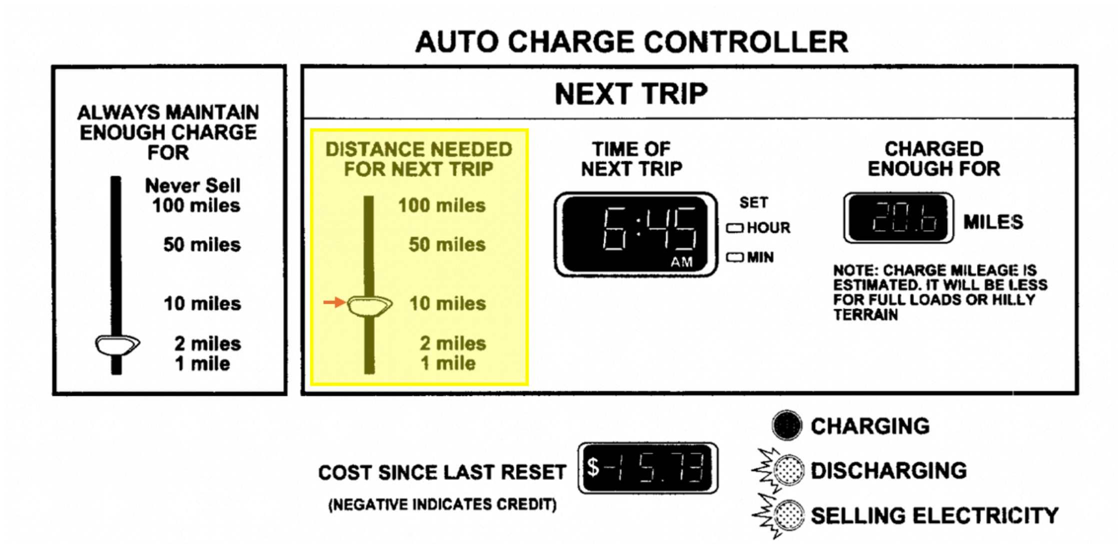
’987 Patent, FIG. 7 (excerpt) (illustrating RN 720, desired charge level for a set range of 110 miles), 19:49-57, 14:65–15:8 (describing setting “desired charge range level 720 to match the desired distance”); *Dec.*, 228.

(2) Ferro’s Teachings

Ferro teaches the user may input charging preferences including a minimum amount of charge, a maximum amount of charge, or specify different charge levels depending on the power source. *Ferro*, [0123]. Therefore, Ferro teaches that *an amount of charge may be specified*. *Dec.*, 229.

(3) Letendre's Teachings

Letendre teaches a third portion *comprising a slider by which an amount of charge may be specified*, namely an "auto charge controller" "control panel" including a movable slider the driver selects to "set [] the length of the expected next trip" (here, 10 miles) (the specified *amount of charge*):



Letendre, 18 and 20, 19 (disclosing "a control that the driver sets according to driving needs"); *Dec.*, 230-232 (citing *Kempton* (Ex. 1073), identified in *Letendre*, 19, as the source for the above figure, and which refers to the control as a "slider").

Letendre discloses the control may be "physical, on the dash, or on a Webpage." *Letendre*, 19-20. A POSITA would have understood or found obvious a selectable control (e.g., Letendre's slider) on a Webpage is a visually selectable element on a GUI. *Dec.*, 233. Specifically, a Webpage displays graphical elements, and because the control is selectable by a user, per Letendre, the control is a graphical element on a GUI. *Id.*

Letendre thus discloses a similar slider as described in the ’987 Patent, namely a selectable control to indicate a desired level of charge (e.g., an *amount of charge* based on the miles needed for travel). *Dec.*, 234.

(4) <u>Motivation to Combine</u>

A POSITA would have been motivated and found it obvious to modify Ferro-Oyobe-Donnelly to include Letendre’s graphical slider on the charge level bar graph of the GUI as a *third portion*, where the operator moves the slider to specify a desired charge. *Dec.*, 235. In the combination, (1) the Ferro display and I/O unit is already implemented using a touchscreen presenting a GUI (*see* Section V.A.10.b); (2) the touchscreen already presents a GUI displaying the Donnelly bar graph depicting the state of charge (*see* Section V.A.10.c); and (3) the displayed bar graph is further modified to include a selectable slider to select Ferro’s minimum and/or maximum charge amount preference, or Letendre’s desired charged mileage. *Id.*

Letendre expressly teaches, suggests, and motivates the combination. Letendre teaches: “it is essential that the driver be able to limit any draw down so travel is not affected.” *Letendre*, 19. Letendre then discusses “a control the driver sets according to driving needs” and provides the exemplary slider display discussed above. *Id.* Given Ferro teaches both vehicle battery charging/discharging and an I/O device on-board the vehicle to manage these preferences, a POSITA would have been expressly motivated to include an on-board GUI with a slider by which the user indicates a desired charge level (e.g., maximum/minimum charge level or set mileage), as such is "essential…so travel is not affected." *Letendre*, 19; *Ferro*, [0093]; *Dec.*, 236.

The modification would have merely required applying a known technique (using a slider to adjust charge settings on a vehicle) to a known device (GUI of an electric vehicle showing a charge bar graph) ready for improvement to yield the predictable results of easily allowing a user to choose a desired level of charge. *Dec.* 237. A POSITA would have appreciated only having to slide their finger across the GUI on the input/output display to indicate the amount of charge in Ferro's charging preferences, rather than having to press the screen multiple times to enter a percentage charge. *Id*. Sliders on a GUI were known to make inputting information easier for users, and thus a POSITA would have been motivated to include a slider on the bar graph to allow a user to easily indicate the amount of charge. *Id.*

The modification would have had a REOS, given the modified Ferro system already includes a touchscreen with a GUI where operators input the charging preferences, and these preferences include a user indicating an "amount of charge[,]" such as a "maximum level of charge[.]" *Ferro*, [0123]; *see* Section V.A.10.b.

Additionally, applying a slider graphic on the GUI for allowing a user to adjust a parameter was well-known. *Dec.*, 238-239.

e) ***Unitary*** **Vehicle Charge Indicator**

Regarding the claimed *unitary* vehicle charge indicator and applying the construction in Section III.C.3 that a *unitary vehicle charge indicator* at least includes a bar graph comprising the charged, uncharged, and slider portions, Donnelly's bar graph displayed on the GUI modified to include Letendre's slider is a ***unitary*** *vehicle charge indicator*. *Dec.,* 240-242. The proposed combination of Letendre's slider and Donnelly's battery status indicator into Ferro's user interface renders obvious a unitary vehicle charge indicator comprising the charged, uncharged, and slider portions, as construed above.

In addition to the motivations provided at Section V.A.10.d.4, there would have been a motivation for providing a *unitary* element, as a POSITA would have recognized the convenience and aesthetic appeal of providing the relevant battery charge input and output portions and the slider on the GUI simultaneously, enabling the user to set the maximum/minimum charge levels with a single touchscreen input. *Dec.,* 236-242. Providing the first, second, and third portions together on a GUI would have been obvious to try, i.e., the most desirable option from a finite set of possible options, namely combined or separate portions of the GUI. *Dec*., 238. A POSITA would have recognized providing combined, "unitary" GUI elements would have desirably improved display space utilization, concisely provided a user with all relevant battery information at a single glance, and improved the user's ability to discern the difference between the battery's current amount of charge and the user-entered desired amount of charge. *Dec.,* 240-242. A POSITA would have recognized that each of these motivations would have been further improved by providing the first, second, and third GUI portions superimposed, to the extent such is necessary to satisfy a "unitary" vehicle charge indicator. *Id*.

B. Claim 2

In the combination of Claim 1, the system includes an on-vehicle GUI. *See* Claim 1[i]'s Mapping.

Ferro teaches the data processing system 200 (*electrical charging system*) may connect to a remote device via a network, such as the Internet. *Ferro*, [0106], [0042], [0027]; *Dec.*, 245. Ferro also teaches a principal (user) inputting preferences for managing charging, where the preferences are transferred from a remote preference service or in-vehicle preferences service to the on-board planner via a wireless connection and/or wired connection. *Ferro*, [0093], [0091], [0064], [0083]. Therefore, Ferro contemplates transferring/receiving data remotely via a wireless network. *Dec.*, 246.

Letendre teaches "charge controller," including the slider, may be "on a Web page." *Letendre,* 19-20.

A POSITA would have found it obvious to adapt the GUI of the on-board electric charging system to *display a web page*, per Letendre. *Dec.*, 248. Vehicles including an on-board display capable of displaying webpages were well known prior to the ’987 Patent. *Dec.*, 248, 250. Ferro already includes the hardware and software for communicating with a remote server or computer via a wireless network, including the Internet. Therefore, the combination simply entails communicating the web-page-based GUI from a remote server to the touchscreen via Ferro’s Internet connection. *Dec*., 249.

A POSITA would have been motivated to make the modification so various principals/users of the charging transaction, both at the vehicle and remote, would have access to the same web-based GUI. *Ferro*, [0091], [0083], [0093]; *Dec.*, 250. For example, Ferro teaches preferences are saved in multiple locations, such as servers 104, 106 as well as the vehicle and/or energy preference service. *Ferro,* [0033], [0042]; *Dec.*, 250. Therefore, having the web-based GUI at a remote server for inputting/receiving preferences would have standardized the preference interface for remote users and in-vehicle users. *Id*.

There would have been a REOS, given (1) the system already contains communications unit 210 for wirelessly connecting with remote devices, (2) the system is connected to the Internet via network 102, and (3) the ubiquity of vehicles accessing websites via on-board displays as of the ’987 Patent. *Ferro,* [0038],

[0042]; *Dec.*, 251. Thus, a POSITA would simply have had to program the processor to access the web page via network 102 to display the GUI. *Id*.

C. Claim 3

See Claim 1[i]'s Mapping. The modified Ferro includes a touchscreen display presenting a GUI. *See* Section V.A.10.b. Because the Ferro display (implemented with Donnelly's touchscreen display presenting the GUI) is on-board the vehicle, the GUI *forms a part of the electric vehicle*. *Dec.*, 253.

D. Claim 4

The '987 Patent describes exemplary "vehicle diagnostics" include "alarm conditions" and "maintenance reminders[.]" *'987 Patent*, 15:57-59.

Donnelly teaches a GUI that displays a Warnings Screen 25006. *Donnelly*, 21:39–22:25, FIG. 34. Warnings Screen 25006 displays a warning that is a maintenance notification, such as "high temperature" or high/low current indicating an unacceptable motor current. *Donnelly*, 25:12-21.

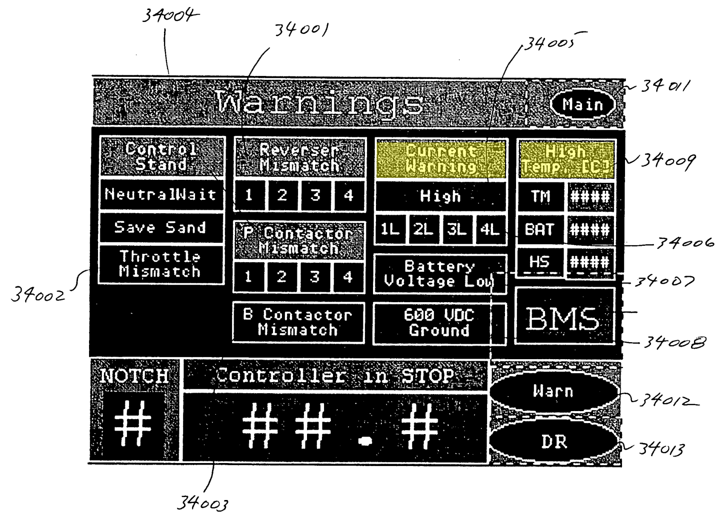


FIG. 34

Donnelly, FIG. 34. Donnelly teaches Warnings Screen displays "minor alarms that have been detected." *Donnelly*, 25:4-5. A POSITA would have understood or found obvious that a minor alarm indicating a dangerous condition, such as high temperature of the battery or high/low current is a *maintenance notification*. *Dec.*, 255-256.

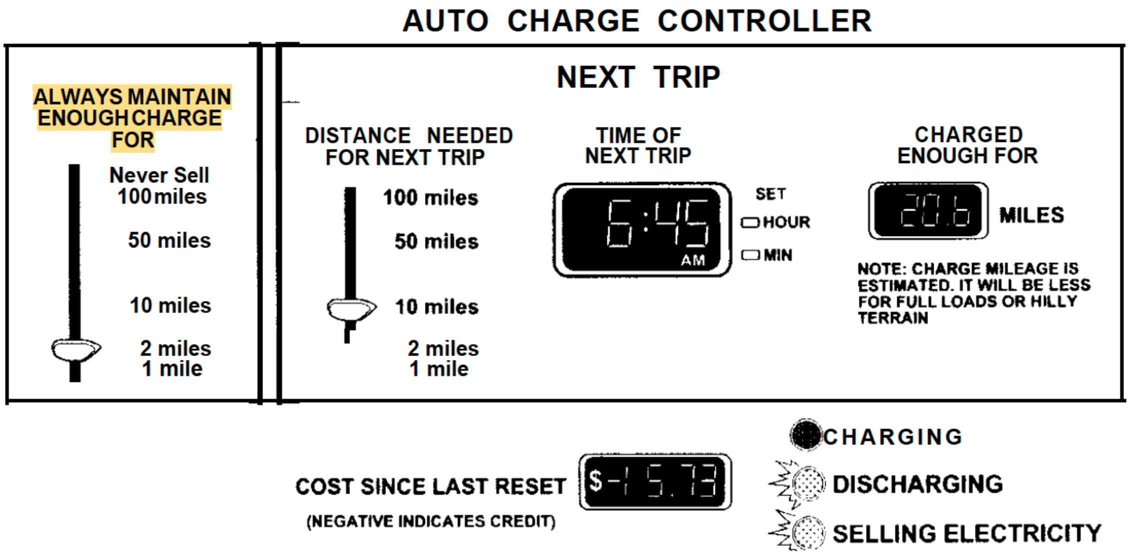
A POSITA would have found it obvious and been motivated to modify the GUI of the charge transaction system to receive a maintenance notification, per Donnelly. *Dec.*, 257. A POSITA would have appreciated the GUI presenting a warning so the user could maintain the vehicle and its components (e.g., battery) properly. *Dec.*, 257-258 (opining displaying battery information on a single display presenting a GUI would have been user-friendly). There would have been a REOS, given the data processing system already receives information regarding the battery, such as low voltage, and the modified Ferro already includes a display presenting a

GUI with information on the battery (i.e., charged/uncharged capacity). *See* Claim 1[i]'s Mapping; *Dec.*, 259. Thus, the modification would simply require the data processing system receiving additional information regarding battery health, such as battery temperature or current levels, as taught by Donnelly, and displaying such information on the GUI. *Id*.

E. Claim 6

The charging schedule is developed by the dynamic energy transaction planner 402 using charging preferences, which include a "minimum level 536 of charge in the electric vehicle's storage[.]" *Ferro* [0084], [0123]. *See* Claim 1[f]'s Mapping. A POSITA would have understood maintaining a minimum level of charge to be a *factor of safety*. *Dec*., 262-264; *cf. '987 Patent*, 15:39-42, 19:52-57 (describing maintaining a minimum level of charge to drive 20 miles and potentially including a "factor of safety"), FIG. 7 (RN 726) (showing factor of safety of 1.5).

Further, Letendre teaches a minimum distance (in miles) the vehicle battery should "[a]lways maintain enough charge" to travel:



Letendre, 2, FIG. 1.

A POSITA would have understood or found obvious the "[a]lways maintain" entry is a type of *factor of safety*, as a minimum battery level for a minimum distance is always maintained for reserve travel. *Dec.*, 262-264 (comparing '987 Patent, 15:39-42, 19:52-57, *with* Letendre's "always maintain" entry). Additionally, Letendre's slider has comparable user-settable functionality to the factor of safety field 726 in the '987 Patent, FIG 7. *Letendre*, 18; *Dec.*, 262-265.

A POSITA would have found it obvious and been motivated to modify the Ferro data processing system to include an "always maintain" charge entry based on distance for the express benefit taught in Letendre that "[i]t is essential that the driver be able to limit any draw down so travel is not affected." *Letendre*, 18; *Dec.*, 265-267. A POSITA would have appreciated allowing a user to enter a mileage distance, in addition to a "minimum" charge level in Ferro's charging preferences, as users more readily know their travel distance. *Dec.* 266. The modification would have had a REOS, given Ferro already teaches basing the transaction plan on a vehicle operator's charging preferences. *See* Claim 1[g]; *Dec*., 268. Thus, the combination simply requires programming processor 204 to receive a factor of safety input (e.g., "always maintain" mileage input) from the user as a charging preference for the transaction plan. *Dec.* 268.

F. Claim 7

The modified Ferro contains an "always maintain" mileage input as a charging preference. Thus, the *one or more charging preferences comprise the factor of safety*. *See* Claim 6's Mapping.

G. Claim 8

1. Claim 8[Pre]

Ferro teaches an *electrical charging method*. *Ferro*, Abstract, [0012], FIG. 3. *See* Claim 1[Pre].

2. Claim 8[a]

See Claims 1[a], 1[e].

3. Claim 8[b]

See Claims 1[b], 1[f].

4. Claim 8[c]

See Claims 1[c]-1[d], 1[g].

5. Claim 8[d]

See Claims 1[c]-1[d], 1[h].

6. Claim 8[e]

See Claim 1[i].

H. Claim 9

See Claim 2.

I. Claim 10

See Claim 3.

J. Claim 11

See Claim 4.

K. Claim 13

See Claim 6.

L. Claim 14

See Claim 7.

M. Claim 15

1. Claim 15[Pre]

See Claim 1[Pre].

2. Claim 15[a]

See Claim 1[a].

3. Claim 15[b]

See Claim 1[b].

4. Claim 15[c]

See Claim 1[c].

5. Claim 15[d]

See Claim 1[d].

6. Claim 15[e]

See Claim 1[e].

7. Claim 15[f]

See Claim 1[f].

8. Claim 15[g]

See Claim 1[g], which maps *at least one current value of a dynamic attribute of an electric charge provider*, namely a current cost (or price) of electricity charged by an electric energy provider, such as a utility company providing power from a power grid. *Ferro*, [0037], [0066]. The current price of electricity at a given time is a *first value* of the dynamic attribute and is *determine[d]* by Ferro's processor unit 204. *Dec.*, 288-289. *See* Claims 15[j]-15[k]'s Mapping.

9. Claim 15[h]

See Claim 1[g].

10. Claim 15[i]

See Claim 1[h].

11. Claims 15[j]-[k]

Ferro teaches continuously updating the cost of electricity to *retrieve a second value of the at least one dynamic attribute*, namely an updated current price of electricity. Specifically, Ferro teaches planner 402 "receives set of … current state of devices updates 437" and "[i]n response to one or more updated …changes in device state" (i.e., changes in electricity cost) "…modifies dynamic energy transaction plan 424 to create updated dynamic energy transaction plan 438." *Ferro*, [0114], [0073]-[0076] (teaching "the energy transaction plan is dynamic and constantly updating to reflect changing conditions in real time" and further teaching updating the plan's first set of terms with a second set of terms).

Ferro provides an example of a user parking their car for two weeks at an airport. *Ferro*, [0115]. During this time, planner 402 "monitors the price of electricity and charges electric vehicle 400 when the price of electricity falls below a low price threshold." *Id.* When the price of electricity is high, the planner 402 discharges electricity back to the power grid "for a profit." *Id.* Ferro teaches the planner 402 "continuously sends requests for updates to the energy preference services" or, alternatively, the services "send the updates in response to an update or change occurring." *Ferro*, [0116]-[0117].

Ferro also discloses the energy transaction plan includes different time intervals at different rates for charging electricity:

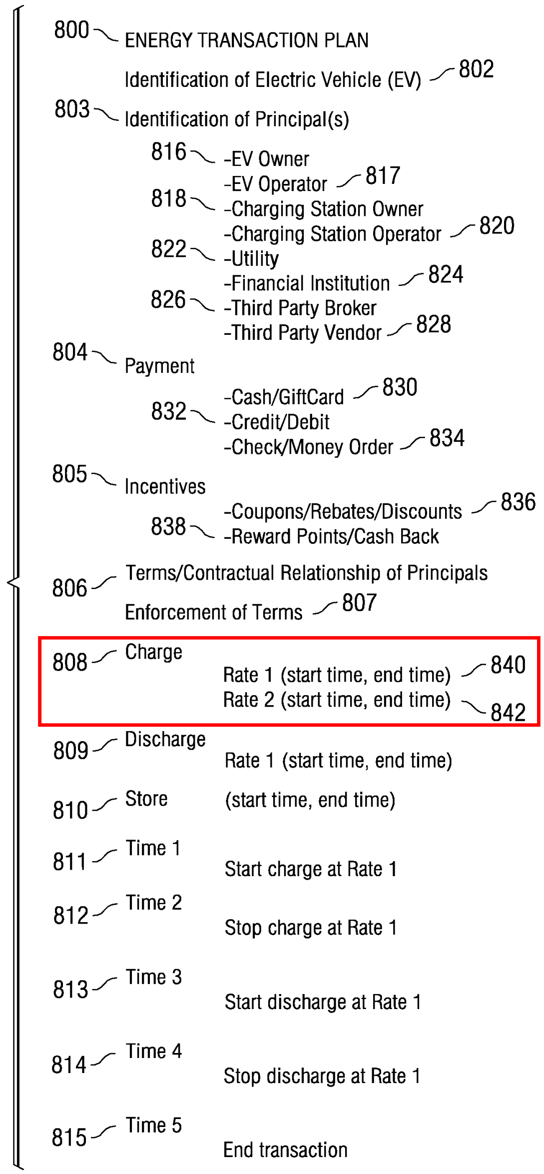


FIG. 8

Ferro, FIG. 8 (RN 840, 842), [0138]-[0139].

Ferro thus teaches Claim 15[j] because Ferro continuously updates the price of electricity by processor unit 204 retrieving (either by requesting or automatically being sent) updated price information (i.e., *retrieve a second value*). *Dec.*, 292-293.

Ferro also teaches Claim 15[k] because Ferro continuously regenerates the transaction plan instructing when and at what price to charge the vehicle based on the updated current electricity price. Ferro teaches modifying plan 424 to create updated plan 438. *Ferro*, [0114]. "FIG. 12 is a flowchart illustrating a process for generating an updated dynamic energy transaction plan":

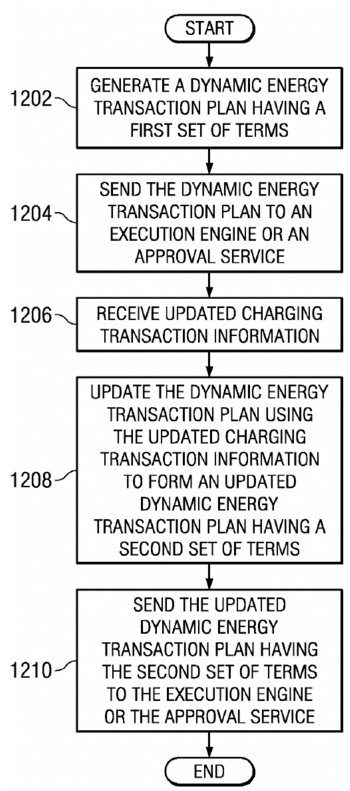


FIG. 12

Ferro, [0148], FIG. 12.

Ferro teaches generating a plan "having a first set of terms" based on charging preferences, device capabilities, and/or current state of device information. *Ferro*, [0149]. The plan with the first set of terms is sent to the execution engine 316 for execution. *Id.* As discussed for Claim 1[h], execution engine initiates the charging, i.e., *charging of the vehicle in accordance with the charging schedule*, recited in Claim 15[i]. *Ferro*, [0060].

The planner "monitor[s] for updates or changes to the charging transaction information." *Ferro*, [0149]. Once updates are received, including updated device state information (e.g., electricity price), the planner updates the plan to "include[] a second set of terms." *Ferro*, [0150]-[0151]. The plan with the second set of terms is then sent "to an execution engine[.]" *Ferro*, [0150].

Because Ferro teaches updating the transaction plan with the updated cost of electricity and then executing the updated plan, i.e., charging the vehicle according to the updated plan, Ferro teaches Claim 15[k]. *Dec.*, 294-295.

12. Claim 15[l]

See Claim 1[i].

N. Claim 16

See Claim 2.

O. Claim 17

See Claim 3.

P. Claim 18

See Claim 4.

Q. Claim 20

See Claim 6.

R. Claim 21

See Claim 7.

S. Claim 22

1. Claim 22[Pre]

See Claim 1[Pre].

2. Claim 22[a]

See Claim 1[b].

3. Claim 22[b]

See Claim 1[c].

4. Claim 22[c]

See Claim 1[d].

5. Claim 22[d]

See Claim 1[i]. The modified Ferro *provide[s] a user interface* via presenting the graphical user interface (GUI) of Donnelly on the touchscreen, as mapped for Claim 1[i]. *Dec.*, 306.

Because the modified Ferro provides a GUI (per Donnelly), the modified Ferro teaches the claimed *graphical depiction[s]*. *Dec.*, 307 (discussing how elements presented on a GUI are *graphical depictions* because they depict graphical elements via the graphical user interface).

Per Claim 1[i]'s mapping at Section V.A.10.e, the vehicle charge indicator is a *unitary* element.

The Donnelly-Letendre bar graph depicts *an electric vehicle battery capacity* as indicated by the entire width of the bar graph annotated with the orange box in the below Fig. 28:

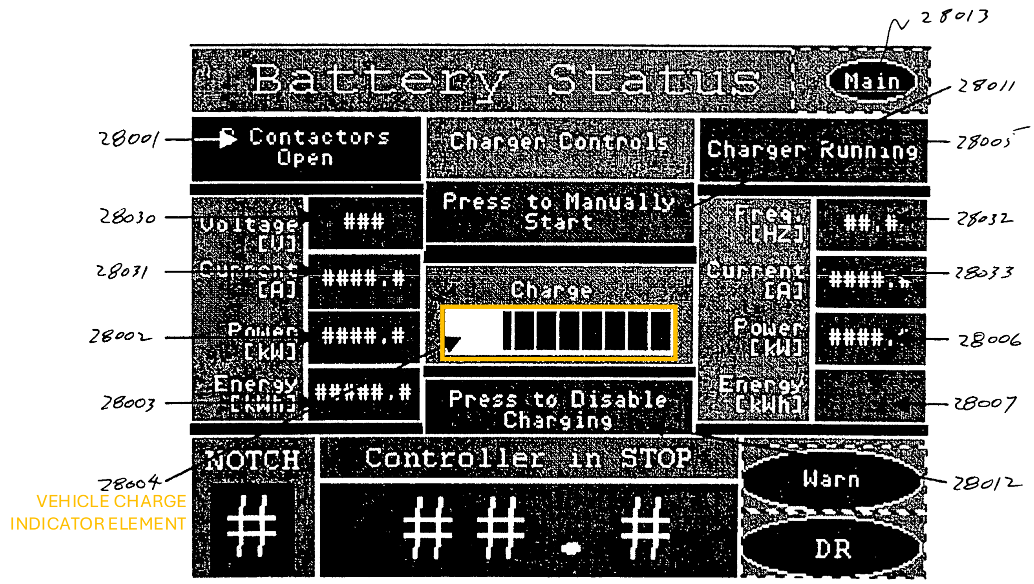


FIG. 28

Donnelly, FIG. 28, 23:16-19; *Dec.*, 308 (opining that a POSITA would have readily recognized that the entire fillable width of the bar graph is representative of the capacity of the battery).

Similarly, a portion of the Donnelly bar graph (e.g., the dark-colored rectangles) would have been understood to depict *a current charge level of the electric vehicle battery*, as discussed for Claim 1[i]. *Dec.*, 217-219, 308.

Finally, the bar graph with slider of Donnelly-Letendre presented on the GUI of the modified Ferro touchscreen is also a *combined input/output element* because the bar graph outputs information, e.g., charged and uncharged charge levels of the battery, and allows for input of information via slider. *See* Claim 1[i]; *Dec*., 310. Specifically, as discussed for Claim 1[i], the user may manually actuate the slider to input *a desired charge parameter of the electric vehicle*, such as an amount of charge.

6. Claim 22[e]

See Claims 1[f], 1[i]. Specifically, Ferro teaches the charging preferences are entered by the vehicle operator via an input/output device on-board the vehicle, via the modified GUI in the proposed combination.

7. Claim 22[f]

See Claim 1[g].

8. Claim 22[g]

See Claim 1[h].

T. Claim 23

Ferro teaches *charging preferences* 406 that include "electric vehicle charging preferences" 500, such as a maximum amount of charge 538 (*a desired charge limit for the electric vehicle*). *See* Claim 1[f], *citing Ferro*, [0082], [0084], [0118], [0120], [0122]-[0123], FIG. 5; *Dec*., 314-315.

U. Claim 24

Ferro teaches *charging preferences* 406 that include "electric vehicle charging preferences" 500, such as a time 512, including time of day 530, for charging the vehicle (*a time parameter governing charging of the electric vehicle*). *See* Claim 1[f], *citing Ferro*, [0082], [0084], [0118], [0120], [0122]-[0123], FIG. 5; *Dec.*, 316.

V. Claim 25

See Claim 2.

W. Claim 26

See Claim 3.

X. Claim 27

See Claim 4.

Y. Claim 29

See Claim 6.

Z. Claim 30

See Claim 7.

VI. GROUND 2: OBVIOUSNESS OF CLAIMS 5, 12, 19, AND 28

A. Claims 5, 12, 19, and 28

The modified Ferro includes a touchscreen display presenting a GUI. *See* Claim 1[i]'s Mapping. Knockeart teaches a removable personal device that communicates with an in-vehicle system. *Knockeart*, 2:46, Abstract, 4:32-67, FIGs. 1, 3-6 (FIGs. 5-6 disclosing communication with onboard computer). Knockeart discloses the removable personal device may be a "cellular telephone" or a PDA, such as a PALM PDA. *Knockeart*, 12:38-41, 6:39-47; *Dec.*, 323-324 (opining a cellular telephone is a *smartphone*).

A POSITA would have been motivated and found it obvious to adapt the GUI to be displayed on a removable smartphone. *Dec*., 325. A POSITA would have appreciated being able to view and/or enter their charging preferences while away from the vehicle. *Ferro*, [0032]-[0033], [0037], [0064]; *Dec*., 326. There would have been a REOS, as the phone already includes touchscreen that receives "manual input." *Knockeart*, 2:46-50, 4:57-59, *Dec*., 327. The modification therefore would simply require programming the processor of modified Ferro to display the GUI on the graphical touchscreen of Knockeart, through wireless communications, which is within a POSITA's expertise. *Dec*. 328.

VII. DISCRETION UNDER § 325(D)

The Board should not discretionally deny under § 325(d) because the Petitioner's prior art and arguments do not meet either parts one or two of the *Advanced Bionics* framework, given the weighting of the *Becton-Dickinson* factors.

A. Part One of *Advanced Bionics* Is Not Satisfied

Ferro was listed on the face of the '987 Patent as a "References Cited[,]" but was never applied by Examiner in an Office Action. *'987 Patent,* (56); *'987 File History*. Donnelly, Letendre, Seelig, Knockeart, and Oyobe were never considered by the Examiner. *See, generally, '987 File History*.

The Examiner issued an Examiner's amendment adding the *slider* limitation to independent claim 32 (issued claim 22) in the Notice of Allowance, indicating the *slider* as allowable over the prior art. *'987 File History,* 684-696, 699 (indicating the other independent claims were allowable as they already included the *slider* limitation). The Examiner stated previously-considered art neither anticipated nor rendered obvious the claims. *'987 File History,* 697. Petitioner combines Ferro-Oyobe with Donnelly and Letendre for teaching these added limitations in all grounds. Donnelly and Letendre are non-cumulative and materially different from any art evaluated during examination, given Letendre discloses a web page charging control panel with sliders for indicating user charge preferences and Donnelly teaches a GUI showing a battery state-of-charge via a bar graph. *See,* Section V.A.10. Thus, factors (a-b) weigh against denying institution.

Ferro has similarities to Hafner applied by Examiner during prosecution. *'987 File History,* 90. However, Hafner is silent to any "dynamic" nature of the planner, and thus Ferro is materially different from Hafner. *Compare, e.g., Ferro,* Abstract *with Hafner,* Abstract. The Board previously confirmed Ferro's "dynamic" planner portions being "materially different" from an essentially identical Hafner in IPR2023-00062. *Tesla, Inc. v. Charge Fusion Technologies, LLC,* IPR2023-00062, Paper 13, 19 (PTAB May 11, 2023). Because Petitioner discusses the "dynamic" nature of the planner throughout our arguments, there is little overlap with any arguments made during prosecution. Donnelly, Letendre, Seelig, and Oyobe are applied in every Petition ground, further decreasing any overlap with examination arguments. Thus, factor (d) weighs against denying institution.

Thus, part one of the framework is not met because the "**combination of prior art and arguments** [] are not the same or substantially the same as that considered" during prosecution. *Align Technology, Inc. v. Dental Monitoring SAS*, IPR2023-01369, Paper 10, 9-10 (PTAB March 5, 2024); *Caterpillar Inc. v. Wirtgen America, Inc.,* IPR2022-01278, Paper 12, 42-43 (PTAB Feb. 7, 2023).

B. Part Two of *Advanced Bionics* Is Not Satisfied

The Examiner never discussed or applied Ferro in an Office Action, weighing factor (c) "strongly" against denying institution. *Solaredge Technologies LTD. v. SMA Solar Technology AG*, IPR2020-00021, Paper 8, 11-12 (PTAB Apr. 10, 2020). Because Petitioner provides additional discussion and facts (including Mr. Andrews's Declaration) not provided by the Examiner, factor (f) weighs against denying institution. *Hamilton Technologies LLC v. Fleur Tehrani*, IPR2020-01199, Paper 6, 21 (PTAB Jan. 6, 2021) (Board finding material error because the "examiner did not have the benefit of the teachings of" new, additional references that were "not before the examiner"). Thus, factor (e) weighs against denying institution. Part two of the framework is not satisfied because Petitioner has demonstrated the Office materially erred.

For the reasons above, the Board should not exercise discretion to deny institution.

VIII. 35 U.S.C. § 314(a) DISCRETION

The Board should not discretionarily deny the IPR. The Parties are currently involved in litigation for patents related to the '987 Patent. *See* Related Matters, below. However, the '987 Patent is not presently the subject of any patent infringement lawsuit between the Parties. *Id.* In the Litigation identified in the Related Matters, below, Patent Owner previously filed a Motion for Leave to File First Amended Complaint for Patent Infringement. (Ex. 1087, Doc. 79, including Ex. A, p. 7). In an Order dated October 31, 2024, the Court denied as moot Plaintiff's Motion for Leave to File First Amended Complaint. (Ex. 1093, *Order*, Doc. 100). Therefore, the '987 Patent is not presently the subject of a concurrent litigation.

Additionally, the Litigation identified in the Related Matters, below, is stayed. (Ex. 1088, *Order*, Doc. 100).

Because there is no pending litigation between the Parties involving the '987 Patent, the Board should not exercise its discretion to deny this IPR.

IX. CONCLUSION

Petitioner respectfully requests *inter partes* review of the Challenged Claims.

Respectfully submitted,

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COUNSEL FOR PETITIONER

X. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8(A)(1)

A. Real Party-In-Interest

Petitioner is the real party-in-interest. 37 C.F.R. § 42.8(b)(1).

B. Related Matters

The Parties are currently involved in the following Litigation: *Charge Fusion Technologies, LLC v. Tesla, Inc.*, W.D. Tex., Case No. 1:22-cv-00488. U.S. Patent Nos. 9,853,488; 10,819,135; and 10,998,753 are asserted in the Litigation and are related (i.e., in the same patent family) to the '987 Patent, which is the subject of the present IPR. In the Litigation, Plaintiff, Charge Fusion Technologies, LLC, previously filed on June 5, 2024, a Motion for Leave to File First Amended Complaint for Patent Infringement, requesting to add to the Litigation U.S. Patent Nos. 11,575,275; 11,563,338 (the subject of IPR2025-0032); 11,990,788 (the subject of IPR2025-00152); and the '987 Patent. (Ex. 1087, Doc. 79, Ex. A, p. 7). In an Order dated October 31, 2024, the Court denied as moot Plaintiff's Motion for Leave to File First Amended Complaint. (Ex. 1093, *Order*, Doc. 100). The '987 Patent is not presently the subject of a concurrent litigation.

Pursuant to 37 C.F.R. § 42.8(b)(2), Tesla Inc. identifies the following matters related to the '987 Patent:

Tesla, Inc. v. Charge Fusion Technologies, LLC, IPR2025-00032, regarding U.S. Patent No. 11,563,338; and

Tesla, Inc. v. Charge Fusion Technologies, LLC, IPR2025-00152, regarding U.S. Patent No. 11,990,788.

C. Lead and Back-Up Counsel

Petitioner provides the following designation and service information for lead and back-up counsel. 37 C.F.R. § 42.8(b)(3) and (b)(4).

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D. 37 C.F.R. § 42.8(b)(4) – Service Information

Please address all correspondence to the lead and back-up counsel as shown above. Petitioner consents to electronic service by e-mail at the e-mail addresses provided above.

CLAIM LISTING APPENDIX
U.S. Patent No. 11,631,987 for Claims 1-29

Claim Designation	Claim Language
Claim 1[Pre]	An electrical charging system, comprising:
Claim 1[a]	a vehicle sensor;
Claim 1[b]	a communication device;
Claim 1[c]	a processor in communication with the vehicle sensor and the communication device; and
Claim 1[d]	a memory in communication with the processor, the memory storing instructions that when executed by the processor cause the processor to:
Claim 1[e]	receive, from the vehicle sensor, information indicative of a presence of a vehicle in a parking space;
Claim 1[f]	receive, from the communication device, information indicative of one or more charging preferences corresponding to a desired charging of the vehicle, wherein the one or more charging preferences are defined by an operator of the vehicle;
Claim 1[g]	determine, based at least on the one or more charging preferences and at least one current value of a dynamic attribute of an electric charge provider, a charging schedule for the vehicle; and
Claim 1[h]	transmit a control signal to a parking space charge device that starts a charging, in accordance with the charging schedule, of the vehicle;
Claim 1[i]	wherein at least one of the one or more charging preferences is defined by user input received via a graphical user interface adapted to display a unitary vehicle charge indicator element comprising: (i) a first portion indicative of an amount of charge residing in a battery of the electric vehicle; (ii) a second portion indicative of an uncharged capacity of the battery of the electric vehicle; and (iii) a third portion comprising a slider by which an amount of charge may be specified.
Claim 2	The electrical charging system of claim 1, wherein the graphical user interface is adapted to display a web page.
Claim 3	The electrical charging system of claim 2, wherein the graphical user interface forms a part of the vehicle.

Claim Designation	Claim Language
Claim 4	The electrical charging system of claim 1, wherein the graphical user interface is adapted to receive a maintenance notification.
Claim 5	The electrical charging system of claim 4, wherein the graphical user interface forms a part of a smartphone.
Claim 6	The electrical charging system of claim 1, wherein the determining of the charging schedule for the vehicle is further based upon a factor of safety parameter.
Claim 7	The electrical charging system of claim 6, wherein the one or more charging preferences comprise the factor of safety parameter.
Claim 8[Pre]	An electrical charging method, comprising:
Claim 8[a]	receiving, from a vehicle sensor, information indicative of a presence of an electric vehicle in a parking space;
Claim 8[b]	receiving, via a communication device, information indicative of one or more charging preferences corresponding to a desired charging of the electric vehicle, wherein the one or more charging preferences are defined by an operator of the electric vehicle;
Claim 8[c]	determining, by a processor, based at least on the one or more charging preferences and at least one current value of a dynamic attribute of an electric charge provider, a charging schedule for the electric vehicle; and
Claim 8[d]	transmitting, by the processor, a control signal to a parking space charge device that starts a charging, in accordance with the charging schedule, of the electric vehicle;
Claim 8[e]	wherein at least one of the one or more charging preferences is defined by user input received via a graphical user interface adapted to display a unitary vehicle charge indicator element comprising: (i) a first portion indicative of an amount of charge residing in a battery of the electric vehicle; (ii) a second portion indicative of an uncharged capacity of the battery of the electric vehicle; and (iii) a third portion comprising a slider by which an amount of charge may be specified.
Claim 9	The electrical charging method of claim 8, wherein the graphical user interface is adapted to display a web page.
Claim 10	The electrical charging method of claim 9, wherein the graphical user interface forms a part of the electric vehicle.

Claim Designation	Claim Language
Claim 11	The electrical charging method of claim 8, wherein the graphical user interface is adapted to receive a maintenance notification.
Claim 12	The electrical charging method of claim 11, wherein the graphical user interface forms a part of a smartphone.
Claim 13	The electrical charging method of claim 8, wherein the determining of the charging schedule for the electric vehicle is further based upon a factor of safety parameter.
Claim 14	The electrical charging method of claim 13, wherein the one or more charging preferences comprise the factor of safety parameter.
Claim 15[Pre]	An electrical charging system, comprising:
Claim 15[a]	a vehicle sensor;
Claim 15[b]	a communication device;
Claim 15[c]	a processor in communication with the vehicle sensor and the communication device; and
Claim 15[d]	a memory in communication with the processor, the memory storing instructions that when executed by the processor cause the processor to:
Claim 15[e]	(a) receive, from the vehicle sensor, information indicative of a presence of a vehicle in a parking space;
Claim 15[f]	(b) receive, from the communication device, information indicative of one or more charging preferences corresponding to a desired charging of the vehicle, wherein the one or more charging preferences are defined by an operator of the vehicle;
Claim 15[g]	(c) determine a first value of a dynamic attribute of an electric charge provider;
Claim 15[h]	(d) determine, based at least on the one or more charging preferences and the first value of the dynamic attribute, a charging schedule for the vehicle;
Claim 15[i]	(e) transmit a control signal to a parking space charge device that starts a charging of the vehicle in accordance with the charging schedule;
Claim 15[j]	(f) retrieve a second value of the at least one dynamic attribute; and
Claim 15[k]	(g) repeat (d) and (e), utilizing the retrieved second value of the dynamic attribute as the first value of the dynamic attribute;

Claim Designation	Claim Language
Claim 15[l]	wherein at least one of the one or more charging preferences is defined by user input received via a graphical user interface adapted to display a unitary vehicle charge indicator element comprising: (i) a first portion indicative of an amount of charge residing in a battery of the electric vehicle; (ii) a second portion indicative of an uncharged capacity of the battery of the electric vehicle; and (iii) a third portion comprising a slider by which an amount of charge may be specified.
Claim 16	The electrical charging system of claim 15, wherein the graphical user interface is adapted to display a web page.
Claim 17	The electrical charging system of claim 16, wherein the graphical user interface forms a part of the vehicle.
Claim 18	The electrical charging system of claim 15 wherein the graphical user interface is adapted to receive a maintenance notification.
Claim 19	The electrical charging system of claim 18, wherein the graphical user interface forms a part of a smartphone.
Claim 20	The electrical charging system of claim 15, wherein the determining of the charging schedule for the vehicle is further based upon a factor of safety parameter.
Claim 21	The electrical charging system of claim 20, wherein the one or more charging preferences comprise the factor of safety parameter.
Claim 22[Pre]	An electrical charging system, comprising:
Claim 22[a]	a communication device;
Claim 22[b]	a processor in communication with the communication device; and
Claim 22[c]	a memory in communication with the processor, the memory storing instructions that when executed by the processor cause the processor to:
Claim 22[d]	provide a user interface comprising a unitary combined input/output element comprising: (i) a graphical depiction of an electric vehicle battery capacity, (ii) a graphical depiction of a current charge level of the electric vehicle battery, and (iii) a graphical input slider element that permits an operator of the vehicle to provide input defining a desired charge parameter of the electric vehicle;

Claim Designation	Claim Language
Claim 22[e]	receive, from the communication device and via the user interface, information indicative of one or more charging preferences corresponding to a desired charging of the electric vehicle, wherein the one or more charging preferences are defined by the operator of the vehicle and include an indication of the desired charge parameter of the electric vehicle received via the graphical input element that permits the operator of the vehicle to provide input defining the desired charge parameter of the electric vehicle;
Claim 22[f]	determine, based at least on the one or more charging preferences and at least one current value of a dynamic attribute of an electric charge provider, a charging schedule for the vehicle; and
Claim 22[g]	transmit a control signal to a parking space charge device that starts a charging, in accordance with the charging schedule, of the electric vehicle.
Claim 23	The electrical charging system of claim 22, wherein the desired charge parameter comprises a desired charge limit for the electric vehicle.
Claim 24	The electrical charging system of claim 22, wherein the desired charge parameter comprises a time parameter governing charging of the electric vehicle.
Claim 25	The electrical charging system of claim 22, wherein the user interface is adapted to display a web page.
Claim 26	The electrical charging system of claim 25, wherein the user interface forms a part of the electric vehicle.
Claim 27	The electrical charging system of claim 22, wherein the user interface is adapted to receive a maintenance notification.
Claim 28	The electrical charging system of claim 27, wherein the user interface forms a part of a smartphone.
Claim 29	The electrical charging system of claim 22, wherein the charging schedule for the electric vehicle is further based upon a factor of safety parameter.
Claim 30	The electrical charging system of claim 29, wherein the one or more charging preferences comprise the factor of safety parameter.

APPENDIX OF EXHIBITS

Exhibit 1001	U.S. Patent No. 11,631,987 to Ambroziak, et al. ("the *'987 Patent*")
Exhibit 1002	U.S. Patent No. 11,631,987 File History ("the *'987 File History*")
Exhibit 1003	Declaration of Scott Andrews
Exhibit 1004	U.S. Patent Application Publication No. 2009/0313034 to Ferro, et al. ("Ferro")
Exhibit 1005	European Patent Application Publication 1920968 to Oyobe, et al. ("Oyobe")
Exhibit 1006	U.S. Patent No. 7,124,691 to Donnelly, et al. ("Donnelly")
Exhibit 1007	Letendre, S.E. and Kempton, W. *The V2G Concept: A New Model for Power?* Public Util. Fortn. February 2002, 140, pp. 16-26. ("Letendre")
Exhibit 1008	*Intentionally left blank*
Exhibit 1009	*Intentionally left blank*
Exhibit 1010	U.S. Patent No. 6,622,083 to Knockeart et al. ("Knockeart").
Exhibit 1011	U.S. Patent Publication No. 2008/0136371 to Sutardja ("Sutardja")
Exhibit 1012	Willett Kempton and Jasna Tomić. *Vehicle-to-grid power fundamentals: Calculating capacity and net revenue.* Journal of Power Sources. 2005. 144. pp. 268–279 ("Kempton 2005 – Revenue")
Exhibit 1013	Chan, *The State of the Art of Electric and Hybrid Vehicles,* February 2002, Vol. 90, No. 2, IEEE ("Chan")
Exhibit 1014	*Electric Vehicle Battery Systems,* Sandeep Dhameja, Newnes, 2002 ("Sandeep")
Exhibit 1015	U.S. Patent No. 5,573,090 to Ross ("Ross")
Exhibit 1016	Weed, R. *Electric Vehicles: Copper Applications in Electrical*. February 1998 ("Weed")
Exhibit 1017	*Rawson, Kateley,* Electric Vehicle Charging Equipment Design and Health and Safety Codes, SAE Intl., 1999 ("Rawson")
Exhibit 1018	U.S. Patent No. 7.693,609 to Kressner et al. ("Kressner")
Exhibit 1019	U.S. Patent No. 7,084,859 to Pryor ("Pryor")
Exhibit 1020	U.S. Patent Publication No. 2008/0039980 to Pollack et al. ("Pollack")

Exhibit 1021	*Installation Guide for Electric Vehicle Charging Equipment,* Massachusetts Division of Energy Resources, September 200 ("Massachusetts Division of Energy Resources")
Exhibit 1022	U.S. Patent No. 5,467,006 to Sims ("Sims")
Exhibit 1023	U.S. Provisional Application 61/134,646 ("*'646 Provisional*")
Exhibit 1024	U.S. Patent Publication No. 2009/0312903 to Hafner et al. ("Hafner")
Exhibit 1025	U.S. Patent No. 6,081,205 to Williams ("Williams")
Exhibit 1026	U.S. Patent No. 6,614,204 to Pellegrino et al. ("Pellegrino")
Exhibit 1027	Brooks, Gage, *Integration of Electric Drive Vehicles with the Electric Power Grid – a New Value Stream,* EVS 18 Berlin, 2001 ("Brooks")
Exhibit 1028	U.S. Patent Publication No. 2008/0312782 to Berdichevsky et al. ("Berdichevsky")
Exhibit 1029	U.S. Patent No. 5,487,002 to Diller et al. ("Diller")
Exhibit 1030	U.S. Patent No. 2,309,941 to Drummond ("Drummond")
Exhibit 1031	U.S. Patent Publication No. 2003/0230443 to Cramer et al. ("Cramer")
Exhibit 1032	Aylor et al., *A Battery State-of-Charge Indicator for Electric Wheelchairs,* IEEE Transactions on Industrial Electronics, Vol. 39, No. 5, October 1992 ("Aylor")
Exhibit 1033	Nadal, M and Birbar, F. *Development of a Hybrid Fuel Cell/Battery Powered Electric Vehicle.* Iht. J. Hydrogen Energy. 1996. Vol. 21, No. 6. pp. 491-505. ("Nadal")
Exhibit 1034	2006 Civic Hybrid Online Reference Owner's Manual, Honda ("2006 Honda Civic Manual")
Exhibit 1035	2000 Insight Online Reference Owner's Manual, Honda ("2000 Honda Insight Manual")
Exhibit 1036	Owners Manual: 2008 Tesla Roadster, Tesla ("2008 Tesla Roadster")
Exhibit 1037	*The Human-Computer Interaction Handbook: Tangible User Interfaces,* Second Edition, 2007, Hiroshi Ishii, MIT Media Laboratory, ("Ishii")
Exhibit 1038	*The Graphical User Interface: An Introduction,* Jansen, Computer Science Program University of Maryland, 1998, SIGCHI Bulletin ("*Jansen*")
Exhibit 1039	Johnsgard et al., *A Comparison of Graphical User Interface Widgets for Various Tasks,* Proceedings of the Human Factors

	and Ergonomics Society, 39th Annual Meeting, 1995 (“Johnsgard”)
Exhibit 1040	Olsen Jr. et al., *Input/Output Linkage in a User Interface Management System,* ACM, Vol. 19, No. 3, 1985 (“Olsen”)
Exhibit 1041	U.S. Patent No. 6,577,928 to Obradovich (“Obradovich”)
Exhibit 1042	*Intentionally left blank*
Exhibit 1043	*Intentionally left blank*
Exhibit 1044	*Intentionally left blank*
Exhibit 1045	*Intentionally left blank*
Exhibit 1046	*Intentionally left blank*
Exhibit 1047	*Intentionally left blank*
Exhibit 1048	*Intentionally left blank*
Exhibit 1049	*Intentionally left blank*
Exhibit 1050	U.S. Patent No. 5,563,491 to Tseng (“Tseng”)
Exhibit 1051	U.S. Patent No. 6,154,005 to Hyogo et al. (“Hyogo”)
Exhibit 1052	*Sakamoto et al.,* Large Air-Garp Coupler for Inductive Charger, IEEE Transactions on Magnetics, Vol. 35, No. 5, September 1999 (“Matsuo”)
Exhibit 1053	U.K. Patent Application No. GB 2438979 to Taylor-Haw et al. (“Taylor-Haw”)
Exhibit 1054	U.S. Patent No. 5,523,666 to Hoelzl et al. (“Hoelzl”)
Exhibit 1055	*Understanding Your Motherboard’s Bus System,* James McPherson, TechRepublic, December 19, 2000 (“McPherson”)
Exhibit 1056	*Computer: History of Computers,* Gary Masters, Microsoft Encarta, 1994 (“History”)
Exhibit 1057	*Fukuda et al., Evaluating Second Car System, an Electric Vehicle Sharing Experiment in Tama New Town District, Inagi City, Tokyo,* TRB Annual Meeting, 2003 (“Fukuda”)
Exhibit 1058	*Intentionally left blank*
Exhibit 1059	U.S. Patent No. 8,266,075 to Ambrosio et al. (“Ambrosio”)
Exhibit 1060	*An Introduction to Graphical User Interfaces and Their Use by CITIS,* Sherrik, Susan, U.S. Dept. of Commerce, 1992 (“Sherrick”)
Exhibit 1061	U.S. Patent No. 5,555,502 to Opel (“Opel”)
Exhibit 1062	*All Volkswagens Built after 2008 to get touchscreen system,* Rory Jurnecka, MT, November 12, 2007 (“Jurnecka”)

Exhibit 1063	*Geneva '08 Preview: BMW ConnectedDrive Allows Unrestrcited in-car Internet,* Michael Harley, February 22, 2008 ("Harley")
Exhibit 1064	*Chicago 2008: Ford Introduces Work Solutions in-dash computer package for F-150 [w/video],* Ford, February 5, 2008, ("Ford")
Exhibit 1065	U.S. Patent No. 8.405,618 to Colgate et al. ("Colgate")
Exhibit 1066	*A Guide to Understanding Battery Specifications,* MIT Electric Vehicle Team, December 2008 ("Electric Vehicle Team")
Exhibit 1067	U.S. Patent No. 7,904,219 to Lowrey et al. ("Lowrey")
Exhibit 1068	*Internet Multimedia on Wheels: Connecting Cars to Cyberspace,* Jameel et al., IEEE, 1998 ("Jameel")
Exhibit 1069	U.S. Patent No. 7,285,936 to Ohnuma et al. ("Ohnuma")
Exhibit 1070	U.S. Patent No. 7,501,793 to Kadouchi et al. ("Kadouchi")
Exhibit 1071	U.S. Patent Application Publication No. 2005/0278079 to Maguire ("Maguire")
Exhibit 1072	*PowerSafe: Safety, Storage, Operating, and Maintenance Manual,* VRLA Battery Systems mSeries, EnerSys, March 2008 ("PowerSafe")
Exhibit 1073	Kempton et al., *Electric Vehicles as a New Power Source for Electric Utilities,* Transpn Res., Vol. 2, No. 3, Elsevier, 1997 ("Kempton")
Exhibit 1074	*Webster's New World Telecom Dictionary,* Ray Horak, Wiley Publishing, 2008 ("Webster's New World Telecom Dictionary")
Exhibit 1075	Eick, SG. *Data Visualization Sliders*, ACM UIST, November 2004, ("Eick")
Exhibit 1076	U.S. Patent No. 5,615,347 to Davis et al. ("Davis")
Exhibit 1077	Patent Owner's Preliminary Response IPR2022-01217
Exhibit 1078	U.S. Patent No. 5,654,621 to Seelig ("*Seelig*")
Exhibit 1079	U.S. Patent No. 5,734,872 to Kelly ("Kelly")
Exhibit 1080	*Pervasive Computing: The Smart Phone – Customizing User Interaction in Smart Phones,* Korpipää et al., IEEE CS, 2006 ("Pervasive Computing: The Smart Phone")
Exhibit 1081	*Spotlight: The Rise of the Smart Phone,* Pei Zheng et al., IEEE Computer Society, Vol. 7, No. 3, March 2006 ("Zheng")
Exhibit 1082	*Intentionally left blank*
Exhibit 1083	*Intentionally left blank*

Exhibit 1084	*Intentionally left blank*
Exhibit 1085	IPR2022-00519 Declaration of Scott Andrews
Exhibit 1086	Declaration of June Ann Munford ("*Munford Dec.*")
Exhibit 1087	Charge Fusion Technologies, LLC v. Tesla, Inc. 1:22-cv-00488, No. 79 Plaintiff Charge Fusion Technologies, LLC's Motion for Leave to Amend Complaint (W.D.Tex. June 5, 2024)
Exhibit 1088	Charge Fusion Technologies, LLC v. Tesla, Inc., 1:22-cv-00488, No. 74 Order to Stay (W.D.Tex. Feb. 23, 2023)
Exhibit 1089	U.S. Patent No. 9,853,488 to Fincham et al. (the '488 Patent")
Exhibit 1090	*Happy Birthday, Palm Pilot,* Gary Krakow, March 22, 2006, ("Krakow")
Exhibit 1091	*Your Palm Treo 700p Smartphone User Guide,* Palm, 2006 ("PALM Treo 700P Manual")
Exhibit 1092	U.S. Patent No. 5,596,261 to Sunyama ("Sunyama")
Exhibit 1093	Charge Fusion Technologies, LLC v. Tesla, Inc. 1:22-cv-00488, No. 100 Order Denying Plaintiff's Opposed Motion for Leave to File First Amended Complaint (W.D.Tex. Oct. 31, 2024)

CERTIFICATION OF WORD COUNT

The undersigned certifies pursuant to 37 C.F.R. § 42.24 that the foregoing Petition for *Inter Partes* Review, excluding any table of contents, mandatory notices under 37 C.F.R. § 42.8, certificates of service or word count, or appendix of exhibits, contains 13,751 words according to the word-processing program used to prepare this document (Microsoft Word).

Dated: November 8, 2024

ERISE IP, P.A.

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COUNSEL FOR PETITIONER

CERTIFICATE OF SERVICE ON PATENT OWNER
UNDER 37 C.F.R. § 42.105

Pursuant to 37 C.F.R. §§ 42.6(e) and § 42.105(b), the undersigned certifies that on November 8, 2024, a complete and entire copy of this Petition for *Inter Partes* Review and Exhibits were provided via Federal Express to the Patent Owner by serving the correspondence address of record for the ’987 Patent:

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Further, a courtesy copy of this Petition for *Inter Partes* Review was sent via email to Patent Owner’s litigation counsel:

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