

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

GRAPHITE CHARGING COMPANY LLC,
Patent Owner.

Case No. IPR2024-00387

U.S. Patent No. 8,103,391

**PETITION FOR *INTER PARTES* REVIEW OF
ALL CLAIMS (1-20) OF U.S. PATENT NO. 8,103,391**

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PETITIONER'S EXHIBIT LIST

<u>Exhibit</u>	<u>Description</u>
Ex-1001	U.S. Patent No. 8,103,391 to Ferro <i>et al.</i> (“’391 Patent”)
Ex-1002	U.S. Patent No. 5,596,258 to Kimura <i>et al.</i> (“Kimura”)
Ex-1003	U.S. Patent No. 5,650,710 to Hotta (“Hotta”)
Ex-1004	U.S. Patent No. 5,659,240 to King (“King”)
Ex-1005	U.S. Patent No. 5,696,367 to Keith (“Keith”)
Ex-1006	U.S. Patent No. 5,548,200 to Nor <i>et al.</i> (“Nor”)
Ex-1007	Prosecution History of the ’391 Patent
Ex-1008	U.S. Patent No. 6,614,204 to Pellegrino <i>et al.</i> (“Pellegrino”)
Ex-1009	Declaration of Expert C. Arthur MacCarley, Ph.D., P.E.
Ex-1010	Curriculum Vitae of Expert C. Arthur MacCarley
Ex-1011	SAE Standard J1772 (Revised Nov. 2001)
Ex-1012	Federal Court Management Statistics—Profiles (Sept. 30, 2023)
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I. INTRODUCTION

Pursuant to 35 U.S.C. § 311 and 37 C.F.R. § 42.100, Tesla, Inc. (“Petitioner”) requests *Inter Partes* Review (“IPR”) of Claims 1-20 (“Challenged Claims”) of U.S. Patent No. 8,103,391 (“’391 Patent,” Ex-1001), which is purportedly owned by Graphite Charging Company LLC (“Patent Owner”).

II. MANDATORY NOTICES

A. Real Party-in-Interest (37 C.F.R. § 42.8(b)(1))

The real party-in-interest is Petitioner, located at 1 Tesla Road, Austin, TX 78725.

B. Related Matters (37 C.F.R. § 42.8(b)(2))

The ’391 Patent has been asserted against Petitioner in *Graphite Charging Company LLC v. Tesla, Inc.*, Case No. 1:23-cv-00925 (W.D. Tex.) (“District Court Case”). To the best of Petitioner’s knowledge, the ’391 Patent has not been asserted against other parties.

C. Counsel (37 C.F.R. § 42.8(b)(3))

Petitioner designates Alexander B. Stein (Reg. No. 71,397) as lead counsel for this matter, with Brent A. Hawkins (Reg. No. 44,146), Paul Margulies (Reg. No. 59,580), Nicholas A. Restauri (Reg. No. 71,783), and Peter M. Loderup (Reg. No. 79,839) as back-up counsel. Pursuant to 37 C.F.R. § 42.10(b), a Power of Attorney is filed concurrently herewith.

D. Service Information (37 C.F.R. § 42.8(b)(3)-(4))

Mailings and other deliveries for lead and back-up counsel should be addressed to Morgan, Lewis & Bockius LLP, 1301 Second Ave., Ste. 3000, Seattle, WA 98101 (Telephone: 206-274-6400; Fax: 206-274-6401). Pursuant to 37 C.F.R. §42.8(b)(4), Petitioner consents to e-mail service at: Tesla-Graphite391-IPR@morganlewis.com and pmargulies@tesla.com.

III. CERTIFICATION AND FEES

Petitioner certifies that the '391 Patent is available for IPR and that Petitioner is not barred or estopped from requesting this IPR on the grounds identified herein.

The required fees are submitted herewith in accordance with 37 C.F.R. §§ 42.103(a) and 42.15(a). Any additional fees for this IPR may be charged to Deposit Account No. 50,0310 (Order No. 103508-03-8000).

IV. IDENTIFICATION OF CLAIMS AND GROUNDS

The '391 Patent issued from U.S. Patent App. No. 12/194,325, which was filed in the U.S. Patent Office ("Office") on August 19, 2008 without an earlier claim to priority. For this proceeding, Petitioner uses August 19, 2008 as the earliest effective filing date of the Challenged Claims ("Effective Filing Date"), so the pre-AIA statute controls.

This petition relies on the prior-art references listed below, none of which were considered by the Office during prosecution and each of which were published more than one year before the Effective Filing Date. Accordingly, the following references qualify as prior art under § 102(b):

- U.S. Patent No. 5,596,258 (“Kimura,” Ex-1002), which published on January 21, 1997;
- U.S. Patent No. 5,650,710 (“Hotta,” Ex-1003), which published on July 22, 1997;
- U.S. Patent No. 5,659,240 (“King,” Ex-1004), which published on August 19, 1997;
- U.S. Patent No. 5,696,367 (“Keith,” Ex-1005), which published on December 9, 1997; and
- U.S. Patent No. 5,548,200 (“Nor,” Ex-1006), which published on August 20, 1996.

Unpatentability of the Challenged Claims is based on these Grounds:

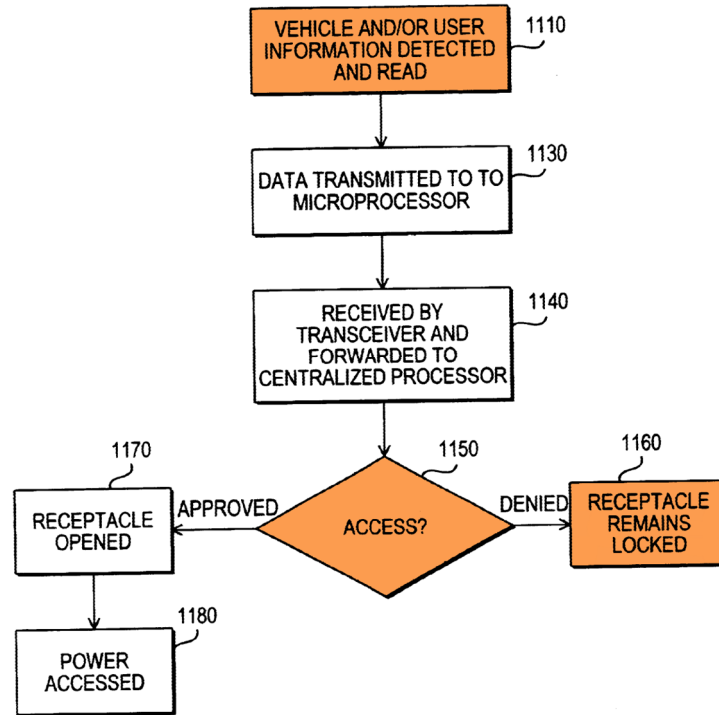
Ground	Prior Art	Statutory Basis	Claims
1	Kimura	§ 103	1, 4-8, 11-15, and 18-20
2	Kimura and Hotta	§ 103	2, 5, 9, 12, and 16
3	Kimura and King	§ 103	3, 10, and 17

4	Keith	§ 102	1, 2, 4-9, 11-16, and 18-20
5	Keith	§ 103	3, 8-19
6	Keith and Nor	§ 103	6 and 13

V. SUMMARY OF PROSECUTION HISTORY

During prosecution, the claims were rejected as anticipated by Pellegrino.

Ex-1007, 54. The Office relied on Pellegrino's description of detecting information pertaining to an electric vehicle and then preventing a user from charging the vehicle after determining that the user or the vehicle was not authorized for charging. *Id.*, 54-55; *see also* Ex-1008, 6:54-60 and 7:8-19.



Ex-1008, Fig. 3.¹

The independent claims were then amended to specify that the monitoring for and detecting of interruptions occurs “during the flow of electricity.” Ex-1007, 23 and 32-36. An argument was also made that “*Pellegrino* never functions **during the flow of electricity.**” *Id.*, 38-40. Shortly thereafter, the Office allowed the claims. *Id.*, 18-19.

The two primary references used herein—Kimura (Ex-1002) and Keith (Ex-1005)—each disclose this exact feature, namely, monitoring for and detecting

¹ Unless otherwise noted, all emphasis in textual quotations and all colors and colored textual annotations in figures have been added.

various types of interruptions during the flow of electricity. *See* Sections VIII(A)(2)-(3) and XI(A)(2)-(3).

VI. LEVEL OF ORDINARY SKILL

A person of ordinary skill in the art (“POSA”) would have had a bachelor’s degree in computer science or electrical engineering, along with at least two to three years of experience working on software and/or hardware used to manage charging processes for electric vehicles. Ex-1009 ¶¶ 16-20. Additional advanced educational degrees could substitute for some years of industry experience and vice versa. *Id.*

A POSA would have also been familiar with standards and regulations relevant to charging of electric vehicles (including J1772, Ex-1011), as well as with the principles and technologies that the ’391 Patent identifies as part of the general knowledge, including: (i) electric vehicles, (ii) vehicle charging stations, and (iii) power grids. Ex-1009 ¶¶ 16-20; Ex-1001, 1:15-62.

VII. CLAIM CONSTRUCTION

Petitioner applied plain and ordinary meanings to all terms. No express constructions are required in this proceeding.

VIII. GROUND #1: KIMURA RENDERS CLAIMS 1, 4-8, 11-15, AND 18-20 OBVIOUS

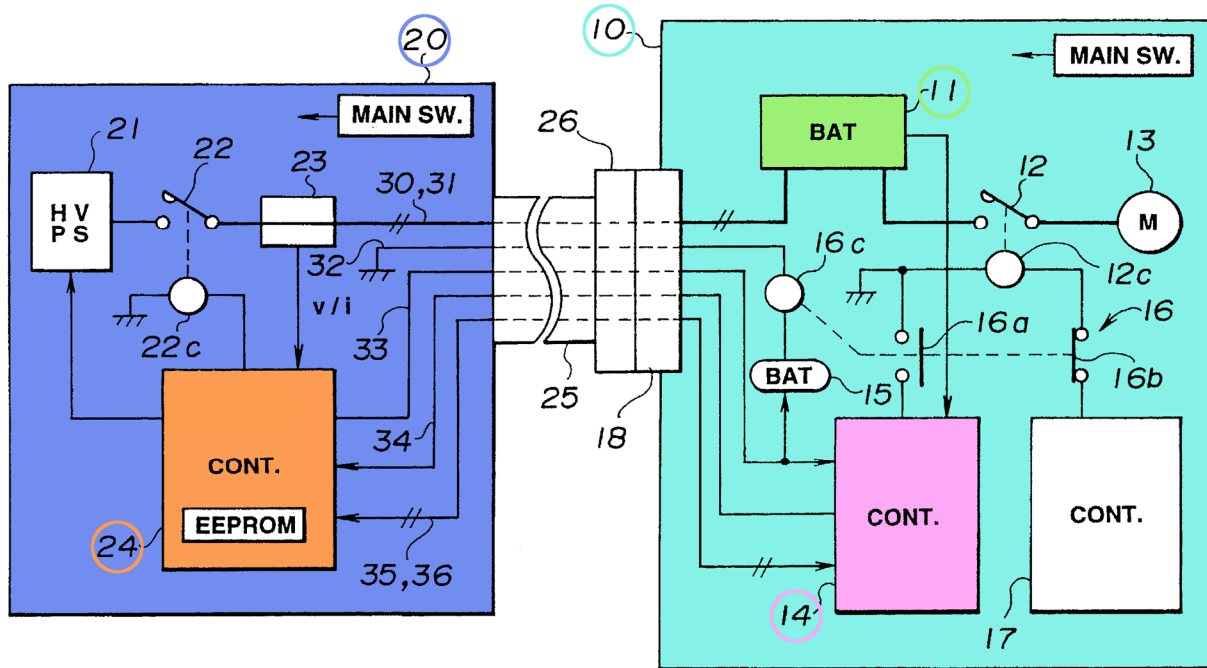
A. Claim 1

1. 1[P]

1[P] recites *a computer implemented method of managing a charging process of an electric vehicle.*² If limiting, Kimura teaches this.

Kimura teaches “a charging apparatus and method of charging a battery of an electric car [vehicle].” Ex-1002, 1:11-13. In Figure 1, Kimura illustrates using a charger 20 (purple) with a charger controller 24 (orange) to charge the battery 11 (green) of an electric vehicle 10 (turquoise) with a battery controller 14 (pink).

² Italics are used exclusively herein to identify language from the Challenged Claims (excepting italicized text used in citations).



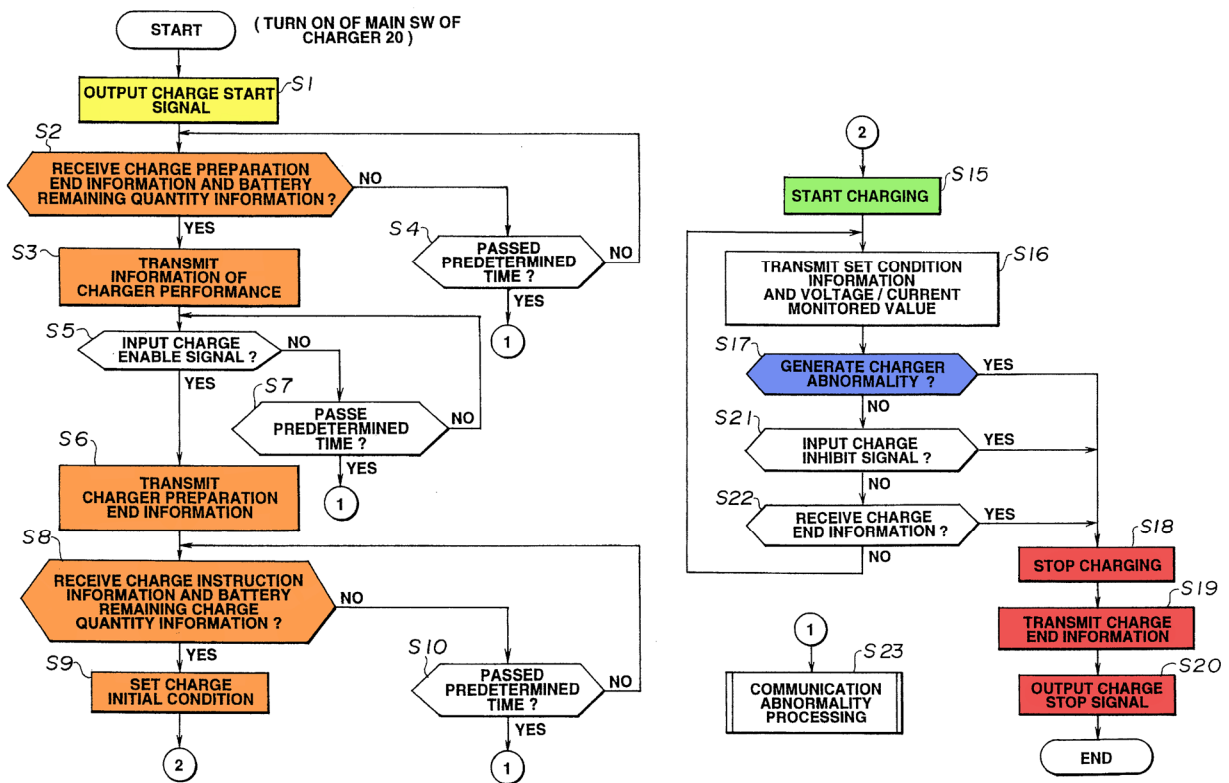
Ex-1002, Fig. 1.

The battery controller 14 and the charger controller 24 communicate with each other over control lines 33-36, which Kimura explains “are control lines to transmit various control signals between the battery controller 14 ... and the [charger] controller 24.” *Id.*, 3:49-52.

Kimura teaches that charger controller 24 executes a charge control program (Figures 10A-10C) and battery controller 14 executes an electric vehicle charge control program (Figures 12-13). *Id.*, 2:49-61. Thus, Figures 10A-10C and 12-13, and the descriptions thereof, collectively illustrate a method of managing a charging process of the electric vehicle 10. Ex-1002, 6:9-10:65.

Beginning at S1, Kimura's charger controller 24 outputs a charge start signal (yellow). Then, charging parameters are established through an exchange of information between the charger and battery controllers 24 and 14 (e.g., S2, S3, S6, S8, and S9 on the charger side, orange). Kimura then initiates the flow of electricity, S15 (green); monitors for charger-side interruptions, S17 (purple); and eventually terminates the charging process after an interruption, S18-S20 (red).

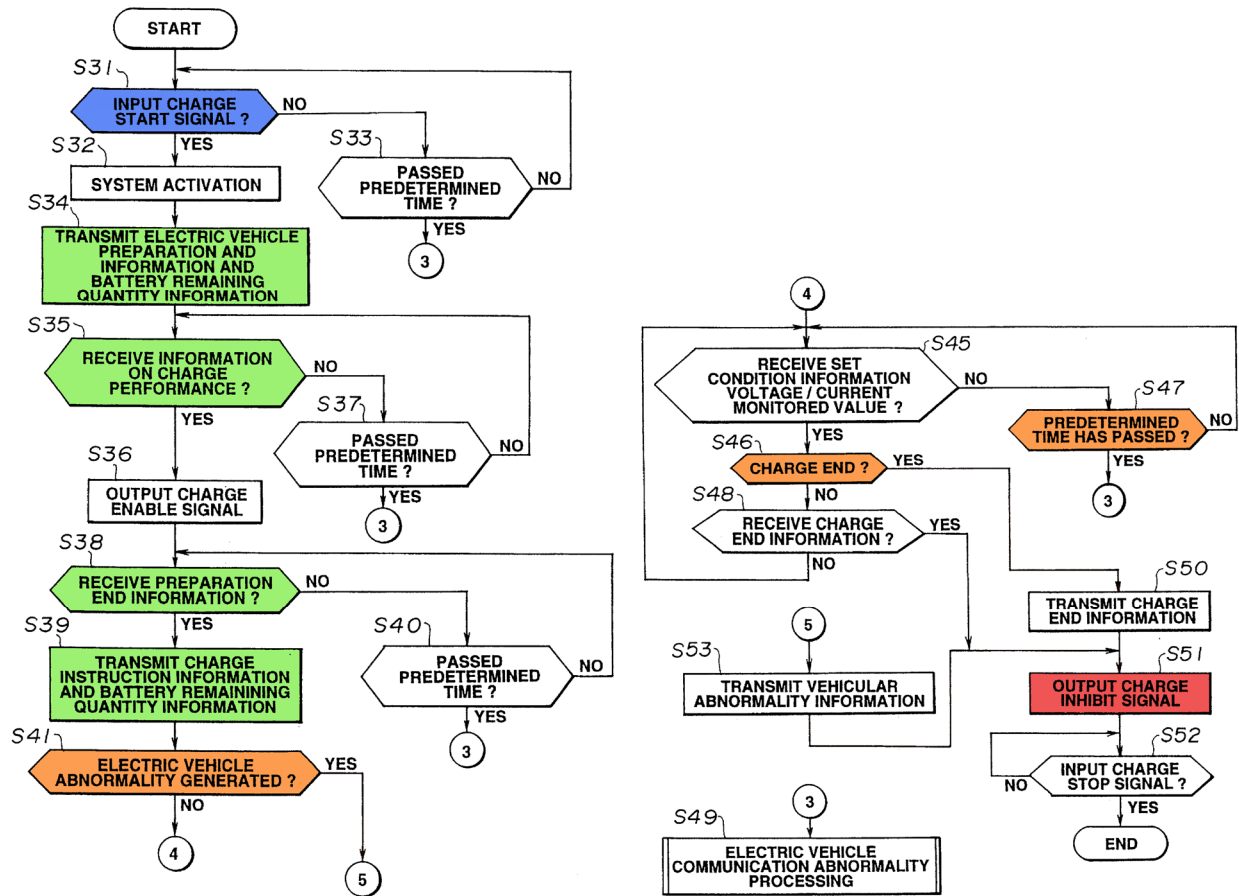
Id., Figs. 10A-10B.



Ex-1002, Figs. 10A-10B.

On the vehicle side, the charge start signal is received at S31 (blue), and vehicle-side steps occur for the exchange of information regarding initial charging

conditions (e.g., S34, S35, S38, and S39, all green). While electricity is flowing, Kimura's charging process monitors for vehicle-side interruptions at S41, S46, and S47 (orange), and detected interruptions lead to transmission of a charge inhibit signal at S51 (red) and eventual termination of the charging process.



Ex-1002, Figs. 12-13.

Portions of Kimura's charging process related to Figures 10A-10B are implemented by "a **microcomputer** of the charger controller 24" (*id.*, 6:9-15 and 6:13-15), whereas other portions related to Figures 12-13 of the charging process

are implemented by a microcomputer of the battery controller 14 (*id.*, 9:9-19 and 8:66-9:6).

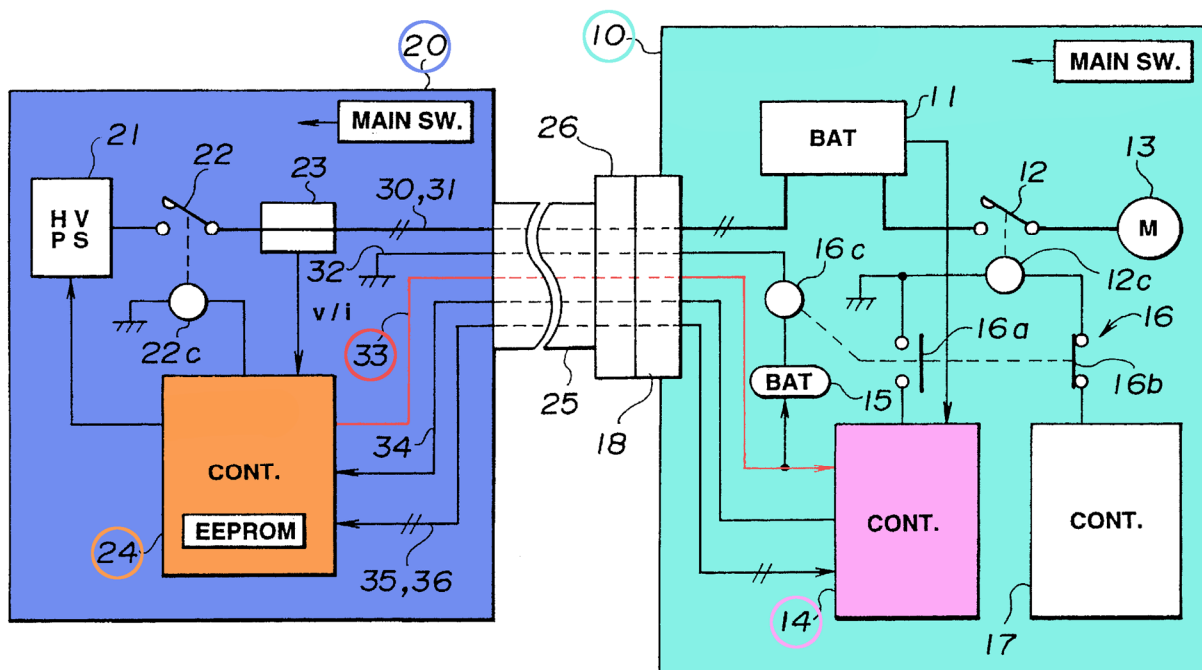
Thus, Kimura teaches *a computer* (e.g., the charger controller 24 and/or the battery controller 14, or at least portions thereof) *implemented method of managing a charging process* (e.g., control programs implementing Figures 10A, 10B, 12, and 13) *of an electric vehicle* (i.e., the electric vehicle 10). Ex-1009 ¶¶ 46-53.

2. 1[A]

1[A] recites, *responsive to receiving, from an energy transaction execution engine, a request signaling a start of the charging process, monitoring a set of operational parameters of the charging process during the flow of electricity for one or more interruptions*. Kimura teaches this.

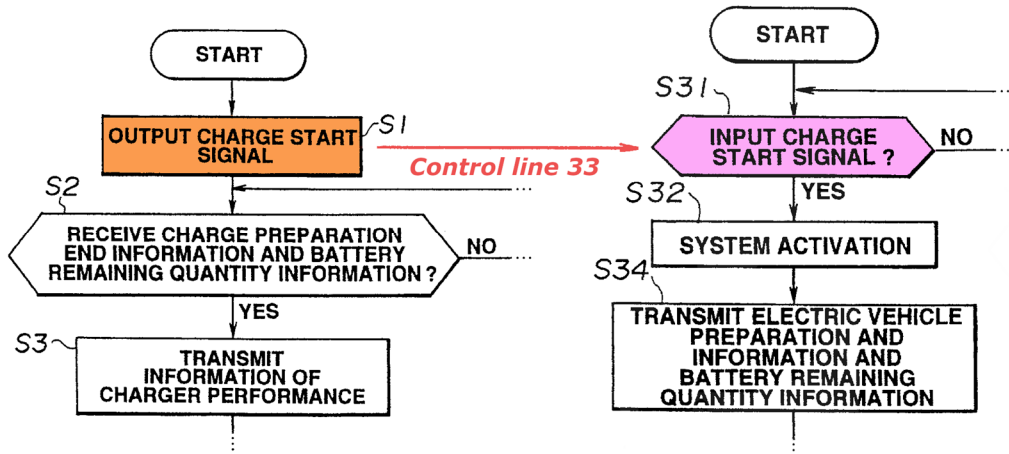
In Kimura, the charging process begins when the charger controller 24 (orange) transmits a charge start signal to the battery controller 14 (pink) via control line 33 (red). Ex-1002, 3:54-56 and 6:13-19.³

³ Kimura once mentions transmitting the charge start signal “via the control line **32**” (Ex-1002, 6:13-19), but this is erroneous. Kimura repeatedly says that signal is communicated via control line **33**. *Id.*, 9:30-32 and 3:53-55; *cf.* 3:45-48.



Ex-1002, Fig. 1.

The charge start signal acts as a request to the battery controller 14 signaling the start of the charging process. Transmission and receipt of this signal are illustrated in Figures 10A and 12, respectively, with the charger controller 24 transmitting the charge start signal at S1 (orange) and the battery controller 14 receiving the signal at S31 (pink). *Id.*, Figs. 10A and 12. The charging process then continues (*id.*, 6:14-18).



Ex-1002, Figs. 10A and 12 (excerpted).

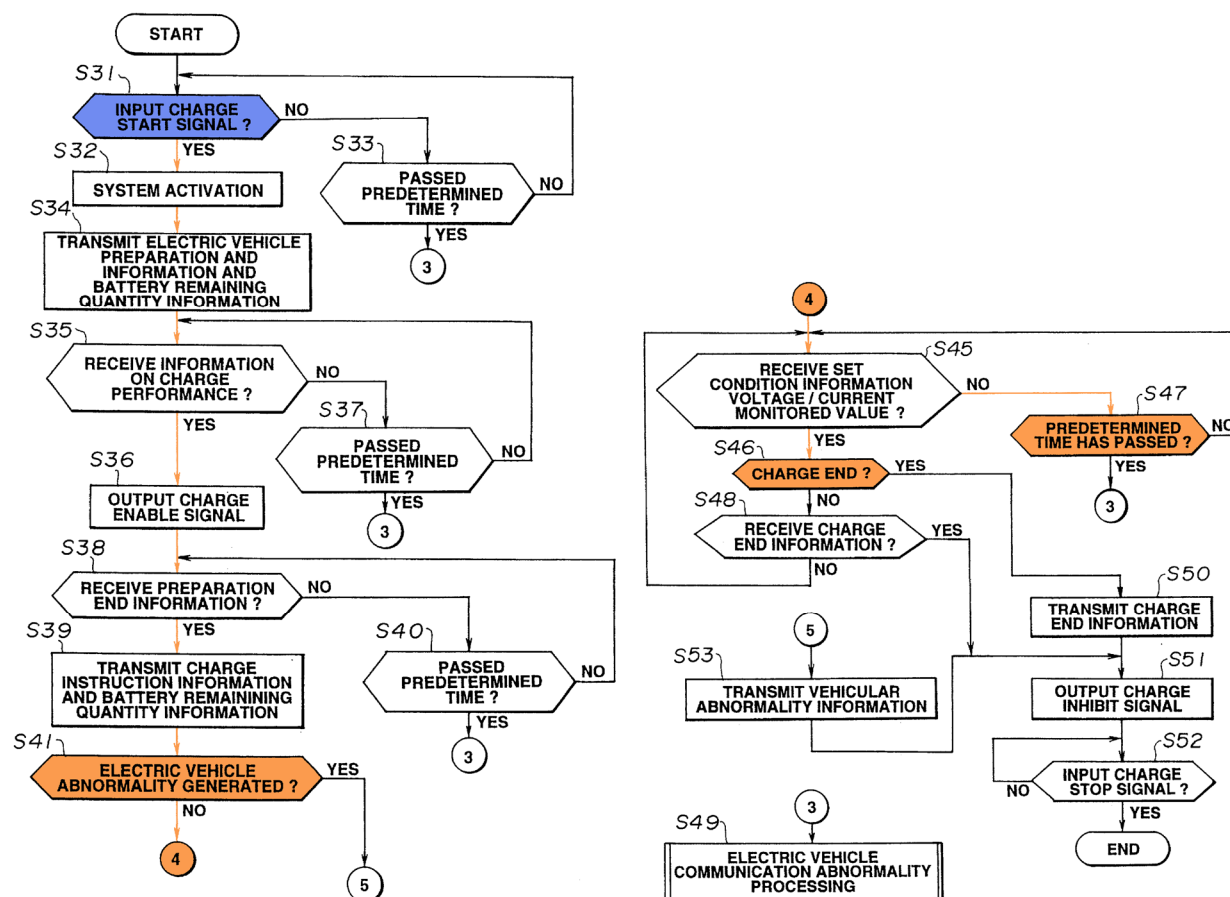
The source of the charge start signal—including portions of charger controller 24 implementing S1—qualifies as an *energy transaction execution engine*, as they execute energy transactions and the claim language requires nothing more. Kimura’s charger 20 includes its controller 24 and therefore qualifies as an *energy transaction execution engine* for similar reasons. Embodiments of the energy transaction execution engine in the ’391 Patent are likewise broad, with generic depictions in figures and general discussions in the text. *See, e.g.*, Ex-1001, 8:60-9:11, 12:11-19, and Figs 3-4.

Moreover, the charger controller 24 and the *energy transaction execution engine* from the ’391 Patent perform similar functions, including initiation and termination of the charging process, *compare* Ex-1002, 6:16-18 and 7:44-50 *with*

Ex-1001, 8:63-65 and 12:9-14, in the same way and for the same result (safely charging an electric vehicle), *compare* Ex-1002, 7:23-26 *with* Ex-1001, 1:66-2:13.⁴

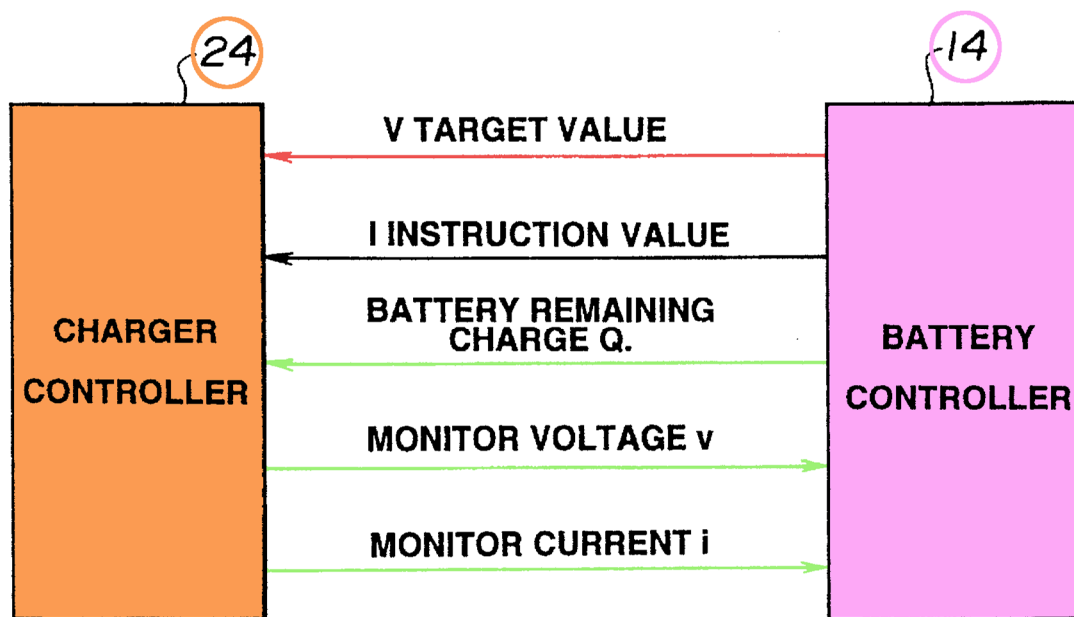
After the battery controller 14 receives the charge start signal from the charger controller 24, the battery controller 14 then monitors operational parameters responsive to receiving the signal. Ex-1002, 9:31-35 (describing receipt of and response to reception of the charge start signal), 10:19-50 (describing monitoring of the operational parameters), and Figs. 12-13 (illustrating the monitoring operations, e.g., at S41, S46, and S47, as being downstream from reception of the charge start signal, at S31).

⁴ The *energy transaction execution engine* does not appear to be in means-plus-function format, but, due to 37 C.F.R. § 42.104(b)(3), Petitioner cautiously notes that corresponding structure would be energy transaction execution engine 316 and any implementing algorithm. As explained above, Kimura at least teaches an equivalent. No admission is made concerning definiteness.



Ex-1002, Figs. 12-13.

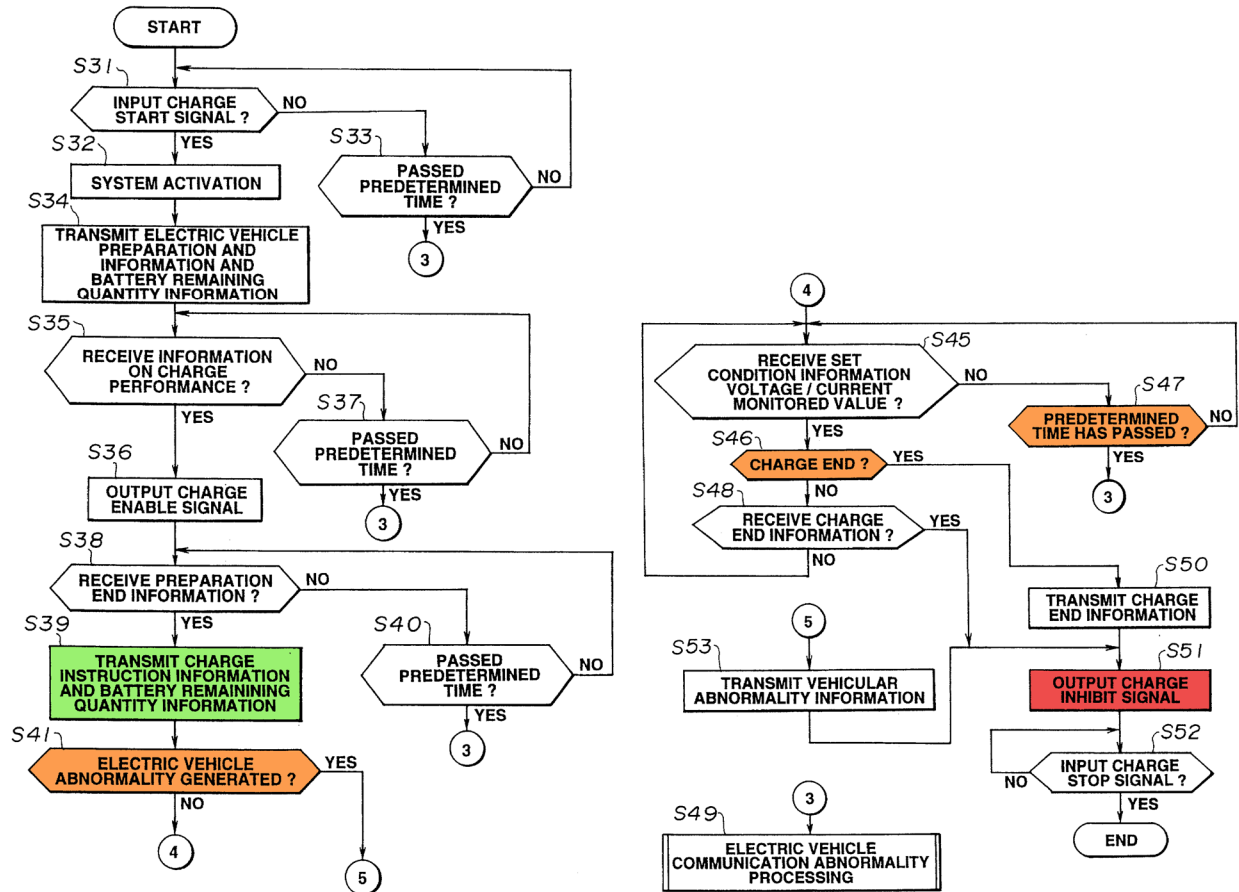
The operational parameters monitored by the battery controller 14 include amount of power leakage in the electric vehicle 10, state of the battery 11, state of the charge circuit, voltage of the battery 11, quantity of the battery 11, and communication delay time. *Id.*, 10:19-48; *cf.* Ex-1001, 11:20-22. Monitoring of voltage and current, for instance, is depicted in Figure 6 of Kimura, which illustrates the exchange of a voltage value, a current value, and a battery charge value (green), as well as a voltage threshold value (red). Ex-1002, 5:14-17; *see also id.*, Fig. 8 (similar illustration for different mode).



Ex-1002, Fig. 6.

Electricity begins to flow after the battery controller 14 and the charger controller 24 exchanges information regarding charge instructions and battery quantity. Ex-1002, 7:3-5, 10:7-13, and Figs. 10A and 12. In Figure 12, this exchange is indicated by S39 (green). *Id.*, Fig. 12. After the information is received at the charger controller 24, “a switch coil 22c is energized to turn on the switch 22 and the charging operation is started by controlling the high voltage power supply 21.” *Id.*, 10:13-26.

In Figure 12, each of the vehicle-side monitoring operations, S41, S46, and S47, occurs while electricity is flowing and prior to transmission of a charge inhibit signal at S51 (red). *Id.*, Fig. 12.



Ex-1002, Figs. 12-13.

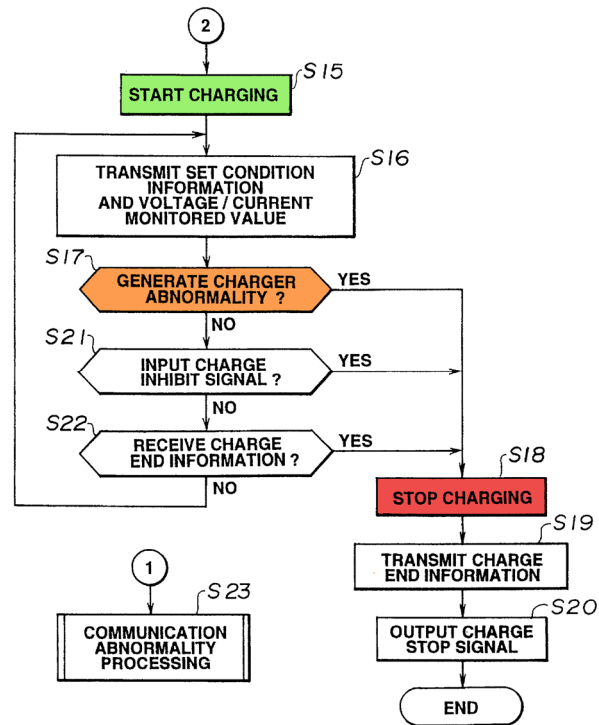
As Kimura explains, the battery controller 14 monitors the operational parameters to determine when to terminate. Ex-1002, 10:45-48. In other words, the monitoring operation involves monitoring for interruptions to the charging process. This is just like the '391 Patent, which explains that interruptions include events or circumstances that warrant termination of the charging process. Ex-1001, 11:8-12.

Vehicle-side interruptions in Kimura can be caused by power leakage in the electric vehicle 10, failure of the battery 11, a break in the charge circuit, a

communication failure with the charger controller 24, or the voltage or capacity of the battery 11 reaching a predetermined amount. Ex-1002, 10:19-48.

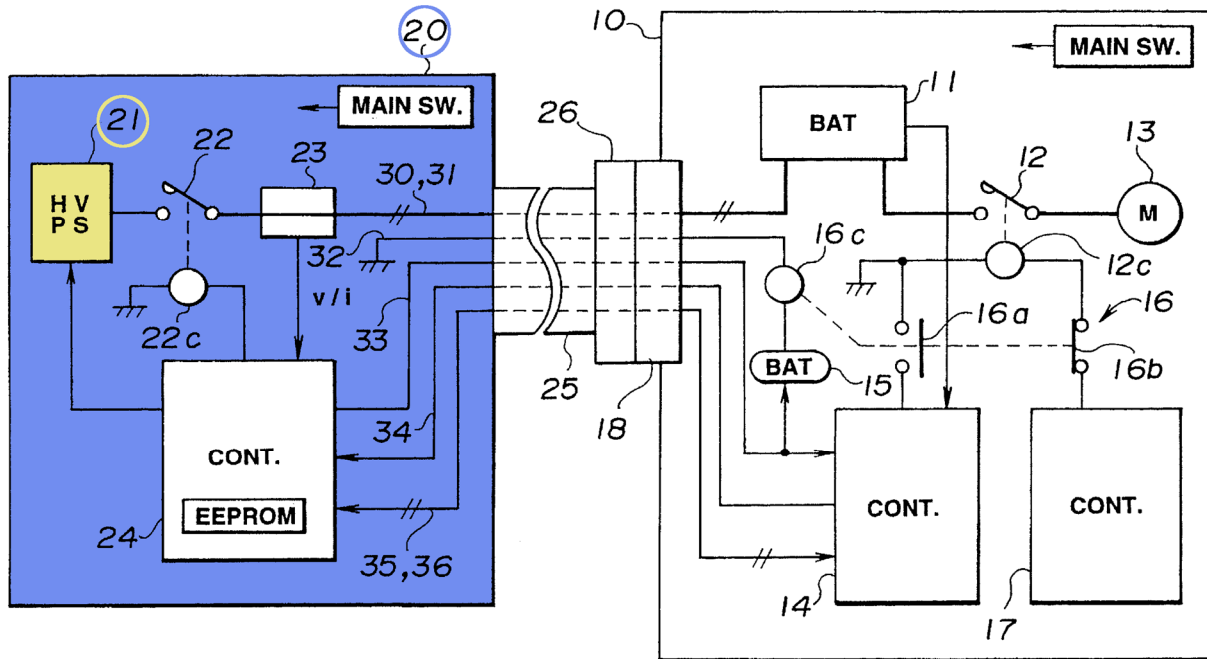
Thus, Kimura teaches *responsive to receiving, from an energy transaction execution engine* (e.g., the charger controller 24), *a request signaling a start of the charging process* (e.g., the charge start signal), *monitoring* (e.g., at the battery controller 14) *a set of operational parameters* (e.g., amount of power leakage in the electric vehicle 10, state of the battery 11, state of the charge circuit, voltage of the battery 11, quantity of the battery 11, and communication delay time) *of the charging process during the flow of electricity for one or more interruptions* (e.g., caused by power leakage in the electric vehicle 10, failure of the battery 11, a break in the charge circuit, a communication failure with the charger controller 24, or the voltage or capacity of the battery 11 reaching a predetermined amount). Ex-1009 ¶¶ 54-68.

If PO argues that the claims require monitoring and/or interruption detection at the charger side, Kimura teaches this. Kimura describes charger controller 24 monitoring operational parameters for interruptions during the flow of electricity. Ex-1002, 7:23-26 (indicating electricity begins to flow at S15, green), 7:33-39 (describing monitoring of the charging process, at S17), 7:40-44 (indicating electricity is cut off at S18, red).



Ex-1002, Fig. 10B.

S17 (orange) denotes monitoring for charger-side interruptions, which Kimura refers to as “charger abnormalit[ies].” In Kimura, charger-side interruptions can be caused by “a leakage in ... current of the charger 20 [purple], [or] a breakdown, overheat, or power failure in the high voltage power supply 21 [yellow].” *Id.*, 7:33-39.



Ex-1002, Fig. 1.

Detection of these charger-side abnormalities leads to charging-process termination. *Id.*, 7:33-39 and Fig. 10B (illustrating termination of the charging process, at S20, following detection of a charger abnormality, at S17); *cf.* Ex-1001, 11:8-12.

The monitoring performed at the charger controller 24 involves monitoring various operational parameters of the charging process. Ex-1002, 7:33-39. These operational parameters include the amount of current leakage in the charger 20 and the state of the high-voltage power supply 21. *Id.*

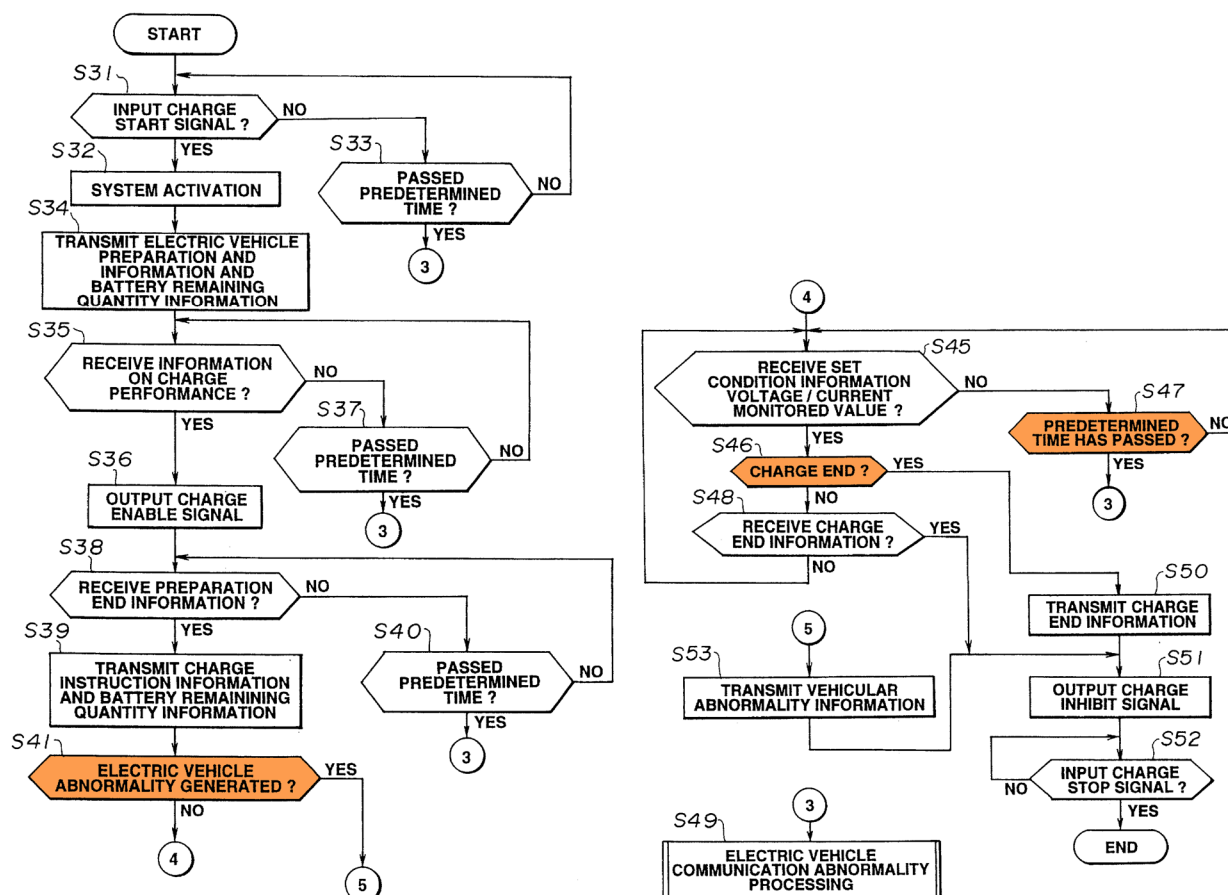
The charger side of Kimura's system also receives a charge enable signal at S5, which is also a *request signaling the start of the charging process*, and that

charge enable signal is “transmitted from the electric vehicle 10 via the control line 34” (i.e., the portions of the electric vehicle 10 responsible for transmitting the charge enable signal would be portions of the *energy transaction execution engine*). Ex-1002, 6:44-57. Ex-1009 ¶¶ 69-74.

3. 1[B]

1[B] recites *detecting the one or more interruptions during the flow of electricity from the set of operational parameters which conform to a set of predefined interrupt conditions*. Kimura teaches this.

Kimura explains that interruption detection involves determining whether the monitored operational parameters (assessed at S41, S46, S47, orange) conform to predefined interrupt conditions.



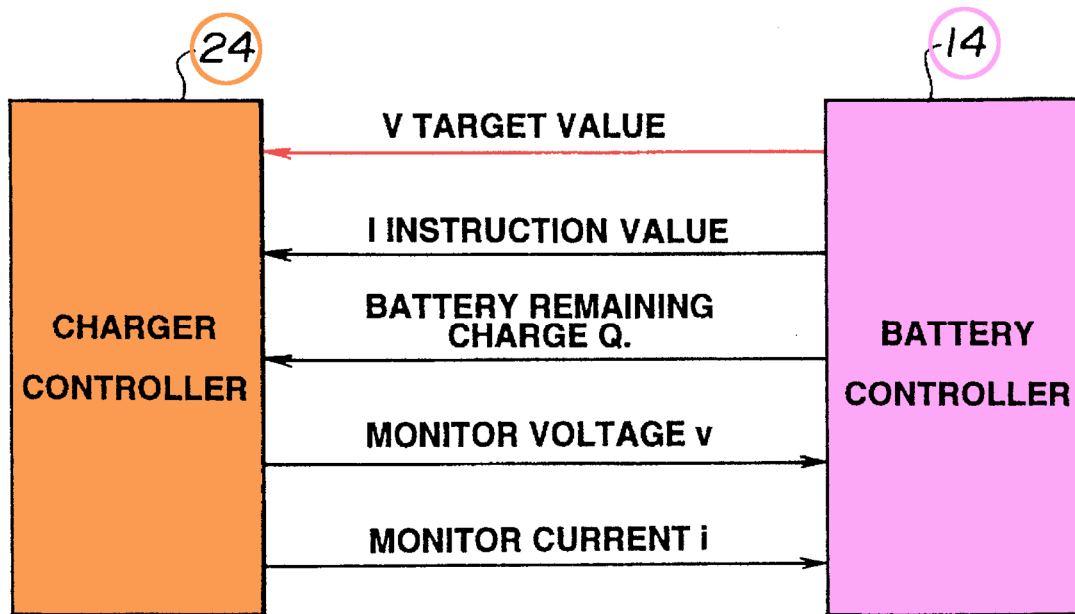
Ex-1002, Figs. 12-13.

For example, the battery controller 14 detects “communication abnormalit[ies],” based on whether a communication-delay parameter satisfies “[a] **predetermined** period of time.” *Id.*, 10:42-45. Specifically, the battery controller 14 determines that an interruption has occurred when the charger controller 24 fails to communicate with the battery controller 14 within the predetermined amount of time. *Id.*

As another example, the battery controller 14 detects “electric vehicle abnormalit[ies]” caused by “leakage of power in the electric vehicle 10,

battery [11] failure, and/or charge circuit breakage.” *Id.*, 10:19-22 and Figure 12 (“electric vehicle abnormalities,” S41).

To detect these abnormalities, Kimura teaches that information exchanged between battery controller 14 (pink) and charger controller 24 (orange) establishes relevant thresholds (e.g., a voltage target value, red) for detection of predefined interrupt conditions. *See, e.g., id.*, 7:27-31 (describing S16 at which set values of voltage or current and monitored values for those operational parameters are exchanged) and 10:32-37; *see also id.*, Fig. 8 (illustrating exchange of a current target value).



Ex-1002, Fig. 6.

For instance, Kimura describes “a step S45 in which the battery controller 14 determines whether **the set values of the voltage and current from the**

charger 20 via the control lines 35 and 36 and **the monitored values of the voltage and current** have [been] received from the charger 20.” *Id.*, 10:33-37.

The battery controller 14 then monitors for abnormalities “on the basis of the voltage and [the] remaining quantity of the battery 11.” *Id.*, 10:45-48. The interrupt condition in Kimura is a threshold or a state defining (e.g., received at S45), for instance, whether the battery 11 has failed or whether the amount of leakage in the electric vehicle 10 is sufficient for termination of the charging process. *Id.*, 10:19-22. Accordingly, detecting predefined interrupt conditions in Kimura involves comparing monitored values against the set values. *Id.*, 8:66-9:2 (“[T]he [battery] controller 14 always monitors whether a predetermined charge quantity is reached on the basis of a terminal voltage across the battery 11 during the charging operation.”).

At a minimum, detecting electric-vehicle abnormalities would have been an obvious technique for comparing an operational parameter against a corresponding, predefined interrupt condition. Ex-1009 ¶ 81.

Thus, Kimura teaches *detecting the one or more interruptions* (e.g., the communication abnormality, the electric vehicle abnormalities, or the interruptions caused by the voltage or quantity of the battery 11 reaching the respective predefined thresholds) *during the flow of electricity from the set of operational parameters which conform to a set of predefined interrupt conditions* (e.g., the

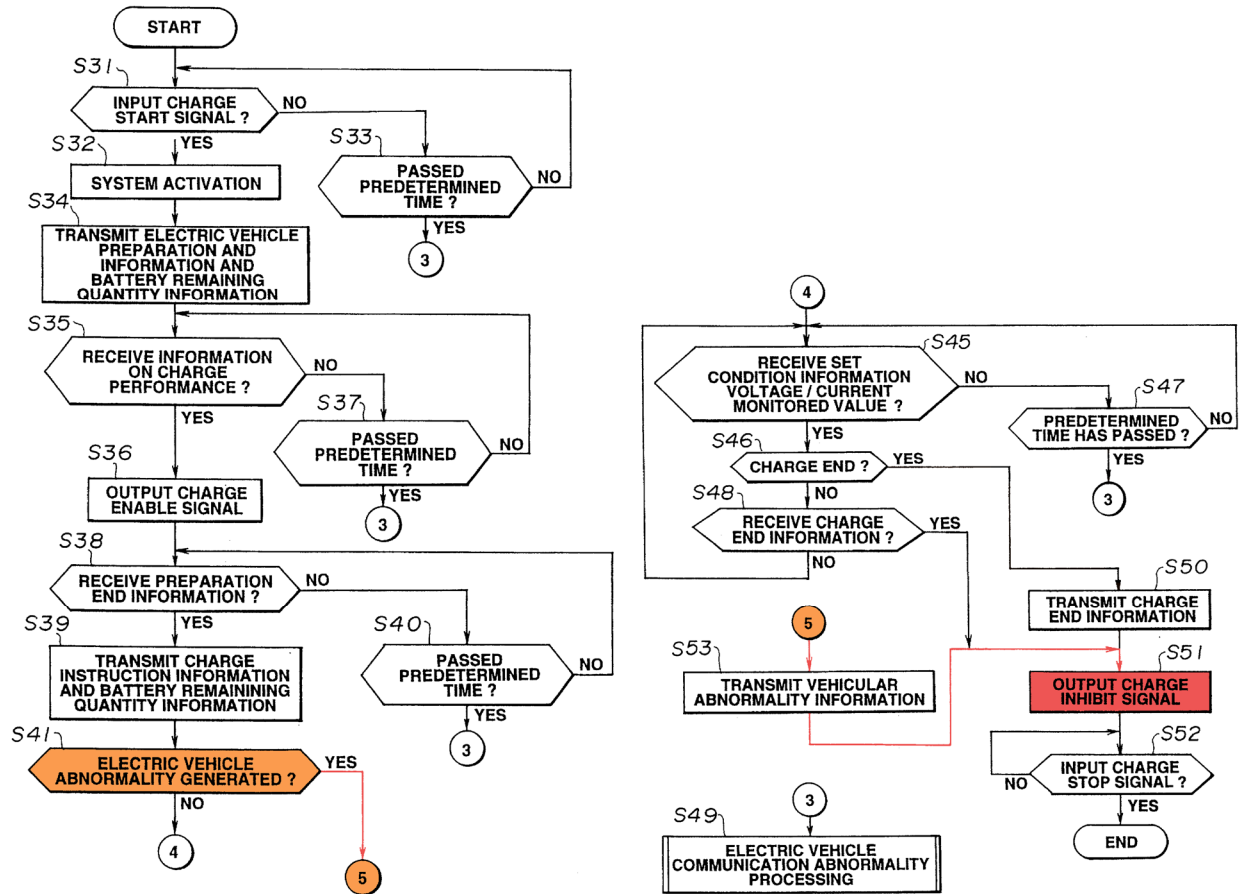
thresholds or states defining unacceptable values or limits for Kimura's parameters).⁵ Ex-1009 ¶¶ 75-82.

4. 1[C]

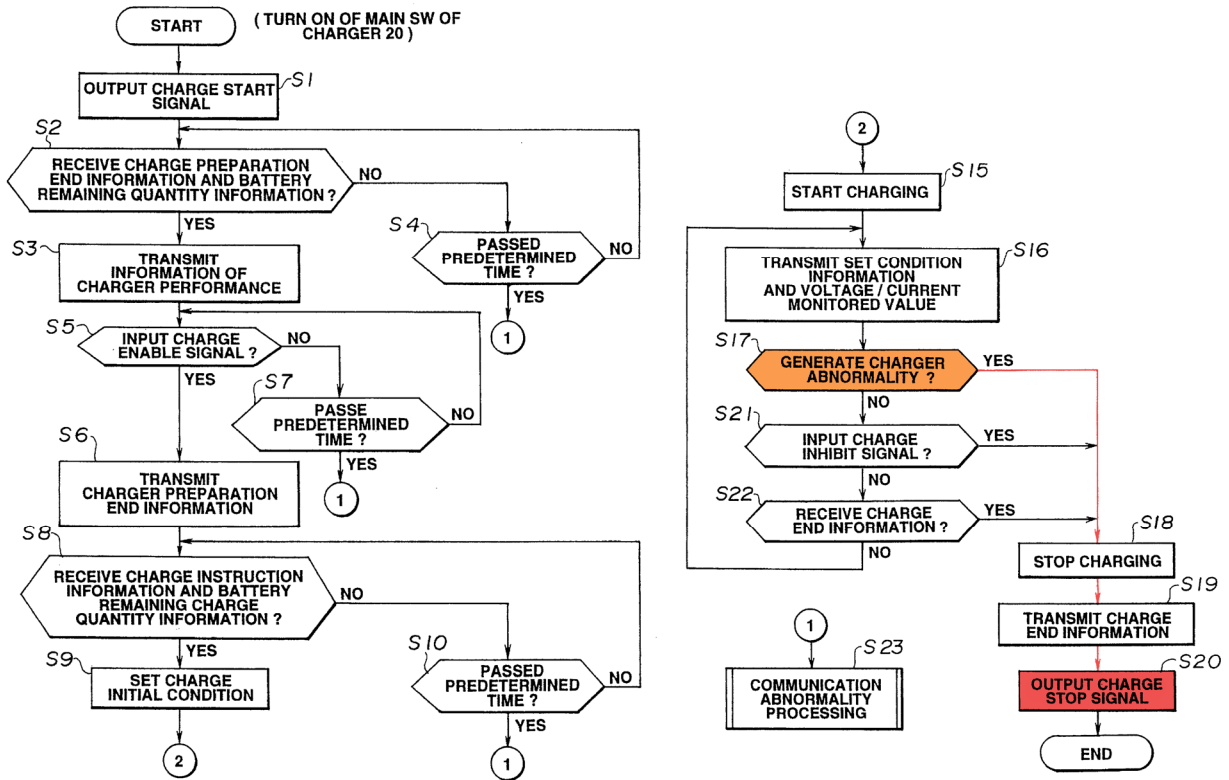
1[C] recites *wherein the one or more interruptions comprise at least one of a device capabilities interruption, a preference interruption, and a data services interruption*. Kimura teaches this.

The electric-vehicle and charger abnormalities in Kimura include device capabilities interruptions. These abnormalities lead to termination of the charging process based on capabilities of the devices involved. Ex-1002, 10:19-22, Figs. 12-13 (on vehicle side, illustrating transmission of the charge inhibit signal, S51 (red), as occurring responsive to detection of a device capabilities interruption, S41 (orange)), 7:33-36, and Figs. 10A-10B (on charger side, illustrating termination of the charging process, S20 (red), as occurring responsive to detection of a device capabilities interruption, S17 (orange)).

⁵ As noted (pp.18-21), Kimura teaches charger-side monitoring and interruption detection too.

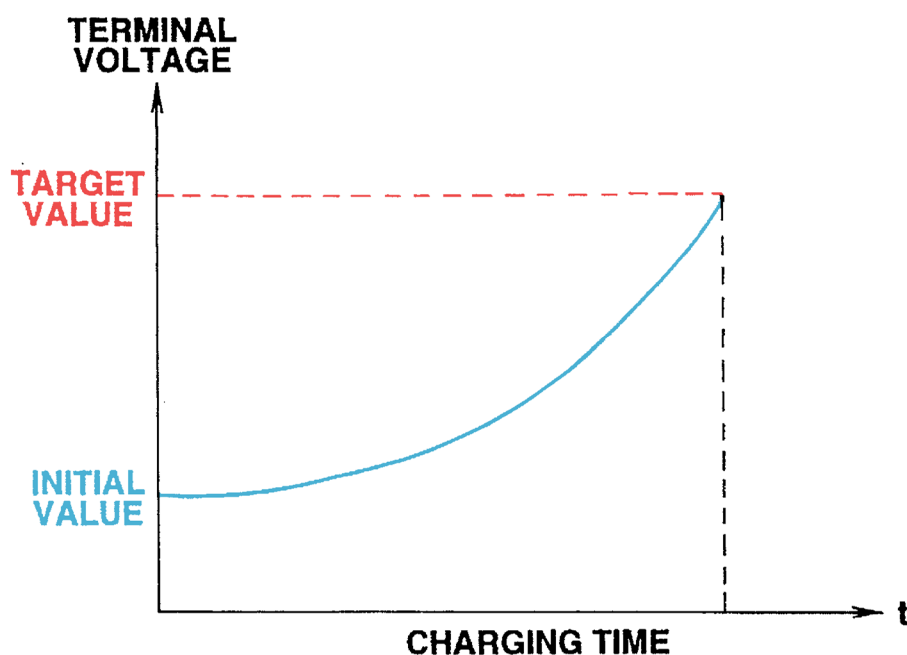


Ex-1002, Figs. 12-13.



Ex-1002, Figs. 10A-10B.

Preference interruptions, which can occur based on third-party defined preferences (Ex-1001, 13:22-33), occur in Kimura when the voltage of the battery 11 reaches a threshold set by a third-party. In Kimura, the terminal voltage is “set according to the type of the battery.” Ex-1002, 5:21-27. Kimura further explains that “target values of the voltages and currents ... may be set through a DIP switch and/or jumper switch.” *Id.*, 6:3-8.

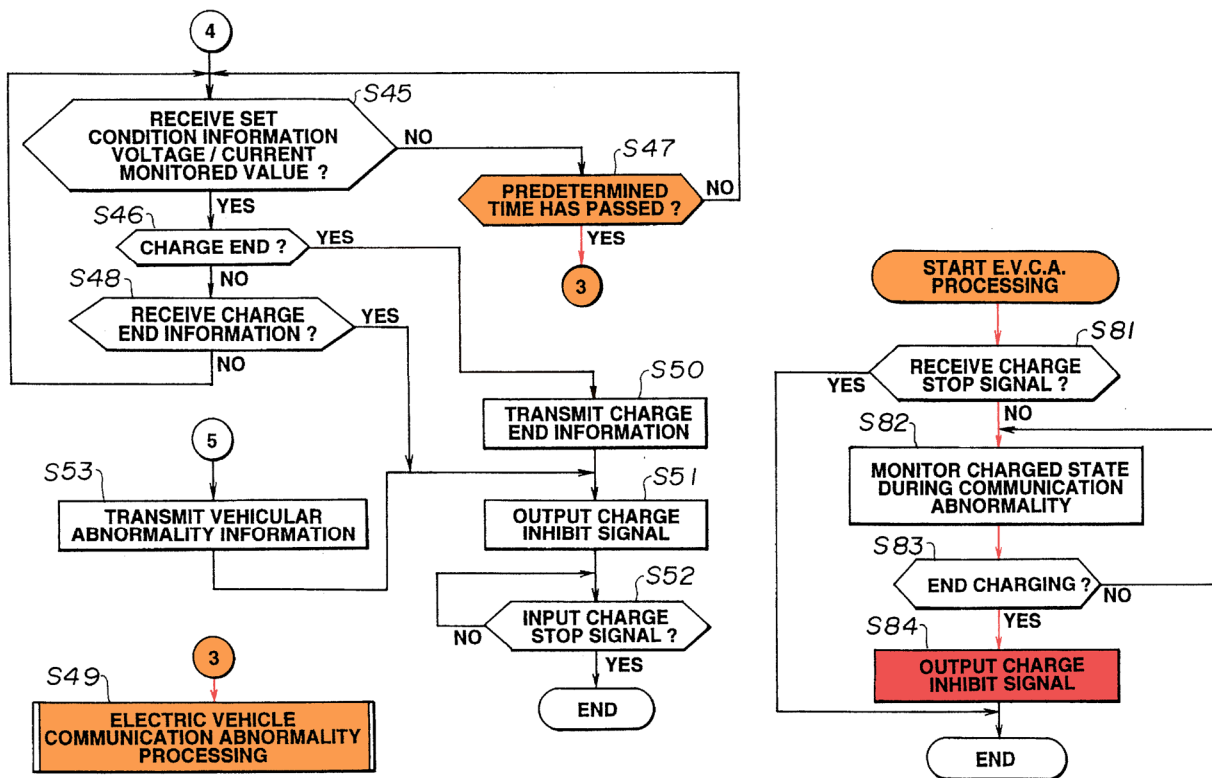


Ex-1002, Fig. 7.

Set voltage or current values constitute a preference with respect to the charging process, the violation of which causes a preference interruption. *Cf.* Ex-1001, 7:64-8:3. Accordingly, Kimura indicates that the charging process is terminated after detecting that “the terminal voltage [of the battery 11] exceeds a **predetermined threshold value.**” Ex-1002, 5:21-27

Kimura also teaches data services interruptions, an example being communication abnormalities. As in the '391 Patent, these abnormalities lead to termination of the charging process due to a communication failure between data sources, namely the battery controller 14 and the charger controller 24. Ex-1002, 2:6-13, 10:41-44, and Figs. 13 and 14 (data services interruption processing, at S47

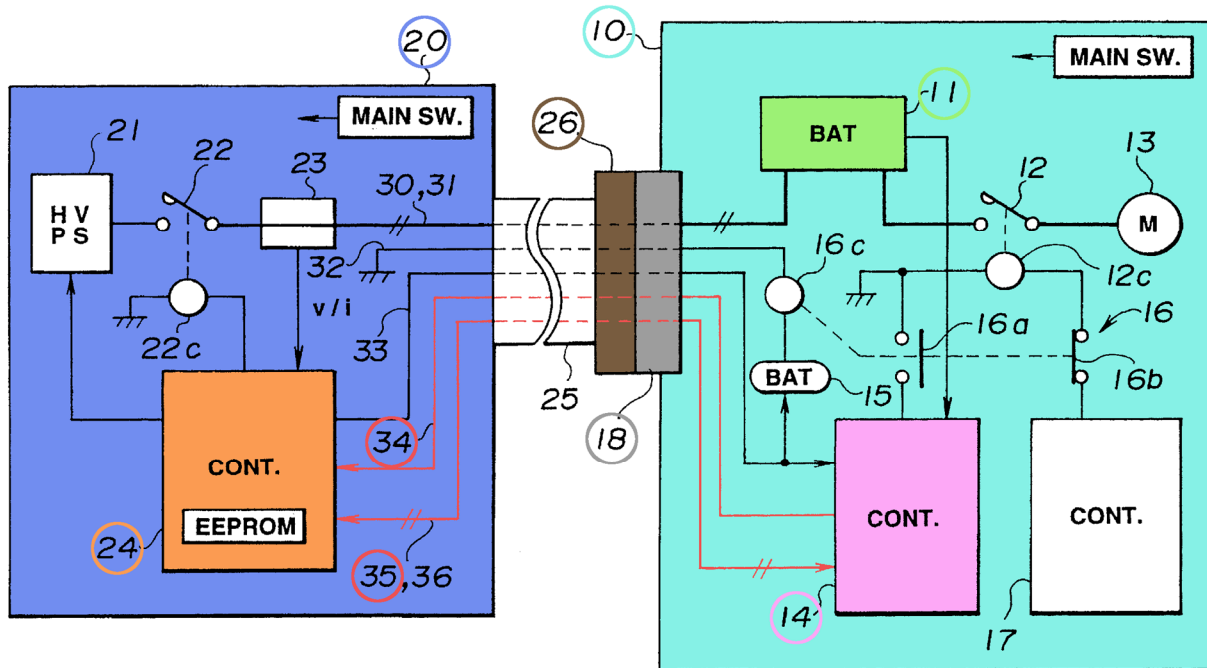
and S49 (orange), the subsequent output of a charge inhibit signal, at S84 (red), and the eventual termination of the charging process thereafter); *cf.* Ex-1001, 13:38-40 and 13:40-41. Specifically, a data services interruption occurs when the charger controller 24 fails to communicate with the battery controller 14 regarding threshold values and corresponding operational parameters. Ex-1002, 10:41-44.



Ex-1002, Figs. 13-14.

Another data services interruption occurs when a loose connection is detected between the charger connector 26 (brown) and the vehicle-side connector 18 (gray). Data signals are conveyed by way of control lines 34 and 35 (red), which “are communication lines used to perform the information receipt and

transmission related to various types of charges in accordance with a communication format previously prescribed between the battery controller 14 [pink] of the electric vehicle [10] [turquoise] and charger controller 24 [orange] of the charger 20 [purple].” Ex-1005 at 3:60-65.

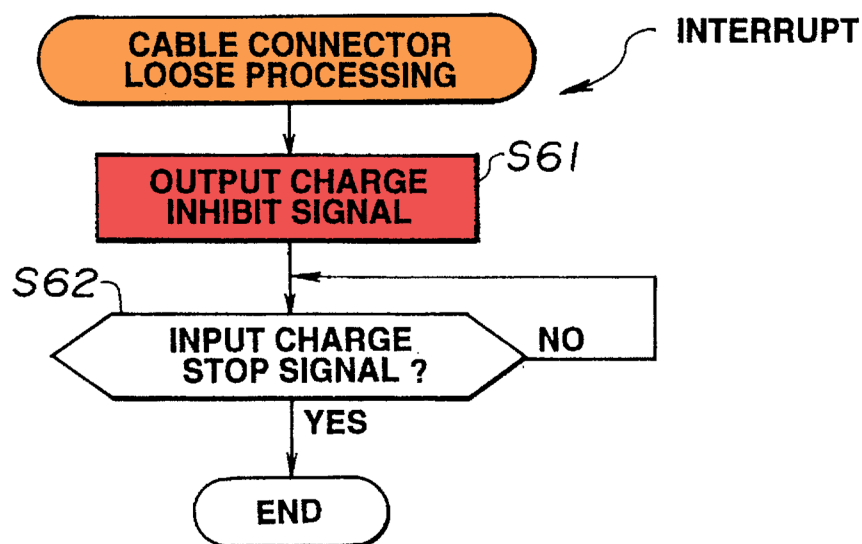


Ex-1002, Fig. 1.

To detect this data services interruption, an operational parameter in the form of “control current flowing through the control line 32 is detected,” and, “[i]f the control current is interrupted, the controller determines that the loose [sic] in the connectors 18 and 26 [has occurred] and immediately interrupts the charge current.” Ex-1005, 4:53-59; *see also id.*, 4:48-63 (noting that detecting this loose

connection interruption helps to avoid occurrence of large sparks in the control lines).

Kimura's Figure 15 provides more details on this data services interruption and explains that the routine of Figure 15 is executed by the microcomputer of the vehicle charge computer 24 and also that detection of this interruption (orange) leads the vehicle charge computer 24 to send the charge inhibit signal (red) to the energy transaction execution engine in Kimura (i.e., portions of the charger controller 14), thereby causing termination of the charging process.



Ex-1002, Fig. 15.

Similarly, because the connectors 26 and 18 also allow for delivering the flow of electricity to the vehicle battery, a loose connection at those connectors can also (or alternatively) indicate a device capabilities interruption—namely that the

charger device in Kimura is no longer able to properly deliver a charge to the vehicle.⁶

Thus, Kimura teaches *wherein the one or more interruptions comprises at least one of a device capabilities interruption* (e.g., the electric vehicle abnormalities or loose connection impacting control lines 30 and/or 31), *a preference interruption* (e.g., caused by the terminal voltage of the battery 11 reaching a predefined voltage level), *and a data services interruption* (e.g., the communication abnormalities or loose connection impacting data services). Ex-1009 ¶¶ 83-91.

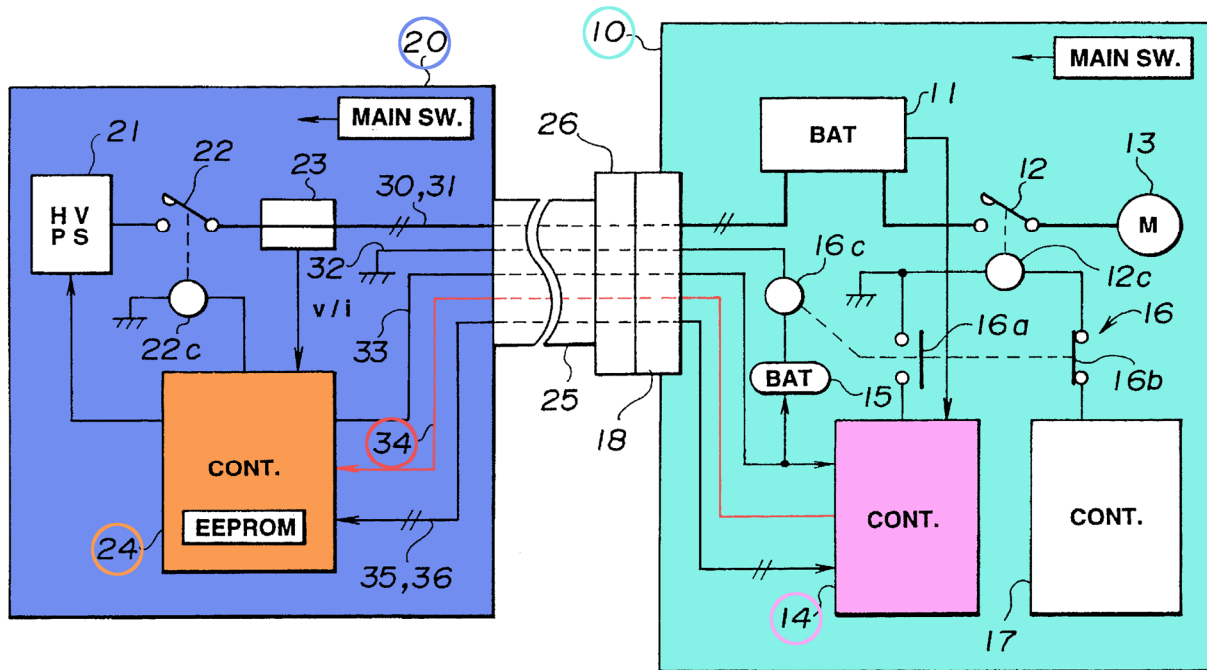
5. 1[D]

1[D] recites, *responsive to detecting the one or more interruptions, sending a response to the energy transaction execution engine to terminate the charging process*. Kimura teaches this.

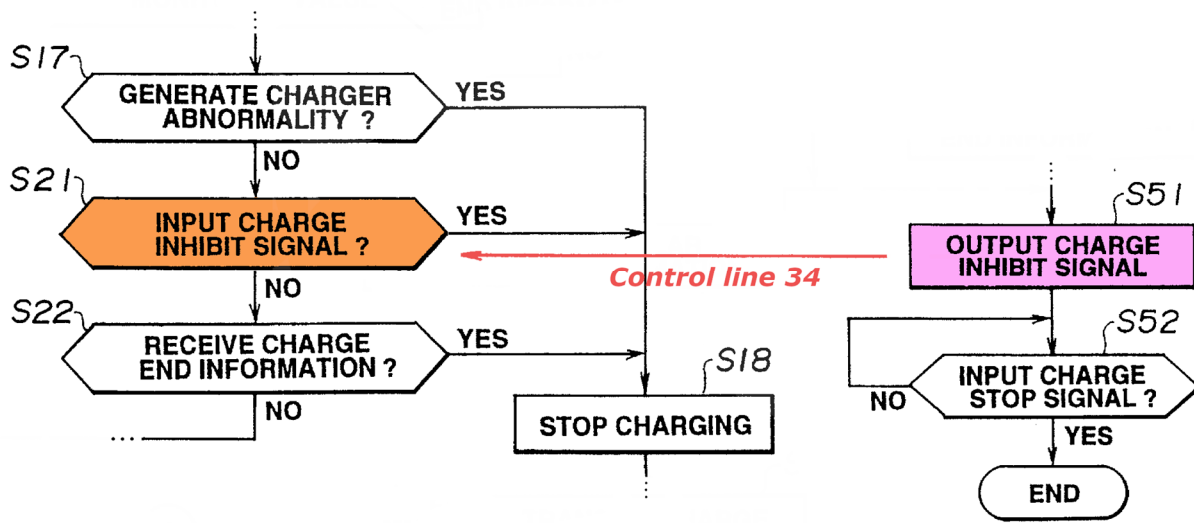
In Kimura, battery controller 14 (pink) sends a charge inhibit signal to charger controller 24 (energy transaction execution engine) via a control line 34 (red) after detecting an interruption. Ex-1002, 11:30-33. This signal is a response to terminate because it causes the charger controller 24 (orange) to terminate the

⁶ Nothing in the Challenged Claims nor in described embodiments precludes an interruption from qualifying as multiple types of interruptions.

charging process. *Id.*, 7:55-61 (stating that, “[i]n the case where **the charge inhibit signal is received** from the electric vehicle 10, some abnormality occurs in the electric vehicle 10 **so that a charge halt processing is executed** after the steps from the step S18.”).



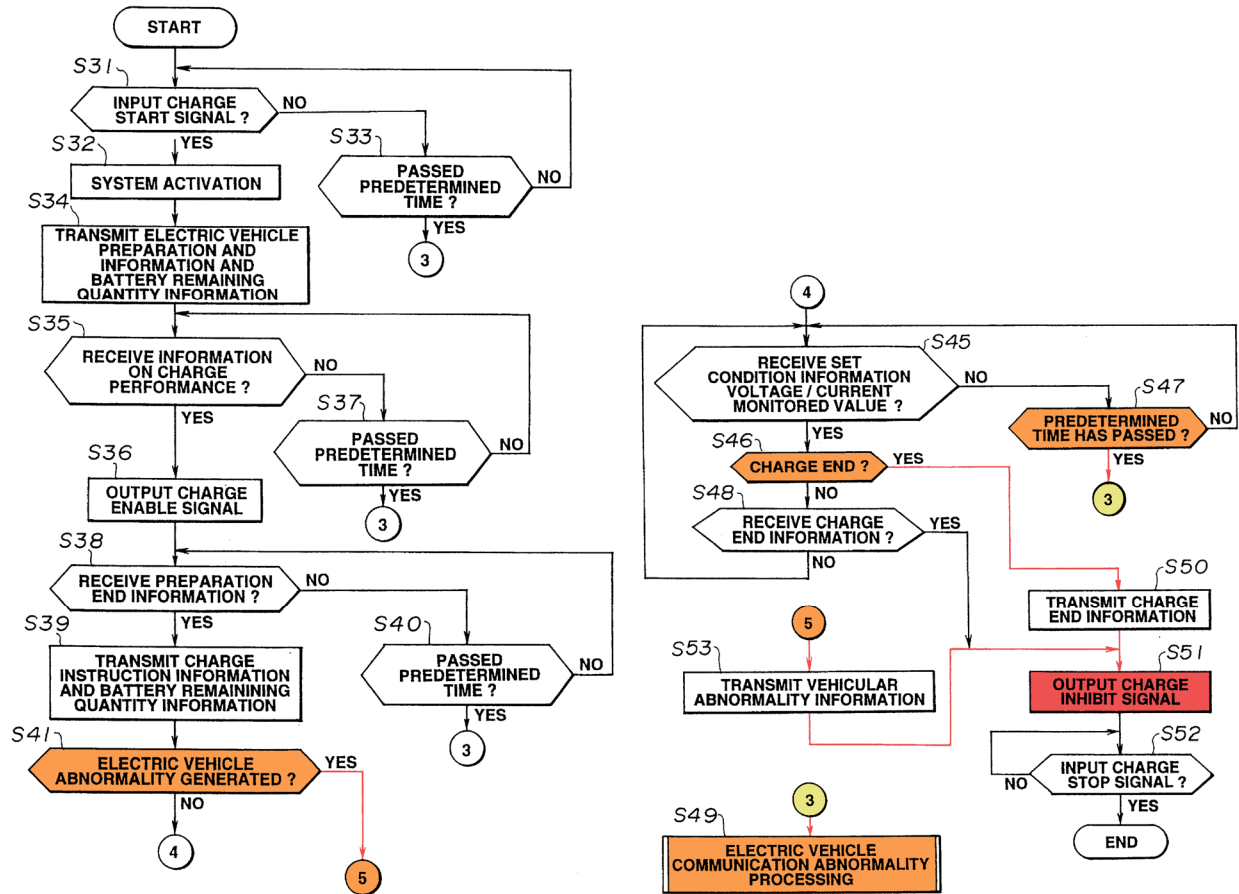
Ex-1002, Fig. 1.



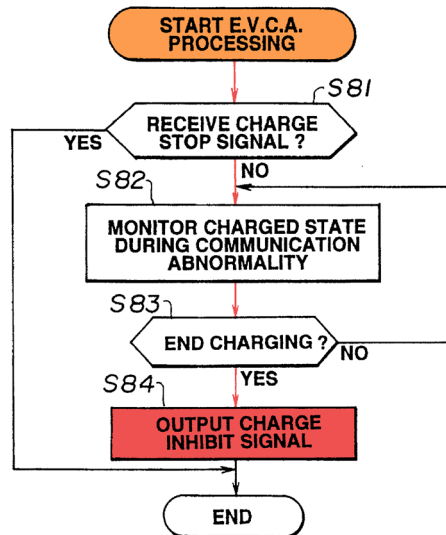
Ex-1002, Figs. 10B and 13 (excerpted).

Figures 12-14 show controller 14 sending the charge inhibit signal to controller 24 in response to detecting an interruption.⁷ *Id.*, Figs. 12-13 (illustrating transmission of the charge inhibit signal, at S51 and S84 (both red), as being downstream from interruption detection, at S41, S46, and S47-S49 (each orange)).

⁷ The pathway after S47 has the battery controller 14 forgoing the response to terminate the charging process if the charger controller 24 has already started termination (S81-Yes). There is another pathway where controller 14 sends that response (S81-No, pathway in red below in Figure 14). Ex-1009 ¶ 93.



Ex-1002, Figs. 12-13.



Ex-1002, Fig. 14.

Thus, Kimura teaches *responsive to detecting the one or more interruptions* (e.g., at the battery controller 14), *sending a response* (e.g., the charge inhibit signal) *to the energy transaction execution engine* (e.g., the charger controller 24) *to terminate the charging process.*⁸ Ex-1009 ¶¶ 92-94.

* * * *

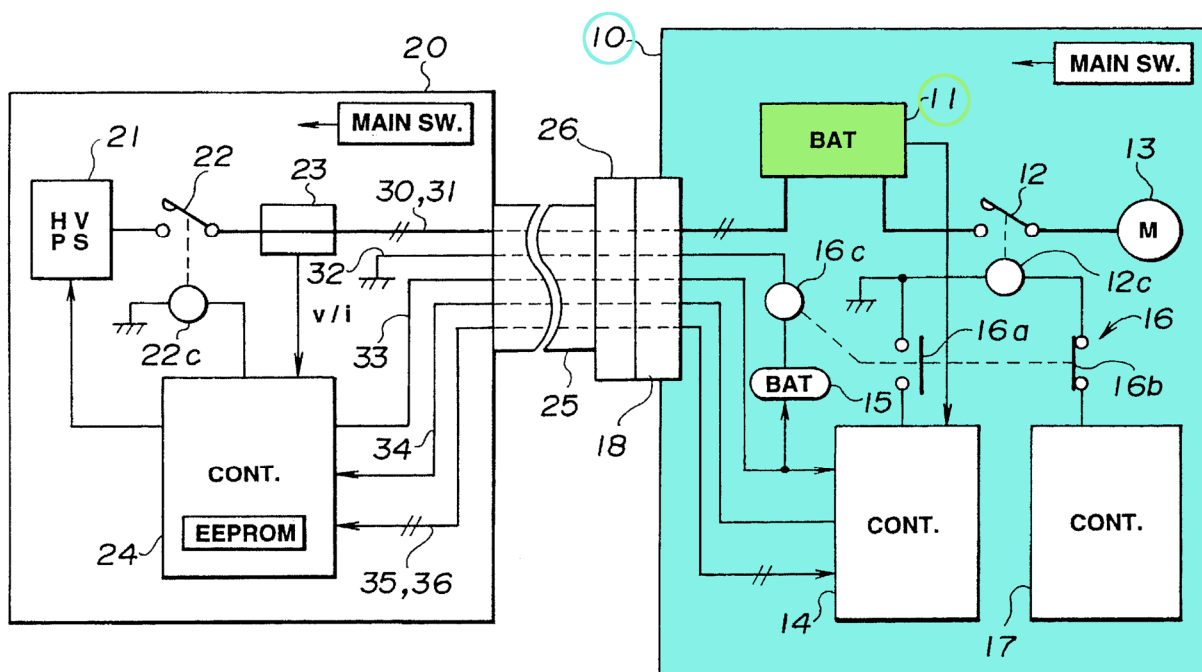
Kimura teaches each and every limitation of Claim 1, so it should be cancelled. Ex-1009 ¶¶ 44-95 (also discussing confirmation from J1772).

B. Claim 4

Claim 4 depends from Claim 1, which Kimura teaches. Section VIII(A). Claim 4 adds *wherein the one or more interruptions is the device capabilities interruption, and the device capabilities interruption originates from at least one component of an electric vehicle transaction infrastructure.* Kimura teaches this.

Of Kimura's device capabilities interruptions (Section VIII(A)(4)), some arise from power leaking from the electric vehicle 10 (turquoise), failure of the battery 11 (green), and a break in the charge circuit. Ex-1002, 10:19-22.

⁸ On the charger side (*see* pp.18-21 and nn.5,7), Kimura sends a response to terminate responsive to detecting an interruption. *See* Ex-1002, 7:33-44 and Fig. 10B (signal transmission between S17 to S18).



Ex-1002, Fig. 1.

Each of these device capabilities interruptions originates from a component of Kimura's infrastructure for enabling the charging of an electric vehicle, including the electric vehicle (and/or the charger), the battery, and the charge circuit. That these components of Kimura qualify as part of an electric vehicle transaction infrastructure is consistent with the '391 Patent, which describes "a charging infrastructure for managing all phases of an electric vehicle transaction," and also indicates that the example electric vehicle transaction infrastructure "may be implemented on a data processing system associated with an electric vehicle." Ex-1001, 7:32-34 and 9:61-67. The respective controllers on the vehicle and charger side process data and are thus data processing systems associated with

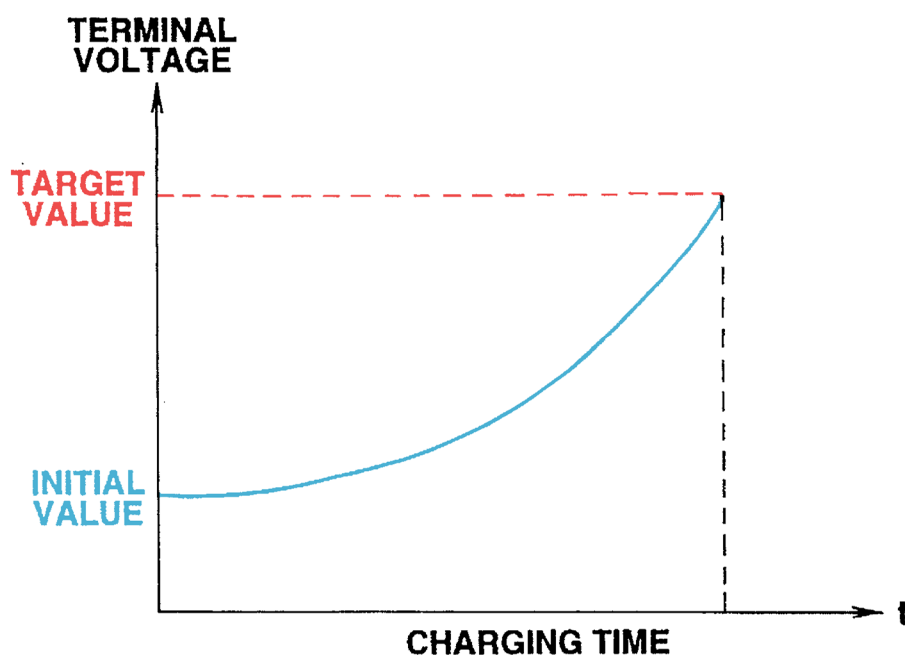
Kimura's electric vehicle, and those controllers are used to detect/originate the device capabilities interruptions.

Thus, Kimura teaches *wherein the one or more interruptions is the device capabilities interruption* (e.g., caused by power leaking from the electric vehicle 10, failure of the battery 11, or the charge circuit breakage), *and the device capabilities interruption originates from at least one component* (e.g., the electric vehicle 10, the battery 11, the charge circuit, or the battery controller 14 detecting the interruption) *of an electric vehicle transaction infrastructure* (e.g., including the charge circuit, as well as the electric vehicle 10 and the components thereof). Ex-1009 ¶¶ 96-99.

C. Claim 5

Claim 5 depends from Claim 1, which Kimura teaches. Section VIII(A). Claim 5 adds *wherein the one or more interruptions is the preference interruption, and the preference interruption is detected from a violation of a preference selected by a participant to the charging process*. Kimura teaches this.

One preference interruption in Kimura involves voltage (blue) reaching a predetermined target value (red). Ex-1002, 5:21-27 and 11:24-28 (referring to the threshold as a “preset voltage level”).



Ex-1002, Fig. 7.

Regardless of whether the voltage threshold is set by a user, a third party, or by a computer entity (e.g., controllers 14 or 24), setting the voltage threshold constitutes participation in the charging process. Accordingly, the voltage threshold is, at a minimum, necessarily set by a participant to the charging process.⁹

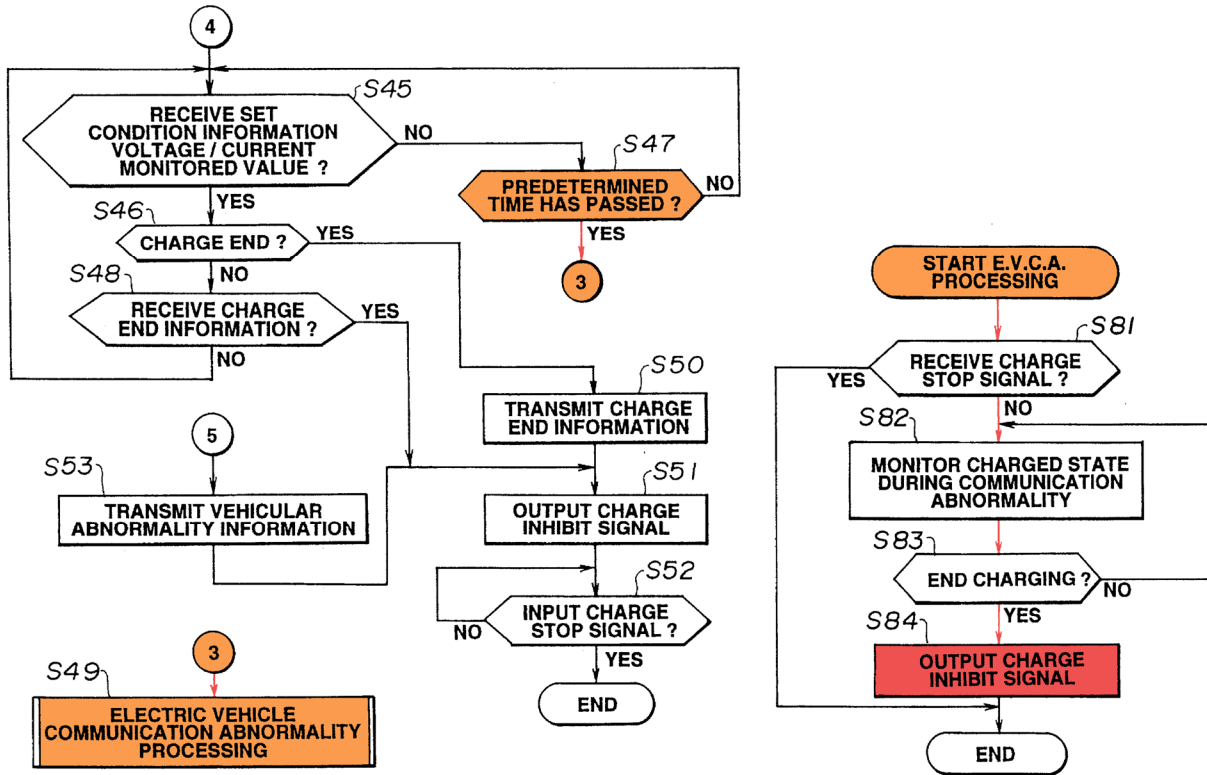
⁹ The phrase *participant to the charging process* is twice mentioned (Claims 5 and 12). The claims separately recite *participant* and *user*. Human users and electronic participants in the process both thus qualify as participants. *Cf.* Ex-1001, 13:21-36 (preferences set by “users or third parties”).

Thus, Kimura teaches *wherein the one or more interruptions is the preference interruption* (e.g., caused by the terminal voltage of the battery 11 reaching the predefined threshold), *and the preference interruption is detected from a violation of a preference selected by a participant to the charging process* (e.g., entity that selected the preference).” Ex-1009 ¶¶ 100-103.

D. Claim 6

Claim 6 depends from Claim 1, which Kimura teaches. Section VIII(A). Claim 6 adds *wherein the one or more interruptions is the data services interruption, and the data services interruption originates from a failure in data transmission*. Kimura teaches this.

One of Kimura’s data services interruptions occurs when the charger controller 24 fails to communicate with the battery controller 14 within a predetermined amount of time (S47-Yes and S49, orange). Ex-1002, 10:41-44. This originates from a failure in data transmission, namely, the failure of the charger controller 24 to communicate threshold values and corresponding operational parameters for the charging process to the battery controller 14. *Id.*



Ex-1002, Figs. 13-14.

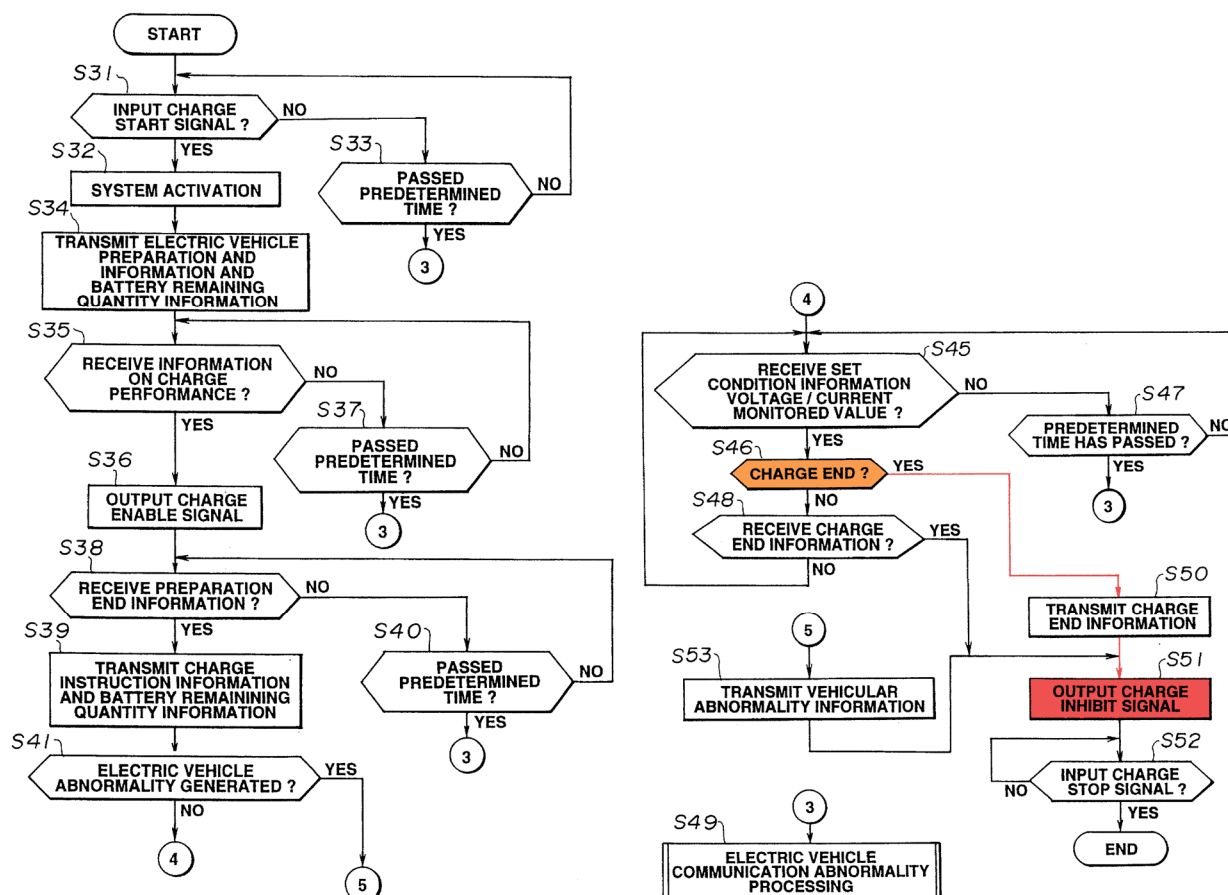
Thus, Kimura teaches *wherein the one or more interruptions is the data services interruption* (e.g., caused by failure of the charger controller 24 to communicate with the battery controller 14 within a predetermined period of time), *and the data services interruption originates from a failure in data transmission* (e.g., the failure in the transmission of data regarding threshold values and corresponding operational parameters for the charging process). Ex-1009 ¶¶ 104-106.

E. Claim 7

Claim 7 depends from Claim 1, which Kimura teaches. Section VIII(A).

Claim 7 adds *wherein the one or more interruptions are detected by identifying an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions*. This largely repeats features in Claim 1, while adding *the ... interruptions [being] detected by identifying an operational parameter*. Kimura teaches this.

An example of this is when the battery controller 14 detects that the voltage of the battery 11 (operational parameter) conforms to a predetermined voltage threshold (predefined interrupt). Ex-1002, 10:45-48. As Kimura explains, after the voltage exceeds the voltage threshold, the charger controller 14 outputs a charge inhibit signal, which ultimately causes termination of the charging process. Ex-1002, 10:45-48 and 10:54-56.



Ex-1002, Figs. 12-13.

Thus, Kimura teaches *wherein the one or more interruptions are detected by identifying an operational parameter* (e.g., the voltage of the battery 11) *from the set of operational parameters that conform to the set of predefined interrupt conditions* (e.g., an interrupt condition that occurs in Kimura when the voltage of the battery 11 exceeds the predetermined voltage threshold). Ex-1009 ¶¶ 107-09.

F. Claim 8

1. 8[P]

8[P] recites *a computer program product for managing a charging process of an electric vehicle*. If limiting, Kimura teaches this.

Kimura teaches “a charger control program” executed by charger controller 24, and “an electric vehicle charger control program” executed by battery controller 14. Ex-1002, 2:49-61 (indicating Figures 10A-10B depict the charger control program and Figures 12-13 depict the electric vehicle charge control program).

Thus, Kimura teaches *a computer program product* (e.g., the charger and electric vehicle charge control programs) *for managing a charging process* (e.g., the process of Figures 10A and 10B, as well as that of Figures 12-13) *of an electric vehicle* (e.g., the electric vehicle 10). Ex-1009 ¶¶ 111-12.

2. 8[A]

8[A] recites *a tangible computer-recordable storage medium*. Kimura teaches this. Kimura explains that “the microcomputer of the charger controller 24 starts the control program shown in FIGS. 10A and 10B” and that “the microcomputer in the battery controller 14 starts the execution of the control program shown in FIGS. 12 and 13.” Ex-1002 at 6:13-15 and 9:17-19. Because these microcomputers are able to start their respective control programs, this

means that those respective control programs are expressly, or at least necessarily, stored on one or more tangible, computer readable storage media. At a minimum, a POSA would have at once envisaged these respective control programs stored on one or more tangible computer readable storage media.

Thus, Kimura teaches *a tangible computer-recordable storage medium* (e.g., tangible, computer-recordable media storing the charger and electric vehicle charge control programs). Ex-1009 ¶¶ 113-15.

3. 8[B]-[E]

8[B]-[E] are substantively identical to 1[A]-[D] (Sections VIII(A)(2)-(5)), respectively, while adding *first, second, and third program instructions*. Kimura teaches the added recitations.

Each of the operations being associated with program instructions is taught in Kimura through its control programs executed by charger and battery controllers 24 and 14. A program executed by a microcomputer, as Kimura's control programs are, includes instructions for each of its operations, so each of the operations that is a part of Kimura's control programs also includes (at least necessarily) corresponding instructions within the control programs.

In seeking to build Kimura's system, a POSA would have known to store instructions for Kimura's control programs on a tangible computer-recordable

storage medium. To allow for the execution of these control programs taught by Kimura, storage was a necessary prerequisite.

Thus, Kimura teaches the added features regarding *first ...*, *second ...*, and *third program instructions* (e.g., instructions that, when executed, cause performance of Kimura’s charger and electric vehicle control programs). Ex-1009 ¶¶ 116-19.

4. 8[F]

8[F] recites *wherein the first program instructions, the second program instructions, and the third program instructions are stored on the tangible computer-recordable storage medium*. Kimura teaches this feature, as explained for 8[A]. Section VIII(F)(2).

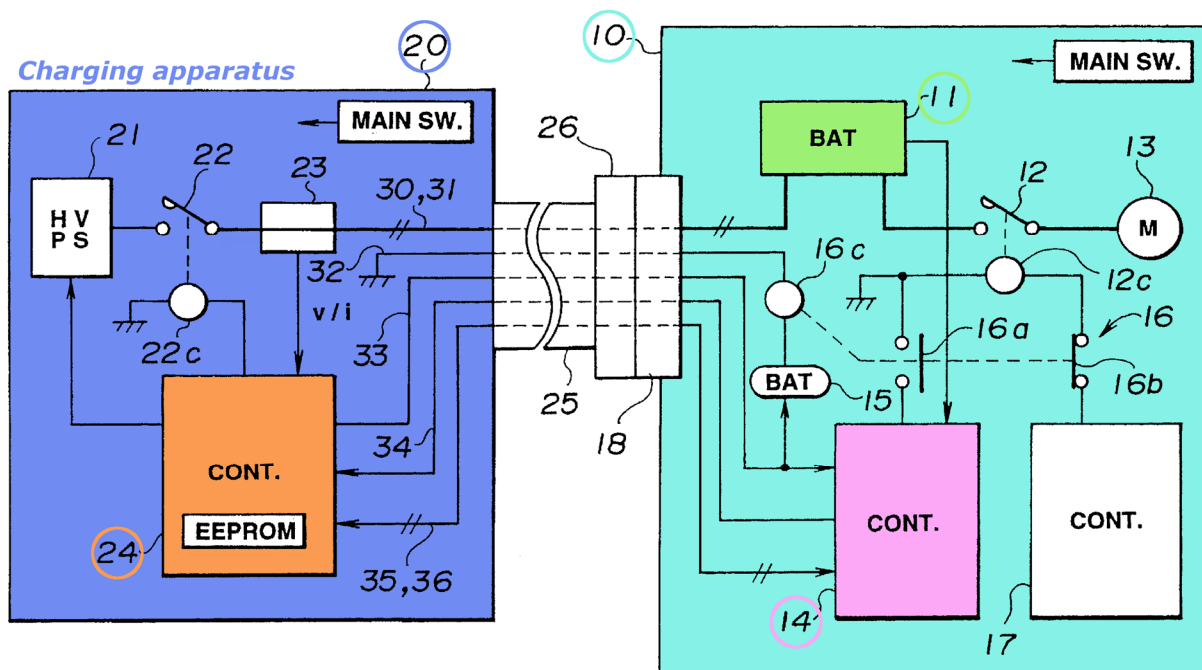
G. Claims 11-14

Claims 11-14 depend from Claim 8, which Kimura renders obvious. Section VIII(F). Claims 11-14 are analogous to Claims 4-7, so Claims 11-14 are rendered obvious by Kimura for analogous reasons (Sections VIII(B)-(E)).

H. Claim 15

1. 15[P]

15[P] recites *an apparatus*. If limiting, Kimura teaches this. Figure 1 of Kimura illustrates “a schematic circuit block diagram of a **charging apparatus** for an electric vehicle.” Ex-1002, 2:19-22.



Ex-1002, Fig. 1.

Thus, Kimura teaches *an apparatus* (e.g., the charging apparatus). Ex-1009 ¶¶ 124-25.

2. 15[A]-[C]

15[A]-[C] recite *a bus system; a memory connected to the bus system, wherein the memory includes a computer usable program code; and a processing unit connected to the bus system, wherein the processing unit executes the computer usable program code*. Kimura teaches this.

The '391 Patent indicates that its bus system “may be implemented using any suitable type of architecture that provides for a transfer of data between different components or devices attached to the bus system.” Ex-1001, 6:51-54. Kimura includes architecture that transfers data between the battery controller 14

and the charger controller 24, including respective buses necessary to Kimura's microcomputers for exchanging data using control lines 33, 34, 35, and 36. Ex-1002, 3:50-65.

Kimura further indicates that the microcomputers associated with its controllers 14 and 24 include "peripheral parts," (*id.*, 3:15-18), which a POSA would have understood to refer to aspects of the bus system to facilitate transferring data via the control lines. Ex-1009 ¶ 128. Moreover, Kimura indicates that the controllers 14 and 24 execute computer usable program code stored in a memory, as discussed with respect to Claim 8. *See* Section VIII(F)(2).

The microcomputers in Kimura form a processing unit (or one or more processing units) as those microcomputers execute (process instructions for) respective control programs on the vehicle and charger sides of Kimura's apparatus. *See id.*

At minimum, a POSA would have been motivated by these teachings to utilize buses of Kimura's microcomputers, the EEPROM (or other memory taught by Kimura, as discussed above) as a memory, and the microcomputers as a processing unit. This is consistent with the '391 Patent, which states that its bus system "may be implemented using any suitable type of architecture that provides for a transfer of data between different components or devices attached to the bus system." Ex-1001, 6:51-54. Further, this is also consistent with common

knowledge in the art, where computer programs were stored in memory and executed by computers such as the microcomputers of Kimura. Ex-1009 ¶ 130.

Thus, Kimura teaches *a bus system* (e.g., the control lines 33-36 and the peripheral parts); *a memory connected to the bus system, wherein the memory includes a computer usable program code; and a processing unit* (e.g., the microcomputers) *connected to the bus system, wherein the processing unit executes the computer usable program code.* Ex-1009 ¶¶ 126-131.

3. 15[D]-[G]

15[D]-[G] are substantively identical to 1[A]-[D], respectively, and those substantively-identical portions are taught or suggested by Kimura for analogous reasons to those above (Sections VIII(A)(2)-(5)).

I. Claims 18-19

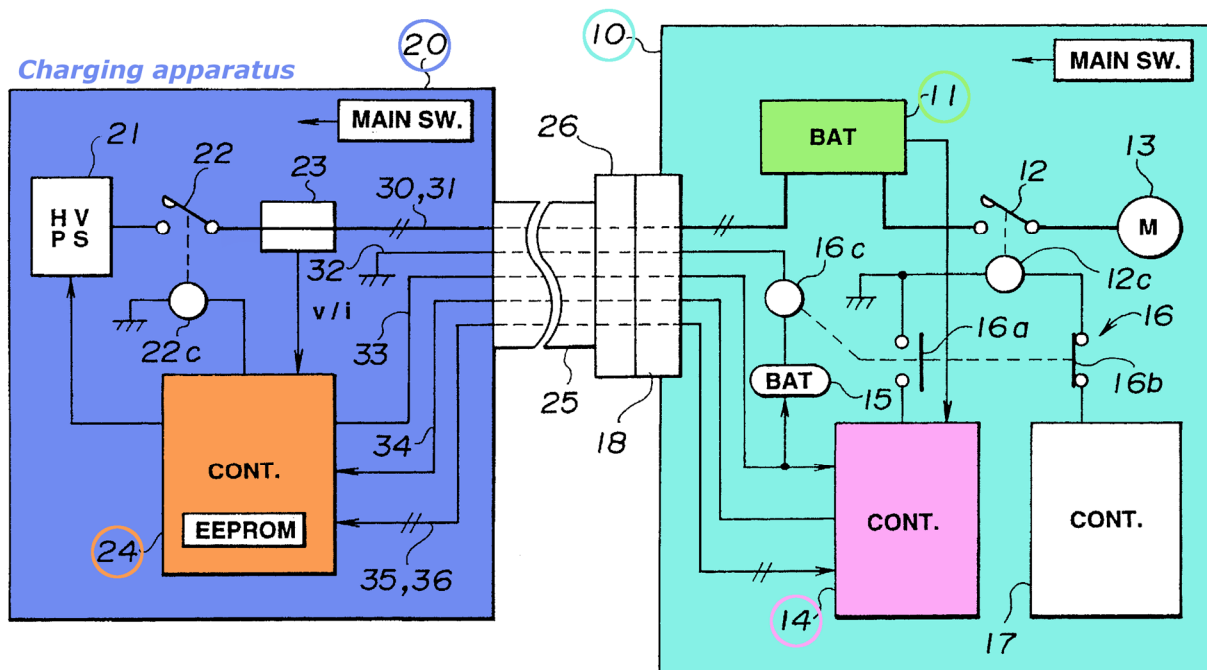
Claims 18 and 19 depend from Claim 8, which Kimura renders obvious (Section VIII(F)). Claims 18 and 19 are analogous to Claims 4 and 7, respectively, and are rendered obvious by Kimura for analogous reasons (Sections VIII(B) and (E)).

J. Claim 20

1. 20[P]

20[P] recites *a system for managing a charging process of an electric vehicle.* If limiting, Kimura teaches this.

This feature is disclosed by the “**charging apparatus** for an electric vehicle” of Kimura. Ex-1002, 2:19-22. Kimura’s charging apparatus includes components associated with the vehicle 10 (turquoise) and components associated with the charger 20 (purple), and the components of either side of the system (e.g., the respective controllers 14 and 24) are collectively used to manage Kimura’s charging process. Ex-1009 ¶ 136.



Ex-1002, Fig. 1.

Thus, Kimura teaches *a system* (e.g., including the electric vehicle 10 and its battery controller 14, as well as the charger 20 and its controller 24) *for managing a charging process of an electric vehicle* (e.g., the electric vehicle 10). Ex-1009 ¶ 136-37.

2. 20[A]

20[A] recites *an energy transaction execution engine, wherein the energy transaction execution engine executes the charging process*. Kimura's *energy transaction execution engine* is the charger controller 24 (or portions thereof). The charger controller 24 in Kimura executes the charger control program in Kimura, which, alongside the electric vehicle charger control program, allows for executing the charging process in Kimura.

3. 20[B]-[F]

20[B]-[F] recite *an energy transaction interrupt monitor, wherein the energy transaction interrupt monitor ... performs the operations of 1[A]-[D]*. The interrupt monitor in Kimura is the vehicle controller 24 (or portions thereof), which executes the electric vehicle charge control program to monitor for interruptions to Kimura's charging process, as explained previously. Section VIII(A)(2).

Monitoring functions occur on the charger side too, so those portions of the charger controller 24 involved with monitoring functions (e.g., portions of the charger controller 24 associated with S17) not only can be considered as part of the *energy transaction execution engine*, but they also, or alternatively, can be considered a part of both the execution engine and the interrupt monitor as the claims do not preclude this, nor do the examples in the '391 Patent. Ex-1009 ¶ 139-40.

IX. GROUND #2: KIMURA IN VIEW OF HOTTA RENDERS CLAIMS 2, 5, 9, 12, AND 16 OBVIOUS

A. Motivation to Combine Kimura and Hotta

Kimura and Hotta share a field of endeavor with the '391 Patent—charging processes for electric vehicles. Ex-1001, 1:8-14; Ex-1002, 1:7-8; Ex-1003, 1:12-17. Kimura and Hotta are at least reasonably pertinent to at least one problem of the '391 Patent—designing charging processes that work for complex sets of circumstances. Ex-1001, 6:60-7:11; Ex-1002, 7:33-49 and 10:18-31; Ex-1003, 1:64-2:63.

Ample motivation-to-combine also existed.

First, Kimura provides express motivation for a POSA to seek out “various changes and modifications” that “may be made without departing from the scope of” Kimura’s invention (Ex-1002 at 12:30-34) and also provides a description of certain aspects, including a mention of “a main switch (not shown) of the charger 20,” without complete implementation details (*id.*, 6:13-15). In view of the express motivation and the minimal detail provided around certain aspects, a POSA would have been motivated to look to analogous references (including Hotta), e.g., to help understand these certain aspects including related to the purposes that might be served by Kimura’s “main switch.”

Upon reviewing the analogous Hotta reference, a POSA would have seen its teachings related to use of command keys (a charging start command key and a

charging stop command key (Ex-1003, 1:19-26)), as well as the use of a scheduled boarding time setting key switch, and would have been motivated to modify Kimura's system to include such command keys (and/or its existing main switch could have been used in accordance with Hotta's teachings). Ex-1009 ¶ 146. Allowing for manual control for a user to stop Kimura's charging would have been a desirable feature to ensure consistency with teachings from relevant standards. *Id.* This would have further motivated a POSA to implement it to assure a safe and commercially-desirable system. *Id.* Likewise, allowing for use of a key switch like Hotta's boarding time setting key switch would have enhanced the prospects of creating a commercially successful device, thus motivating the inclusion of such a feature.

Second, at a minimum, making use of Hotta's command keys in Kimura's system would have been obvious to try (finite number of predictable solutions for implementing manual inputs in charging systems, including by using Hotta's command keys) or would have been a simple substitution of one known element (Kimura's lightly-described main switch) for another known element (Hotta's command keys) to achieve predictable results (a charging process that can be stopped by pressing Hotta's charging stop command key). *Id.* ¶ 147.

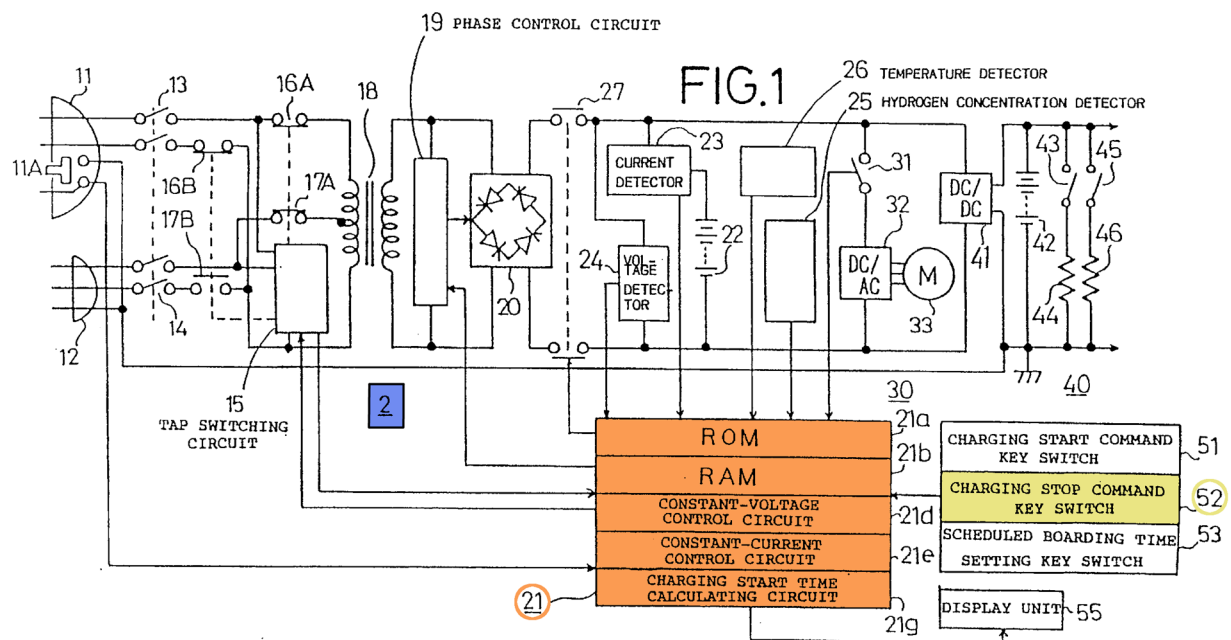
Adding Hotta's command keys to Kimura's system, or modifying Kimura's main switch in accordance with the functions of Hotta's command keys, would

have been routine for a POSA exercising only ordinary skill, so the modification would have been achieved with a reasonable expectation of success and the manual interruption would have been handled like any other interruption in Kimura. *Id.* ¶ 142-48.

B. Claim 2

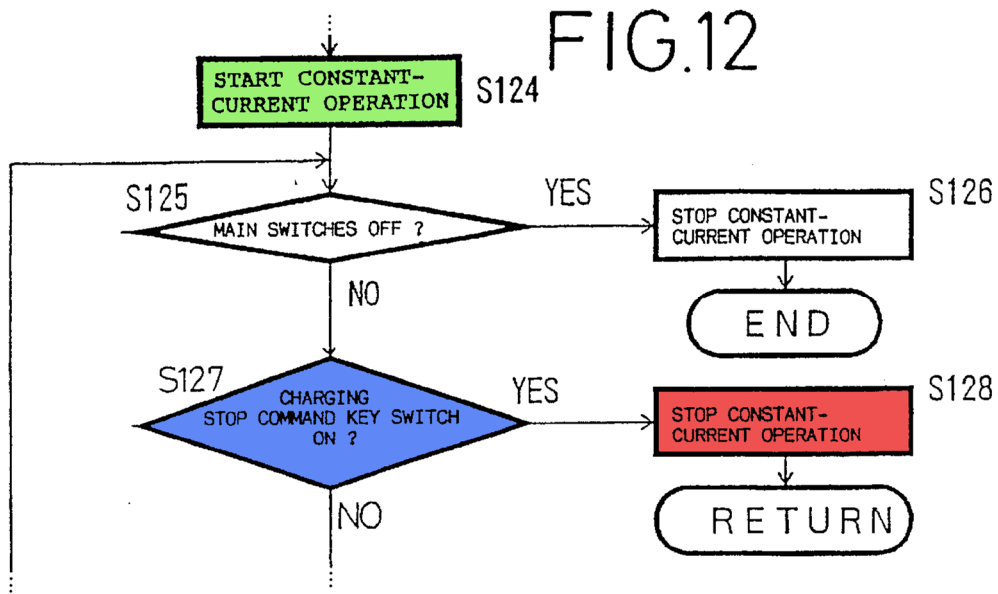
Claim 2 depends from Claim 1, which Kimura teaches or suggests (Section VIII(A)), and Kimura-Hotta retains those aspects of Kimura relied on against Claim 1. Claim 2 specifies *a manual override interruption* and that, *responsive to receiving, from a user, the manual override interruption, terminating the charging process*. Hotta discloses this.

In Hotta, an electric vehicle charger 2 (purple) includes a controller 21 (orange) with a charging stop command key switch 52 (yellow). Ex-1003, Fig. 1 and 3:30-31. “If the charging stop command key switch 52 is turned on,” Hotta explains, “then the constant-current operation is stopped in a step S105.” *Id.*, 15:42-47.

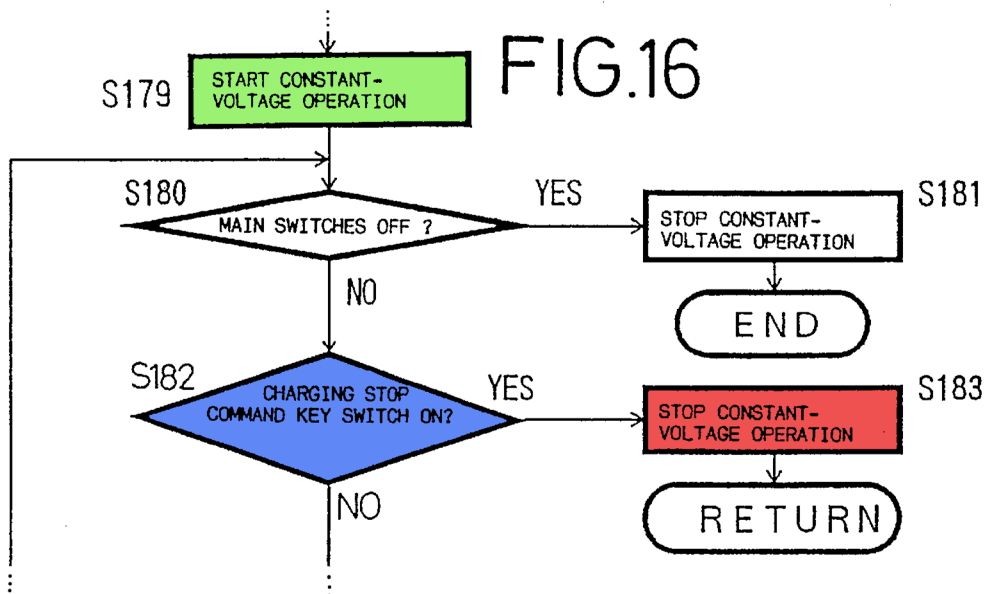


Ex-1003, Fig. 1.

Turning on charging-stop-command key switch 52 is a manual override interruption as it causes termination. Cf. Ex-1001, 12:26-28. Hotta shows in its figures that manual pressing on the charging stop command key switch at S127 and S182 (blue) leads to a stopping of its respective charging operation S128 or S183 (red), and that detection of this interruption occurs during both the constant-current and constant-voltage charging operations in Hotta, with charging starting at S124 and S179 (green).



Ex-1003, Figs. 11-12 (excerpted).



Ex-1003, Figs. 15-16 (excerpted).

Hotta indicates that charging stop command key switch 52 is “for stopping charging the storage battery” and that this occurs when “the charging stop

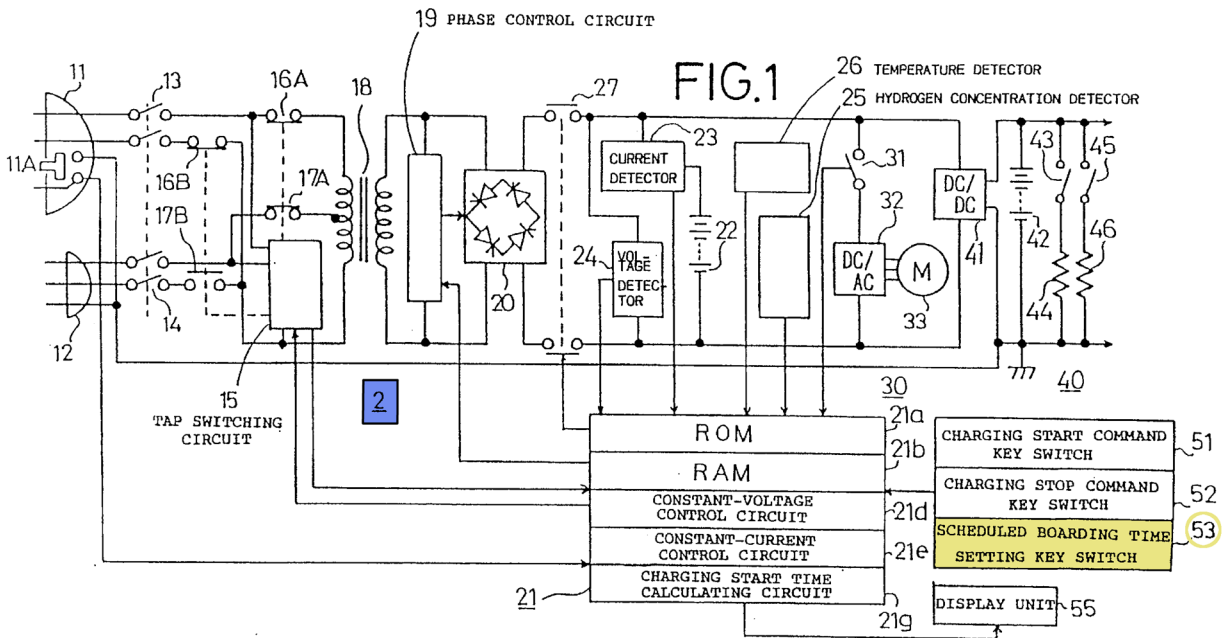
command key is manually pressed,” e.g., by an operator/ user of a vehicle involved in the charging process. Ex-1003, 1:22-26.

Thus, Kimura-Hotta renders obvious *wherein the one or more interruptions is a manual override interruption* (e.g., caused by manually pressing Hotta’s charging-stop-command key switch 52, or by pressing Kimura’s main switch that functions as taught for Hotta’s stop command key), *and wherein the computer implemented method further comprises: responsive to receiving, from a user* (e.g., the manual pressing of the stop command key), *the manual override interruption, terminating the charging process.* Ex-1009 ¶¶ 149-54.

C. Claim 5

Claim 5 depends from Claim 1, which Kimura teaches (Section VIII(A)), and Kimura-Hotta retains those aspects of Kimura relied on against Claim 1. Claim 5 specifies *the one or more interruptions is the preference interruption, and the preference interruption is detected from a violation of a preference selected by a participant to the charging process.* Kimura-Hotta renders this obvious.

Hotta regards a charger 2 (purple) configured to ensure that the charging of an electric vehicle is completed by “[an] indicated scheduled boarding time.” Ex-1003, 2:4-21. This “boarding time” is set by the user of the electric vehicle via a key switch 53 (yellow) (*id.*, Abstract, 2:4-21 and Claim 12), and it corresponds to a time at which the user intends to use the vehicle, (*id.*, 2:4-21).



Ex-1003, Fig. 1.

Hotta therefore teaches user selection of a preference for a charging process. Applying this to Kimura, it would have been obvious for a POSA to allow for user selection of preferences, including the voltage, current, and other battery-specific preferences that could be read from Kimura's DIP switch or just as easily indicated from user inputs.

It also would have been obvious to combine Kimura with the boarding-time-selection functionality of Hotta, thereby allowing the user of the charging process to indicate preferences with respect thereto. Given Kimura's teachings regarding terminating the charging process based on various thresholds and other parameters (Section VIII(A)(5)), a POSA would have been motivated to also allow the user to terminate the charging process based on their preferences, such as a preference

with respect to a time at which the charging process should terminate (i.e., the “boarding time” of Hotta).

Thus, Kimura in view of Hotta renders obvious *wherein the one or more interruptions is the preference interruption* (e.g., caused by voltage or current reaching a corresponding threshold), *and the preference interruption is detected from a violation of a preference* (e.g., the corresponding threshold) *selected by a participant to the charging process* (i.e., user selected, per Hotta). Ex-1009 ¶¶ 155-59.

D. Claims 9, 12, and 16

Claims 9, 12, and 16 depend from obvious claims 8 and 15 (Sections VIII(F) and (H)), and added features are analogous to Claims 2 or 5, so those added features are rendered obvious by Kimura-Hotta for reasons discussed above (Section IX(B)-(C)).

X. GROUND #3: KIMURA IN VIEW OF KING RENDERS CLAIMS 3, 10, AND 17 OBVIOUS

A. Motivation to Combine Kimura and King

Kimura and King are both related to charging processes for electric vehicles. Ex-1001, 1:8-14; Ex-1002, 1:7-8; Ex-1004, 1:4-6. Kimura and King are at least reasonably pertinent to at least one problem allegedly solved by the '391 Patent—designing charging processes that work for complex sets of circumstances. Ex-

1001, 6:60-7:11; Ex-1002, 7:33-49 and 10:18-31; Ex-1004, 1:64-2:2. There was also ample motivation for a POSA to modify Kimura in view of King.

First, Kimura provides express motivation for a POSA to seek out “various changes and modifications” that “may be made without departing from the scope of” Kimura’s invention (Ex-1002, 12:30-34). In seeking to build Kimura’s charger, and provided with the express motivation to seek out changes and modifications, a POSA would have been provided with ample motivation to look to analogous references (including King), e.g., to help understand implementation details, including those aspects related to the storing of operational parameters.

Upon reviewing the analogous King reference, a POSA would have seen its teachings related to non-volatile memory 34 and its use in storing “such data as battery temperature profile, ampere-hours of charge, battery profile, and charger status.” Ex-1004, 4:44-5:6. That King teaches doing this “[d]uring battery charging” (*id.*) would have provided a POSA with an understanding to make use of King’s non-volatile memory 34 to store all of Kimura’s operational parameters during Kimura’s charging operation. This combination was also a natural one as Kimura already teaches an EEPROM, which is a type of non-volatile memory as well.

Second, at a minimum, making use of King’s memory 34 to store all operational parameters would have been obvious to try (finite number of

predictable solutions for implementing storage of parameters, including by using King's memory 34) or would have been a simple substitution of one known element (Kimura's EEPROM) for another known element (King's memory 34) to achieve predictable results (storing of operational parameters for use during electric-vehicle charging processes). Ex-1009 ¶ 164.

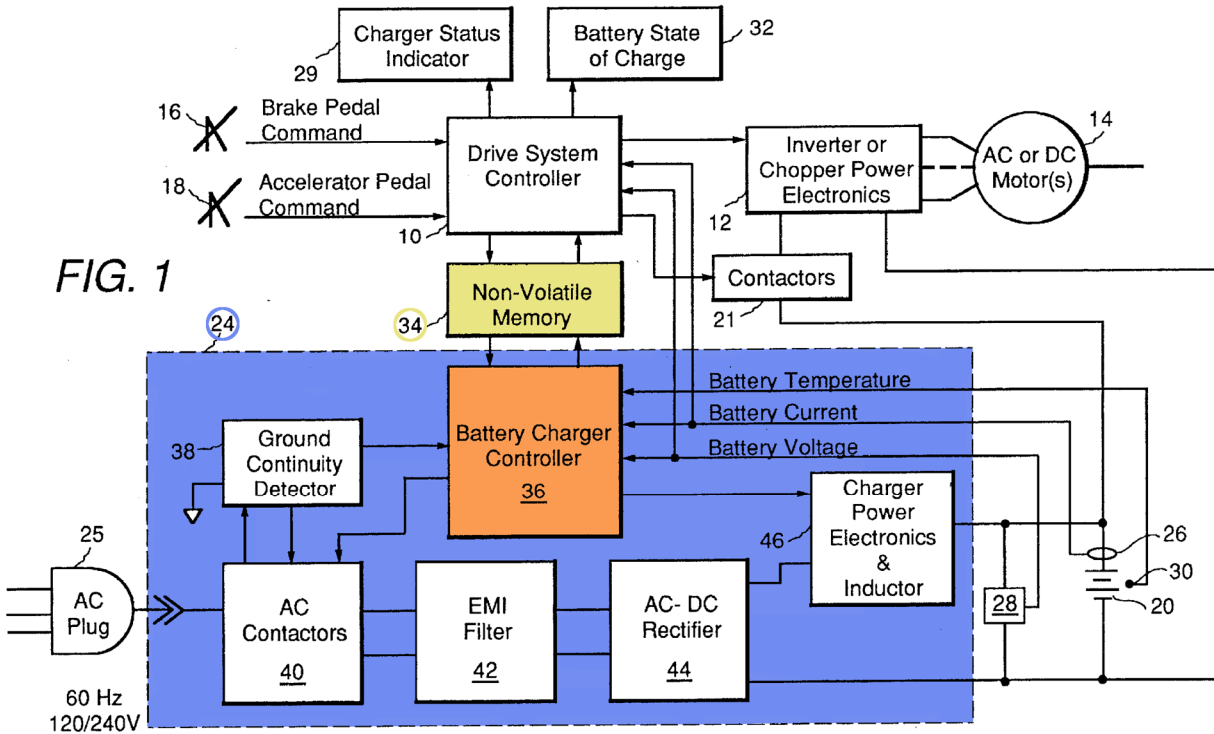
Adding King's memory 34 to Kimura's system, or modifying Kimura's EEPROM to function like King's memory 34, would have been routine for a POSA exercising only ordinary skill to implement storage at various memory devices, so the modification would have been achieved with a reasonable expectation of success. Ex-1009 ¶ 161-65.

B. Claim 3

Claim 3 depends from Claim 1, which Kimura teaches or suggests (Section VIII(A)), and Kimura-Hotta retains those aspects of Kimura relied on against Claim 1. Claim 3 adds *storing the set of operational parameters in a storage device*. King discloses this.

King describes a charger 24 (purple) that operates according to various operational parameters, including “battery temperature profile, ampere-hours of charge, battery charge profile, charger status.” Ex-1004, 5:49-51 and 4:66-5:1. King teaches storing all of these operational parameters in a memory (yellow)—

instructing that “[d]uring battery charging, memory 34 stores” the operational parameters. *Id.*, 4:66-5:1.



Ex-1004, Fig. 1.

As noted above, there was ample motivation for a POSA to modify Kimura to include King’s non-volatile memory 34 and to implement King’s teachings related to storing all of the operational parameters during a charging process, so the Kimura-King system would have included a non-volatile memory and would have stored all of Kimura’s operational parameters. Ex-1009 ¶¶ 161-65.

Thus, Kimura-King renders obvious *storing the set of operational parameters* (e.g., battery temperature profile, ampere-hours of charge, battery

charge profile, charger status) *in a storage device* (i.e., the non-volatile memory 34). Ex-1009 ¶¶ 166-69.

C. Claims 10 and 17

Claims 10 and 17 depend from obvious claims 8 and 15, respectively, and the added feature is analogous to Claim 3, which is rendered obvious by Kimura-King for reasons discussed above (Section X(B)).

XI. GROUND #4: KEITH ANTICIPATES CLAIMS 1, 2, 4-9, 11-16, AND 18-20

Both Keith and Kimura teach exactly what Applicant told the Office was missing from the prior art. The grounds that follow below rely on Keith as an additional/alternative primary reference demonstrating unpatentability of the Challenged Claims.

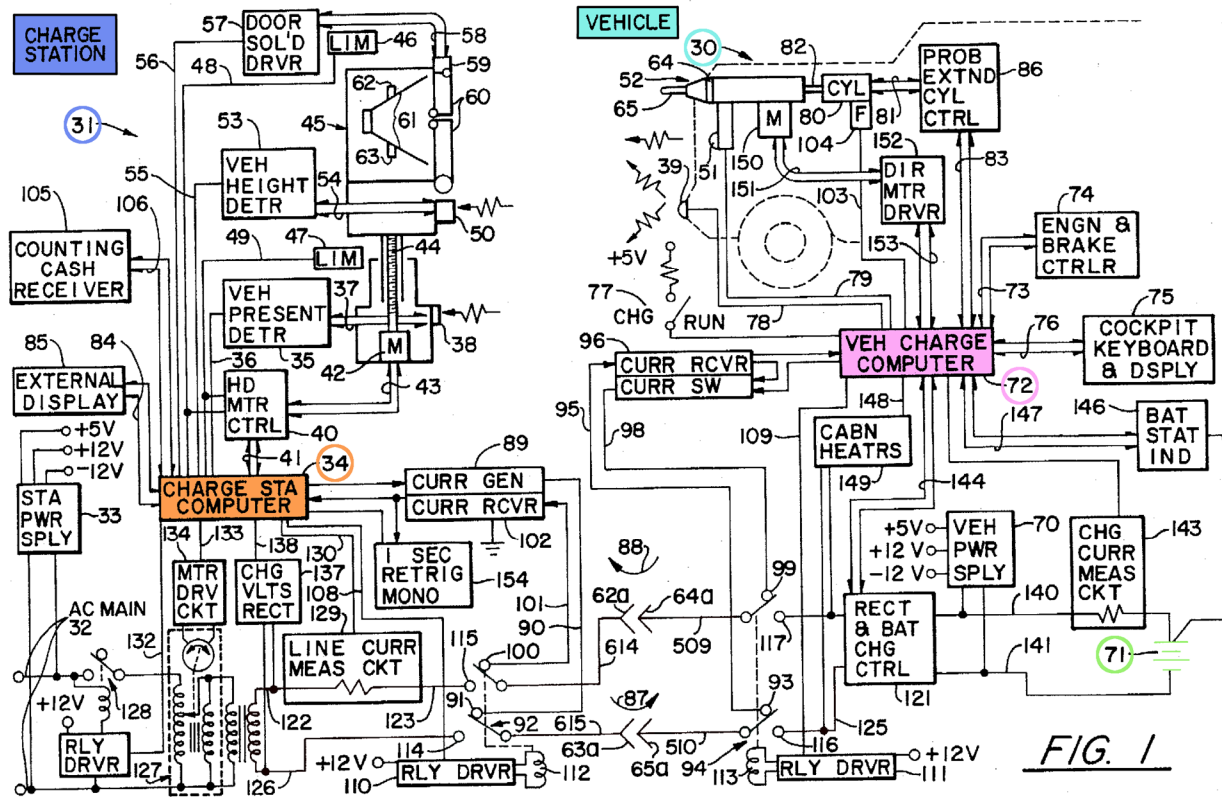
A. Claim 1

1. 1[P]

1[P] recites *a computer implemented method of managing a charging process of an electric vehicle*. If limiting, Keith discloses this.

The charging process of Keith involves a charge station 31 (purple) providing electricity to the battery 71 (green) of an electric vehicle 30 (turquoise). Ex-1005, 4:65-5:2; *see also id.*, Figs. 2-17. As Keith explains, this process is implemented by charge station computer 34 (orange) and vehicle charge

computer 72 (pink). *Id.*, 7:32-40; *see also id.*, 9:6-9 (steps at charge station computer 34) and 9:53-56 (steps at vehicle charge computer 72).



Ex-1005, Fig. 1.

Keith executes subroutines at the charge station computer 34 (Figure 15) and the vehicle charge computer 72 (Figure 16). Ex-1005, 3:62-4:15.

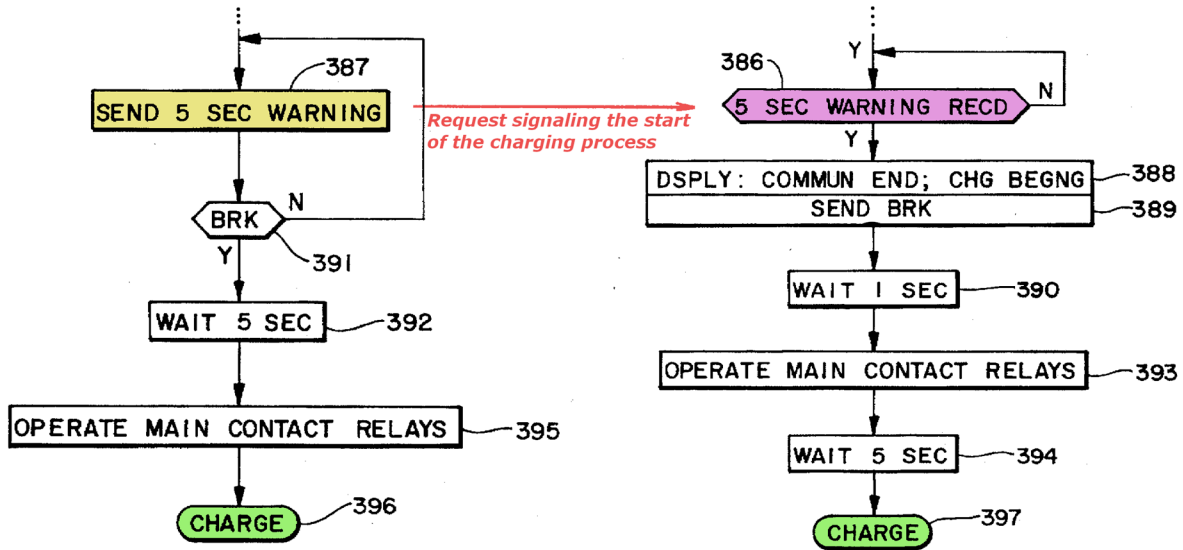
Thus, Keith discloses *a computer* (e.g., the charge station computer 34 and the vehicle charge computer 72) *implemented method of managing a charging process* (i.e., the charging process including the subroutines of Figures 15 and 16) *of an electric vehicle* (i.e., the vehicle 30). Ex-1009 ¶¶ 173-75.

2. 1[A]

1[A] recites, *responsive to receiving, from an energy transaction execution engine, a request signaling a start of the charging process, monitoring a set of operational parameters of the charging process during the flow of electricity for one or more interruptions.* Keith discloses this.

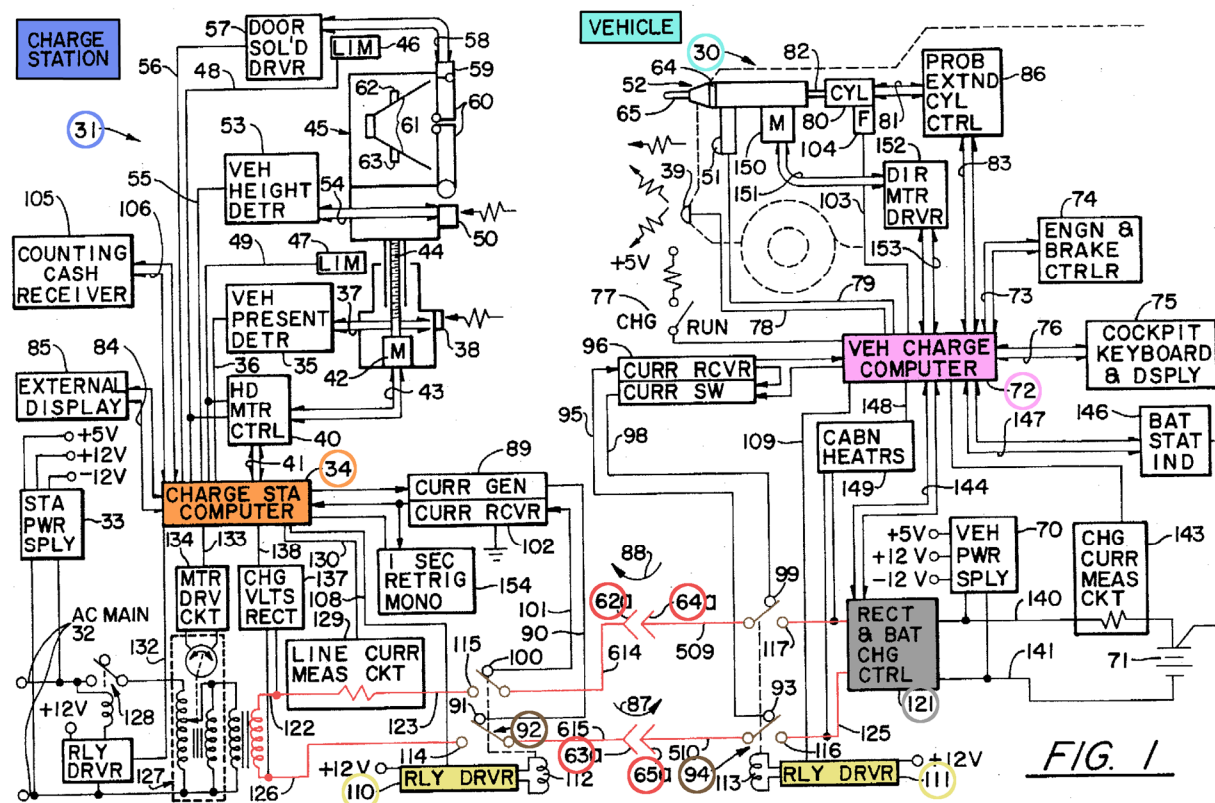
In Keith, the charge station computer 34 sends a five-second warning to the vehicle charge computer 72 to signal that “the charge phase is going to begin.” Ex-1005, 20:15-23. This five-second warning is a request signaling the start of the charging process, with portions of the charging station computer 34 responsible for transmitting the warning acting as the *energy transaction execution engine*.¹⁰

¹⁰ If this is in means-plus function format (n.4), Keith at least discloses an equivalent. Ex-1009 ¶ 179.



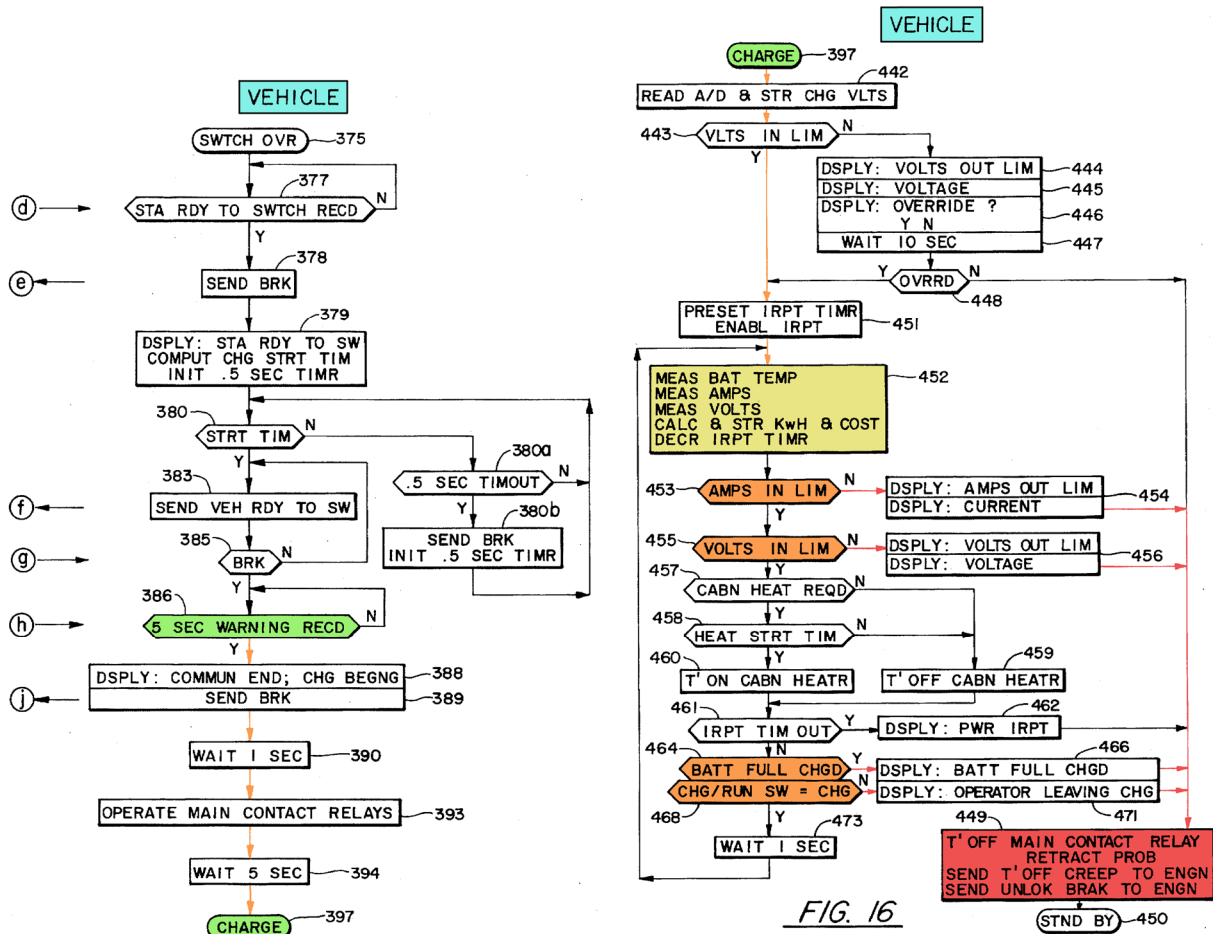
Ex-1005, Figs. 13-14 (excerpted).

After the five-second warning, the charge station computer 34 and the vehicle charge computer 72 operate respective relay drivers 110 and 111 (yellow), thereby closing relays 92 and 94 (brown) and completing the circuit between charge station 31 (purple) and vehicle 30 (turquoise). *Id.*, 7:36-43. Power then flows to the vehicle 30, “through the connections 62-65 (red) to the rectifier and battery charge control circuit 121 (gray).” *Id.*, 8:1-6.



Ex-1005, Fig. 1.

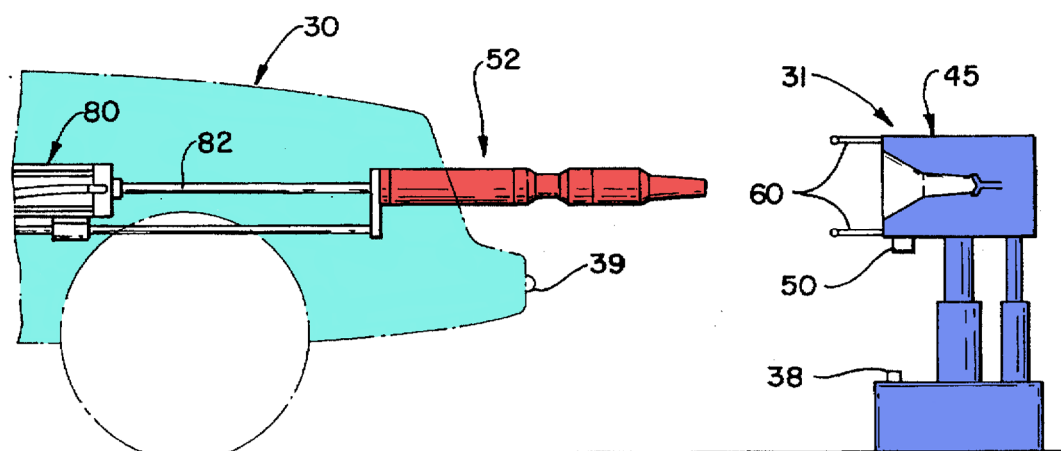
As illustrated in Figures 14 and 16 (below), the five-second warning (386, green) causes the vehicle charge computer 72 to monitor operational parameters of the charging process (452, yellow; and 453, 455, 464, and 468, all orange), including battery temperature, current, voltage, the amount of energy transferred to the battery 71, and energy cost. *Id.*, 23:57-62 and Figs. 14 and 16 (step 386 leads to the subsequent monitoring of operational parameters, at 452, 453, 455, 464, and 468). The monitored operational parameters in Keith can lead to interruptions, e.g., 453-N, 455-N, 464-Y, and 468-Y (red pathways), and then termination at 449 (red). *E.g.*, Ex-1005, 23:62-24:1, 24:1-7, and 24:24-28.



Ex-1005, Figs. 14 and 16.

This monitoring occurs *during the flow of electricity*. Keith's vehicle charge computer 72 operates its relay driver 111 at step 393 of Figure 14, and electricity flows to the vehicle 30 as of transfer point 397 in Figures 14 and 16. *Id.*, 20:25-32 and 20:41-47. Charging continues during monitoring and until it is determined that the charging process should be terminated. *Id.*, 8:29-32 ("The charge will continue until something goes awry").

When termination step 449 is reached, the vehicle charge computer 72 de-energizes vehicle contact relay 94 and retracts charging probe 52 (red) of vehicle 30 (turquoise) at step 449 of Figure 16. *Id.*, 23:29-41; *cf. id.*, Fig. 19. When computer 34 of the charge station 31 (purple) determines that probe 52 (red) is released, termination occurs. *Id.*



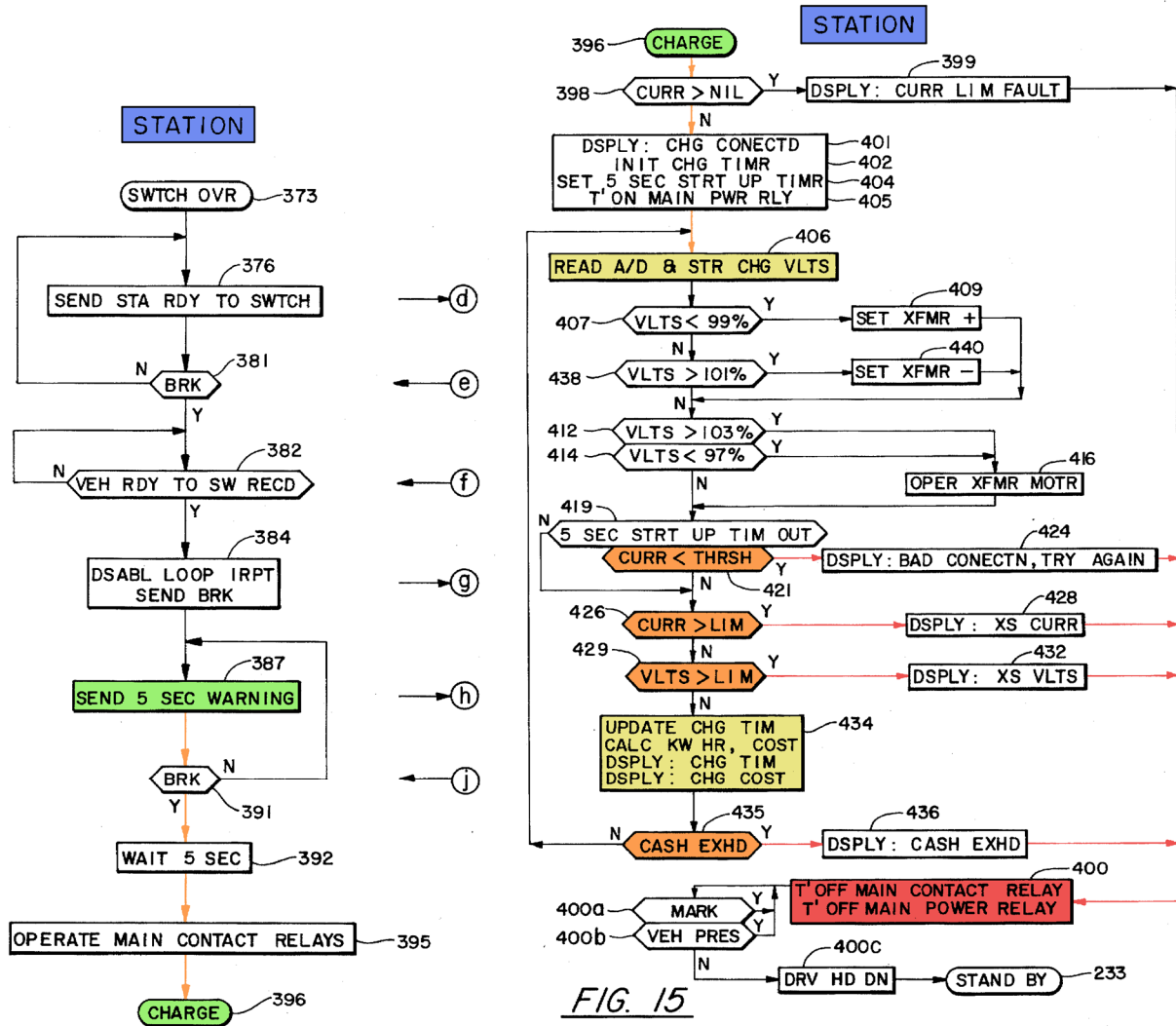
Ex-1005, Fig. 19.

Thus, Keith discloses *responsive to receiving, from an energy transaction execution engine* (i.e., portions of the charge station computer 34), *a request signaling a start of the charging process* (i.e., signal with the five-second warning), *monitoring* (e.g., at the vehicle charge computer 72) *a set of operational parameters* (e.g., the battery temperature, the current, the voltage, the amount of energy transferred to the battery 71, and the cost of said energy) *of the charging process during the flow of electricity for one or more interruptions* (e.g., caused by

the operating parameters measuring outside of their respective limits).” Ex-1009

¶¶ 176-84.

To the extent PO argues that monitoring for and detecting interruptions need also, or alternatively, occur on the charger side, Keith teaches or discloses this, as well. *Id.* ¶¶ 185-86. As with the monitoring performed at the vehicle charge computer 72, this charger-side monitoring is responsive to receipt of a request, as the request is received from the *energy transaction execution engine* identified above, namely, the hardware and/or software responsible for transmitting the five-second warning to the vehicle charge computer 72. *See* Ex-1005, Fig. 13. The request on the charger side is signaled within the charge station computer 34, represented by operations leading from 387 of Figure 13 to 406 of Figure 15 (orange pathway).



Ex-1005, Figs. 13 and 15.

At the charge station computer 34, monitoring involves measuring and calculating operational parameters, at steps 406 and 434 (yellow), and determining whether the parameters are in bounds, at steps 421, 426, 429, and 435 (orange). *Id.*, 21:29-31, 21:66-22:30. Moreover, Keith explains that if one of the parameters is detected as conforming to a predetermined interrupt condition (i.e., if the

parameter is not “in limits”), the charging process is terminated. *Id.*, 22:4-16, 21:4-6, and Fig. 15 (termination at step 400).

3. 1[B]

1[B] recites *detecting the one or more interruptions during the flow of electricity from the set of operational parameters which conform to a set of predefined interrupt conditions*. Keith discloses this.

Before the charge station 31 provides power to the vehicle 30, they communicate to define various limits. Ex-1005, 6:31-36, 11:54-58, and 18:17-24. As Keith explains, “[t]he vehicle [30] and station [31] communicate ... to establish battery type and voltage, method of payment and credit card number, as well as the cost basis for the power.” *Id.*, Abstract.

Detecting the predefined interrupt conditions in Keith involves comparing operational parameters against these predefined limits. At the vehicle charge computer 72, Keith describes determining whether “the current is within limits,” *id.*, 23:62-24:1; whether “the voltage is within limits,” *id.*, 24:1-7; whether “the battery is fully charged,” *id.*, 24:24-28; and whether “the charge/run switch [77] is closed,” *id.*, 24:28-34. Similarly, at the charge station computer 34, Keith describes determining whether “the current ... exceeds a current limit,” *id.*, 21:66-22:4; whether “the voltage is beyond limits,” *id.*, 22:9-12; and whether “the amount of cash which has been deposited is exhausted,” *id.*, 22:27-28.

Thus, Keith discloses *detecting the one or more interruptions* (e.g., caused by the voltage, the current, the battery charge level, the status of the charge/run switch 77, or the amount of cash spent not being within a predefined limit) *during the flow of electricity from the set of operational parameters which conform to a set of predefined interrupt conditions* (e.g., the voltage, current, and charge level limits based on the type of the battery 71, the state of the charge/run switch 77, or the amount of cash to be spent). Ex-1009 ¶¶ 187-90.

4. 1[C]

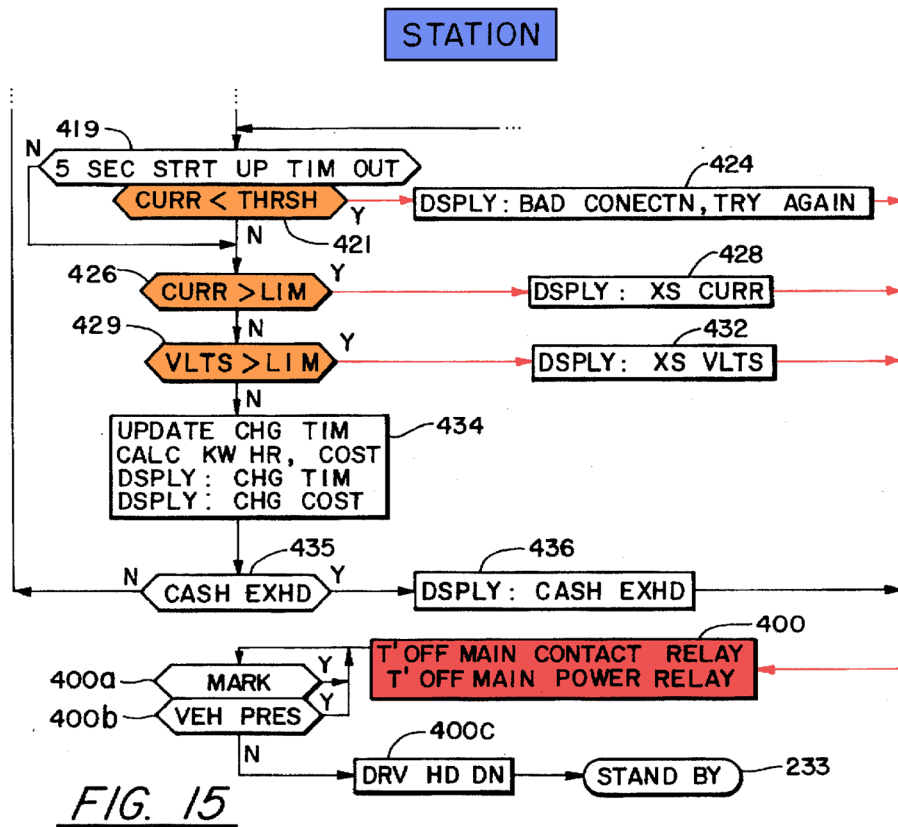
1[C] recites *wherein the one or more interruptions comprise at least one of a device capabilities interruption, a preference interruption, and a data services interruption*. Keith discloses this.

While not required (Ex-1001, 10:38-48 (“‘at least one of’ when used with a list of items means that ... only one of each item may be needed”)), Keith discloses all three types of interruptions.

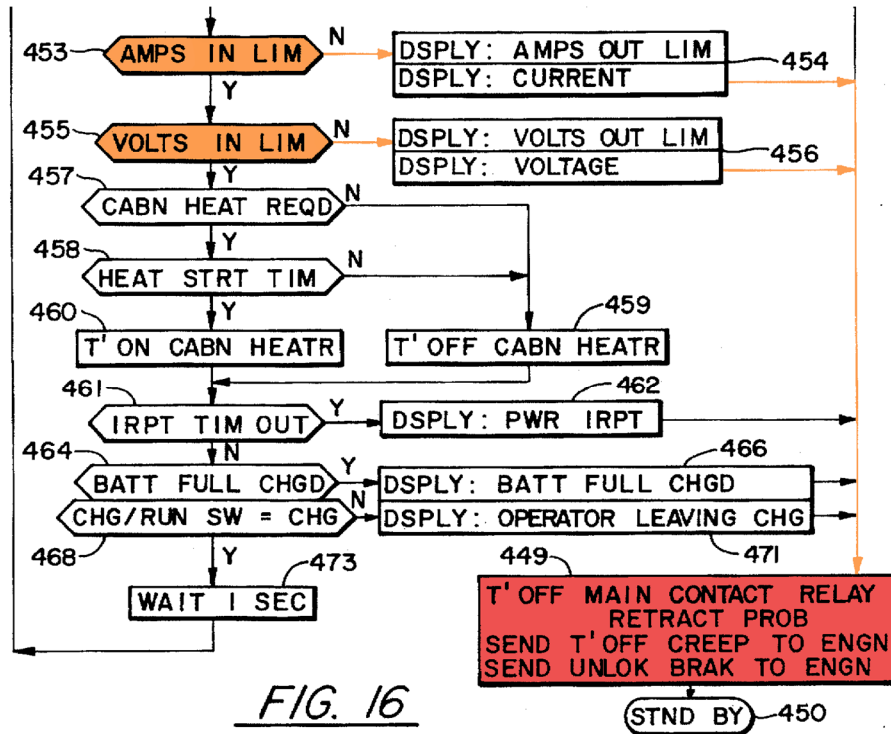
Regarding device capabilities interruptions, the ’391 Patent explains that they can be caused by “**transaction plan amperage** [i.e., current], ... stability of charging devices, or any other condition or status associated with components of an electric vehicle energy transaction infrastructure.” *Id.*, 13:15-20.

Keith explicitly describes interruptions caused by amperage and voltage measurements. Ex-1005, 23:62-24:7 and 21:66-22:12. As discussed above, these

interruptions can be detected by the vehicle charge computer 72 (*id.*, 23:62-24:7),
as well as by the charge station computer 34 (*id.*, 21:66-22:12).



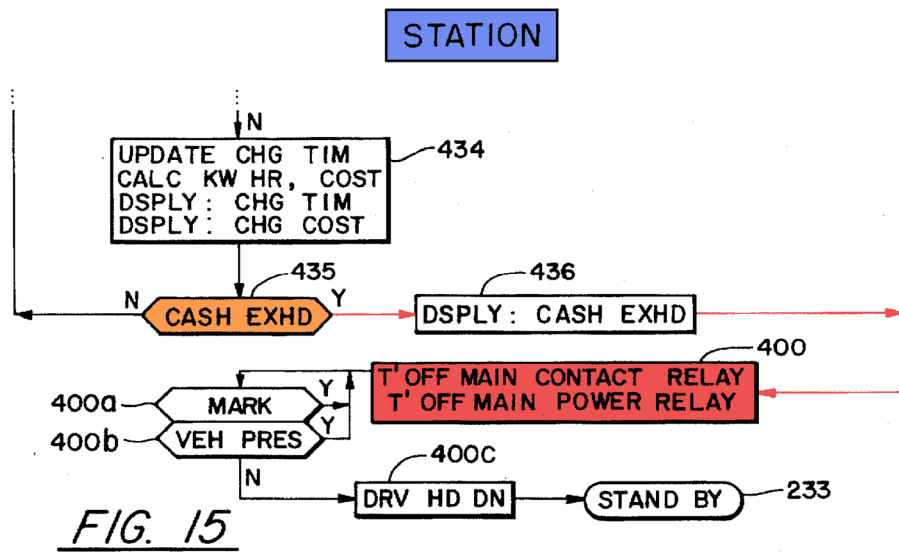
Ex-1005, Fig. 15 (excerpted).



Ex-1005, Fig. 16 (excerpted).

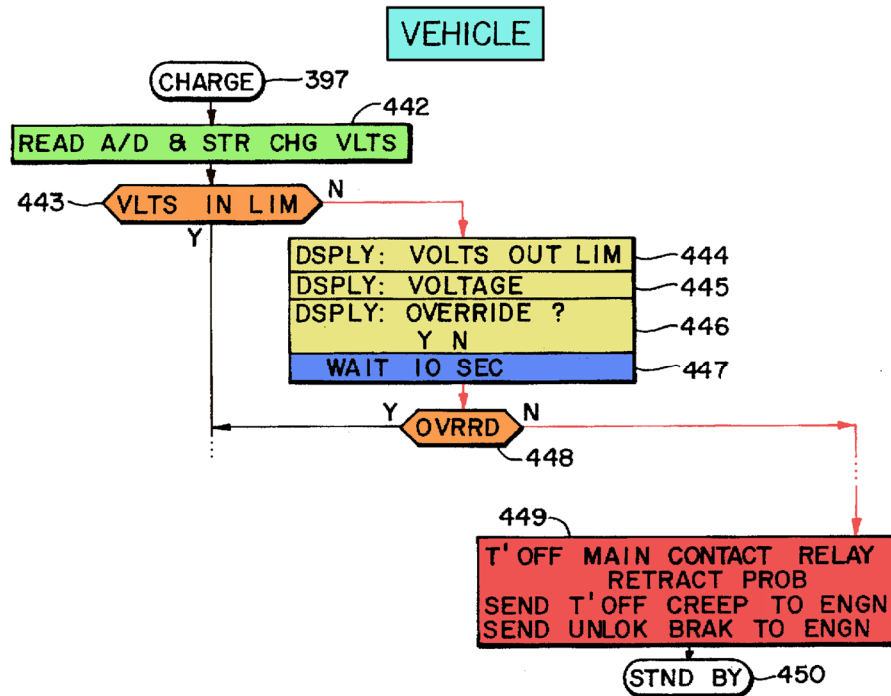
As for preference interruptions, the '391 Patent provides an example of “a preference for a **threshold cost** for charging an electric vehicle.” Ex-1001, 13:26-28.

Keith describes this too. As Keith explains, at step 435 of the charging process (orange), the charge station computer 34 “determines if the amount of cash which has been deposited [i.e., a user-defined preference for charging cost] is exhausted.” Ex-1005, 22:27-28. If exhausted, then the charge control computer 34 informs the user and terminates charging at step 400 (red). *Id.*, 22:27-29.



Ex-1005, Fig. 15 (excerpted).

An example of a data services interruption in Keith occurs at steps 443-448 in Figure 16 during which voltage over a limit is detected, at 443 (orange), as electricity begins flowing to the vehicle 30, at 442 (green). After a sequence of display steps 444-446 (yellow) requesting data from a user (i.e., whether or not to override), a response-waiting period of ten seconds occurs at 447 (blue). If no response is received after ten seconds, (i.e., an interruption in data services from the user failing to provide data in time), the logic proceeds to 449 (red) for termination.



Ex-1005, Fig. 16 (excerpted).

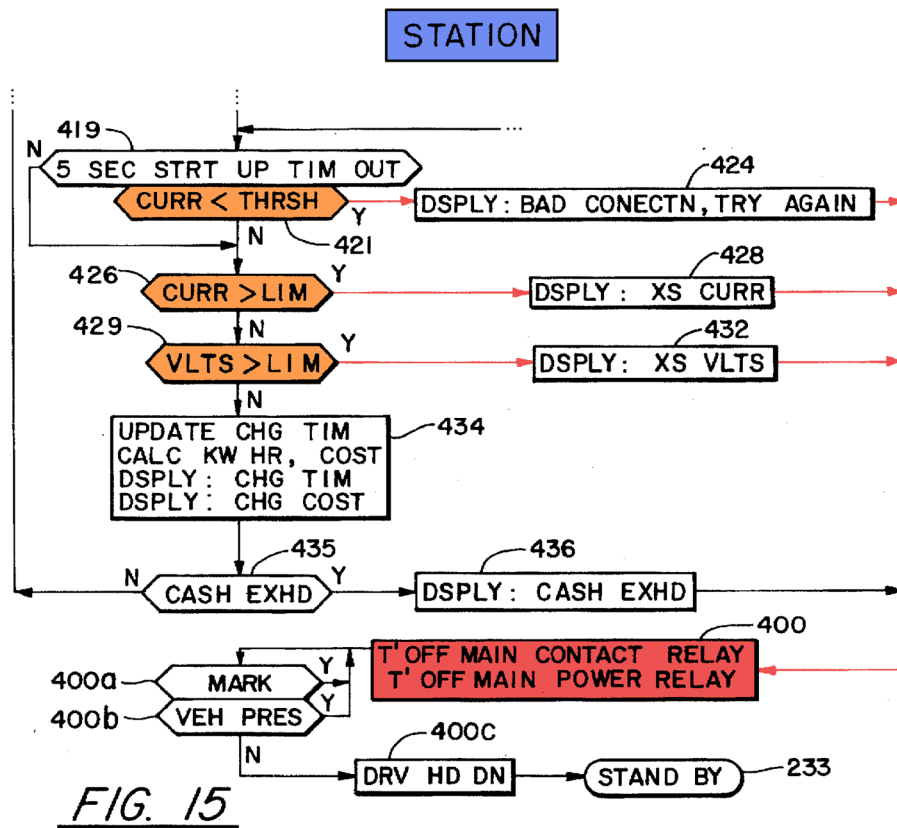
Thus, Keith discloses *wherein the one or more interruptions comprises at least one of a device capabilities interruption (e.g., caused by the current or the voltage not being within a respective limit), a preference interruption (e.g., caused by exhaustion of cash), and a data services interruption (e.g., caused by a user not providing requested data in time).* Ex-1009 ¶¶ 191-98.

5. 1[D]

1[D] recites, *responsive to detecting the one or more interruptions, sending a response to the energy transaction execution engine to terminate the charging process.* Keith discloses this.

For controller 72, the response to terminate the charging process is signaled by de-energizing the vehicle contact relay 94. Ex-1005, 23:29-35. As Keith illustrates, this occurs responsive to detecting an interruption at the vehicle charge controller 72. *See id.*, Fig. 16 (illustrating positive determinations at any of steps 453, 455, 464, and 468 and leading to de-energizing the vehicle contact relay, at step 449). This de-energizing of the vehicle contact relay 94 provides a response that causes the charge station computer 34 to terminate the charging process. *Id.*, 23:29-35.

At the charge station computer 34, hardware and/or software at the charge station 31 likewise sends a response to terminate the charging process responsive to detecting an interruption. This is signaled within the charge station computer 34 and is represented (expressly or, at a minimum, necessarily) by the arrows in Figure 15 pointing from the various steps at which interruptions can be detected to termination of the charging process. *See id.*, Fig. 15 (illustrating positive determinations at any of steps 421, 426, 429, 434, and 435 (all orange) leading to termination at step 400, red).



Ex-1005, Fig. 15 (excerpted).

Thus, Keith discloses *responsive to detecting the one or more interruptions* (e.g., caused by the current or the voltage not being within a respective limit, or caused by exhaustion of the cash deposited for the charging process), *sending a response* (e.g., the de-energizing of the main contact relay 94, or the signal represented by the operations leading from steps 421, 426, 429, and 435 to step 400 of Figure 15) *to the energy transaction execution engine* (e.g., portions of the charge station controller 34, including those implementing 387 and 400) *to terminate the charging process*. Ex-1009 ¶¶ 199-202.

* * * *

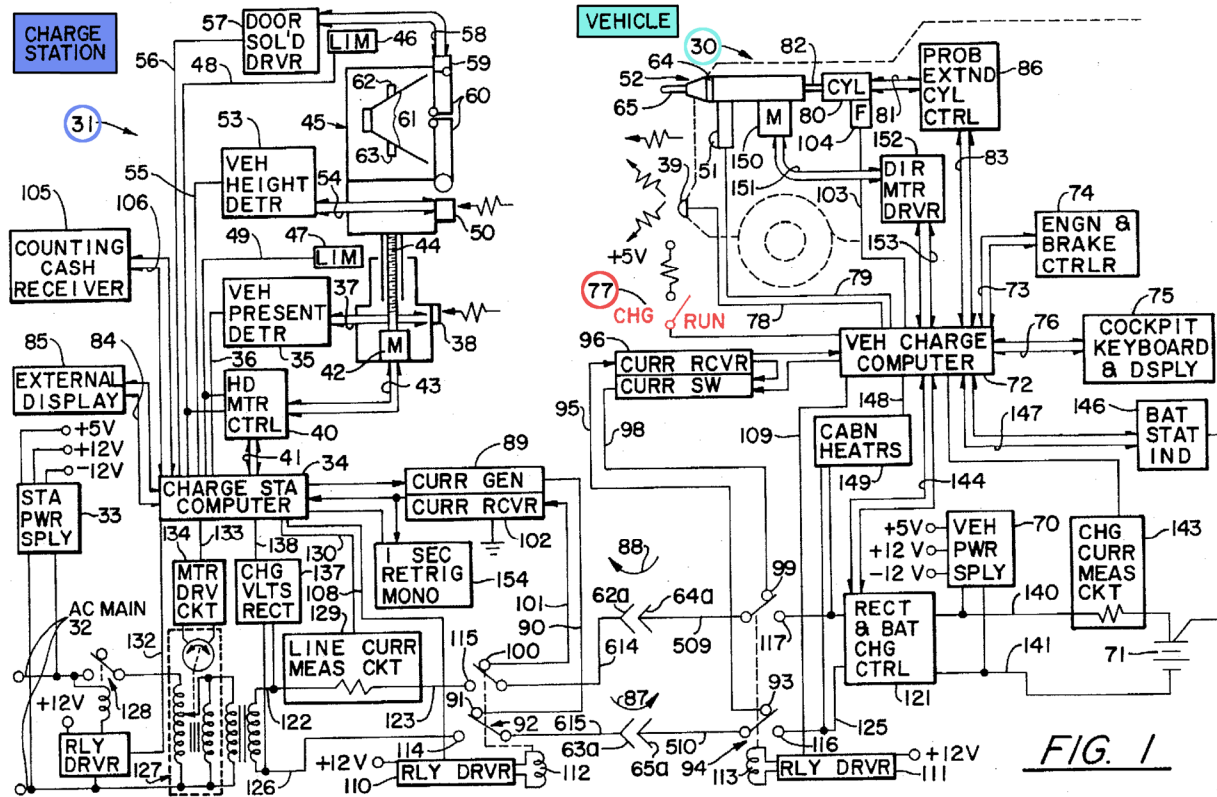
Because Keith discloses each and every limitation of Claim 1, it is unpatentable as anticipated and should be cancelled. Ex-1009 ¶¶ 172-203.

B. Claim 2

Claim 2 depends from Claim 1, which Keith discloses. Section XI(A).

Claim 2 adds *wherein the one or more interruptions is a manual override interruption, and wherein the computer implemented method further comprises: responsive to receiving, from a user, the manual override interruption, terminating the charging process.* Keith discloses this.

In Keith, a manual override interruption occurs when “the operator moves a charge[/]run switch 77 into the open position.” Ex-1005, 8:29-32. As Keith explains, the charge/run switch 77 (red) allows the operator to manually terminate the charging process. *Id.*, 8:1-6 and 8:29-32.



Ex-1005, Fig. 1.

The operator acts as a user of the charging station. *See* Ex-1005, 2:10-15.

As the operator moves charge/run switch 77 into open position, the charging station receives a manual interruption and terminates accordingly. *Id.*, 8:29-32.

Keith, just like the '391 Patent (Ex-1001, 12:26-31), also explains that its charge/run switch 77 can be part of a user interface. Ex-1005 at 6:6-8 (explaining that charge/run switch 77 “may be a discrete switch, or may simply be a suitable keyboard input through the cockpit keyboard and display system 75.”).

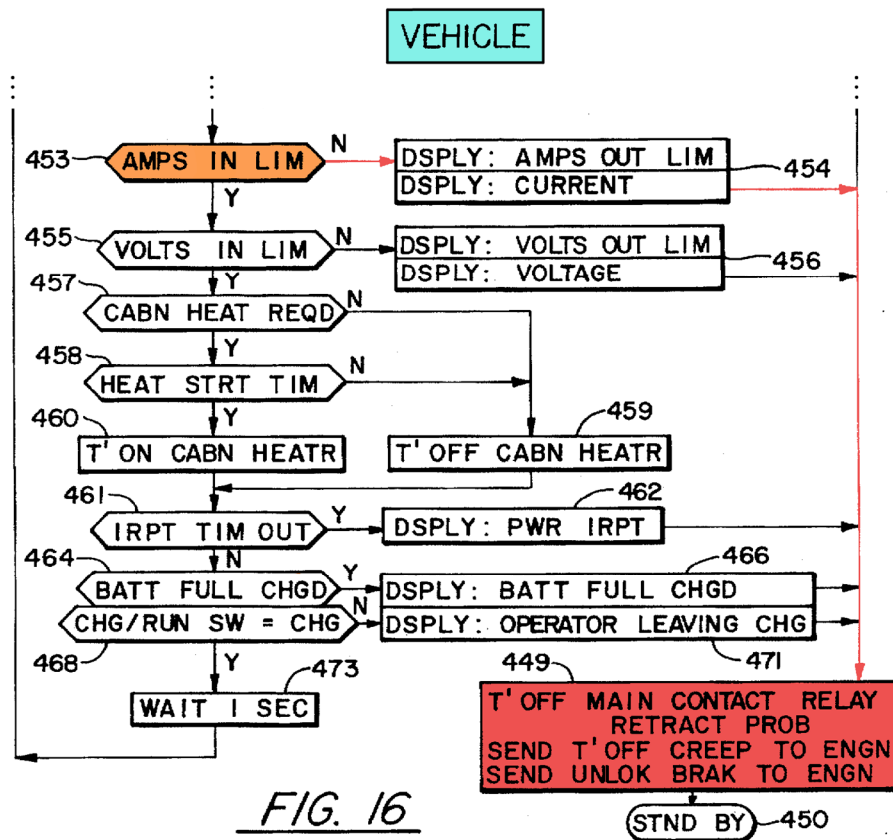
Thus, Keith anticipates *wherein the one or more interruptions is a manual override interruption* (i.e., caused by opening of charge/run switch 77), and

wherein the computer implemented method further comprises: responsive to receiving, from a user (e.g., vehicle owner/operator), the manual override interruption, terminating the charging process. Ex-1009 ¶¶ 204-07.

C. Claim 4

Claim 4 depends from Claim 1, which Keith anticipates. Section XI(A). Claim 4 adds *wherein the one or more interruptions is the device capabilities interruption, and the device capabilities interruption originates from at least one component of an electric vehicle transaction infrastructure.* Keith discloses this.

One example in Keith is caused by “record[ing] the current measured by the charge current measuring circuit 143,” and then conducting a test 453 (orange) to “determine[] if the current is in limits.” Ex-1005, 23:57-63. This example device capabilities interruption occurs when the measured current is not within limits, which causes the “display to inform the operator that the current is out of limits” and leads to termination of the charging process at 449 (red).



Ex-1005, Fig. 16 (excerpted).

This interruption also originates from a component of Keith's electric vehicle transaction infrastructure, i.e., charge current measuring circuit 143 of the vehicle and the vehicle charge computer 72. Cf. Ex-1001, 7:32-34 (indicating that energy transaction infrastructure is “a charging infrastructure for managing all phases of an electric vehicle transaction”) and 9:64-67 (noting internal vehicle components as being part of the infrastructure).

Thus, Keith discloses *wherein the one or more interruptions is the device capabilities interruption* (e.g., caused by current exceeding a predefined limit), and

the device capabilities interruption originates from at least one component (e.g., charge current measuring circuit 143 and vehicle charge computer 72) of an electric vehicle transaction infrastructure (e.g., including vehicle 30). Ex-1009 ¶¶ 209-12.

D. Claim 5

Claim 5 depends from Claim 1, which Keith anticipates. Section XI(A). Claim 5 adds *wherein the one or more interruptions is the preference interruption, and the preference interruption is detected from a violation of a preference selected by a participant to the charging process.* Keith discloses this.

One preference interruption in Keith involves exhaustion of the cash deposited by the user for charging. Ex-1005, 22:27-28. This is a preference selected by a participant to the charging process. Keith explains, “the operator [of the vehicle 30] ... deposit[s] cash into a counting cash receiver” and “[t]he charge ... continue[s] until ... the credit established by the counting cash receiver 105 is exhausted.” *Id.*, 7:24-26 and 8:29-31; *cf. id.*, 6:4.

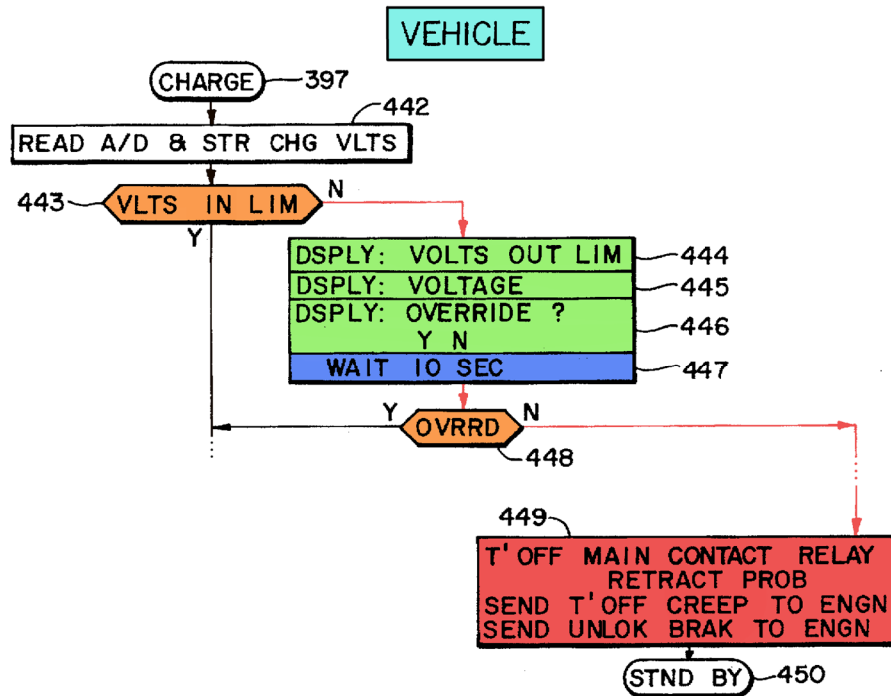
Thus, Keith discloses *wherein the one or more interruptions is the preference interruption (e.g., caused by exhaustion of cash deposited), and the preference interruption is detected from a violation of a preference selected by a participant to the charging process (e.g., owner/operator of vehicle 30).* Ex-1009 ¶¶ 213-15.

E. Claim 6

Claim 6 depends from Claim 1, which Keith anticipates. Section XI(A).

Claim 6 adds *wherein the one or more interruptions is the data services interruption, and the data services interruption originates from a failure in data transmission*. Keith discloses this.

One data services interruption in Keith occurs when voltage over a limit is detected as electricity begins to flow to the vehicle at 443 (orange), followed by a sequence of display steps 444-446 (green) at the vehicle leading to a request for data from a user (i.e., whether or not to override) and a response-waiting period of 10 seconds at step 447 (blue). Ex-1005, 23:16-39. If no response is received after 10 seconds (an interruption in data services from the user failing to respond in time), then the logic proceeds to 449 (red) and the charging process is terminated. *Id.*



Ex-1005, Fig. 16 (excerpted).

Thus, Keith discloses *wherein the one or more interruptions is the data services interruption, and the data services interruption originates from a failure in data transmission* (e.g., caused by a user not providing data in time). Ex-1009 ¶¶ 216-18.

F. Claim 7

Claim 7 depends from Claim 1, which Keith anticipates. Section XI(A). Claim 7 adds *wherein the one or more interruptions are detected by identifying an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions*. Keith discloses this.

As one example, Keith describes “determin[ing] if the current provided by the line current measuring circuit 129 ... exceeds a current limit which is established by manufacturer’s data.” Ex-1005, 21:66-22:4. The current is the *operational parameter from the set of operational parameters*. Other operational parameters in this set include those discussed above as to Claim 1. *See* Section XI(A)(2)-(4).

Thus, Keith discloses *wherein the one or more interruptions are detected by identifying an operational parameter (e.g., the current) from the set of operational parameters that conform to the set of predefined interrupt conditions (e.g., the current limit)*. Ex-1009 ¶¶ 219-21.

G. Claim 8

1. 8[P]

8[P] recites *a computer program product for managing a charging process of an electric vehicle*. If limiting, Keith discloses this.

Keith discloses “a background program [that] ... determines when charging should cease, either because the battery is full, a switch has been thrown, or there is excess voltage or current in the system.” Ex-1005, 3:47-51. Additionally, Keith illustrates various logic diagrams for managing a charging process, as well as computers 34 and 72 for executing that logic, as discussed in more detail above. *See* Section XI(A)(2)-(5).

Thus, Keith discloses *a computer program product* (e.g., the background program) *for managing a charging process* (e.g., the process of Figures 15 and 16) *of an electric vehicle* (e.g., the vehicle 30). Ex-1009 ¶¶ 223-24.

2. 8[A]

8[A] recites *a tangible computer-recordable storage medium*. Keith discloses this. Keith explains that the charge station computer 34 executes a “charge station computer program” and that the vehicle charge computer 72 executes a “vehicle charge computer program.” Ex-1005, 17:41-49, 18:45-47, and 18:45-47; *cf. id.*, Figs. 11 and 12 (illustrating portions of the charge station and vehicle charge computer programs, respectively).

Because these computers are able to run their respective programs, this means that those respective control programs are expressly, or at least necessarily, stored on one or more tangible, computer readable storage media. At a minimum, a POSA would have at once envisaged these respective control programs as being stored on one or more tangible computer readable storage media.

Thus, Keith discloses *a tangible computer-recordable storage medium* (e.g., tangible, computer-recordable media storing the charge station and vehicle charge computer programs). Ex-1009 ¶¶ 225-27.

3. 8[B]-[E]

8[B]-[E] are substantively identical to 1[A]-[D] (Sections XI(A)(2)-(5)), respectively, while adding *first, second, and third program instructions*. Keith discloses these additions.

That each of the operations is associated with program instructions is taught in Keith through the computer programs executed by its charge station computer 34 and vehicle charge computer 72. A program executed by a computer, as Keith's computer programs are, includes instructions for each of its operations, so each of the operations in Keith's computer programs also includes corresponding instructions within the control programs.

Thus, Keith discloses the added features regarding *first ... , second ... , and third program instructions* (e.g., instructions that, when executed, cause performance of the charge station and vehicle charge computer programs). Ex-1009 ¶¶ 228-30.

4. 8[F]

8[F] recites *wherein the first program instructions, the second program instructions, and the third program instructions are stored on the tangible computer-recordable storage medium*. Keith discloses this feature, as explained above for 8[A]. Section XI(G)(2).

* * * *

Because Keith discloses each and every limitation of Claim 8, it is unpatentable as anticipated and should be cancelled. Ex-1009 ¶¶ 222-32.

H. Claims 9 and 11-14

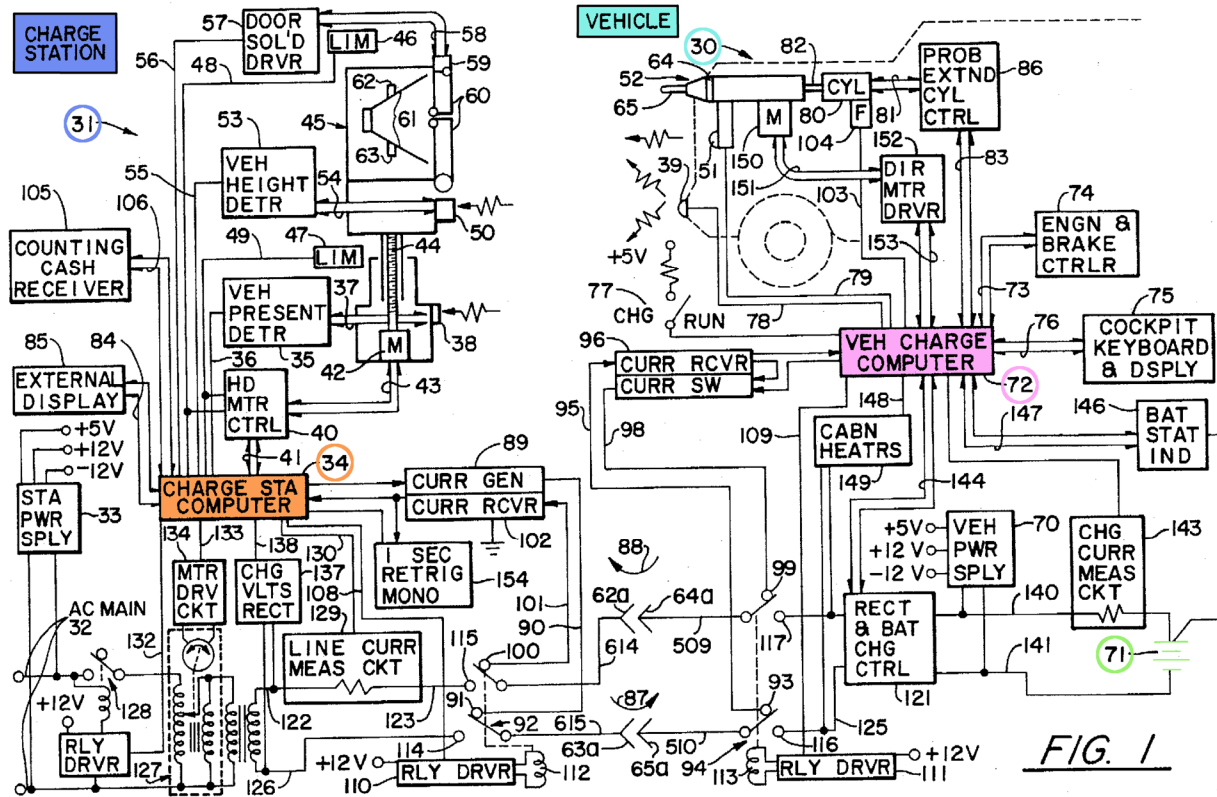
Claims 9 and 11-14 depend from Claim 8, which Keith anticipates. Section XI(G). Claims 9 and 11-14 are otherwise analogous to Claims 2 and 4-7, respectively, so these claims are anticipated for reasons analogous to those above (Sections XI(B)-(F)).

I. Claim 15

1. 15[P]

15[P] recites *an apparatus*. If limiting, Keith discloses this.

Keith illustrates a “schematic block diagram of [an] **apparatus**.” Ex-1005, 3:60-61. This apparatus includes a charge station 31 (purple) with a charge station computer 34 (orange) for charging the battery 71 (green) of an electric vehicle 30 (turquoise) with a vehicle charge computer 72 (pink). *Id.*, 4:65-5:10.



Ex-1005, Fig. 1.

Thus, Keith discloses *an apparatus* (e.g., the apparatus including the charge station 31). Ex-1009 ¶¶ 235-36.

2. 15[A]-[C]

15[A]-[C] recite *a bus system; a memory connected to the bus system, wherein the memory includes a computer usable program code; and a processing unit connected to the bus system*. Keith discloses this.

The '391 Patent indicates that its bus system “may be implemented using any suitable type of architecture that provides for a transfer of data between different components or devices attached to the bus system.” Ex-1001, 6:51-54.

Keith includes architecture that provides for data transfers between charge station computer 34 and vehicle charge computer 72 using an RS232 UART system that involves contacts 62-65. Ex-1005, 6:31-36. Moreover, Keith indicates that the controllers 14 and 24 execute computer usable program code stored in a memory, as discussed for Claim 8. *See* Section XI(G). Further, the computers in Keith form a processing unit (or one or more processing units) as those computers execute (process instructions for) respective computer programs on the vehicle or charger side of Keith's apparatus. *See id.*

Thus, Keith discloses *a bus system* (e.g., the RS232 UART system and the contacts 62-65); *a memory connected to the bus system, wherein the memory includes a computer usable program code; and a processing unit* (e.g., the charge station and vehicle charge computers 34 and 71) *connected to the bus system, wherein the processing unit executes the computer usable program code.* Ex-1009 ¶¶ 237-39.

3. 15[D]-[G]

15[D]-[G] are substantively identical to 1[A]-[D], respectively, so these limitations are disclosed by Keith for analogous reasons to those above (Sections XI(A)(2)-(5)).

J. Claims 16 and 18-19

Claims 16 and 18-19 depend from Claim 15, which Keith anticipates.

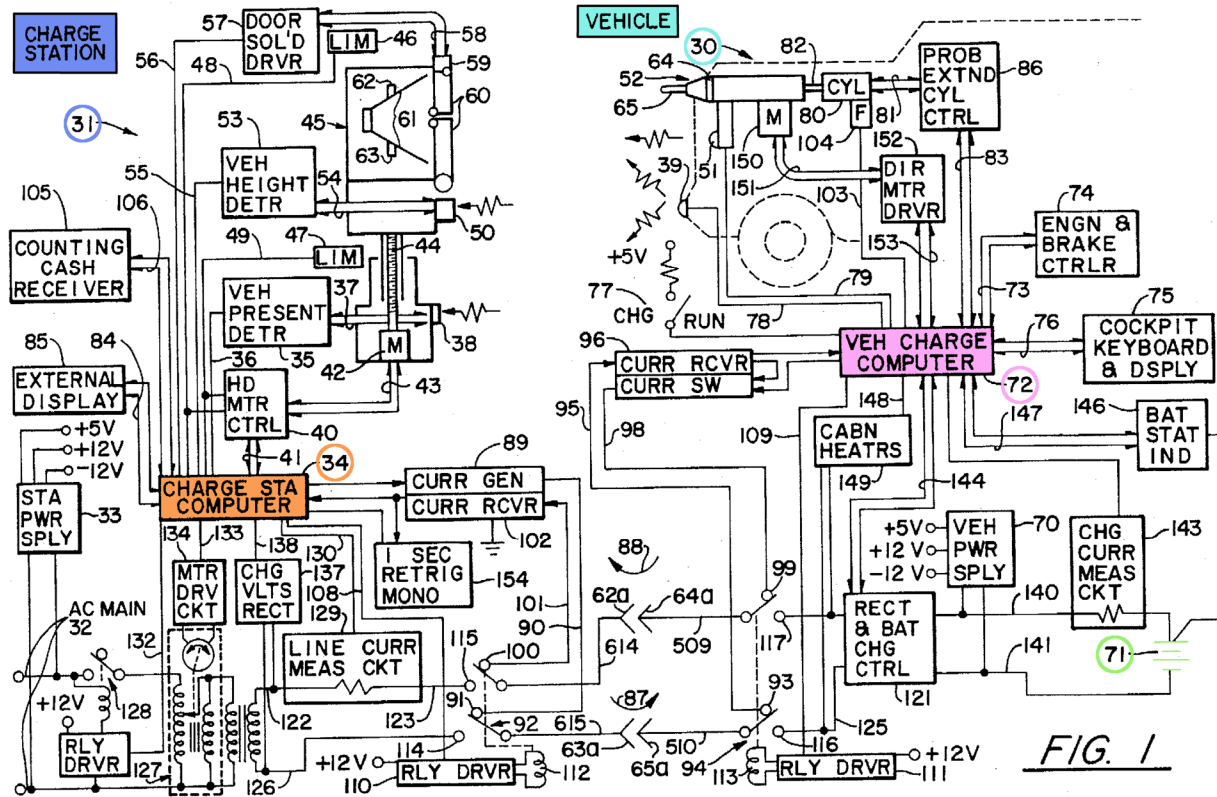
Section XI(I). Claims 16 and 18-19 are otherwise analogous to Claims 2, 4, and 7, respectively, and are anticipated for reasons analogous to those above (Sections XI(B), (C), and (F)).

K. Claim 20

1. 20[P]

20[P] recites *a system for managing a charging process of an electric vehicle*. If limiting, Keith discloses this.

Keith's apparatus includes components associated with the vehicle 30 (turquoise) and with the charge station 31 (purple), and the components of either side of the system (e.g., the respective computers 72 and 34) are collectively used to manage Keith's charging process. Ex-1009 ¶ 244.



Ex-1005, Fig. 1.

Thus, Keith discloses *a system* (e.g., including the vehicle 30 and its vehicle charge computer 72, as well as the charge station 31 and its charge station computer 34) *for managing a charging process of an electric vehicle* (e.g., the vehicle 30). Ex-1009 ¶ 244-45.

2. 20[A]

20[A] recites *an energy transaction execution engine, wherein the energy transaction execution engine executes the charging process*. As explained above, Keith's *energy transaction execution engine* is the charge station computer 34 (or portions) or the electric vehicle computer program (or portions). Section XI(A)(2).

3. 20[B]-[F]

20[B]-[F] recite *an energy transaction interrupt monitor, wherein the energy transaction interrupt monitor* performs the operations of 1[A]-[D]. Keith discloses an energy transaction interrupt monitor in its vehicle charge computer 72 and its charge station computer (or portions of either of the computers 34 and 72), both of which monitor for interruptions to Keith's charging process, as explained above. Section XI(A)(2).

Thus, Keith discloses *an energy transaction interrupt monitor* (e.g., portions of the vehicle charge computer 72 or portions of the charge station computer 34). Ex-1009 ¶ 247-48.

* * * *

Because Keith discloses each and every limitation of Claim 20, it is unpatentable as anticipated and should be cancelled. Ex-1009 ¶¶ 243-49.

XII. GROUND #5: KEITH RENDERS CLAIMS 3 AND 8-19 OBVIOUS

A. Claim 3

Claim 3 depends from Claim 1, which Keith anticipates. Section XI(A). Claim 3 adds *storing the set of operational parameters in a storage device*. Keith teaches this.

Keith describes monitoring various operational parameters at both the vehicle charge computer 72, as well as at the charge station computer 34. *See*

Section XI(A)(2). For instance, Keith notes that the vehicle charge computer 72 measures parameters including battery temperature, current, voltage, the amount of energy transferred to the battery 71, and the cost of said energy. Ex-1005, 23:57-62. With regard to the latter two parameters, Keith explicitly states that the vehicle charge computer 72 “stores the kilowatt hours [i.e., energy] and cost.” *Id.*, 23:57-62.

Although Keith does not appear to disclose using these two parameters at the vehicle charge computer 72 for interruption detection, Keith does describe detecting interrupts at the charge station computer 34 based on the cost of the charge. *Id.*, 22:27-29, 21:4-6. In the event the Board determines that anticipation of Claim 3 requires *storing the set of operational parameters in a storage device* of the same device performing the monitoring and detection operations, Petitioner notes that it would have been obvious to perform Keith’s storing the cost of the charging process and detecting an interruption with respect to the cost of the charging process at the same device (e.g., at the vehicle charge computer 72 or the charge station computer 34).

Additionally, Keith describes displaying the current or the voltage via a display 75 on the vehicle 30 if they ever are out of bounds, thereby informing the operator of the issue as well as the value of the current or the voltage. *Id.*, 23:63-65 and 24:1-7. A POSA would have understood displaying these operational

parameters as requiring the storage thereof, or would have obviously implemented such a technique.

Thus, Keith teaches *storing the set of operational parameters* [e.g., the amount of energy transferred to the battery, the cost of the energy, the current, or the voltage] *in a storage device* [e.g., memory of the vehicle charge computer 72]. Ex-1009 ¶¶ 250-54.

B. Claim 8

8[A] and 8[F] recite a storage medium that stores instructions for operations described in 8[B]-[E]. Petitioner maintains that Keith discloses these features. Sections XI(G)(2) and (4). However, Petitioner also notes that the former features are rendered obvious by Keith alone, which teaches computers 34 and 72 that execute, respectively, a “charge station computer program” and a “vehicle charge computer program.” Ex-1005, 17:41-49, 18:45-47, and 18:45-47; *cf. id.*, Figs. 11 and 12 (illustrating portions of the charge station and vehicle charge computer programs, respectively).

A POSA would have understood the computer programs of Keith as including various instructions corresponding to the functionality of the programs. Moreover, to allow for the execution of these instructions, storage would have been a necessary prerequisite.

C. Claims 9-14

Claims 9-14 depend from Claim 8, which Keith renders obvious.

Sections XI(G) and XII(B). Claims 9-14 are analogous to Claims 2-7, respectively. Thus, Keith renders Claims 9-14 obvious for the reasons discussed above with respect to Claims 2-7. *See* Sections XI(B)-(F).

D. Claim 15

15[A]-[C] recite a bus system, a memory including computer usable program code, and a processing unit. Petitioner maintains that Keith discloses these features (Sections XI(I)(2)). However, Petitioner also notes that the former features are rendered obvious by Keith alone, which teaches an RS232 UART system that includes contacts 62-65 (Ex-1005, 6:31-36), a memory for storing instructions associated with the aforementioned computer programs (*see* Section XII(B)), and computers 34 and 72 configured to execute control programs with functionality corresponding to [D]-[G] (*see id.*).

A POSA would have been motivated by these teachings to utilize the contacts as a bus system (or in conjunction with a bus system), the memory as a memory including computer usable program code, and the computers as a processing unit. This is consistent with the '391 Patent, which states that its bus system “may be implemented using any suitable type of architecture that provides for a transfer of data between different components or devices attached to the bus

system.” Ex-1001, 6:51-54. Further, this is also consistent with common knowledge in the art, where computer programs were stored in memory and executed by computers such as the computers of Keith. Ex-1009 ¶ 259-61.

E. Claims 16-19

Claims 16-19 depend from Claim 15, which Keith renders obvious. Section XII(D). Claims 16-19 are otherwise analogous to Claims 2-4 and 7, respectively, so these claims are rendered obvious for the reasons discussed above (Sections XI(B)-(F)).

XIII. GROUND #6: KEITH IN VIEW OF NOR RENDERS CLAIMS 6 AND 13 OBVIOUS

A. Motivation to Combine Keith and Nor

As a threshold matter, Keith and Nor qualify as analogous art to the ’391 Patent because they share the same field of endeavor with the ’391 Patent, namely the field of charging processes for electric vehicles. Ex-1001, 1:8-14; Ex-1005, 1:8-11; Ex-1006, 1:7-14.

Keith and Nor are reasonably pertinent to at least one problem allegedly solved by the ’391 Patent. In particular, the ’391 Patent, Keith, and Nor are each concerned with ensuring that an electric vehicle charging process is executed safely. Ex-1001, 9:8-21; Ex-1005, 2:10-35; Ex-1006, 9:29-61.

Additionally, for at least the two reasons detailed below, there was ample motivation for a POSA to modify Keith based on Nor’s teachings.

First, Keith indicates various other implementation possibilities for its “communications and exchanges,” and specifically indicates that “the communications may be had via a media different from the charging power transfer (current) medium (herein, both media are the probe-receptable connection).” Ex-1005 at 20:49-56. Thus, while Keith’s primary embodiment discusses an arrangement in which communications come before charging operations, Keith expressly motivates a POSA to explore different options. This express motivation would have naturally led a POSA to consult analogous references (like Nor) to learn more about other ways to implement Keith’s communications and exchanges. In Nor, a POSA would have found that it teaches the use of “a pair of wires 90” for carrying charging current and also teaches a separate “data communication means 92.” Ex-1006 at 10:1-13. Synergies between Keith’s express instructions and Nor’s teachings would have immediately been recognized as the data communication link types taught in Nor line up with the other communication media mentioned by Keith. *Compare* Ex-1005 at 20:49-53 *with* Ex-1006 at 10:6-11. This express motivation and the immediately-apparent synergies would have led a POSA to integrate Nor’s separate communication means with Keith’s system.

Second, at a minimum, modifying Keith to include a separate data communication means would have been obvious to try (utilizing same or different

media for power and data exchanges) and/or was a simple substitution of one known technique (use of same media for power and data exchanges, as in Keith) for another technique (separate to use different media, as in Nor) to achieve predictable results (exchanging power and data between two sides of a charging system).

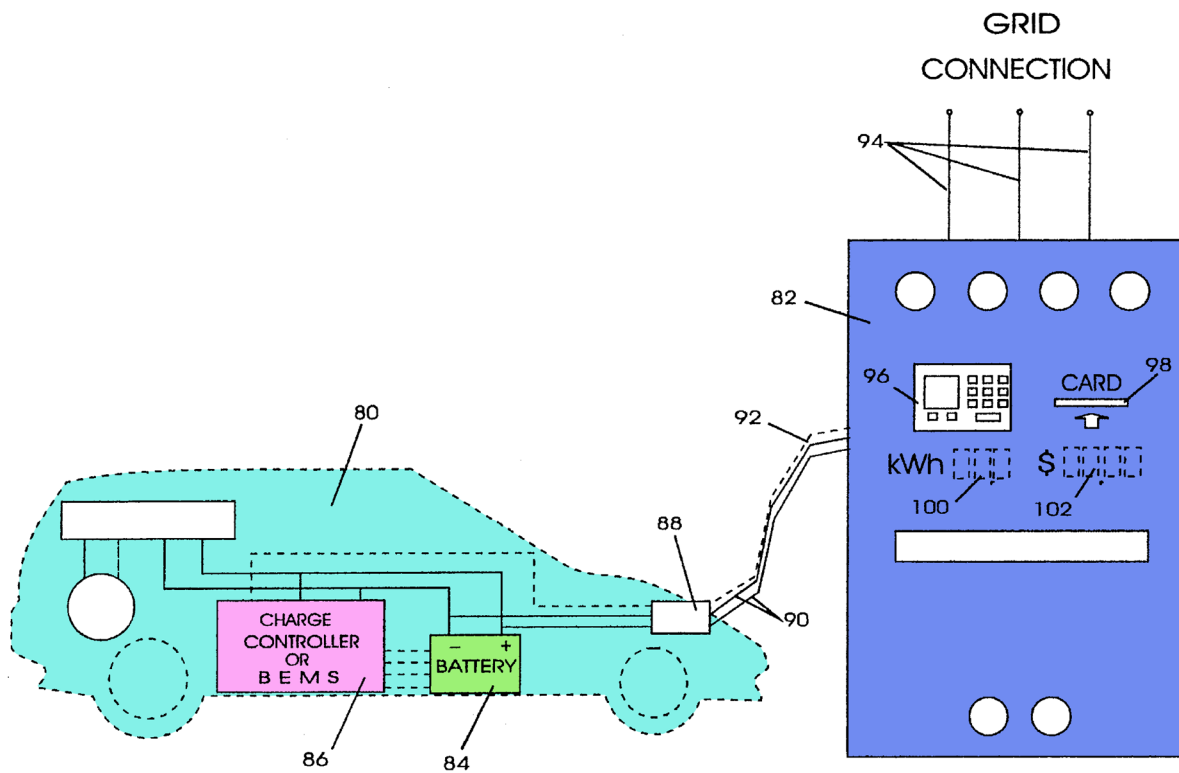
Nor shows in its figures how to create separate data communication means, so following this and applying ordinary skills, a POSA would have reasonably expected to succeed in adding a separate data communication means to Keith. Ex-1009 ¶ 263-71

B. Claim 6

Claim 6 depends from Claim 1, which Keith anticipates (Section XI(A)), and Keith-Nor retains those aspects of Keith relied on against Claim 1. Claim 6 adds *wherein the one or more interruptions is the data services interruption, and the data services interruption originates from a failure in data transmission*. Nor discloses this.

In Nor, a data services interruption occurs when the battery charge controller 86 (pink) of the electric vehicle 80 (turquoise) fails to communicate with the charging station 82 (purple). Ex-1006, 4:52-63. Nor explains that the charging operation is terminated if the battery charge controller 86 and the power station 82 fail to communicate for a certain amount of time (e.g., 4-6 seconds). *Id.*, 4:57-63.

This constitutes a data services interruption because it causes termination of the charging process based on the inability of the charging station 82 to exchange data with the charge controller 86 of the vehicle 80. *Id.*



Ex-1006, Fig. 2.

In adding the separate data communication means of Nor to Keith, a POSA also would have followed Nor's teachings and used that separate data communication means to convey Keith's operational parameters using Nor's separate data communication means (and the timeout periods taught by Nor).

Thus, Keith in view of Nor render obvious *wherein the one or more interruptions is the data services interruption, and the data services interruption*

originates from a failure in data transmission (i.e., the failure of the battery charge controller to communicate with the power station 82). Ex-1009 ¶¶ 272-76.

C. Claim 13

Claim 13 depends from Claim 8, which Keith anticipates (*see* Section XI(G)), and Keith-Nor retains those aspects of Keith relied on against Claim 8. Claim 13 is analogous to Claim 6 and thus is rendered obvious by Keith-Nor. Section XIII(B).

XIV. 314(a)-DISCRETIONARY DENIAL WOULD BE INAPPROPRIATE

Factor One favors institution. The parallel litigation is in its infancy. As of the filing of this petition, the parties are briefing a motion to transfer to California, and merits-based fact discovery is stayed pending resolution of that motion. Thus, no merits discovery has taken place and no schedule has been entered.

Factor Two favors institution. The most recent statistics for the Western District of Texas suggest a median time to trial of **25.8 months** (Ex-1012, 37), which, using the August 2023 filing date, yields an estimated trial date in October 2025, well after the Board's projected Final Written Decision. However, here the expected trial date would be even further out given the merits-based case is stayed.

Factor Three favors institution. The parties are in the middle of venue discovery and will not complete motion-to-transfer briefing until at least April 11,

2024. Ex-1013 ¶ 8. With an institution decision around July 2024, little substantive work will have occurred, especially if the case is transferred.

Moreover, Petitioner expediently filed this petition less than 6 months after Patent Owner filed its Complaint. Ex-1014, 31 (indicating the complaint was filed on August 4, 2023).

Factor Four favors institution or is neutral because the Final Written Decision here will likely trigger estoppel before trial.

Factor Five favors institution or is neutral because “the parties in the parallel proceeding are not different from the parties [in an IPR].” *Amazon v. Zentian*, IPR2023-01195, Paper 10 at 3.

Factor Six strongly favors institution because this Petition advances compelling merits using two different base references in conjunction with both anticipation and obviousness grounds demonstrating that all of the Challenged Claims are unpatentable. Sections VIII, XI, and XII; *see, e.g., Samsung Bioepis v. Regeneron*, IPR2023-00884, Paper 13 (finding “compelling merits” where the Petition challenged all claims using multiple independent anticipatory references in conjunction with obviousness grounds).

Based on a holistic view, the factors weigh for institution.

XV. SECONDARY CONSIDERATIONS

Nothing indicates Examiner reliance on secondary considerations during prosecution. The Board should institute trial to address any new evidence Patent Owner might offer. *Zurn v. Sioux Chief*, IPR2018-00975, Paper 9 at 39.

XVI. CONCLUSION

The Board should institute trial to cancel the Challenged Claims.

Dated: January 31, 2024

Respectfully submitted,

/ Alexander B. Stein /
Alexander B. Stein (Reg. No. 71,397)

U.S. PATENT NO. 8,103,391 – Listing of Challenged Claims

Claim No.	Claim Limitation(s)
1[P]	<i>A computer implemented method of managing a charging process of an electric vehicle</i>
1[A]	<i>responsive to receiving, from an energy transaction execution engine, a request signaling a start of the charging process, monitoring a set of operational parameters of the charging process during the flow of electricity for one or more interruptions</i>
1[B]	<i>detecting the one or more interruptions during the flow of electricity from the set of operational parameters which conform to a set of predefined interrupt conditions</i>
1[C]	<i>wherein the one or more interruptions comprise at least one of a device capabilities interruption, a preference interruption, and a data services interruption</i>
1[D]	<i>responsive to detecting the one or more interruptions, sending a response to the energy transaction execution engine to terminate the charging process</i>
2	<i>The computer implemented method of claim 1, wherein the one or more interruptions is a manual override interruption, and wherein the computer implemented method further comprises: responsive to receiving, from a user, the manual override interruption, terminating the charging process</i>
3	<i>The computer implemented method of claim 1, further comprising: storing the set of operational parameters in a storage device</i>
4	<i>The computer implemented method of claim 1, wherein the one or more interruptions is the device capabilities interruption, and the device capabilities interruption originates from at least one component of an electric vehicle transaction infrastructure</i>
5	<i>The computer implemented method of claim 1, wherein the one or more interruptions is the preference interruption, and the preference interruption is detected from a violation of a preference selected by a participant to the charging process</i>

6	<i>The computer implemented method of claim 1, wherein the one or more interruptions is the data services interruption, and the data services interruption originates from a failure in data transmission</i>
7	<i>The computer implemented method of claim 1, wherein the one or more interruptions are detected by identifying an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions</i>
8[P]	<i>A computer program product for managing a charging process of an electric vehicle</i>
8[A]	<i>a tangible computer-recordable storage medium</i>
8[B]	<i>first program instructions to monitor a set of operational parameters of the charging process during the flow of electricity for one or more interruptions in response to receiving, from an energy transaction execution engine, a request signaling a start of the charging process</i>
8[C]	<i>second program instructions to detect the one or more interruptions during the flow of electricity from the set of operational parameters which conform to a set of predefined interrupt conditions</i>
8[D]	<i>wherein the one or more interruptions comprise at least one of a device capabilities interruption, a preference interruption, and a data services interruption</i>
8[E]	<i>third program instructions to send a response to the energy transaction execution engine to terminate the charging process in response to detecting the one or more interruptions</i>
8[F]	<i>wherein the first program instructions, the second program instructions, and the third program instructions are stored on the tangible computer-recordable storage medium</i>
9	<i>The computer program product of claim 8, wherein the one or more interruptions is a manual override interruption, and wherein the computer program product further comprises: fourth program instructions for terminating the charging process in response to receiving, from a user, the manual override interruption</i>

10	<i>The computer program product of claim 8, further comprising: fifth program instructions to store the set of operational parameters in a storage device</i>
11	<i>The computer program product of claim 8, wherein the one or more interruptions is the device capabilities interruption, and the device capabilities interruption originates from at least one component of an electric vehicle transaction infrastructure</i>
12	<i>The computer program product of claim 8, wherein the one or more interruptions is the preference interruption, and the preference interruption is detected from a violation of a preference selected by a participant to the charging process</i>
13	<i>The computer program product of claim 8, wherein the one or more interruptions is the data services interruption, and the data services interruption originates from a failure in data transmission</i>
14	<i>The computer program product of claim 8, wherein the one or more interruptions are detected by identifying an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions</i>
15[P]	<i>An apparatus comprising</i>
15[A]	<i>a bus system</i>
15[B]	<i>a memory connected to the bus system, wherein the memory includes a computer usable program code</i>
15[C]	<i>a processing unit connected to the bus system, wherein the processing unit executes the computer usable program code to</i>
15[D]	<i>monitor a set of operational parameters of a charging process during the flow of electricity for one or more interruptions in response to receiving, from an energy transaction execution engine, a request signaling a start of the charging process</i>
15[E]	<i>detect the one or more interruptions during the flow of electricity from the set of operational parameters which conform to a set of predefined interrupt conditions</i>
15[F]	<i>wherein the one or more interruptions comprise at least one of a device capabilities interruption, a preference interruption, and a data services interruption</i>

15[G]	<i>send a response to the energy transaction execution engine to terminate the charging process in response to detecting the one or more interruptions</i>
16	<i>The apparatus of claim 15, wherein the one or more interruptions is a manual override interruption, and wherein the processing unit further executes the computer usable program code to terminate the charging process in response to receiving, from a user, the manual override interruption</i>
17	<i>The apparatus of claim 15, wherein the processing unit further executes the computer usable program code to store the set of operational parameters in a storage device</i>
18	<i>The apparatus of claim 15, wherein the one or more interruptions is the device capabilities interruption, and the device capabilities interruption originates from at least one component of an electric vehicle transaction infrastructure</i>
19	<i>The apparatus of claim 15, wherein the one or more interruptions are detected by identifying an operational parameter from the set of operational parameters that conform to the set of predefined interrupt conditions</i>
20[P]	<i>A system for managing a charging process of an electric vehicle, the system comprising</i>
20[A]	<i>an energy transaction execution engine, wherein the energy transaction execution engine executes the charging process</i>
20[B]	<i>an energy transaction interrupt monitor</i>
20[C]	<i>wherein the energy transaction interrupt monitor monitors a set of operational parameters of the charging process during the flow of electricity for one or more interruptions in response to receiving, from the energy transaction execution engine, a request signaling a start of the charging process</i>
20[D]	<i>detects the one or more interruptions during the flow of electricity from the set of operational parameters which conform to a set of predefined interrupt conditions</i>
20[E]	<i>wherein the one or more interruptions comprise at least one of a device capabilities interruption, a preference interruption, and a data services interruption</i>

20[F]	<i>sends a response to the energy transaction execution engine to terminate the charging process in response to detecting the one or more interruptions</i>
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CERTIFICATION OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This petition includes 13,850 words as counted by Microsoft Word and is therefore in compliance with the 14,000-word limit established by 37 C.F.R.

§ 42.24(a)(1)(i). Accordingly, pursuant to 37 C.F.R. § 42.24(d), lead counsel for Petitioner hereby certifies that this petition complies with the applicable type-volume limits.

Dated: January 31, 2024

Respectfully Submitted,

/ Alexander B. Stein /

Alexander B. Stein, Reg. No. 71,397

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(b), I certify that I caused to be served a true and correct copy of the Power of Attorney, Petition for *Inter Partes* Review of U.S. Patent No. 8,103,391, and the exhibits cited therein on Patent Owner's correspondence address of record for the subject patent as follows:

Graphite Charging Company LLC
3610-2 N Josey
Suite 223
Carrollton, Texas 75007

A courtesy copy of this petition and supporting exhibits was also served via email on January 31, 2024 on Patent Owner's counsel of record in the district court litigation involving this patent.

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Dated: January 31, 2024

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