

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

WINPLUS NORTH AMERICA, INC.,
Petitioner,

v.

SHENZHEN CARKU TECHNOLOGY CO., LTD.,
Patent Owner.

U.S. Patent No. 10,148,105

IPR Case No.: 2023-00368

DECLARATION OF ALEX Z. KATTAMIS, Ph.D.

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List of Exhibits

Exhibit No.	Description	Identifier
1001	Asserted U.S. Patent No. 10,148,105	The '105 Patent
1002	Prosecution history of the '105 Patent	'105 File History
1003	Prosecution history of the '105 Patent's reissue application No. 17/112,920 updated until Sept 30, 2022	Reissue History
1004	Declaration of Alex Z. Kattamis, Ph.D.	
1005	U.S. Patent Application Pub. No. 2016/0268645	Koebler
1006	Chinese Utility Model No. CN204905522U	Liu
1007	German Utility Model No. 202015103173	Zonesking
1008	U.S. Patent No. 8,493,021	Richardson
1009	U.S. Patent No. 9,007,015	Nook
1010	U.S. Patent No. 3,267,452	The '452 Patent
1011	U.S. Patent No. 2,659,042	The '042 Patent
1012	U.S. Patent No. 4,163,134	The '134 Patent
1013	Balakrishnan Article	
1014	U.S. Patent Pub. No. 2014/0368155	The '115 Publication
1015	U.S. Patent No. 3,950,688	The '688 Patent
1016	U.S. Patent No. 4,871,957	The '957 Patent
1017	U.S. Patent No. 5,909,103	The '103 Patent
1018	U.S. Patent No. 7,446,508	The '508 Patent
1019	U.S. Patent No. 7,592,778	The '778 Patent
1020	U.S. Patent No. 4,366,430	The '430 Patent
1021	U.S. Patent No. 4,463,402	The '402 Patent
1022	U.S. Patent No. 4,769,586	The '586 Patent
1023	U.S. Patent No. 4,488,147	The '147 Patent
1024	CV of Alex Z. Kattamis, Ph.D.	
1025	Shenzhen Carku v. Winplus, Case No. 8:21-cv-02021, Complaint w-exhibits (DN1)	
1026	Shenzhen Carku v. Winplus, Case No. 8:21-cv-02021, Stay Order (DN40)	

I, Alex Z. Kattamis, hereby declare as follows:

1. I am making this declaration at the request of Winplus North America, Inc., a California corporation (“Petitioner”) in the matter of *Inter Partes* Review of U.S. Patent No. 10,148,105 (“the ’105 Patent”).

2. I understand that the ’105 Patent has been assigned to Shenzhen CARKU Technology Co., Ltd. (“CARKU”). CARKU is also referred to as the “Patent Owner” in this declaration.

3. This declaration is based on the information currently available to me. To the extent that additional information becomes available, I reserve the right to continue my investigation and study, which may include a review of documents and information that may be produced, as well as testimony from depositions that have not yet been taken.

4. In preparation of this declaration, I have studied the exhibits identified in the Exhibit List shown above.

5. In forming the opinions expressed below, I have considered:

- a. The documents listed above as well as additional patents and documents referenced herein;
- b. The relevant legal standards, including the standard for obviousness, and any additional documents cited in the body of this declaration; and

- c. My knowledge and experience based upon my work and study in this area as described below.

I. QUALIFICATIONS AND PROFESSIONAL EXPERIENCE

6. I have been retained by Brooks Kushman P.C. on behalf of Winplus North America, Inc. to provide my opinion concerning the validity of U.S. Patent No. 10,148,105 (“the ’105 Patent”) in support of its Petition for *Inter Partes* Review of the ’105 Patent (the “Petition”). All claims of the ’105 Patent will be addressed in this document.

A. Education and Experience

7. I have provided my full background in the curriculum vitae that is attached as EX1024.

8. I am a Senior Managing Engineer in Exponent’s Electrical Engineering and Computer Science practice. I received my B.S.E. degree in Electrical Engineering from the University of Connecticut in 2002 and M.A. and Ph.D. degrees in Electrical Engineering from Princeton University in 2004 and 2007, respectively.

9. Before joining Exponent, I worked as a design engineering intern at General Electric Industrial Systems. There, I designed and implemented power meters and trip units. This work also included the design of power supplies, battery management systems, and firmware coding. Throughout my career at Exponent, I have worked on vehicle power and electronic control systems.

10. I am a licensed Professional Engineer in the State of Connecticut, the State of Georgia, the Commonwealth of Massachusetts, the State of New Jersey, the State of New York, the Commonwealth of Pennsylvania, the State of Rhode Island, and the State of Texas. I am also designated a Model Law Engineer by the National Council of Examiners for Engineering.

11. I am a certified fire and explosion investigator (CFEI) by the National Association of Fire Investigators (NAFI). NAFI's CFEI program is an international registry that recognizes qualified fire and explosion investigators. The program establishes a standard for evaluating the qualifications of those conducting fire, arson, and explosion investigations. I am also a certified vehicle fire investigator (CVFI) by NAFI.

12. I am a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE), which is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity.

B. Compensation

13. Exponent is compensated for my work in this matter at a rate of \$495/hour. My compensation in no way depends on the outcome of this proceeding.

II. RELEVANT LEGAL STANDARDS

14. I have been asked to provide opinions on the claims of the '105 Patent

in light of prior art.

A. Claim Construction

15. I understand that in proceedings at the Patent Trial and Appeal Board, claims are construed under the “*Phillips* standard.” I understand that this means the claims are construed in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art, in light of the specification and prosecution history of the patent. I understand that this is the same claim construction standard employed in district courts.

16. I understand that intrinsic evidence is the primary means by which claim terms are interpreted. The intrinsic evidence includes the claims themselves, the specification of the patent in which the claims appear, and the prosecution history of the patent.

17. I understand that a patentee may give a special definition to a claim term that differs from the normal meaning of the term. If the patent specification sets out an uncommon definition that would give one of ordinary skill in the art notice of the change in meaning, the specification’s definition governs the construction of that term.

18. I understand that extrinsic evidence, such as expert and inventor testimony, dictionaries, and learned treatises, can also inform the meaning of a claim term. However, extrinsic evidence is less significant than the intrinsic evidence in

determining the meaning of a claim term. Further, I understand that extrinsic evidence cannot be used to vary, contradict, expand, or limit the claim language from how it is defined, even by implication, in the specification or file history.

B. Anticipation

19. Counsel has advised me that for a patent claim to be valid, the claimed invention must be novel. Counsel has further advised me that if every element of a claim is disclosed in a single prior art reference, then the claimed invention is anticipated, and the invention is not patentable. For the invention to be anticipated, all the limitations of the claim must be shown in a single prior art reference, arranged as in the claim. A claim is anticipated only if every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. For a reference to inherently disclose a limitation, that claim limitation must necessarily be present in the reference.

C. Obviousness

20. Counsel has also advised me that a claimed invention is unpatentable if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time the alleged invention was made to a person having ordinary skill in the art to which the subject matter pertains. I also understand that an obviousness analysis takes into factual inquiries including

the level of ordinary skill in the art, the scope and content of the prior art, and the differences between the prior art and the claimed subject matter.

21. It is my understanding that the Supreme Court has recognized several rationales for combining references or modifying a reference to show obviousness of the claimed subject matter. Some of these rationales include the following: combining prior art elements according to known methods to yield predictable results; simple substitution of one known element for another to obtain predictable results; a predictable use of prior art elements according to their established functions; applying a known technique to a known device to yield predictable results; choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; and some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

22. I am informed that obviousness should not be determined using hindsight; rather, the inquiry must be from the perspective of a person of ordinary skill in the art at the time that the invention was made. I am informed that there is no requirement that the prior art contain an express suggestion to combine known elements to achieve the claimed invention; a suggestion to combine known elements to achieve the claimed invention may come from the prior art as a whole or individually, and will be viewed in light of the knowledge of one skilled in the art.

The inferences and creative steps a person of ordinary skill in the art would typically employ are also relevant to the determination of obviousness.

23. When a work is available in one field, design alternatives and other market forces can prompt variations of it, either in the same field or in another. If a person of ordinary skill in the art can implement a predictable variation and would see the benefit of doing so, that variation is likely to be obvious. When there is design need or market pressure and there are a finite number of predictable solutions, a person of ordinary skill in the art has good reason to pursue those known options.

24. It is my understanding that there is no rigid rule that a reference or combination of references must contain a “teaching, suggestion, or motivation” to combine references. But I understand that a “teaching, suggestion, or motivation” can be a useful guide in establishing a rationale for combining elements of the prior art.

D. Basis for My Opinion

25. In forming my opinion, I have relied on the '105 Patent claims, disclosure and prosecution history, the prior art exhibits to the Petition for *Inter Partes* Review of the '105 Patent, and my own experience, expertise and knowledge of a person of ordinary skill in the relevant art in the relevant timeframe.

III. SUMMARY OF OPINIONS

26. It is my opinion that Claims 1-5 and 7-9 of the '105 Patent are rendered obvious by Koebler in view of Liu.

27. It is my opinion that Claims 1-7 and 9-10 of the '105 Patent are rendered obvious by Zonesking in view of Richardson.

28. It is my opinion that Claim 8 of the '105 Patent is rendered obvious by Zonesking in view of Richardson and Liu.

29. It is my opinion that Claims 1-10 of the '105 Patent are rendered obvious by Nook in view of Zonesking and Liu.

IV. THE '105 PATENT

A. Overview of '105 Patent

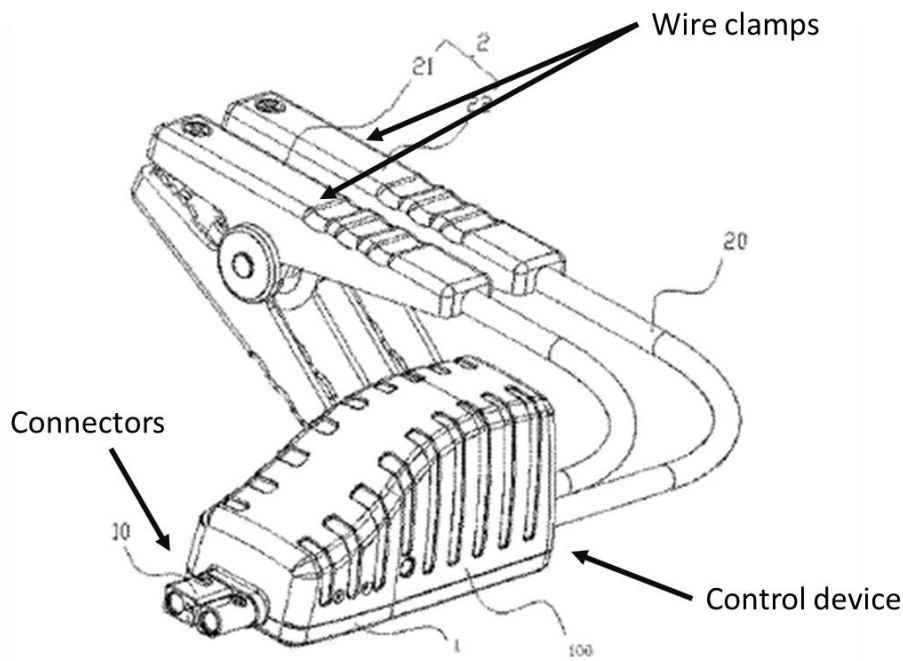
30. The '105 Patent matured from U.S. Application 15/245,146, ('146 application) filed August 23, 2016, and claims priority to Chinese patent application CN201610506106, filed on June 30, 2016, Chinese patent application CN201610506137, filed on June 30, 2016, and Chinese patent application CN201620692248U filed on June 30, 2016. (Collectively "foreign priority applications of the '105 Patent"). Thus, it is my understanding that post-AIA § 102 determines a reference's status as prior art.

31. The '105 Patent is directed to a battery clamp used for jump starting batteries, that includes first and second wire clamps and a control device. (EX1001,

Abstract). The alleged invention purportedly solves the problem of using a lithium battery as an external power supply with such a battery clamp, problems that include the bulging or exploding of the battery due to improper uses. (*Id.*, at 1:45-48, (“The purpose of the present invention is to provide a battery clamp, which aims to solve the aforementioned problems of a lithium battery in an external power supply e.g. battery bulge or explosion resulted from improper uses.”)).

32. Figure 2 of the '105 Patent (shown below) depicts the battery clamp.

33. As shown in Figure 2, the battery clamp 100 comprises a control device 1 and wire clamps 2. One side of the control device is provided with connectors 10, and the other side is provided with wires 20. The control device and the wire clamps are connected via the wires 20. The wire clamps (21, 22) represent a positive and negative electrode, respectively. The wire clamps are connected to the external device 300 for supplying it power. (EX1001, the '105 Patent at 4:10-22.)



Annotated Figure 2 of '105 Patent.

34. The battery clamp of the '105 Patent monitors status information of the external power supply (e.g., temperature) and sends this information to the control device through a communication connector. (*Id.* at 9:61-10:9.) The control device then uses this status information in the decision process of whether to allow power to flow from the external battery to the external device. (*Id.*) For example, if the supply battery is overheating such that its temperature exceeds a threshold, the controller would stop the supply of power. (*Id.*)

35. The master-control board of the control device is depicted in Fig. 4 of the '105 Patent.

As shown in FIG. 4, the master-control board 12 comprises: voltage input ports BATs (including a positive voltage input port BAT+ and a negative voltage input port BAT-), voltage output ports CARs (including a positive voltage output port CAR+ and a negative voltage output port 5 CAR-), a communication port COM, a switch control unit K1 and a master-control circuit unit 128.

(EX1001, '105 Patent at 5:1-7.)

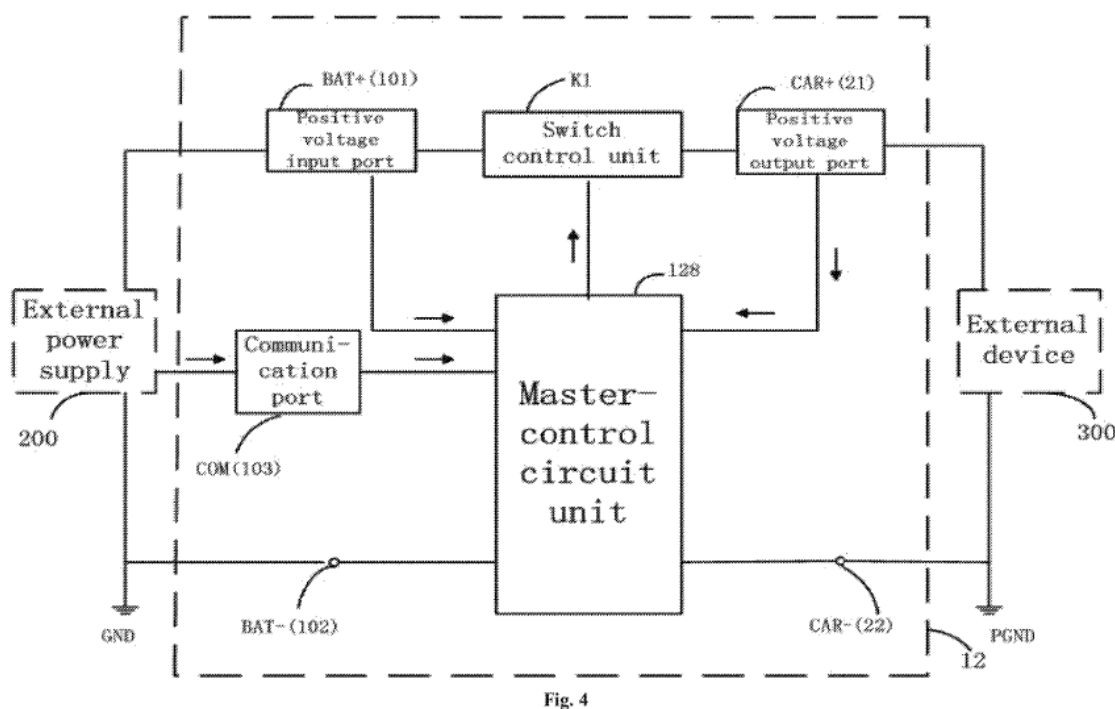


Figure 4 of '105 Patent.

36. Figure 4 of the '105 Patent illustrates the communication port through which the status information of the external power supply travels to the master-control circuit unit on the master-control board. (EX1001, '105 Patent at 5:32-34 (“The master-control circuit unit 128 is connected to the communication

port COM for receiving status information of the external power supply 200.”.)
Based on the status information, the master-control circuit determines the status of the switch control unit, i.e., whether to allow the power supply from the external power supply to the external device. *Id.* at 2:1-3 (“Preferably, the control device is configured to allow the power supply from the external power supply to the external device when the status information is normal...”).

37. The master-control board also may, based on the voltage values or electric current values detected by the master-control circuit unit, control the on/off of the switch control circuit to thereby control whether power is supplied from the external power supply. *Id.* at 5:49-52.

38. The ’105 Patent includes 1 independent claim and 9 dependent claims.

B. Reissue Proceeding

39. On December 4, 2020, a broadening reissue patent application for the ’105 patent was filed. The reissue application was assigned Application Number of 17/112,920 (hereinafter “the ’920 application,” EX1003.)

40. In the ’920 application, Patent Owner amended claims 1-4 and 6-7, cancelled claims 5 and 8-10, and added new claims 11-25. The amendments removed limitations relating to the housing of the control device.

41. After a Non-Final Office Action rejected all pending claims for

claiming more than Patent Owner was entitled to claim under the “original patent requirement” of 35 U.S.C. § 251, as being anticipated under 35 U.S.C. § 102 and/or rendered obvious under 35 U.S.C. § 103, Patent Owner again amended claim 1, cancelled claims 11-25, and added new claims 26-29. Thus, claims 1-4, 6-7 and 26-29 remained.

42. Amended claim 1 is presented below:

1. (Twice Amended) A battery clamp for delivering an instantaneous starting current [from an external power supply] to an external device, the battery clamp comprising:

a control device, comprising:

[a housing;]

a master-control board [mounted within the housing; and];

connectors [disposed at one side of the housing, and] being electrically connected to the master-control board, comprising:

at least a first and second electrode connectors being electrically connected to the master-control board, which are connected to an external power supply for receiving power, and

at least one communication connector connected to the external power supply for receiving status information of the [external] power supply, and sending the status information to the master-control board;

a first and second wire clamps, each having an end configured to receive power from the external power supply via the control device, and another end connected to the external device for supplying power to the external device;

wherein the control device is configured to control power supply from the external power supply to the external device based on the status information.

43. On September 9, 2022, a second Non-Final Office Action was mailed again rejecting all pending claims 1-4, 6-7 and 26-29. Among other things, the Examiner issued the following rejections:

- All pending claims are rejected under the “original patent requirement” of 35 U.S.C. § 251;
- Claims 1 and 2 are rejected under 35 U.S.C. § 103 as being unpatentable over US 6,262,492 to Sheng in view of US 6,222,342 to Eggert;
- Claims 1 and 2 are rejected under 35 U.S.C. § 103 as being unpatentable over US 2010/0173182 to Baxter in view of Richardson;
- Claim 29 is rejected under 35 U.S.C. § 103 as being unpatentable over Baxter and Richardson further in view of US 2013/0260586 to Higuchi; and
- Claims 3, 4, 6, 7 and 26-28, although rejected under 35 U.S.C. § 251,

are allowable over the prior art.

44. On September 30, 2022, Patent Owner filed an IDS citing more than one hundred (100) new references. There has been no further activity as of the filing of this IPR.

V. PERSON OF ORDINARY SKILL IN THE ART

45. I have reviewed the '105 Patent, as well as the prior art documents which will be discussed in detail below. Based on this review, my knowledge and my experience in the field of battery and charging technology, it is my opinion that a person of ordinary skill in the art (POSITA) would have had an undergraduate degree in electrical engineering (or equivalent subject) together with two or three years of experience in automotive electrical systems industry. This description is approximate, and a higher level of education or skill might make up for less experience, and vice-versa. It is also my opinion that the POSITA would have experience and be familiar with vehicle battery charging and jump starting.

46. It is my opinion that this description is approximate and development experience could make up for less education or additional education could make up for less development experience.

47. I also understand that this determination is made at the time of the invention, which for the purpose of this IPR, I have assumed is the June 30, 2016 date of the Chinese priority applications.

48. As I also discussed in my “Qualifications and Professional Experience” (§ I.A) above, I am familiar with the level of knowledge and the abilities of a person having ordinary skill in the art at the time of the claimed invention based on my experience in the industry.

VI. TECHNOLOGY BACKGROUND

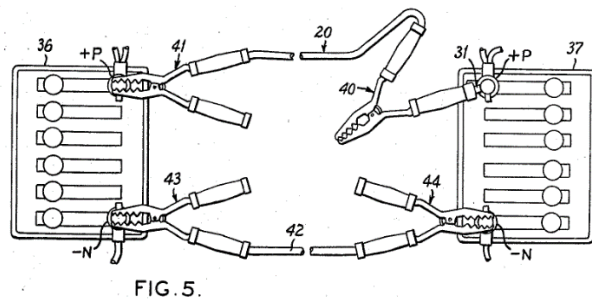
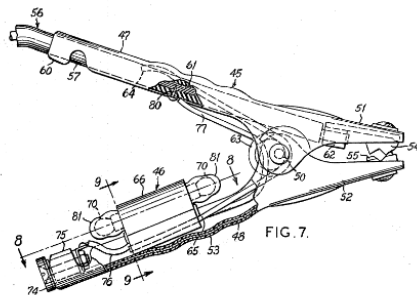
A. Vehicle Battery Jump Starters

49. In normal operation, a vehicle battery is recharged once the engine is started, and the alternator takes over the role of generating electricity. However, the battery may become fully depleted if, for example, the lights, radio, or other electrical system is left on when the engine is not running. The negative reaction needed to recharge the battery must then be supplied by an external power supply.

50. For over half a century, starting or jump-starting a vehicle’s “dead” battery has been accomplished with a pair of so-called jumper cables made of heavy-gauge wire with wire clamps at each end (see below). One clamp is colored red for attachment to the positive terminals, and the other clamp is colored black for attachment to the negative terminals. In use, a direct electrical connection is made between the batteries of the two vehicles. When the engine of the assisted vehicle has started, the cables are disconnected.



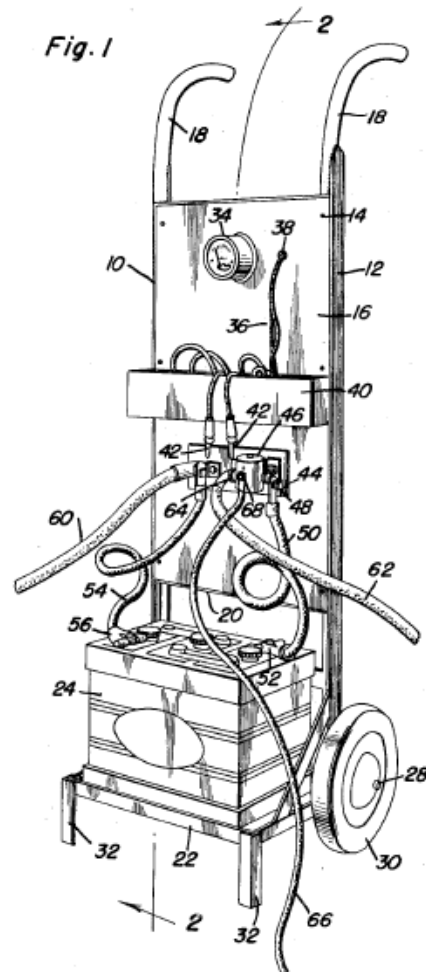
51. Jumper cable clamps like those shown above, have been well-known for over 50 years. For instance, U.S. Patent No. 3,267,452 (“the ’452 Patent,” EX1010) titled “Battery charger clamp and polarity detector” illustrates and discloses such well known and commonly used jumper cables and clamps.



The ’452 Patent Figure 7 and Figure 5.

52. Jump starters that utilize their own battery (as opposed to the battery of another vehicle) have also been known for over 50 years. For example, U.S. Patent No. 2,659,042 (“the ’042 Patent,” EX1011), filed in 1950, discloses “a booster battery with complementary switch-controlled equipment and defective battery testing means may be wheeled or otherwise carted to a scene of needed emergency service and hooked directly to either a starter motor or a defective, storage battery

for starting a car which has become stalled because of a weak battery.” (EX1011, the '042 Patent at 1:02-08.)



The '042 Patent Figure 1.

53. Therefore, it is apparent that both conventional battery jump starters that charge from another vehicle and battery jump starters reliant on external power supplies have been well-known for over 50 years.

B. Potential Hazards of Battery Jump Starting

54. When used correctly, conventional jumper cables as described above function well enough to start a vehicle battery. However, there are several well-known hazards associated with the process that are dangerous for a user. For instance, as described in U.S. Patent No. 4,163,134 (“the ’134 Patent”), sparking can occur when connecting or disconnecting a vehicle with a functioning battery to a discharged battery with a set of conventional cables. (EX1012, the ’134 Patent at 1:5-40.) Such sparks may cause ignition of hydrogen gas emitted from the batteries, resulting in an explosion that can severely injure or kill a person. *Id.*

55. Accidental misconnection of the jumper cables, such as a reverse-polarity connection between vehicles, in which the positive cable from the intact battery is connected to the negative terminal of the assisted vehicle, and the negative cable to the positive terminal, may also produce undesirable and dangerous consequences. For instance, U.S. Patent No. 3,267,452 (EX1010, “the ’452 Patent”) discloses a system for detecting the polarity of the jumper cable connection to ensure the jumper cables are not misconnected thereby causing severe damage.

In utilizing a charger to revitalize or charge a battery, extreme care must be taken to assure that the clamps carrying the positive and negative cables of the charger are connected to corresponding and correct posts of such battery in order to avoid the undesirable effects of reverse charging; For example, reverse charging of automobile storage

batteries, usually of the six or twelve volt type, can cause severe damage to alternator systems, transistor radios, voltage regulators, ignition systems as well as the batteries per se.

It is an important objective of the present invention to provide a polarity detector for assuring that the clamps of the battery charger are being attached to the correct battery posts before charging current is passed through the battery, thereby avoiding any reverse charging action and the resulting disadvantages mentioned previously.

An important object is achieved by mounting a sensing unit on one of the charger clamps and connecting such unit to the associated clamp cable, the sensing unit being capable of indicating whether or not such clamp is being attached to the proper battery terminal.

(EX1010, the '452 Patent at 1:15-36.)

56. In addition, incorrect connection of the jumper cables could also cause sparks and/or melted cables and/or damaged batteries. Another hazard exists when red and black cable clamps contact each other while the other ends are attached to a battery. Such unintended and hazardous misconnections are easily made.

57. More recently, lithium ion (Li-ion) batteries, ubiquitous in portable modern-day electronic devices due to at least their increased energy density, have been used as the power supply for vehicle battery charging. Li-ion batteries have well-known safety-related considerations. For example, one potential failure mode in a Li-ion battery is known as “thermal runaway.” To prevent this known issue it

is important that Li-ion batteries operate within a safe range of voltages. (EX1013, Balakrishnan Article, p. 402 (“Any abuse, including disposing in fire, overcharging, external short circuiting or crushing, can trigger spontaneous heat-evolving reactions, which can lead to fire and explosion.”).) For this reason, modern electrical systems that rely on Li-ion batteries typically include battery management systems which monitor both the lithium batteries and the batteries to be charged to prevent battery damage.

C. Control Systems to Prevent Hazards

58. As a result of these potential hazards, control systems for battery jump starters have evolved over the last 50 years to detect the possibility for a hazard, and to prevent, or terminate, battery charging so that the hazard is averted.

59. Control circuits are ubiquitous in today’s consumer electronics. At its most basic, a control circuit makes a decision based on a set of inputs. In the context of vehicle jump starters, these decisions can be made based on various parameters such as the supply battery voltage, the vehicle voltage, the current passing between the batteries and the temperature of various systems, including but not limited to, that of the supply battery. The design of these basic control circuits is well known and well within the skill of a POSITA at the time of the priority date of the ’105 Patent.

60. These circuits typically detect hazardous conditions and control electronic switches to prevent, or terminate, the jump start when a hazardous condition is detected. Jumper starters that incorporate these control systems are sometimes called “smart” or “intelligent” battery jump starters. (See, e.g., EX1006, Liu at Abstract, p. 12 (“intelligent emergency automotive battery jump starter clamps”); U.S. Patent Pub. No. 2014/0368155 (the ‘155 Publication,” EX1014) (“smart vehicle rescue battery apparatus”).)

61. The use of control circuits to monitor the voltage of a supply battery has been known since long prior to the purported invention of the ‘105 Patent. For example, U.S. Patent No. 3,950,688 (“the ‘688 Patent”), filed in 1975, discloses that an external power supply for charging a lead acid battery will “discontinu[e] the charge as soon as the voltage of the battery falls below a second predetermined voltage, for example 12.6 volts” and that “[t]his second voltage may also be adjustable and regulated as the case requires to a desired value for a given set of circumstances.” (EX1015, the ‘688 Patent at 2:09-14.)

62. Likewise, the idea of monitoring the voltage of the battery used as a power supply battery for charging a vehicle battery has been long known. For example, U.S. Patent No. 4,871,957 (“the ‘957 Patent”), filed in 1988, discloses a “apparatus for eliminating sparking or other undesirable effects when one battery is connected by jumper cables to another battery,” for charging of a vehicle battery by

a power supply comprising another battery. (EX1016, the '957 Patent at 1:7-10, 2:11-20, 10:52-54.) The disclosed apparatus includes “means for sensing a predetermined low battery voltage at either of said batteries and for inhibiting said connecting means for connecting together said sets of cables responsive to the sensing of said low battery voltage.” (*Id.* at 10:52-54, 10:68 -11:7.)

63. The implications of improper voltage can be more serious for Li-ion batteries as compared with lead acid batteries. Consequently, monitoring the voltage and temperature of Li-ion batteries for safety has been well known for many years. For example, U.S. Patent No. 5,909,103 (“the '103 Patent”), filed in 1997, describes how over-discharge of a Li-ion battery (resulting in a low battery voltage) can result in internal short circuits and permanently destroy the battery operation, and how over charging (exceeding a certain voltage called the over-charge limit, typically 4.2 V) may create a fire hazard. (EX1017, the '103 Patent at 1:11-54, 2:20-23.) Specifically, if the voltage exceeds a critical value, the battery “may go into a thermal runaway condition 21 resulting in possible fire or explosion.” (*Id.* at 8:37-39.) The '103 Patent discloses “a safety switch” that disconnects the Li-ion battery from the charging power supply “for identifying out of range voltage conditions during discharge and re-charge” of a Li-ion “to cause immediate open circuit conditions in the event of such out of range voltage condition.” (*Id.* at 3:19-30.)

64. Li-ion batteries are also well known to be sensitive to excessively low

or high temperatures, and as such, these batteries should not be operated at these extreme temperatures. Indeed, U.S. Patent No. 7,446,508 (“the ’508 Patent”), describes how charging a Li-ion battery at too low temperature will cause the electrolyte generating unnecessary gas and charging the battery at too high temperature will shorten the lifetime of the battery. (EX1018, the ’508 Patent at 1:64-67.) As a solution, this patent discloses a battery with a temperature sensor for detecting the temperature of the Li-ion battery pack prior to and during battery charging. (*Id.* at 3:58-4:8.) Both the temperature and the voltage of the battery pack are communicated to a control unit, which then adjusts the charging current in accordance with the battery temperature detected by the temperature sensor. (*Id.* at 5:47-55, 7:38-51.)

65. As another example, U.S. Patent No. 7,592,778 (“the ’778 Patent”), filed in 2005, discloses a Li-ion “battery protection IC chip that comprises a protection section for protecting a battery during charging and discharging, and a temperature detector for detecting an ambient temperature, wherein the protection section is configured to turn off a charge control FET chip and a discharge control FET chip in response to a detection by the temperature detector of the ambient temperature reaching a predetermined temperature.” (EX1019, the ’778 Patent at 1:47-55.)

66. Finally, U.S. Patent No. 9,007,015 (“Nook,” EX1009) and U.S. Patent

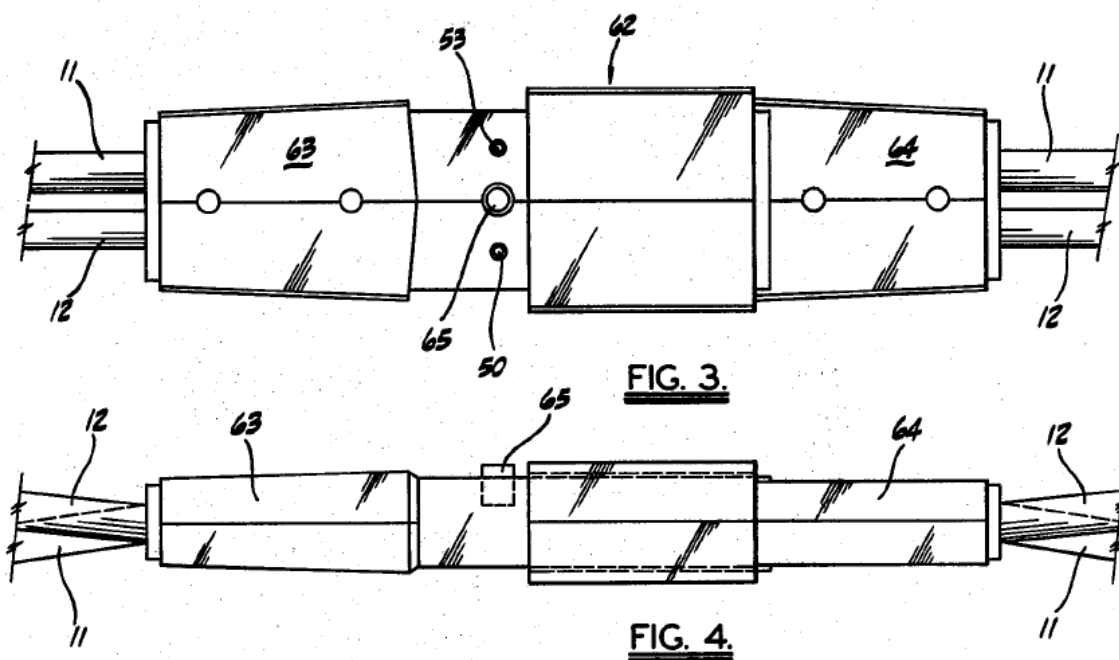
No. 8,493,021 (“Richardson,” EX1008) both disclose control circuits which utilize sensors to monitor the temperature of the power supply batteries in jump starters, and if the temperature is outside a designated range, either prevents or terminates the jump starter until proper conditions exist. (EX1009, Nook at 4:38-41 (“lithium battery temperature sensor 20 monitors the temperature of the lithium battery pack 32 to detect over heating due to high ambient temperature conditions and over extended current draw during jump starting.”).) (EX1009, Nook at 6:25-27 (“The microcontroller software can then determine when the internal lithium battery is too hot to allow jumpstarting, adding safety to the design.”).) (EX1008, Richardson at 2:64-66 (“A battery temperature sensor 38 monitors the temperature of the jump starter's batteries 22 to detect overheating due to excess current draw from the batteries during jump starting.”).) (EX1008, Richardson at 5:13-19 (“If the battery temperature measured by sensor 38 rises above a maximum safe threshold 232, an error flag is set ... The system prevents any further operation until the battery temperature falls below a safe level 238.”).)

1. Control Circuits on Conventional Jumper Cables

67. In conventional jumper cables, which use another vehicle battery as the jump starter, the control circuitry is often housed in the jumper cables themselves.

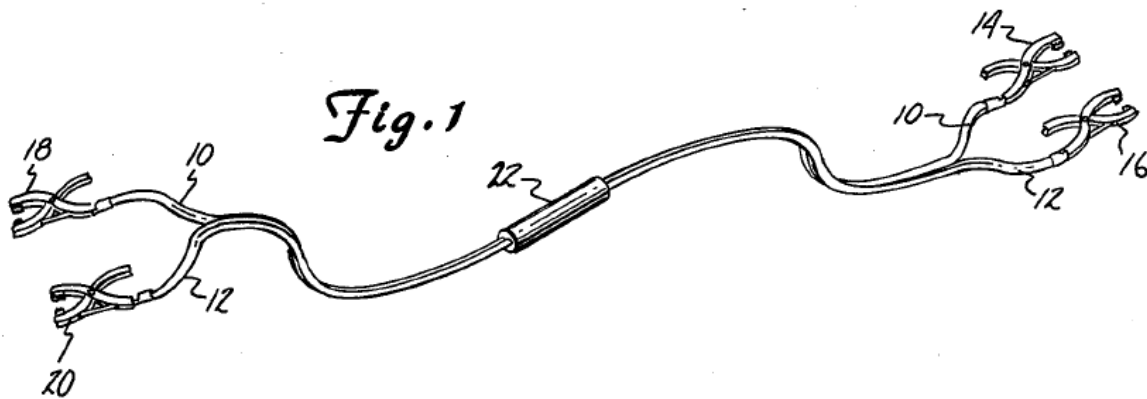
68. For example, U.S. Patent No. 4,366,430 (“the ’430 Patent”), filed in 1982, discloses a “battery booster cable assembly” that “includes means for

determining the differences in voltages of the batteries as connected to the cables for indicating the polarity of connection of the booster cables, and for determining that the batteries are the same voltage, and includes switch means for making the final electrical connection between the batteries at a point remote from either battery, thereby minimizing the possibility of battery explosion.” (EX1020, the ’430 Patent at 1:33-45.) The battery booster cables include “a housing means 62” that is “carried by booster wires 11 and 12.” (*Id.* at 3:60-65 and Figs. 3 and 4.) The housing carries control circuitry comprising “an electrically actuated solenoid lockout 55 for preventing the button 65 from being depressed for closing the housing portions 63 and 64 when a dangerous condition is indicated by the lighting of the red LED 50.” (*Id.* at 3:45-59; *see also* Fig. 2.)



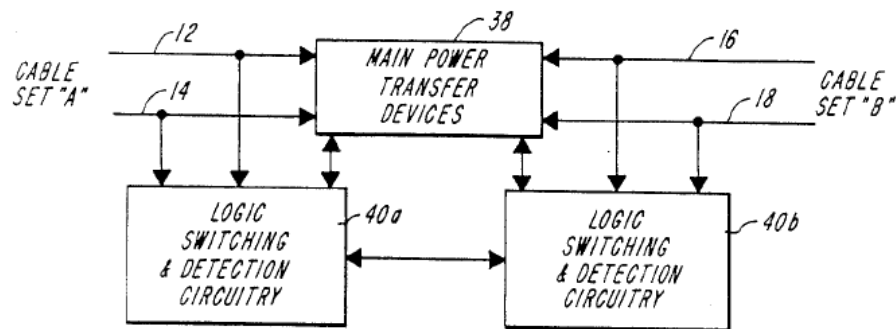
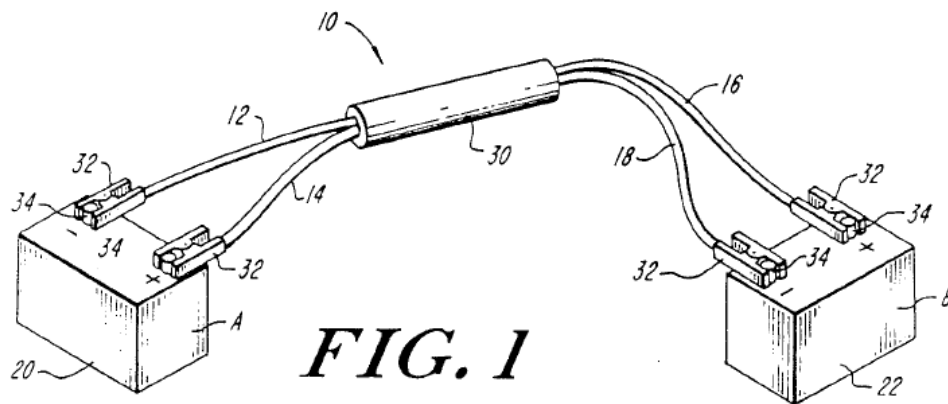
The '430 Patent Figure 3 and Figure 4.

69. U.S. Patent No. 4,463,402 (“the ’402 Patent”), filed in 1983, is another example of housing the control circuitry in an enclosure on the jumper cable. (EX1021, the ’402 Patent at 2:22-30 (disclosing a “safety jumper cable apparatus” which “includes first cable 10, second cable 12, first and second connectors 14 and 16 for connection to electrical terminals of a rescue vehicle, third and fourth connectors 18 and 20 for connection to electrical terminals of a disabled vehicle, and housing 22, which houses circuitry for preventing unsafe or incorrect use of the jumper cable apparatus.”); *see also*, Fig. 1).)



The '402 Patent Figure 1.

70. In addition, U.S. Patent No. 4,871,957 (“the ’957 Patent”) also discloses housing the control circuitry in an enclosure along the length of the jumper cable. (EX1016, the ’957 Patent at 4:30-53 and 3:60-64 (“The purpose of the subject device is to eliminate spark or other undesirable effects due to the misconnection or shorting out of the batteries during a battery jumping process which utilizes jumper cables.”; *see also, Id.* at Figs. 1 and 2A).)



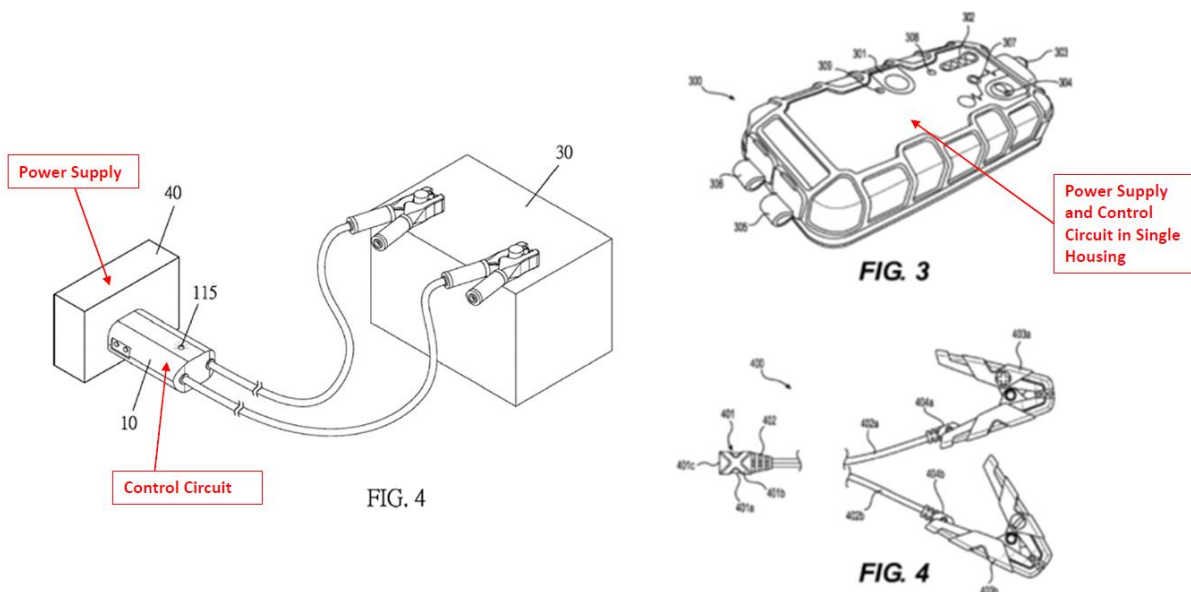
The '957 Patent Figure 1 and Figure 2A.

2. Control Circuits in Jump Starters with External Batteries

71. In the context of jumper starters that utilize their own external power supply batteries, it is known to a POSITA that the power supply battery can either be (1) enclosed in a single housing with the control circuitry, or (2) external from, but connected to, a separate housing that contains the control circuitry.

72. Examples of both designs, from German Patent No. DE202015103173U1 ("Zonesking," EX1007) Figure 4 (left, separate housing) and

Nook (EX1009) Figures 3 and 4 (right, single housing) are shown below:



Annotated Zonesking Figure 4.

Nook Figures 3 and 4.

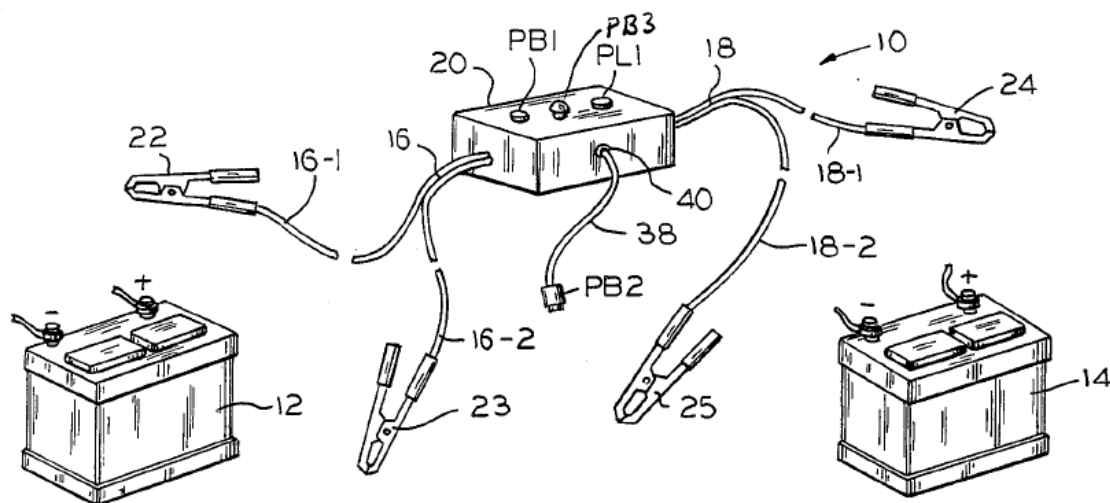
73. There are known advantages to each design. For example, including the power supply in the same housing as the control circuitry results in fewer component parts, which may make it easier to transport. It also makes it less likely that a component will be misplaced, thereby rendering the jumper cables useless. Moreover, including an internal battery in the jump starter systems could allow for a more compact product design, thereby taking up less space in a user's vehicle. One disadvantage is that when the internal power supply is dead, the jump starter cannot be used until it has been recharged. Another disadvantage is that if either the power

supply or control circuitry becomes defective, the whole unit may need to be replaced.

74. In contrast, one significant advantage for jump starters in which the power supply is external to the control circuitry housing is that, if one power supply loses its charge, a second power supply can be connected – without having to wait for the other power supply to be re-charged. Thus, a user can keep a spare battery to ensure the charger is always operable. Moreover, if either the power supply or control circuitry becomes defective, only the defective component needs to be replaced, instead of the entire jump starter.

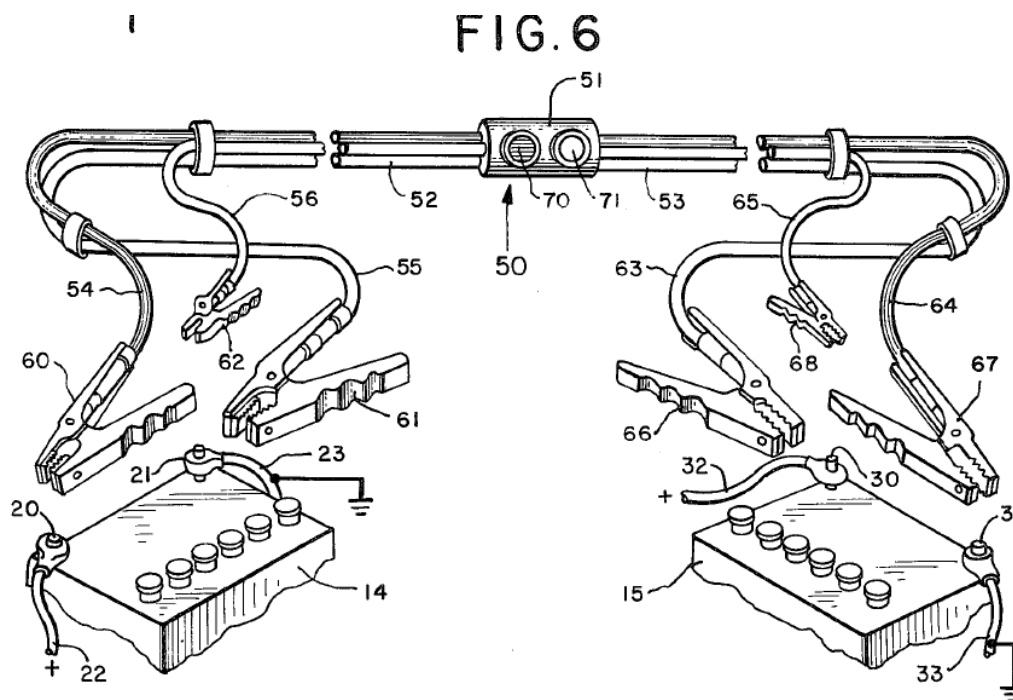
D. Indicator Lights and Alerts on Jump Starters

75. The idea of including indicator lights, buttons and warning alerts on battery jump starters was well-known at the time of the invention. U.S. Patent No. 4,769,586 (“the ’586 Patent”) discloses a “jumper cable apparatus 10” including various push buttons (e.g., PB1) that provide “a safety feature preventing the jumper cable apparatus from coupling the terminals of the batteries 12, 14 until a user depresses the push button PB1” and a “pilot light PL1” that is illuminated “to have a visual indication when the control circuit 26 has coupled the terminals of the two batteries 12, 14.” (EX1022, the ’586 Patent at 4:65-5:1, 7:42-47, 8:17-26, Fig. 1.)



The '586 Patent Figure 1.

76. Additionally, inclusion of alerts with indicator lights on chargers with a cable-mounted housing was known at the time of the invention. Filed in 1982, U.S. Patent No. 4,488,147 (“the ’147 Patent”) discloses “an alarm module 51” with a “housing 43” mounted on vehicle jumper cables that includes “either an aural alarm device 70 or a visual alarm device 71, or both” wherein “the alarm devices will be activated upon misconnection of any battery jumper lead to either the donor or the depleted battery.” (EX1023, ’147 Patent at 5:44-6:14, Fig. 6, Fig. 7.)



The '147 Patent Figure 6.

VII. CLAIM CONSTRUCTION OF THE '105 PATENT

77. I have been asked to review Claims 1-10 of the '105 Patent.

78. In order to properly evaluate these claims, I understand that the terms of the claims must first be construed. For purposes of this declaration, I am applying a plain and ordinary meaning to each limitation within the '105 Patent.

VIII. OVERVIEW OF PRIOR ART REFERENCES

A. Richardson

1. Status as Prior Art

79. United States Patent No. 8,493,021 ("Richardson") was filed on May 6, 2009 and issued on July 23, 2013. Thus, it is my understanding that Richardson

qualifies as prior art to the '105 Patent.

2. Overview of Richardson

80. Richardson discloses a “portable” apparatus for supplying supplemental power to a vehicle. (EX1008, Richardson at Abstract, 1:14-20.) Richardson discloses the use of the apparatus in the context of jump starting a vehicle. (*Id.* at 1:33-37 (“[i]f the battery lacks sufficient power to start the engine, a supplemental power source is necessary to jump start the engine. Typically, jumper cables are used to connect the battery of one vehicle to the dead battery of another vehicle needing to be jumped.”).)

81. Richardson recognizes the problems related to the use of conventional jumper cables.

Several potential problems arise from the use of conventional jumper cables...If the batteries are cross-connected or the clamps inadvertently contact each other when one end of the jumper cables is connected to a battery, sparking can occur resulting in damage to the battery, the electrical system of the vehicle, and injury to the user of the jumper cables. If the jumper cables are not properly connected, there is a potential for the batteries exploding and fire, which may result in injury to those in proximity to the vehicle being jumped.

(EX1008, Richardson at 1:40-52.)

82. To solve these problems, Richardson teaches a smart jump starter that

monitors certain parameters of both the supply battery and the battery to be charged prior to allowing for connection between the supply battery and the vehicle. (EX1008, Richardson at 1:64-67 (“The present invention monitors the voltage of the battery of the vehicle to be jump started and the current delivered by the jump starter batteries to determine if a proper connection has been established and to provide fault monitoring.”); *Id.* at 1:57-63 (“[t]he apparatus... performs real-time monitoring of all system parameters to increase the safety and effectiveness of the unit’s operation while providing additional parametric and diagnostic information obtained before, during and after the vehicle starting operation.”).)

83. Richardson discloses the monitoring of parameters including the voltage and temperature of the power supply battery in the decision process. (EX1008, Richardson at 2:43-44 (“A battery voltage sensor 20 monitors the voltage level of one or more jump starter batteries.”); *see also Id.* at 2:64-66, (“A battery temperature sensor 38 monitors the temperature of the jump starter’s batteries 22 to detect overheating due to excess current draw from the batteries during jump starting.”).) Richardson further discloses a connector (“sensor wiring harness”) which communicates the temperature data from the supply battery to the control circuit on the master-control board. (*Id.*, Figure 1.)

84. Richardson discloses a power source functional block diagram. (EX1008, Richardson at 2:15-16 (“Fig. 1 is a functional block diagram of the

portable power source of the present invention.”).)

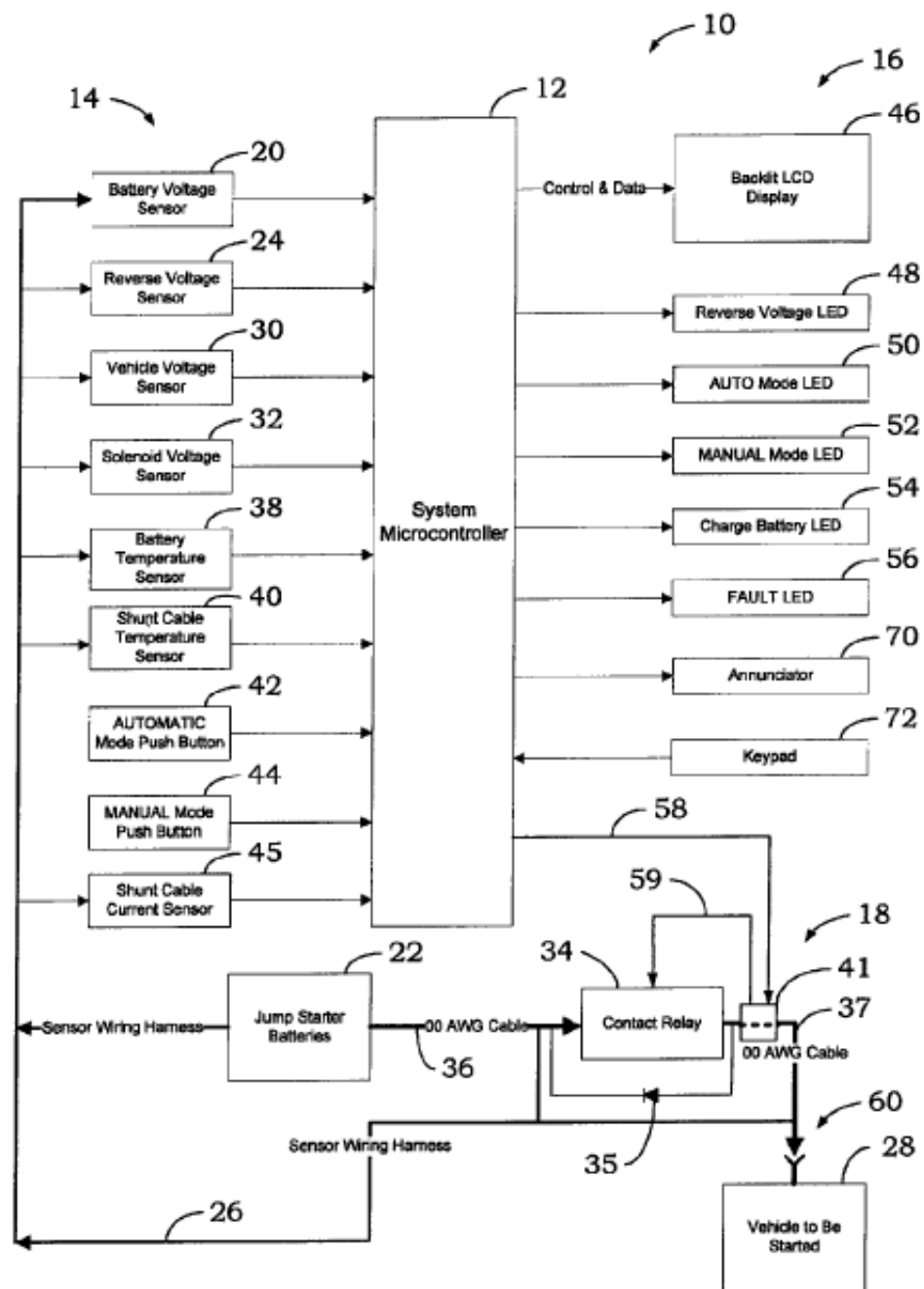


Fig. 1

Richardson Figure 1.

B. Koebler

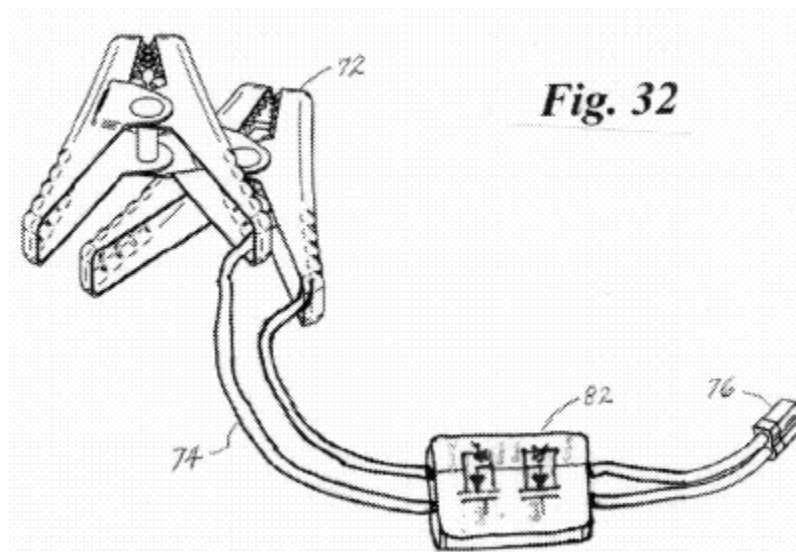
1. Status as Prior Art

85. The application for U.S. Patent Pub. No. 2016/0268645 (“Koebler”; EX1005) was filed on March 13, 2015 and published on September 15, 2016. As such, I understand that Koebler qualifies as prior art to the ’105 Patent.

2. Overview of Koebler

86. Koebler discloses a control apparatus for a jump starter which, employs various hazard prevention mechanisms. (EX1005, Koebler at Abstract (“invention includ[ing] a solid-state switching configuration for high powered battery systems for protecting against over-charging, over-discharging and short circuiting of batteries, especially starter batteries for internal combustion engines.”).)

87. Koebler discloses the jumper cable arrangement where control circuit is employed in a housing on the jumper cables. (EX1005, Koebler at [0068] (“Fig. 32 is an isometric drawing of a battery clamping arrangement with both leads connected to a MOSFET arrangement to prevent overcharging of a battery”).) Two connectors (74) at one side of the housing attach to the wire clamps (72). The connectors (76) at the other side of the housing attach to the external power supply. (*Id.*, Figure 32.)

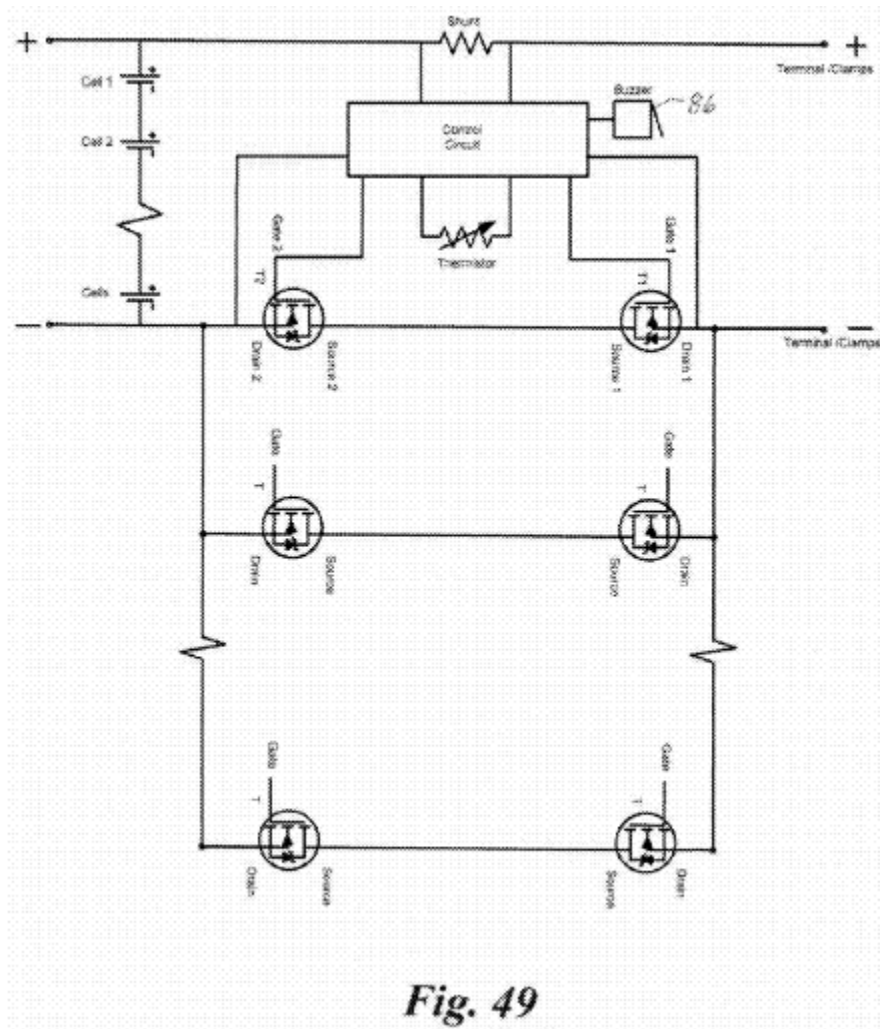


Koebler Figure 32.

88. Koebler discloses the monitoring of parameters including the battery voltage and battery temperature in the decision process. (EX1005, Koebler at [0093] (“To control the solid state switches, electronic controls are needed for the different voltages, currents and and/or temperature with specified parameters in which cells work to prevent damage.”).) Koebler further discloses alerts, such as a buzzing circuit, which alerts the user when the battery is not in a proper condition for jump starting. (*Id.* at [0116] (“An audible alarm such as a buzzer can be provided, which will sound when the lithium base battery is outside its operating range of either voltage or temperature.”).)

89. Koebler also discloses the control circuit for short circuit protection. (EX1005, Koebler at [0071] (“Fig. 49 is a schematic control circuit diagram illustrating short circuit protection, as well as protection from reverse polarity, high

temperature, overvoltage, over-discharge voltage, and having an audible alarm.”.)



Koebler Figure 49.

C. Liu

1. Status as Prior Art

90. Chinese Patent No. CN204905522U (“Liu” EX1006) was filed on July 7, 2015 and patented/published on December 23, 2015. Thus, I understand that Liu qualifies as prior art under to the ’105 Patent.

2. Overview of Liu

91. Liu discloses a starter power supply connector which comprises a plug and a receptacle mating. (EX1006, Liu at Abstract (“the plug comprises: a first base, the first base having three first holes formed thereon, each of the holes having a first terminal; the receptacle comprises: a second base, the second base having three second holes formed thereon and correspondingly connected with the three first holes, each of the second holes having a second terminal; the first terminal and the second terminal being correspondingly connected with each other.”).)

92. Liu discloses the beneficial effects of the using this connector for connecting a control circuit to an external battery for an “intelligent emergency automotive jump starter power supply.” (EX1006, Liu at Abstract (“[W]hen used on an intelligent emergency automotive jump starter power supply, this three-hole starter power supply plug is capable of protecting the battery very effectively to prevent overloading induced explosion of the battery during automotive ignition.”).)

93. Liu discloses using this connector for the monitoring of the temperature of the power supply battery for use in the decision process of whether to jump start the external device. (EX1006, Liu at [0026] (“After connection, the switch of the power supply equipment is turned on with the user being able to directly detect the battery temperature, after which the automotive is started. After startup, the battery clamps are removed from the battery to prevent any adverse impact on the power

supply equipment.”).)

94. Liu discloses the combined view of the plug and receptacle. (EX1006, Liu at [0018] (“Figure 3 is a combined view of the plug and receptacle of the present utility model.”).)

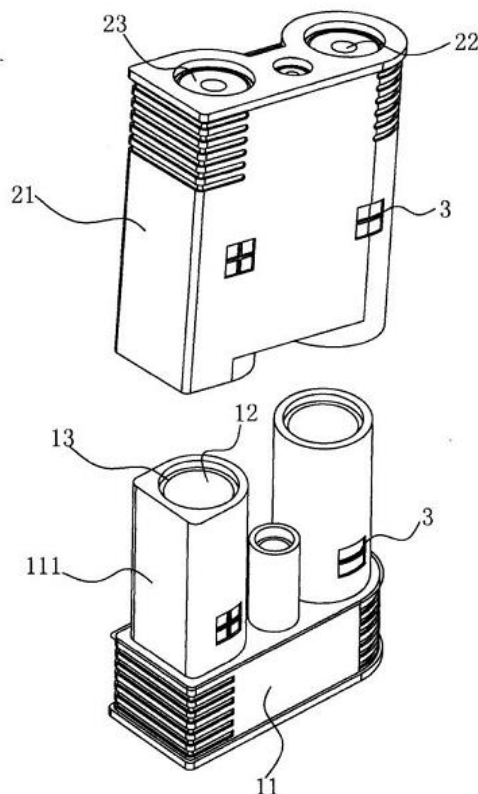


Figure 3

Liu Figure 3.

D. Zonesking

1. Status as Prior Art

95. German Patent No. DE 20 2015 103 173 U1 (“Zonesking”) was filed

on June 17, 2015 and patented/published on August 13, 2015. I understand that Zonesking qualifies as prior art to the '105 Patent.

2. Overview of Zonesking

96. Zonesking discloses a smart jumper cable for vehicles. (EX1007, Zonesking at [0001] (“The present invention relates to a smart jumper cable with current detection function for car or motorcycle batteries ...”).)

97. Zonesking describes potential damage that can occur to the supply batteries if among other things there is an improper connection to the vehicle.

[t]he jumper cable is usually connected to the jump start with a power supply unit. Since conventional jumper cables have no overall protection devices, these jumper cables are only usable to provide power transmission. However, when a reverse current occurs in the power state, it easily causes the power supply unit to be damaged due to the backflow.

(EX1007, Zonesking at [0003].)

98. Zonesking discloses a control circuit for protection of the batteries used in the jump start process. (EX1007, Zonesking at [0001] (“smart jumper cable in which the circuit board of the adapter element is equipped with a protection module and a battery detection unit, so that when the consumer uses the present invention for jump starting, both a protective function as also, a current detection function for

car or motorcycle batteries can be achieved by the present invention to provide a multifunctional recognition application in the present invention.”.)

99. Finally, Zonesking describes the use of a supply battery voltage detector, the result of which is used in the decision process of whether to connect the supply battery to the vehicle. (EX1007, Zonesking at [0014] (“battery detection unit 114 may be an MCU, a comparator or an amplifier.”).)

100. Zonesking discloses that the control circuit is contained in a housing that does not include its own power supply. (EX1007, Zonesking at Figures 3 and 4.) Instead, on one side of the housing, two electrodes connect to the wire clamps. On the other side of the housing is a connector which connects to an external power supply. (*Id.*)

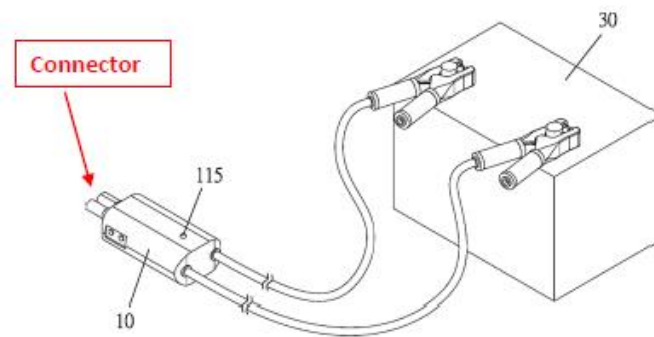


FIG. 3

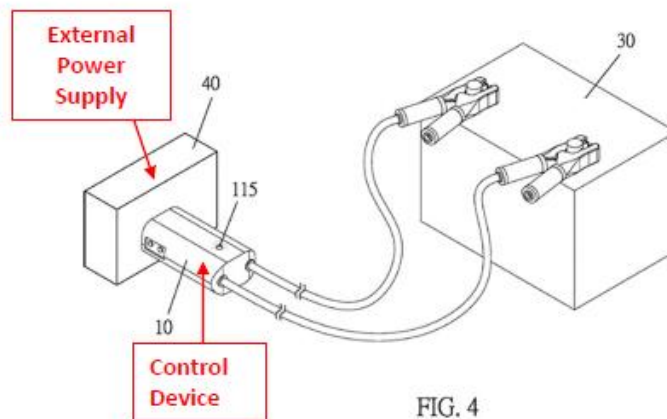


FIG. 4

Annotated Zonesking Figure 3 and Figure 4.

E. Nook

1. Status as Prior Art

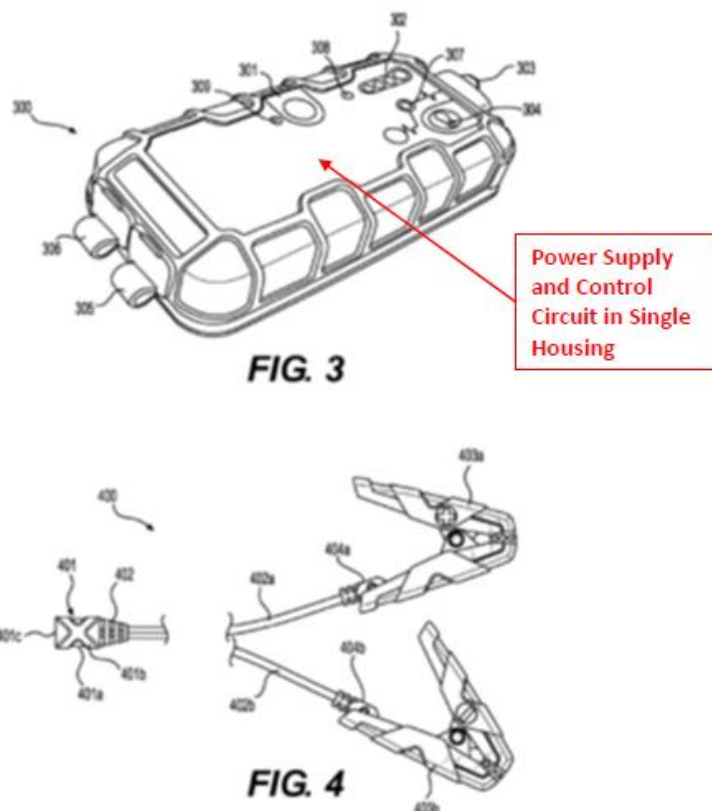
101. U.S. Patent No. 9,007,015 (“Nook,” EX1009) was filed on July 8, 2014, and issued on April 14, 2015. I understand that Nook qualifies as prior art to the ’105 Patent.

2. Overview of Nook

102. Nook discloses “[a] handheld device for jump starting a vehicle engine

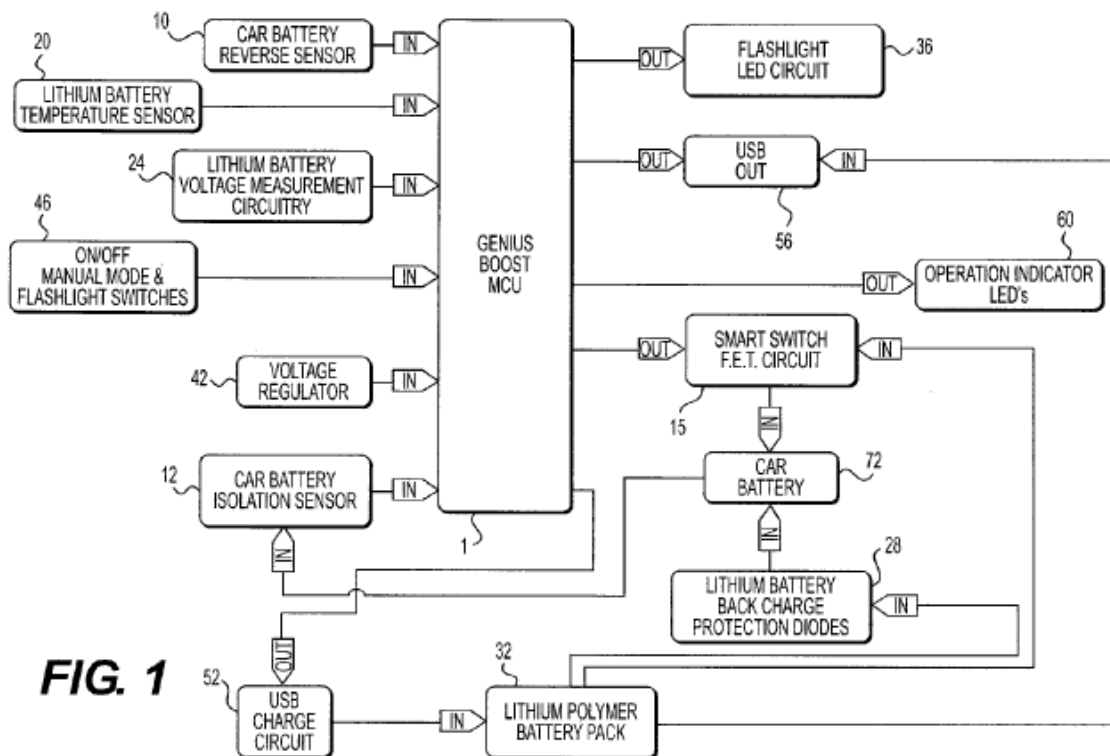
[that] includes a rechargeable lithium ion battery pack and a microcontroller.”
(EX1009, Nook at Abstract.)

103. Nook discloses a portable, smart jump starter in which the power supply battery and the control circuit are both enclosed in a single housing. (EX1009, Nook at Figures 3 and 4). The control circuit of Nook monitors various inputs (e.g., voltage and temperature) and if those inputs are in the proper range for charging, a power FET switch is turned on to connect the power supply battery, such that power is applied to the battery to be charged. (*Id.* at 3:16-36.)



Annotated Nook Figures 3 and 4.

104. The control circuit of Nook is shown below.



Nook Figure 1

105. The control circuit of Nook includes a polarity sensor. (EX1009, Nook at 3:28-36 (“a microcontroller configured to receive input signals from said vehicle isolation sensor and said reverse polarity sensor, and to provide an output signal to said power FET switch, such that said power FET switch is turned on to connect said internal power supply to said output port in response to signals from said sensors indicating the presence of a vehicle battery at said output port and proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs.”).)

106. The Nook control circuit also includes a temperature sensor “configured to detect temperature of said internal power supply and to provide a temperature signal to said microcontroller.” (EX1009, Nook at 8:54-56; *see also*, Nook at 4:38-45 (“a lithium battery temperature sensor 20 monitors the temperature of the lithium battery pack 32 to detect overheating due to high ambient temperature conditions and overextended current draw during jump starting. A lithium battery voltage measurement circuit 24 monitors the voltage of the lithium battery pack 32 to prevent the voltage potential from rising too high during a charging operation and from dropping too low during a discharge operation.”).)

IX. GROUNDS FOR CHALLENGE

A. Ground 1: Claims 1-5 and 7-9 Are Rendered Obvious by Koebler in View of Liu

1. Claim 1 is Disclosed by Koebler in View of Liu

a. Limitation 1.0

... A battery clamp for delivering an instantaneous starting current from an external power supply to an external device, the battery clamp comprising:

107. It is my understanding that a preamble is not limiting where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use of the invention. Here, the body of the claim

describes the complete claimed battery clamp device, and the preamble merely states the function that is performed by the device. Thus, in my opinion, it would not be limiting.

108. Notwithstanding, Koebler discloses a battery clamp for delivering an instantaneous starting current from an external power supply to an external device.

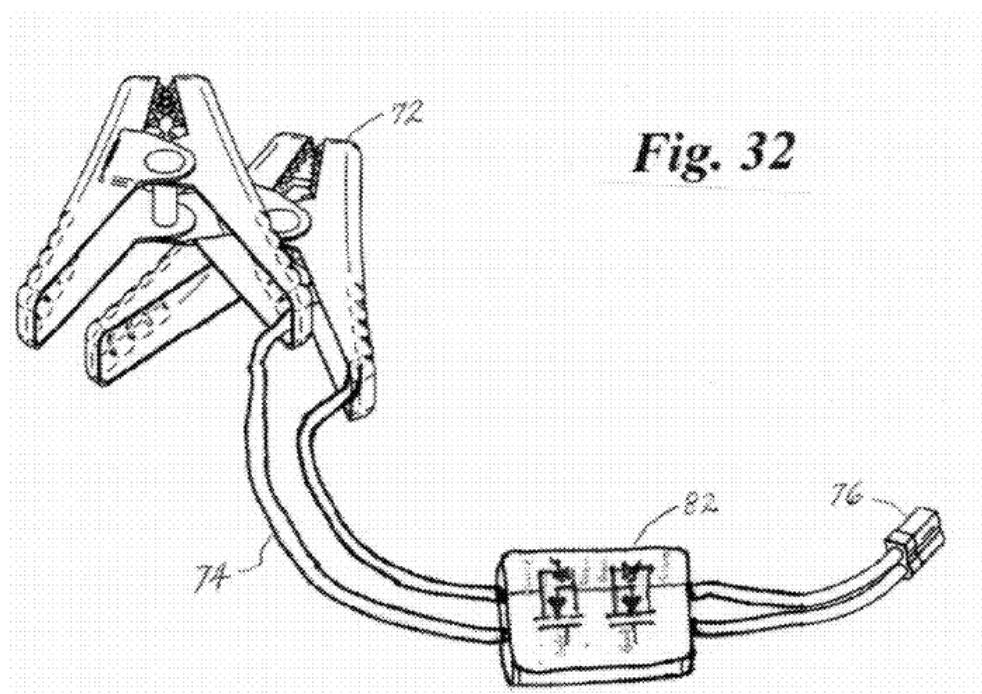
The invention also comprehends a jump starter battery pack for driving a battery device in a 12 volt to 120 volt internal combustion engine, the battery pack being situated in a battery pack housing, and having at least one lithium-based rechargeable cell within the housing ... a pair cables, each cable having a cable housing in which it is situated, one end of each cable being provided with and being connected to a respective terminal clamp, the opposite end of each cable having a connector for connecting to the battery pack, and at least one of a solid state switch, MOSFET, diode, or relay being situated within one of the cable housings.

(EX1005, Koebler at [0115].)

109. Koebler describes a solid-state device incorporated into a jumper cable for jump starting a starter battery using an external power supply. (*Id.* Koebler at [0002] (“The present invention relates to an apparatus for starting an internal combustion (IC) engine.”).) According to Koebler, Figs. 30-32 describe a battery clamp for jump starting an engine from an external power supply. *Id.* at [0112] (“FIG. 30 shows jumper cables 74 with attached battery clamps 72 for starting (or

jump starting) an engine, the cables being connectable to a lithium battery pack by a connector 76”); *see also Id.* at Figs. 30-32.)

110. Koebler further discloses a battery clamp for delivering jump starting current from an external power supply to an external device. (EX1005, Koebler at [0034] (“Another object of the invention is to provide a jump starter for internal combustion engines of all sizes”).)



Koebler Figure 32.

b. Limitation 1.1

... a control device, comprising:

111. Koebler discloses a control device.

112. Koebler describes a control circuit located either within the battery

housing or the cable housing. (EX1005, Koebler at [0116] (“FIGS. 16 through 23 show the variations of the control circuit board, which can be located within either the battery housing or the cable housing.”).)

113. According to Koebler this control circuit protects “against reverse polarity, overvoltage, over-discharge voltage, and excessively high temperature by opening the circuit to terminate the charging.” (EX1005, Koebler at [0116].)

114. One embodiment of the control circuit is schematically detailed in Koebler Fig. 49.

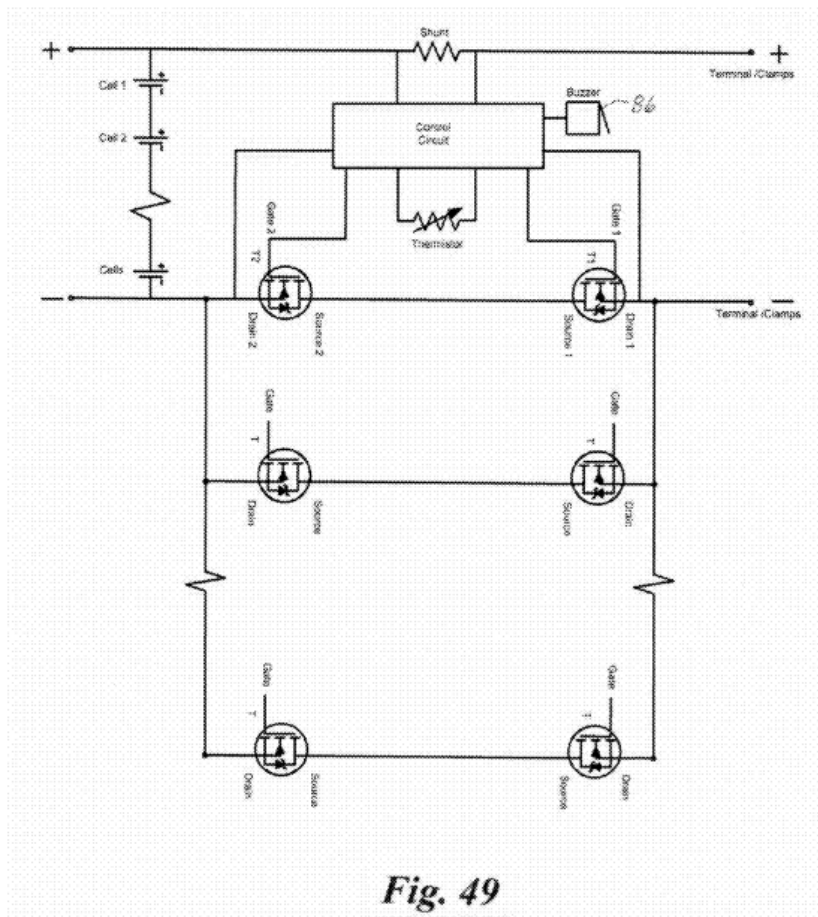


Fig. 49

Koebler Figure 49.

c. Limitation 1.2

... *a housing;*

115. Koebler discloses a housing.

116. Koebler describes that the control circuit board is located within a housing. (EX1005, Koebler at [0116] (“FIGS. 16 through 23 show the variations of the control circuit board, which can be located within either the battery housing or the cable housing.”).)

The invention also comprehends a jump starter battery pack for driving a battery device in a 12 volt to 120 volt internal combustion engine, the battery pack being situated in a battery pack housing, and having at least one lithium-based rechargeable cell within the housing ... a pair cables, each cable having a **cable housing** in which it is situated, one end of each cable being provided with and being connected to a respective terminal clamp, the opposite end of each cable having a connector for connecting to the battery pack, and at least one of a solid state switch, MOSFET, diode, or relay being situated within one of the cable housings.

(EX1005, Koebler at [0115] (emphasis added).)

d. Limitation 1.3

... a master-control board mounted within the housing; and

117. Koebler discloses a master-control board mounted within the housing.

118. Koebler describes a control circuit board located either within the battery housing or the cable housing. (EX1005, Koebler at [0116] (“FIGS. 16 through 23 show the variations of the control circuit board, which can be located within either the battery housing or the cable housing.”).)

119. A POSITA would recognize that the Koebler control circuit board would need to be mounted within the housing, by being held in place in the housing, or secured via clips, screws or other means, to provide a functional, durable product.

120. For instance, a POSITA would have understood Koebler's housing could be formed from two pieces which are combined using screws, fit joints, or even injection molding. Or the two pieces could be assembled using an adhesive bonding or welding technique. Regardless of the technique employed, A POSITA would have understood how to form the housing to enclose and secure Koebler's circuitry using one of these known techniques commonly employed for similar products. A POSITA would have also understood the housing would need to be designed to securely house the circuit board or control circuitry and protect it from the ambient environment.

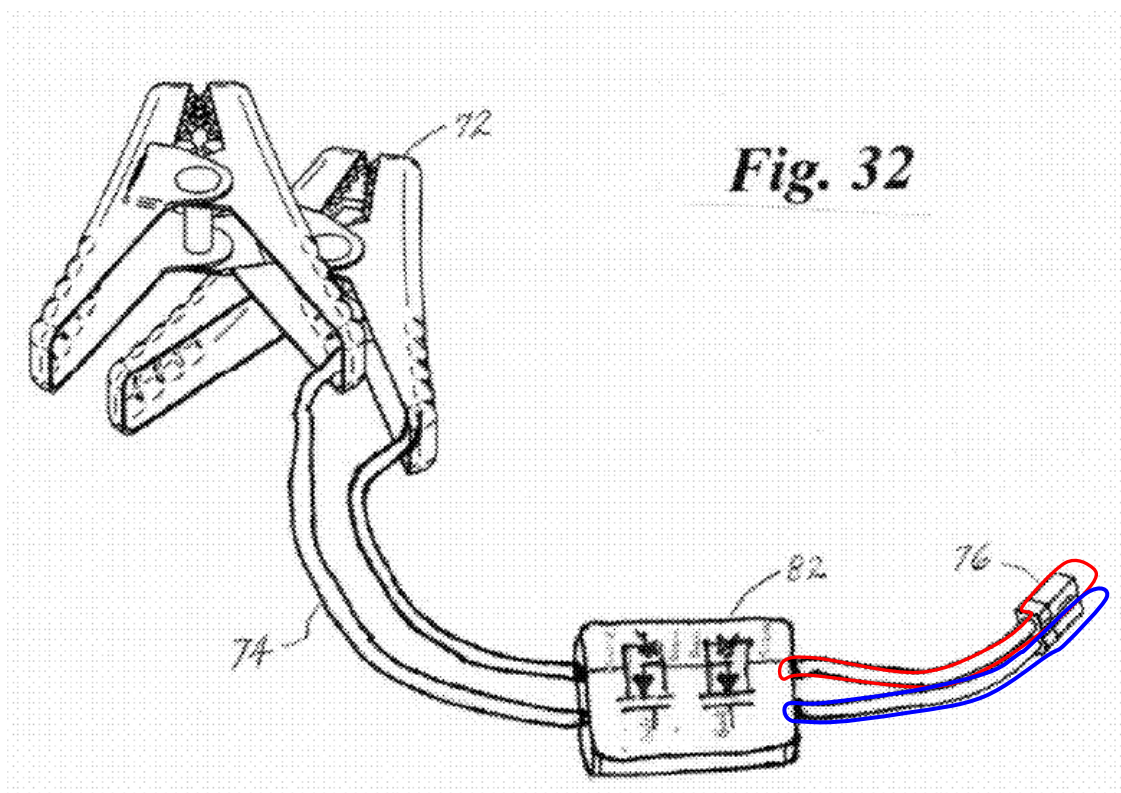
e. Limitation 1.4

... connectors disposed at one side of the housing, and being electrically connected to the master control board, comprising:

121. Koebler discloses connectors disposed at one side of the housing, being electrically connected to the master control board.

122. Koebler describes several arrangements where the jumper cables with attached battery clamps are connected to one side of the cable housing which comprises the master control board, and on the other side of the housing are connectors (shown below highlighted in red and blue in Fig. 32 of Koebler below) for connecting the master control board to a lithium battery pack. (EX1005, Koebler at [0112] ("FIG. 30 shows jumper cables 74 with attached battery clamps 72 for

starting (or jump starting) an engine, the cables being connectable to a lithium battery pack by a connector 76... FIG. 32 shows a jumper cable arrangement in which MOSFETs 82 are employed within the cable housing, which can be in any of the electrical configuration shown in FIGS. 14 through 23.”.) As discussed above, Figures 16 through 23 show variations of the control circuit board, which can be disposed within the cable housing. (*Id.* at Fig. 32.)



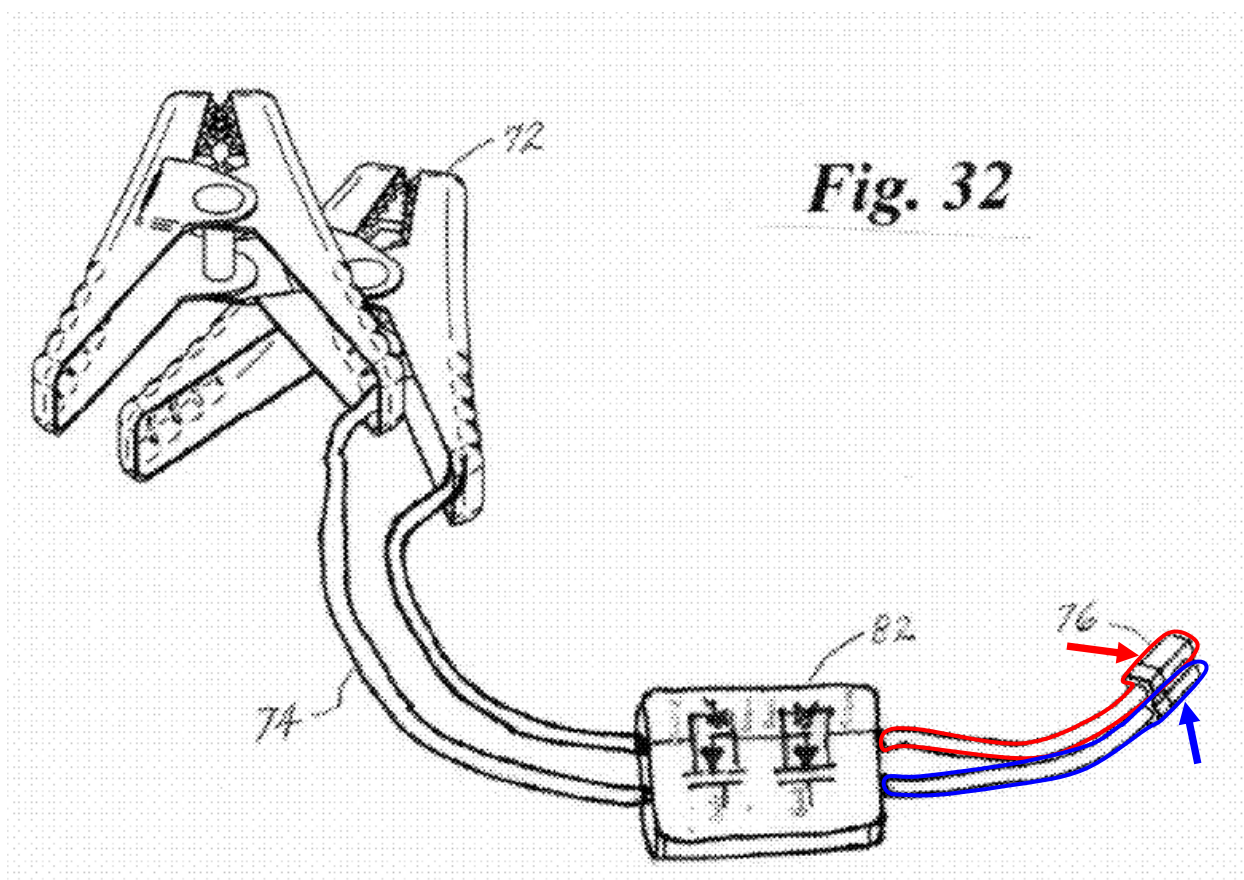
Annotated Koebler Figure 32.

f. Limitation 1.5

... at least a first and second electrode connectors, which are connected to an external power supply for receiving power, and

123. Koebler discloses at least a first and second electrode connectors, which are connected to an external power supply for receiving power.

124. Koebler describes cables which can be connected to an external power supply for receiving power through first and second electrode connectors (shown below highlighted in red and blue in Fig. 32 of Koebler). (EX1005, Koebler at [0112] (“FIG. 30 shows jumper cables 74 with attached battery clamps 72 for starting (or jump starting) an engine, the cables being connectable to a lithium battery pack by a connector 76.”).)



Annotated Koebler Figure 32.

g. Limitation 1.6

... at least one communication connector connected to the external power supply for receiving status information of the external power supply, and sending the status information to the master-control board;

125. Koebler discloses that status information (e.g., temperature) of the external power supply can be monitored and then utilized by the control circuit, but Koebler does not disclose how such status information is communicated from the external power supply to the master control board. (EX1005, Koebler at [0116] (“This circuit will protect against reverse polarity, overvoltage, over-discharge voltage, and excessively high temperature by opening the circuit to terminate the charging.”).)

126. However, if one wanted to monitor supply battery temperature as part of the control circuit in the jumper cables, such communication in Koebler would be necessary. It would have been obvious to a POSITA to look to Liu for the required means to communicate the status signal between the external power supply and the master-control board.

127. Liu discloses a power supply plug used to communicate both power and status information. (EX1006, Liu at Abstract (“The present utility model discloses a starter power supply plug, the starter power supply plug comprising: a plug and a

receptacle mating therewith, wherein the plug comprises: a first base, the first base having three first holes formed thereon, each of the holes having a first terminal; the receptacle comprises: a second base, the second base having three second holes formed thereon and correspondingly connected with the three first holes, each of the second holes having a second terminal; the first terminal and the second terminal being correspondingly connected with each other.”).)

128. Liu further discloses that this plug can be used in a variety of applications including an “intelligent emergency automotive battery jump starter.” (EX1006, Liu at Abstract.)

129. Liu’s connector includes an additional, third terminal, between the electrode terminals, to allow for temperature data from the power supply battery to be shared with the control circuit.

Because the power supply lithium battery is heated up during automotive emergency jump start due to large electric current, the battery will be overheated if the startup time is too long or multiple jump starts are performed. Overheating will either result in swollen and scrapped battery at the very least, or smoke release, combustion and explosion of battery in a worst-case scenario. **Therefore, with a third terminal added to enable connection between the third terminal and an intelligent emergency automotive battery jump starter power supply, temperature data can be transmitted to the intelligent emergency automotive battery jump starter power**

supply through the third terminal. After connection, the switch of the power supply equipment is turned on with the user being able to directly detect the battery temperature, after which the automotive is started. After startup, the battery clamps are removed from the battery to prevent any adverse impact on the power supply equipment.

(EX1006, Liu at [0026] (emphasis added).)

130. As described in my reasons to combine section, both Koebler and Liu are in the same field of invention. Furthermore, both Koebler and Liu describe the necessity of monitoring the status of the supply battery to prevent damage. Finally, both Koebler and Liu describe the use of monitoring the temperature of the supply batteries to protect them. It would have been obvious to a POSITA to look to Liu for the required communication connector to transmit status information (e.g., temperature) between the external power supply and the master-control board in the jumper cables.

131. A POSITA would have understood adding a third connector to Koebler would have been nothing more than adding another wire and connector – modifications well within the skill and capability of a POSITA.

h. Limitation 1.7

... a first and second wire clamps, each having an end configured to receive power from the external power supply via the control device, and another end connected to the external device for supplying power to the external device;

132. Koebler discloses a first and second wire clamps, each having an end configured to receive power from the external power supply via the control device, and another end connected to the external device for supplying power to the external device.

133. Koebler describes jumper cables with a first and second clamps (red and blue in annotated Fig. 32 below), where one end of each clamp is designed to receive power from an external power supply, and the other end is configured to provide power to an external device. (EX1005, Koebler at [0068], (“FIG. 32 is an isometric drawing of a battery clamping arrangement with both leads connected to a MOSFET arrangement to prevent overcharging of a battery.”).)



i. Limitation 1.8

135. Koebler describes the control device controlling the supply of power from the external power supply to the external device based on status information,

including monitoring a voltage and temperature, for determining if these values are outside of the operating range. (EX1005, Koebler at [0116] (“As shown in FIG. 49, short circuit protection can be provided by the control circuit depicted. An audible alarm such as a buzzer can be provided, which will sound when the lithium base battery is outside its operating range of either voltage or temperature. This circuit will protect against reverse polarity, overvoltage, over-discharge voltage, and excessively high temperature by opening the circuit to terminate the charging.”).)

2. Claim 2 is Disclosed by Koebler in View of Liu

a. Limitation 2.0

... The battery clamp of claim 1, wherein the control device is configured to allow the power supply from the external power supply to the external device when the status information is normal

136. Koebler discloses a battery clamp wherein the control device is configured to allow the power supply from the external power supply to the external device when the status information is normal.

137. Koebler describes the control device controlling the power supply from the external power supply to the external device based on status information including monitoring a voltage and temperature for determining if these values are outside of the operating range. (EX1005, Koebler at [0116] (“As shown in FIG. 49, short circuit protection can be provided by the control circuit depicted. An audible

alarm such as a buzzer can be provided, which will sound when the lithium base battery is outside its operating range of either voltage or temperature. This circuit will protect against reverse polarity, overvoltage, over-discharge voltage, and excessively high temperature by opening the circuit to terminate the charging.”.)
When the external supply battery is in the normal operating temperature range, the circuit remains closed, allowing the supply of power from the external supply battery to the external device. (*Id.*)

b. Limitation 2.1

... wherein the status information comprises at least one of the following: temperature, voltage of a battery unit of the external power supply

138. Koebler discloses a control device that provides status information on the battery clamp, wherein the status information comprises at least one of temperature or voltage of a battery unit of the external power supply.

139. Koebler describes the control device controlling the power supply from the external power supply to the external device based on status information including monitoring a voltage and temperature for determining if these values are outside of the operating range. (EX1005, Koebler at [0116]) (“As shown in FIG. 49, short circuit protection can be provided by the control circuit depicted. ... This circuit will protect against reverse polarity, overvoltage, over-discharge voltage, and

excessively high temperature by opening the circuit to terminate the charging.”)). Similarly, Liu discloses the monitoring of status information of the external power supply, including temperature, to protect said power supply. (EX1006, Liu at [0026] (“Therefore, with a third terminal added to enable connection between the third terminal and an intelligent emergency automotive battery jump starter power supply, temperature data can be transmitted to the intelligent emergency automotive battery jump starter power supply through the third terminal.”).)

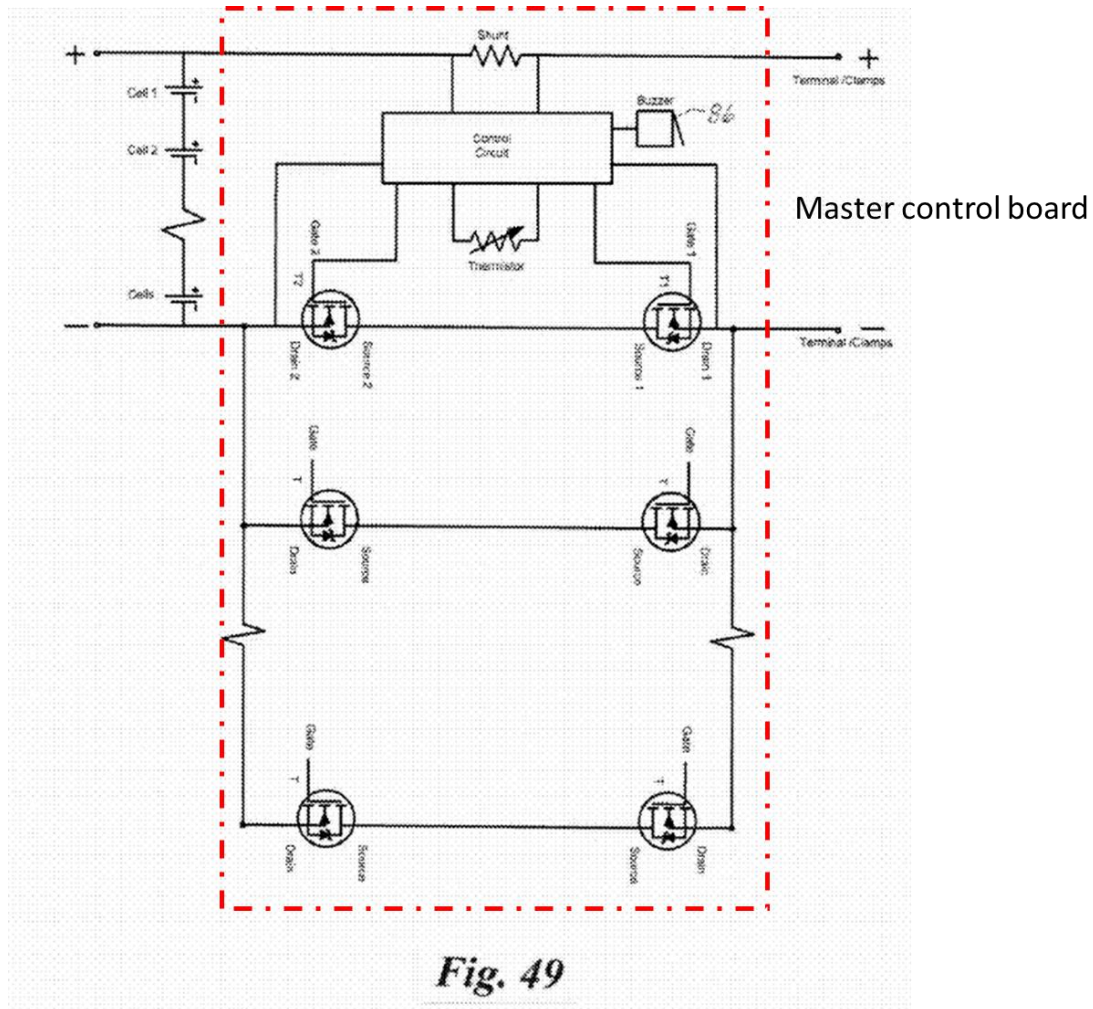
3. Claim 3 is Disclosed by Koebler in View of Liu

a. Limitation 3.0

... The battery clamp of claim 1, wherein the master-control board comprises: a first and second voltage input ports electrically connected to the first and second electrode connectors respectively

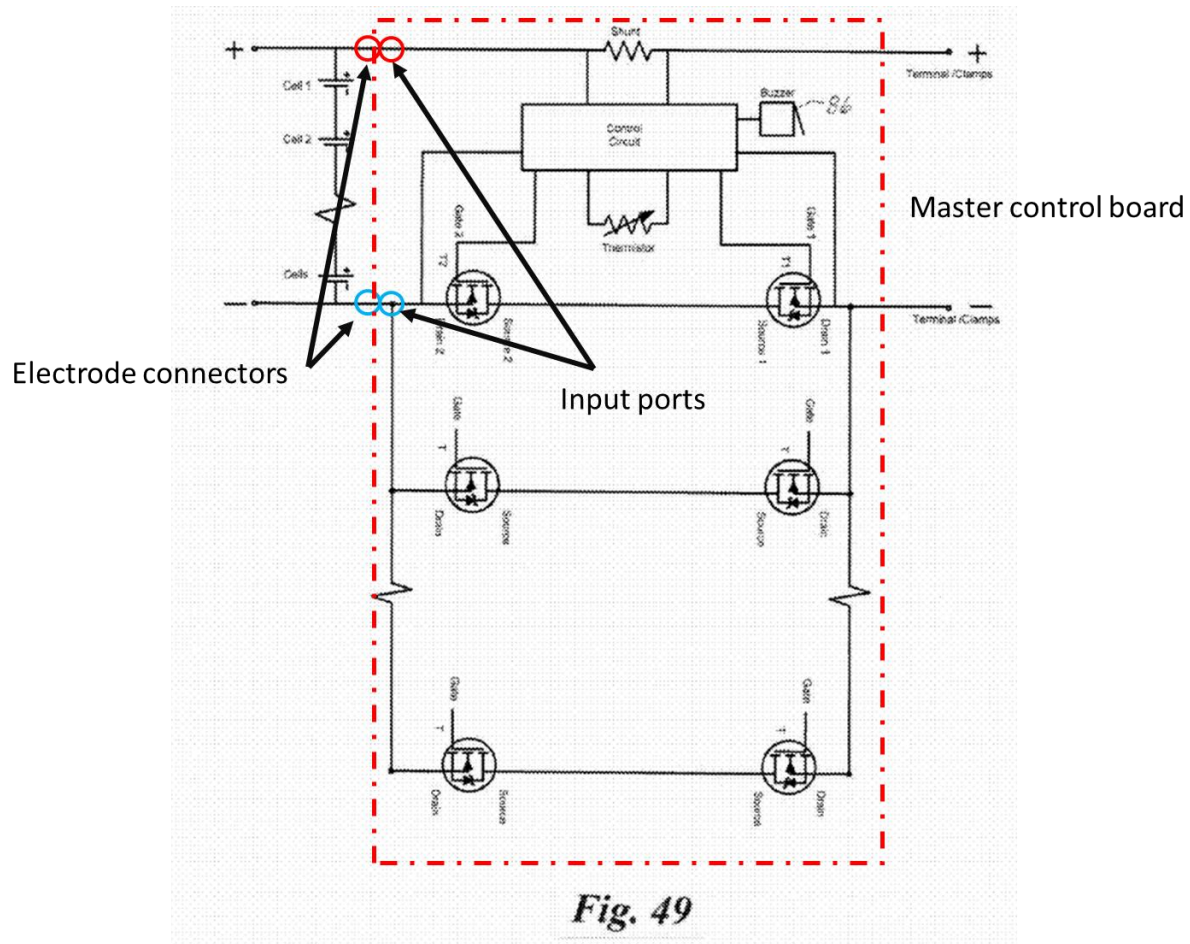
140. Koebler discloses a battery clamp wherein the master-control board comprises a first and second voltage input ports electrically connected to the first and second electrode connectors respectively.

141. Koebler discloses a master-control board as shown in annotated Fig. 49 below. (EX1005, Koebler at [0071] (“FIG. 49 is a schematic control circuit diagram illustrating short circuit protection, as well as protection from reverse polarity, high temperature, overvoltage, over-discharge voltage, and having an audible alarm.”).)



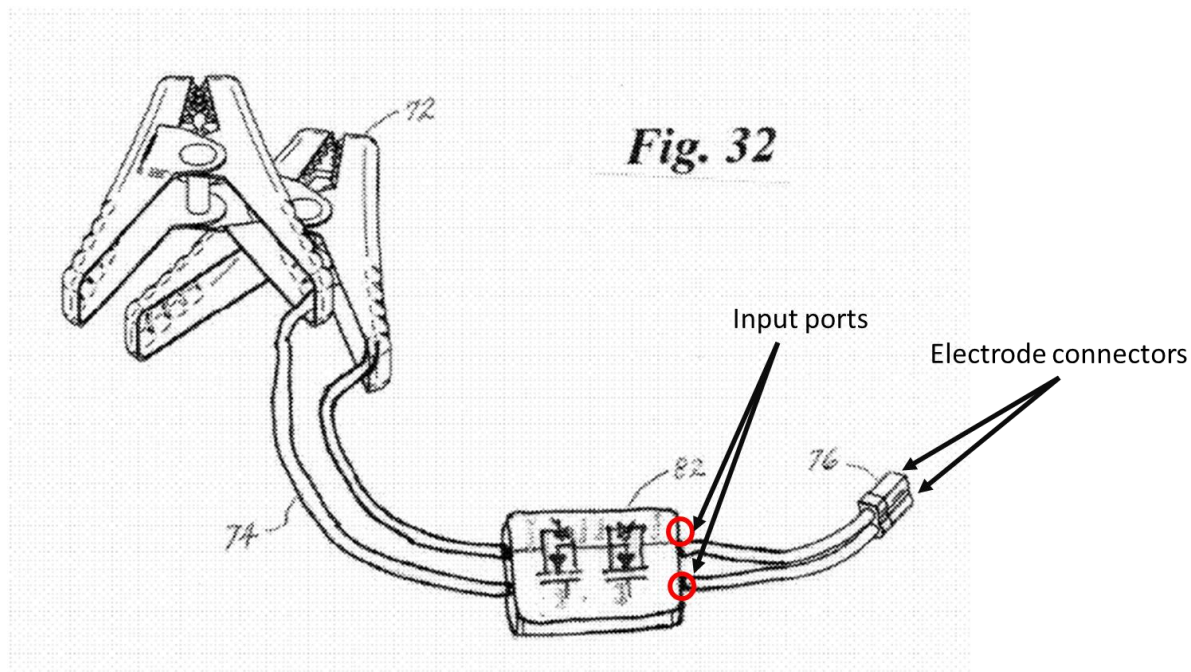
Annotated Koebler Figure 49.

142. Koebler does not expressly show the first and second voltage input ports and first and second electrode connectors in the circuit diagrams. However, a POSITA would understand that they must exist between the external battery and the control circuit board as shown below. See EX1005, Koebler at Fig 49.



Annotated Koebler Figure 49.

143. The voltage input ports and electrode connectors are further illustrated in Fig. 32 of Koebler as annotated below.



Annotated Koebler Figure 32.

144. For operation, there must be voltage input ports that connect the electrode connectors 76 to the master-control board in housing 82. A POSITA would understand that these ports could be in the form of solder pads.

b. Limitation 3.1

... a communication port electrically connected to the communication connector

145. Koebler does not expressly disclose a communication port on the master-control board electrically connected to the communication connector. However, it would have been obvious to a POSITA that a communication connector that is electrically connected to the master control board through a communication

port would be required for the disclosed functionality of Koebler – monitoring the status of the supply battery and sending the status to control circuit in the jumper cables.

146. Furthermore, as discussed above, a POSITA would also look to Liu for a means to electrically connect the communication connector to the communication port.

147. Liu discloses a communication port electrically connected to the communication connector. More specifically, Liu discloses a power supply plug with three ports – two of the ports allow for the supply power from the external supply battery to the control circuit and a third port is for communication of status information from the supply battery to the control circuit. (EX1006, Liu at Abstract.)

148. Liu describes an additional, third port to allow for temperature data to be shared between the supply battery and the control circuit, which necessarily is through a communication port. (EX1006, Liu at [0026] (“Therefore, with a third terminal added to enable connection between the third terminal and an intelligent emergency automotive battery jump starter power supply, temperature data can be transmitted to the intelligent emergency automotive battery jump starter power supply through the third terminal. After connection, the switch of the power supply equipment is turned on with the user being able to directly detect the battery temperature, after which the automotive is started. After startup, the battery clamps

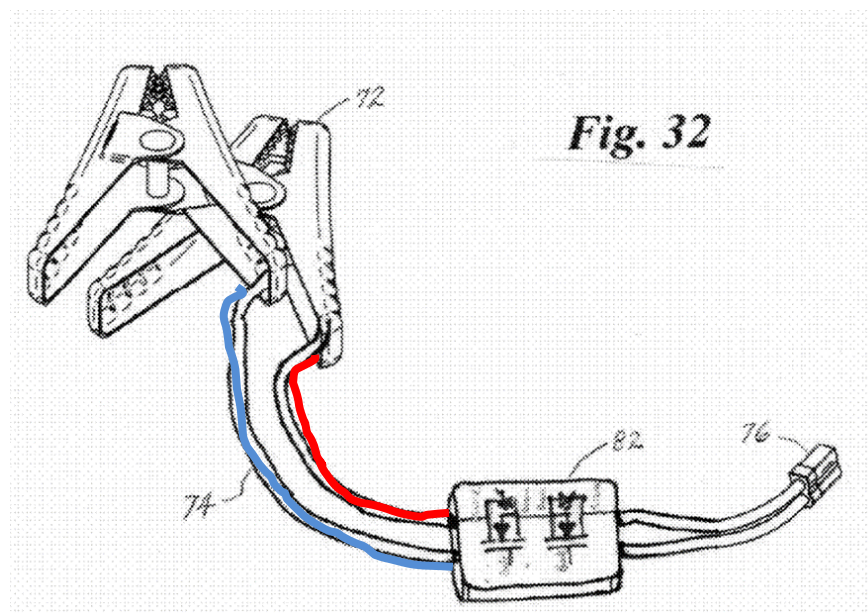
are removed from the battery.”).)

c. Limitation 3.2

... a first and second voltage output ports electrically connected to the first and second wire clamps for supplying power to the external device via the first and second wire clamps

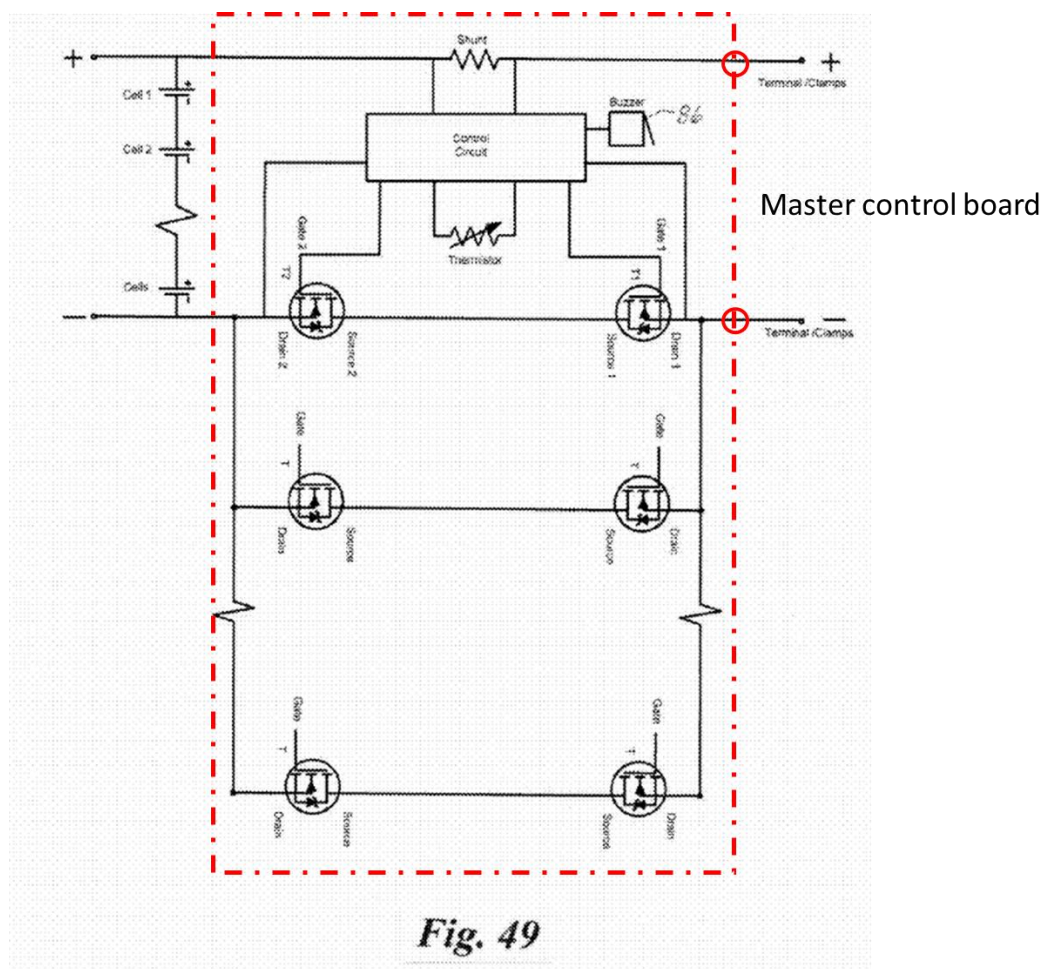
149. Koebler discloses a first and second voltage output ports electrically connected to the first and second wire clamps for supplying power to the external device via the first and second wire clamps.

150. According to Koebler, Figs. 30-32 describe a battery clamp for jump starting an engine from an external power supply. (EX1005, Koebler at [0112]; *see also*, Koebler Fig. 32 below.)



Annotated Koebler Figure 32.

151. Koebler Fig. 49 teaches a circuit which comprises a first and second voltage output ports electrically connected to the first and second wire clamps for supplying power to the external device via the first and second wire clamps. (EX1005, Koebler at Fig. 49.)



Annotated Koebler Figure 49.

152. For operation, there necessarily must be voltage output ports that connect the first and second wire clamps 72 to the printed-circuit board housing in

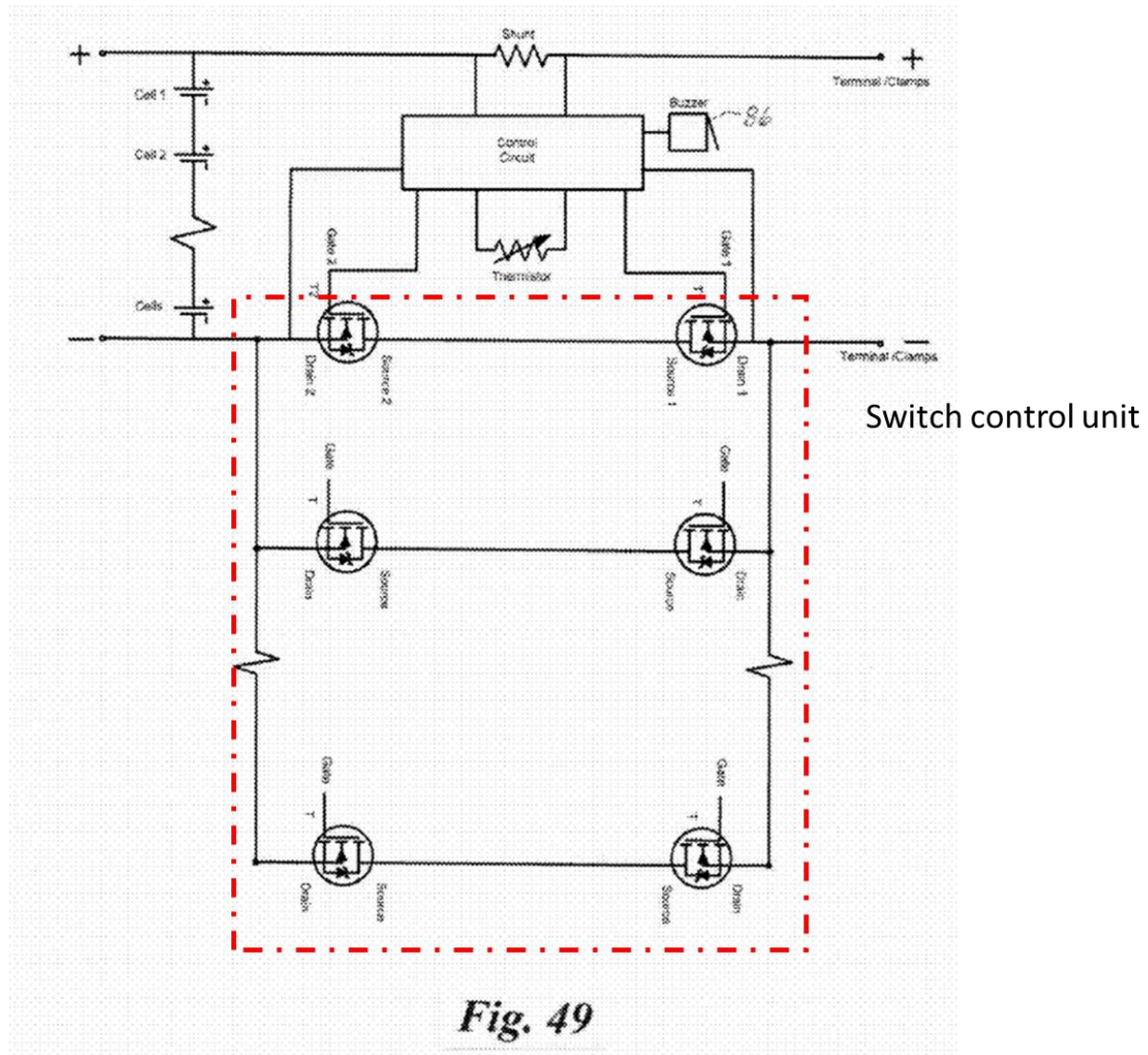
82. These ports would likely take the form of solder pads. See EX1005, Koebler at Fig. 32.

d. Limitation 3.3

... a switch control unit for controlling connection between the first voltage input port and the first voltage output port; and

153. Koebler discloses a switch control unit for controlling connection between the first voltage input port and the first voltage output port.

154. Koebler describes a control circuit that can open the charging circuit, thereby controlling connection between the first voltage input port and the first voltage output port. (EX1005, Koebler at [0116] (“As shown in FIG. 49, short circuit protection can be provided by the control circuit depicted. An audible alarm such as a buzzer can be provided, which will sound when the lithium base battery is outside its operating range of either voltage or temperature. **This circuit will protect against reverse polarity, overvoltage, over-discharge voltage, and excessively high temperature by opening the circuit to terminate the charging.**”) (emphasis added).)



Annotated Koebler Figure 49.

e. Limitation 3.4

... a master-control circuit unit connected to the communication port for obtaining the status information of the external power supply;

155. To the extent that Koebler does not expressly disclose at least one

communication port connected to the master-control circuit, for obtaining the status information of the external power supply, it would have been obvious to a POSITA that a communication port would be required for the disclosed functionality of Koebler – sending status information from power supply to master control unit.

156. Liu expressly discloses a communications connector for the communication of status information from the external power supply. As discussed above in Limitation 1.6, Liu discloses a power supply plug with three ports. (EX1006, Liu at Abstract.) Two of the ports allow for the supply of power from the external supply battery to the controller. Liu described an additional, third port to allow for communication of temperature data of the external supply battery to a control circuit. (*Id.* at [0026].) A POSITA would understand that such a communication connector would necessarily connect to the control circuit through a communication port.

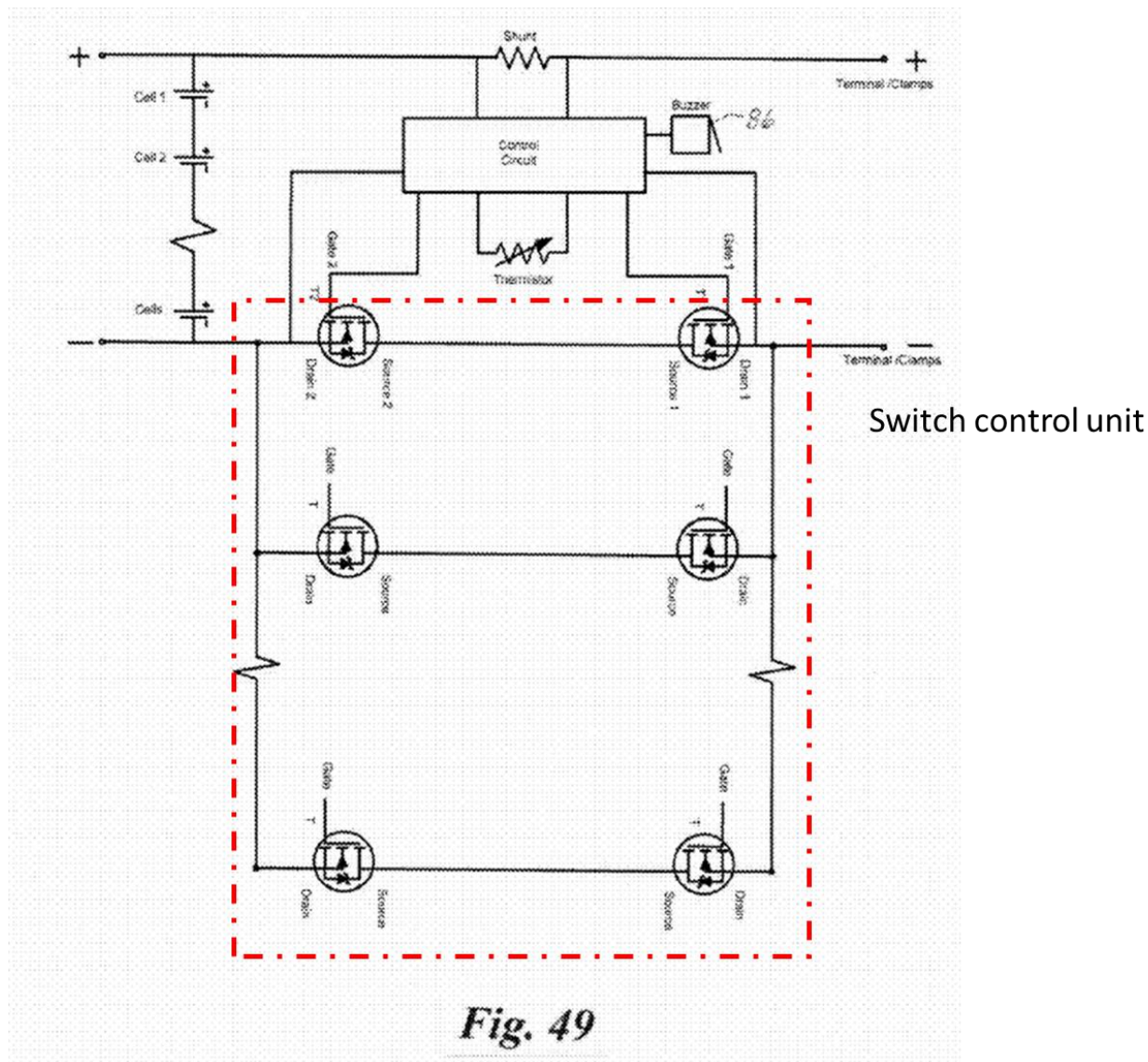
f. Limitation 3.5

... wherein the master-control circuit unit is configured to control the switch control unit based on the status information of the external power supply, thereby controlling connection on/off between the first voltage input port and the first voltage output port.

157. Koebler discloses a master-control circuit unit which is configured to control the switch control unit based on the status information of the external power

supply, thereby controlling connection (i.e., on/off) between the first voltage input port and the first voltage output port.

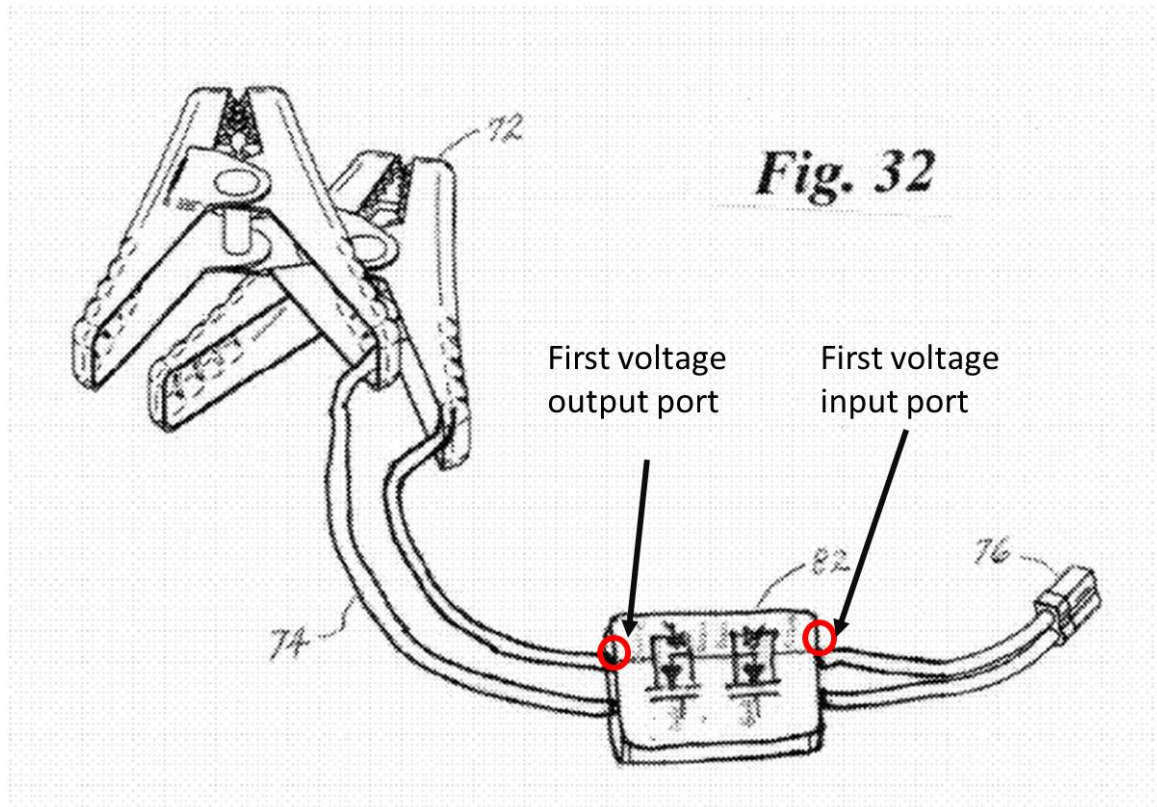
158. Koebler describes the control device controlling the power supply from the external power supply to the external device based on status information, including by monitoring a voltage and temperature for determining if these values are outside of the operating range. The connection between the first voltage input port and the first voltage output port is controlled by monitoring the status information of the external power supply. (EX1005, Koebler at [0116] (“As shown in FIG. 49, short circuit protection can be provided by the control circuit depicted. An audible alarm such as a buzzer can be provided, which will sound when the lithium base battery is outside its operating range of either voltage or temperature. This circuit will protect against reverse polarity, overvoltage, over-discharge voltage, and excessively high temperature by opening the circuit to terminate the charging.”).)



Annotated Koebler Figure 49.

159. Thus, when the external supply battery is in the normal operating temperature range, the circuit remains closed, allowing the supply of power from the external supply battery to the external device. When the temperature of the external power supply ("status information") is excessively high, the circuit is opened and

the connection between the first voltage input port and first voltage output port are terminated. (EX1005, Koebler at [0116] (“This circuit will protect against reverse polarity, overvoltage, over-discharge voltage, and excessively high temperature by opening the circuit to terminate the charging.”).)



Annotated Koebler Figure 32.

4. Claim 4 is Disclosed by Koebler in View of Liu

a. Limitation 4.0

... The battery clamp of claim 3, wherein the master-control circuit unit further comprises: an electric current detection unit for

detecting electric current from the external power supply to the external device;

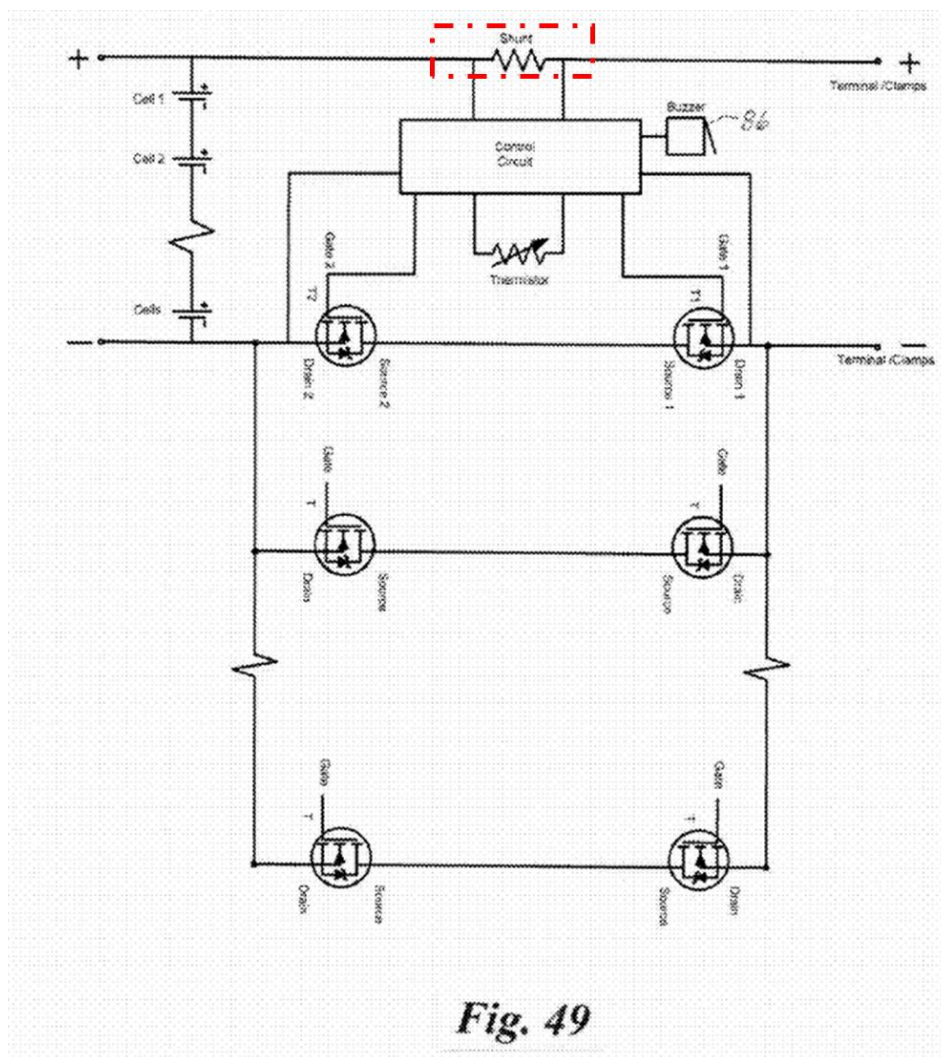
160. Koebler describes a battery clamp comprising a master-control circuit unit which further comprises an electric current detection unit for detecting electric current from the external power supply to the external device.

161. Koebler discloses a master-control board as shown in Fig. 49 below. (EX1005, Koebler at [0071] (“FIG. 49 is a schematic control circuit diagram illustrating short circuit protection, as well as protection from reverse polarity, high temperature, overvoltage, over-discharge voltage, and having an audible alarm.”).)

162. Additionally, Koebler discloses an electric current detection unit for monitoring the current value to compare to a predefined current range, which is used to control the switch control circuit. (EX1005, Koebler at [0104] (“Current monitor A monitors the voltage drop across the drain-source ON resistance ($R_{DS(on)}$) of power MOSFET Q1 and sources a current into node B that is proportional to the MOSFET current. R1 converts this current to a voltage that is compared to VREF at comparator D. When a short circuit occurs, the voltage at node B will exceed VREF (at least momentarily) and cause the output of D to go low, resetting the S-R latch. When the S-R latch is reset the output of G will go high, and C2 will differentiate a positive going pulse into the base of Q5, causing Q5 to turn on for a few microseconds and rapidly discharge the gate of Q2. Rapid turn-off of Q2 is essential to limiting the

energy associated with a short circuit event. By monitoring the status of the S-R latch, the controller **60** can determine when a short circuit cut-off event has occurred.”.)

163. According to Fig. 49 of Koebler, a shunt resistor is placed between the input and output ports. A POSITA would understand that the voltage difference across the shunt is used to detect the electric current as taught by Koebler.



Annotated Koebler Figure 49.

b. Limitation 4.1

... a voltage detection unit for detecting voltage of the external power supply and the external device; and

164. Koebler discloses a voltage detection unit for detecting voltage of the external power supply and the external device.

165. Koebler discusses a circuit which can detect when the external power supply comprising a lithium battery is outside of a specified voltage range. (EX1005, Koebler at [0116] (“An audible alarm such as a buzzer can be provided, which will sound when the lithium base battery is outside its operating range of either voltage or temperature.”).)

166. Koebler also discusses monitoring the voltage of the external battery to be charged, or the external device. (EX1005, Koebler at [0071] (“FIG. 49 is a schematic control circuit diagram illustrating short circuit protection, as well as protection from reverse polarity, high temperature, overvoltage, over-discharge voltage, and having an audible alarm.”).)

167. A POSITA would recognize that detection of the voltage of the external device to be charged is required to allow for protection from reverse polarity.

c. Limitation 4.2

... wherein the master-control circuit unit is configured to compare the electric current value and the voltage value with a predefined electric current range and a predefined voltage range respectively, thereby controlling the switch control unit.

168. Koebler discloses the master-control circuit unit is configured to compare the electric current value and the voltage value with a predefined electric current range and a predefined voltage range respectively, thereby controlling the switch control unit.

169. For instance Koebler describes an electric current detection unit for monitoring the current value to compare to a predefined current range, which is used to control the switch control circuit. (EX1005, Koebler at [0104] (“Current monitor A monitors the voltage drop across the drain-source ON resistance ($R_{DS(on)}$) of power MOSFET Q1 and sources a current into node B that is proportional to the MOSFET current. R1 converts this current to a voltage that is compared to VREF at comparator D. When a short circuit occurs, the voltage at node B will exceed VREF (at least momentarily) and cause the output of D to go low, resetting the S-R latch. When the S-R latch is reset the output of G will go high, and C2 will differentiate a positive going pulse into the base of Q5, causing Q5 to turn on for a few microseconds and rapidly discharge the gate of Q2. Rapid turn-off of Q2 is essential to limiting the

energy associated with a short circuit event. By monitoring the status of the S-R latch, the controller 60 can determine when a short circuit cut-off event has occurred.”.)

170. As explained above, it would have been obvious to a POSITA at the time of the alleged invention, that this can be accomplished via the shunt resistor of Fig. 49.

171. Koebler describes monitoring the voltage to determine if it is within a predetermined range, which is used to control the switch control circuit. (EX1005, Koebler at [0116] (“As shown in FIG. **49**, short circuit protection can be provided by the control circuit depicted. An audible alarm such as a buzzer can be provided, which will sound when the lithium base battery is outside its operating range of either voltage or temperature. This circuit will protect against reverse polarity, overvoltage, over-discharge voltage, and excessively high temperature by opening the circuit to terminate the charging.”).)

172. As discussed above, a POSITA would recognize that detection of the voltage of the external device to be charged is required to allow for protection from reverse polarity.

5. Claim 5 is Disclosed by Koebler in View of Liu

a. Limitation 5.0

... The battery clamp of claim 4, wherein the voltage detection unit comprises: a first voltage detection unit for detecting voltage value of the external power supply; and

173. Koebler discloses a first voltage detection unit for detecting voltage value of the external power supply.

174. Koebler discusses a circuit which can detect when the external power supply comprising a lithium battery is outside of a specified voltage range. (EX1005, Koebler at [0116] (“An audible alarm such as a buzzer can be provided, which will sound when the lithium base battery is outside its operating range of either voltage or temperature.”).)

b. Limitation 5.1

... a second voltage detection unit for detecting voltage value of the external device.

175. Koebler discloses a second voltage detection unit for detecting voltage value of the external device.

176. According to Fig. 49 of Koebler the control circuit allows for reverse polarity protection. (EX1005, Koebler at [0071] (“FIG. 49 is a schematic control circuit diagram illustrating short circuit protection, as well as protection from reverse

polarity, high temperature, overvoltage, over-discharge voltage, and having an audible alarm.”).) A POSITA would realize that reverse polarity protection requires the detection of the second voltage value.

177. In an alternative embodiment Koebler discusses monitoring the voltage of the external device. (EX1005, Koebler at [0116] (“As shown in FIG. **49**, short circuit protection can be provided by the control circuit depicted. An audible alarm such as a buzzer can be provided, which will sound when the lithium base battery is outside its operating range of either voltage or temperature. This circuit will protect against reverse polarity, overvoltage, over-discharge voltage, and excessively high temperature by opening the circuit to terminate the charging.”).)

178. A POSITA would recognize that detection of the voltage of the external device to be charged is required to allow for protection from reverse polarity.

6. Claim 7 is Disclosed by Koebler in View of Liu

a. Claim 7.0

... The battery clamp of claim 4, wherein the master-control circuit unit further comprises: a buzzing circuit unit connected to the master-control chip unit for alerting user about abnormal condition

179. Koebler discloses a buzzing circuit unit connected to the master-control chip unit for alerting user about abnormal condition.

180. Koebler describes a buzzer capable of producing an audible alarm

which is connected to the control circuit. (EX1005, Koebler at [0116] (“As shown in FIG. 49, short circuit protection can be provided by the control circuit depicted. An audible alarm such as a buzzer can be provided, which will sound when the lithium base battery is outside its operating range of either voltage or temperature.”).)

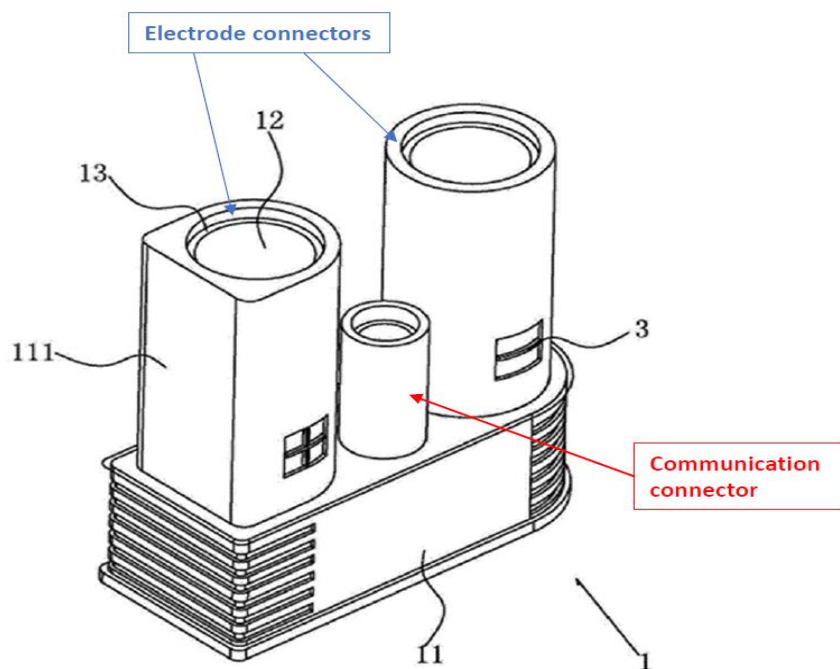
7. Claim 8 is Disclosed by Koebler in View of Liu

a. Claim 8.0

... The battery clamp of claim 1, wherein the communication connector is disposed between the first and second electrode connectors

181. As discussed above, Koebler discloses communication of status information from the external power supply to the control circuit but does not disclose the structure of the communication connector in relation to the electrode connectors. However, the location of the communication connector in relation to the electrode connectors is a simple design choice obvious to a POSITA.

182. Furthermore, a POSITA would look to Liu for the structure of a communication connector that could also provide both power ports. Liu discloses a communication connector disposed between the first and second electrode connectors.



Liu Figure 1.

183. Moreover, when looking at the connectors described in Liu and in Koebler, they are both polarized, meaning they can only be connected in one direction. With this type of connector, there are few ways to add a separate communication port while maintaining the external dimensions of the connector. As such, it would be obvious to place the communication connector between the existing first and second electrode connectors, in order to retain the original polarized connector shape.

8. Claim 9 is Disclosed by Koebler in View of Liu

a. Claim 9

... The battery clamp of claim 1, wherein the housing comprises an upper piece and a lower piece, which are removably connected together, and the master-control board is mounted on the lower piece.

184. Koebler discloses a master-control board enclosed by a housing, which could be formed using at least two pieces as this would be an obvious and known way to assemble Koebler's disclosed housing.

185. Koebler does not disclose whether the master control board is mounted on the lower or upper pieces of the housing. However, a POSITA would understand that the master-control board would necessarily be mounted inside the housing to avoid the board from moving around and the circuit potentially being damaged. (See Limitation 1.3 above.) Thus, it would be obvious to secure the board in Koebler to either the upper piece or the lower piece of the Koebler housing. A POSITA would understand that this is simply a predictable design choice because it would not modify the operation of any of the references.

9. Reasons to Combine Koebler and Liu

186. A POSITA would be motivated to combine Koebler and Liu for at least the reasons set forth below.

187. Both Koebler and Liu relate to smart jump starter cables for vehicles and other external devices – the same field of endeavor.

188. Koebler describes a solid-state device incorporated into a jumper cable for jump starting a starter battery using an external power supply. (EX1005, Koebler at [0002] (“The present invention relates to an apparatus for starting an internal combustion (IC) engine.”).) Koebler describes a control circuit located either within the battery housing or the cable housing. (*Id.* at [0116]). According to Koebler, Figs. 30-32 describe a battery clamp for jump starting an engine from an external power supply. (*Id.* at [0112] (“FIG. **30** shows jumper cables **74** with attached battery clamps **72** for starting (or jump starting) an engine, the cables being connectable to a lithium battery pack by a connector **76**”); *Id.* at Fig. 30.)

189. Liu discloses a power supply plug that can be used in a variety of applications including an “intelligent emergency automotive battery jump starter.” (EX1006, Liu at Abstract.)

190. Both Koebler and Liu describe the necessity to protect supply batteries from damage when jump starting an external device. (EX1006, Liu at [0015] (“In addition, when used on an intelligent emergency automotive jump starter power supply, this three-hole starter power supply plug is capable of protecting the battery very effectively to prevent overloading induced explosion of the battery during automotive ignition.”), *see also* EX1005, Koebler at [0004], (“In order to turn off

power terminals in presently known starter batteries, expensive electronic/electrical components are required to handle the high current loads that a starter motor needs to turn over an IC engine. These embody electronic protection circuitry for upper voltage cut-off (over charging), lower level voltage cut-off (over discharging) and temperature measurements.”.)

191. Both Koebler and Liu describe the use of monitoring of the temperature of supply batteries to protect them from overheating. (EX1006, Liu at [0026] (“Because the power supply lithium battery is heated up during automotive emergency jump start due to large electric current, the battery will be overheated if the startup time is too long or multiple jump starts are performed. Overheating will either result in swollen and scrapped battery at the very least, or smoke release, combustion and explosion of battery in a worst-case scenario.”); *see also* EX1005, Koebler at [0093], (“To control the solid state switches, electronic controls are needed for the different voltages, currents and/or temperature with specified parameters in which cells work to prevent damage.”); *Id.* at [0116] (“This circuit will protect against reverse polarity, overvoltage, over-discharge voltage, and excessively high temperature by opening the circuit to terminate the charging.”).)

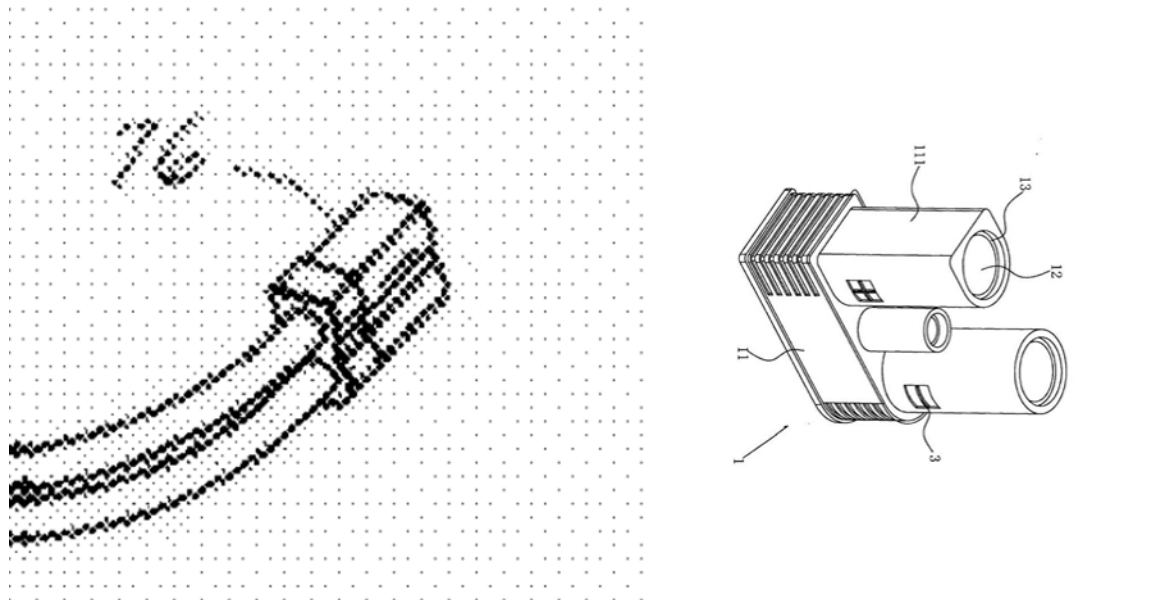
192. Liu further describes a plug for a battery charger that, in addition to two electrode terminals, includes a third terminal for the purpose of communicating status information (e.g. temperature) from the supply battery to the master control

board. (EX1006, Liu at [0026] (“Therefore, with a third terminal added to enable connection between the third terminal and an intelligent emergency automotive battery jump starter power supply, temperature data can be transmitted to the intelligent emergency automotive battery jump starter power supply through the third terminal. After connection, the switch of the power supply equipment is turned on with the user being able to directly detect the battery temperature, after which the automotive is started.”).)

193. If a POSITA wanted to implement Koebler such that the controller was in the jumper cables, a POSITA would look to Liu for guidance on the structure of the communication connector. Indeed, the Liu connector is described for very purpose of sending both power and status information from the external power supply to the controller and includes terminals for both the electrodes and the communication of status data.

194. Moreover, when looking to Koebler, there are a limited set of ways to transmit the temperature or other status measurements from the supply battery to the control circuitry and placing the communications connector in the same plug that houses the main conductors would be at least obvious to try. Additionally, when looking at the connectors described in Liu and in Koebler, they are polarized (one is circular the other has a flat edge), meaning they can only be connected in one direction as shown below. With this type of connector, there are limited ways to add

a separate communication port while maintaining the external dimensions of the connector. As such, it would be obvious to place the communication connector between the existing first and second electrode connectors, in order to retain the original polarized connector shape.



Koebler Figure 30 (left) and Liu Figure 1 (right).

195. For the above reasons a POSITA would be motivated to combine Koebler with Liu.

B. Ground 2: Claims 1-7 and 9 -10 Are Rendered Obvious by Zonesking in View of Richardson

1. Claim 1 is Rendered Obvious by Zonesking in View of Richardson

a. Limitation 1.0

... A battery clamp for delivering an instantaneous starting current from an external power supply to an external device, the battery clamp comprising:

196. It is my understanding that a preamble is not limiting where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use of the invention. Here, the body of the claim describes the complete claimed battery clamp device, and the preamble merely states the function that is performed by the device. Thus, in my opinion, it would not be limiting.

197. Notwithstanding, Zonesking discloses a battery clamp delivering an instantaneous starting current from an external power supply to an external device.

198. Zonesking discloses a “smart jump starter cable” used to jump start a vehicle, such as a car or motorcycle. (EX1007, Zonesking at [0001]; Fig. 1 below.) Zonesking further discloses battery clamps (*i.e.*, “transmission claim”); *Id.* at [0013] (“each power transmission terminal **21** may be a transmission clamp or a transmission terminal.”).)

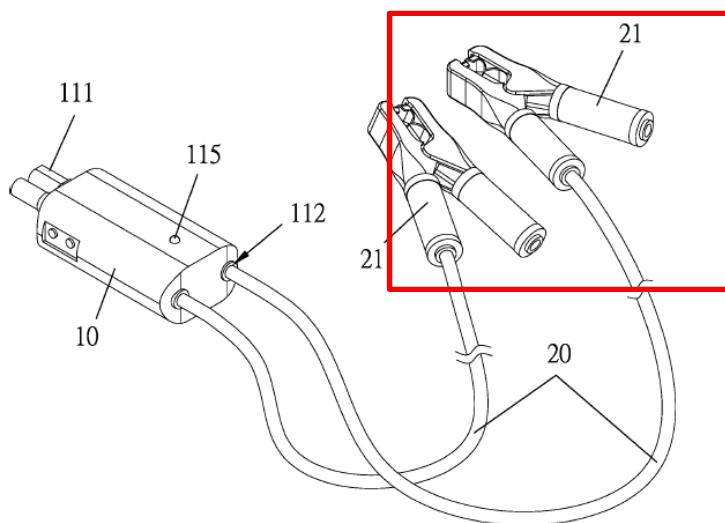


FIG. 1

Annotated Zonesking Figure 1.

The present invention relates to a smart jump starter cable with current detection function for automobile or motorcycle batteries, and in particular to one in which a circuit board of an adapter element is equipped with a protection module and a battery detection unit, such that when the consumer uses the present invention for jump starting, both a protection function and a current detection function for automobile or motorcycle batteries can be achieved by the present invention to provide a multifunctional detection application in the present invention.

(EX1007, Zonesking at [0001].)

199. Zonesking is used with an external power supply. (EX1007, Zonesking at [0018] (“an input terminal 111 is arranged, wherein the input terminal 111 and a

mobile power supply 40 can be connected to achieve a power supply state by mutual plugging in.”); *see also* annotated Zonesking Figure 4 below.)

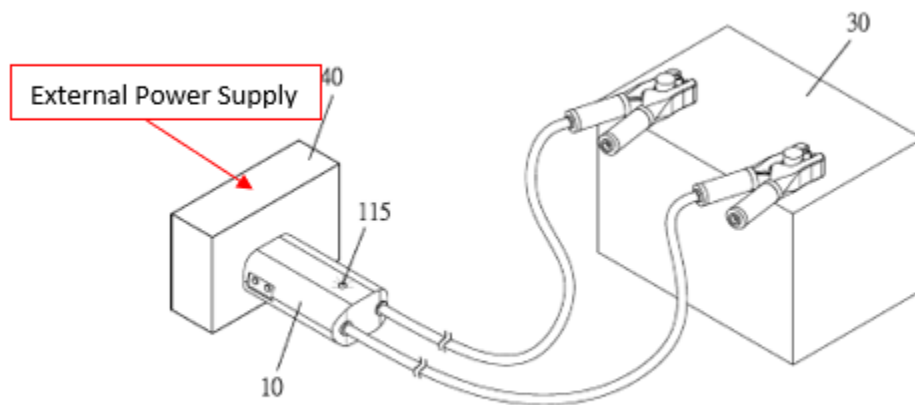


FIG. 4

Annotated Zonesking Figure 4.

200. Richardson also discloses a battery clamp for delivering an instantaneous starting current from a power supply (i.e., “jump starter batteries 22”) to an external device (i.e., “battery of the vehicle to be jump started”).

The present invention monitors the voltage of the battery of the vehicle to be jump started and the current delivered by the jump starter batteries to determine if a proper connection has been established and to provide fault monitoring. For safety purposes, only if the proper polarity is detected can the system operate. The voltage is monitored to determine open circuit, disconnected conductive clamps, shunt cable fault, and solenoid fault conditions. The current through the shunt cable is monitored to determine if there is a battery explosion risk, and for

excessive current conditions presenting an overheating condition, which may result in fire. The system includes an internal battery to provide the power to the battery of the vehicle to be jump started. Once the vehicle is started, the unit automatically electrically disconnects from the vehicle's battery.

(EX1008, Richardson at 1:64-2:11 (emphasis added).)

A battery voltage sensor 20 monitors the voltage level of one or more jump starter batteries 22. A reverse voltage sensor 24 monitors the polarity of the jumper cables on line 26 which are connected to the vehicle's electrical system 28. A vehicle voltage sensor 30 monitors the voltage on line 37 (voltage of the vehicle). When the contacts are open, the solenoid voltage sensor 32 input to microprocessor 12 is used to measure the voltage of the jump starter batteries 22, which may be configured for various jump starter voltages. When the contacts are closed, the voltage difference between the batteries 22 and the contact relay 34 is used to measure the voltage drop across a temperature-and-resistance calibrated 00 AWG shunt cable 36 in order to calculate the current being delivered by the jump starter batteries 22 to the vehicle's electrical system 28. Although the present invention is disclosed and described as connected to a vehicle, it should be understood that it is equally applicable to a stationary engine. Additionally, the connection method to the electrical system or batteries of the engine to be started is not important and may include conductive clamps, NATO connectors, or may be permanently hardwired to the system, for example.

(*Id.* at 2:43-63.)

b. Limitation 1.1

... *a control device, comprising:*

201. Zonesking alone or in combination with Richardson discloses a control device.

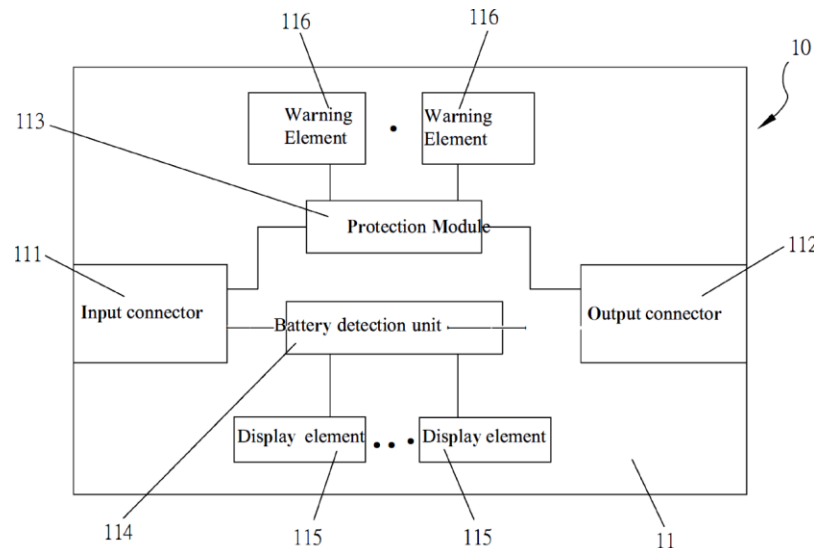
202. Zonesking discloses a smart jump starter cable that includes a “circuit board... equipped with a protection module and a battery detection unit” (i.e., “control device”) that is operable to provide both a protection function and current detection function.

In view of the disadvantages in using existing jump starter cables, the present invention provides a smart jump starter cable with current detection function for automobile or motorcycle batteries, wherein a *circuit board of an adapter element is equipped with a protection module and a battery detection unit*, such that when the consumer uses the present invention for jump starting, both a protection function and a current detection function for automobile or motorcycle batteries can be achieved by the present invention to provide a multifunctional detection application in the present invention.

(EX1007, Zonesking at [0004].)

203. Zonesking’s “circuit board 11” (i.e., “control device”) is disclosed as being “arranged in an adapter element 10” and is shown below as including input

and output connectors or “terminals.” (See EX1007, Fig. 2 of Zonesking below; see also *Id.* at [0012] (“an adapter element 10, wherein a circuit board 11 is arranged in the adapter element 10, a protection module 113, an input terminal 111, an output terminal 112, a battery detection unit 114.”).)



Zonesking at Figure 2.

204. Figure 1 of Richardson illustrates a functional block diagram of the control circuit and sensors used for providing supplemental power from a “jump starter battery” to the “vehicle to be started.” Figures 2A-2D illustrates “a schematic of the portable power source, control circuit and sensors...” (EX1008, Richardson at 2:17-19.) Richardson’s “microprocessor 12,” “control circuit,” and “sensors” are a control device.

Referring initially to FIG. 1, the portable supplemental power source (jump starter) of the present invention is generally indicated by reference numeral 10. Jump starter 10 includes a programmable

microprocessor 12 which receives inputs 14 and produces informational outputs 16 and control outputs 18. Microprocessor 12 provides flexibility to the system 10 to allow updates to the functionality and system parameters without changing the hardware. In the preferred embodiment, an 8-bit microprocessor with 64 k bytes of programmable flash memory is used to control the system 10. One such microprocessor is the ATmega644P available from Atmel Corporation. The microprocessor 12 may be programmed via an internal connector 90, or an external connector 92 (see FIG. 2). It should be understood that other programming ports may be included are not limited to the two shown in the figure.

(EX1008, Richardson at 2:27-42.)

205. As I discuss in my Reasons to Combine, Zonesking discloses and illustrates a portable “smart jump starter cable” for providing jump starting from an external power source to a vehicle battery. Richardson likewise discloses and illustrates control logic and circuitry for jump starting a vehicle battery with a jump starter battery.

206. While Zonesking discloses control circuitry for monitoring the current being provided from the external power source to the vehicle battery, Richardson provides and discloses additional monitoring functionality. Richardson, however, does not disclose the associated packaging for the control circuitry used for jump starting and monitoring between the “jump starter battery” and the vehicle battery to

be jump started.

207. It would have been obvious to a POSITA to modify Zonesking to include the control circuit and sensors of Richardson. Or it would have been obvious to use the housing and connectors disclosed and illustrated by Zonesking with the Richardson's additional control circuitry for monitoring the operation between a power source (i.e., "jump starter battery") and the vehicle battery to be charged. A POSITA would have it would be desirable to include such functionality within the housing of Zonesking. Or a POSITA would have understood it would be obvious to try and modify Zonesking with the teachings of Richardson to gain the predictable results of the enhanced functionality disclosed by Richardson.

c. Limitation 1.2

... *a housing*;

208. Zonesking alone or in combination with Richardson discloses a control device.

209. For instance, Zonesking discloses an "adapter element 10" which is a "housing" for the control device. (EX1007, Zonesking at [0012].)

210. According to Zonesking the "adapter element 10" houses the protection module and battery detection unit found on "circuit board 10." (See EX1007, Zonesking at [0012] ("adapter element 10, wherein a circuit board 11 is arranged in

the adapter element 10 ...”); *see also* annotated Zonesking Fig. 4 below).) A POSITA would understand this “adapter element 10” as being an enclosure that would likely be assembled to securely house the circuit board within.

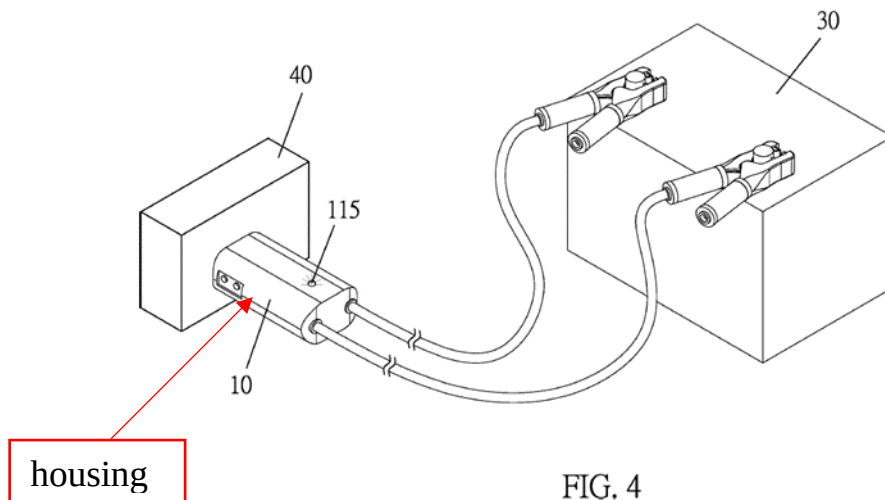


FIG. 4

Annotated Zonesking Figure 4.

211. Again, Richardson does not disclose nor illustrate how its control circuitry (i.e., circuit board, microprocessor, and sensors) is housed with the same level of detail as Zonesking. But a POSITA would have understood Richardson’s control circuitry (i.e., circuit board, microprocessor, and sensors) would necessarily be housed within the same “adapter element 10” disclosed by Zonesking. A POSITA would further understand Zonesking’s “adapter element 10” might require modifications to house the additional control circuitry. For instance, the width, height, or depth of the “adapter element 10” might need to be modified to house the additional components and circuit board. But such modifications would be minimal,

and well within the skill and knowledge of a POSITA.

212. For instance, a POSITA would have understood the enclosure could be formed from two pieces which are combined using screws, fit joints, or even injection molding. Or the two pieces could be assembled using an adhesive bonding or welding technique. Regardless of the technique employed, A POSITA would have understood how to form the “adapter element 10” to house either Zonesking’s “circuit board 11” or Richardson’s control circuitry using one of these known techniques commonly employed for similar products. A POSITA would have also understood the “adapter element 10” would need to be designed to securely house the circuit board or control circuitry and protect it from the ambient environment.

d. Limitation 1.3

... a master-control board mounted within the housing; and

213. Zonesking alone or in combination with Richardson discloses a master-control board mounted within the housing.

214. For instance, Zonesking includes circuit board 11 which is a master-control board housed in the enclosure of adapter element 10.

[T]he present invention provides a smart jump starter cable with current detection function for automobile or motorcycle batteries, which comprises: an adapter element 10, wherein a circuit board 11 is arranged in the adapter element 10, a protection module 113, an input

terminal 111, an output terminal 112, a battery detection unit 114, at least one display element 115 and at least one warning element 116 are arranged on the circuit board 11, one end of the protection module 113 can be electrically connected to the input terminal 111, the other end of the protection module 113 can be electrically connected to the output terminal 112, one end of the battery detection unit 114 can be electrically connected to the input terminal 111, the other end of the battery detection unit 114 can be electrically connected to the output terminal 112, each display element 115 can be electrically connected to the battery detection unit 114, and each warning element 116 can be electrically connected to the protection module 113; and a power transmission element 20, wherein the power transmission element 20 has at least one power transmission terminal 21, and the power transmission element 20 can be electrically connected to the output terminal 112 of the adapter element 10.

(EX1007, Zonesking at [0012].)

215. Richardson also discloses various data (e.g., temperature measurements) being received from the jump starter battery and sent to the master control board via a communication connector (“sensor wiring harness”) as shown below.



WINPLUS Ex. 1004

Indeed, a POSITA would understand Zonesking's "circuit board" or Richardson's control circuitry could be secured within the "adapter element 10" using, e.g., mounting pins, screws, or adhesive. Or the "adapter element 10" could be a housing where a molding process is used to completely encompass and securely houses or mount the control circuitry.

217. Absent being securely mounted, a POSITA would understand the circuit board could be free to move and would be at risk for being damaged during use. A POSITA would have understood that securing the Zonesking's "circuit board 11" or Richardson's control circuitry within the "adapter element 10" would have required nothing more than using a known technique to improve Zonesking's smart jump starter cable in a known and commonly employed way. Alternatively, mounting the circuit board in the housing would also be understood as being a mere design choice and a POSITA would be motivated, or at have understood it would be obvious to try and use securing mechanisms, to prevent damage to Richardson's control circuitry.

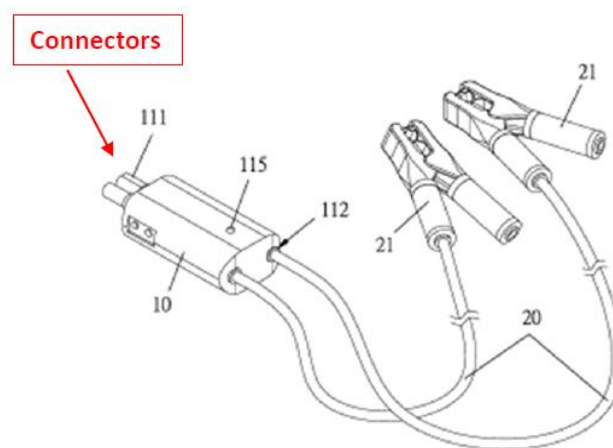
e. Limitation 1.4

... connectors disposed at one side of the housing, and being electrically connected to the master control board, comprising:

218. Zonesking alone or in combination with Richardson discloses connectors disposed at one side of the housing and being electrically connected to

the master control board.

219. For instance, Zonesking discloses “input terminal 111” (i.e., “connectors”) disposed at one side of the housing – i.e., the “adapter element 10.” (See EX1007, annotated Zonesking Fig. 1 below, wherein the input terminal 111 is disposed at one side of the adapter element 10.)



Annotated Figure 1 of Zonesking.

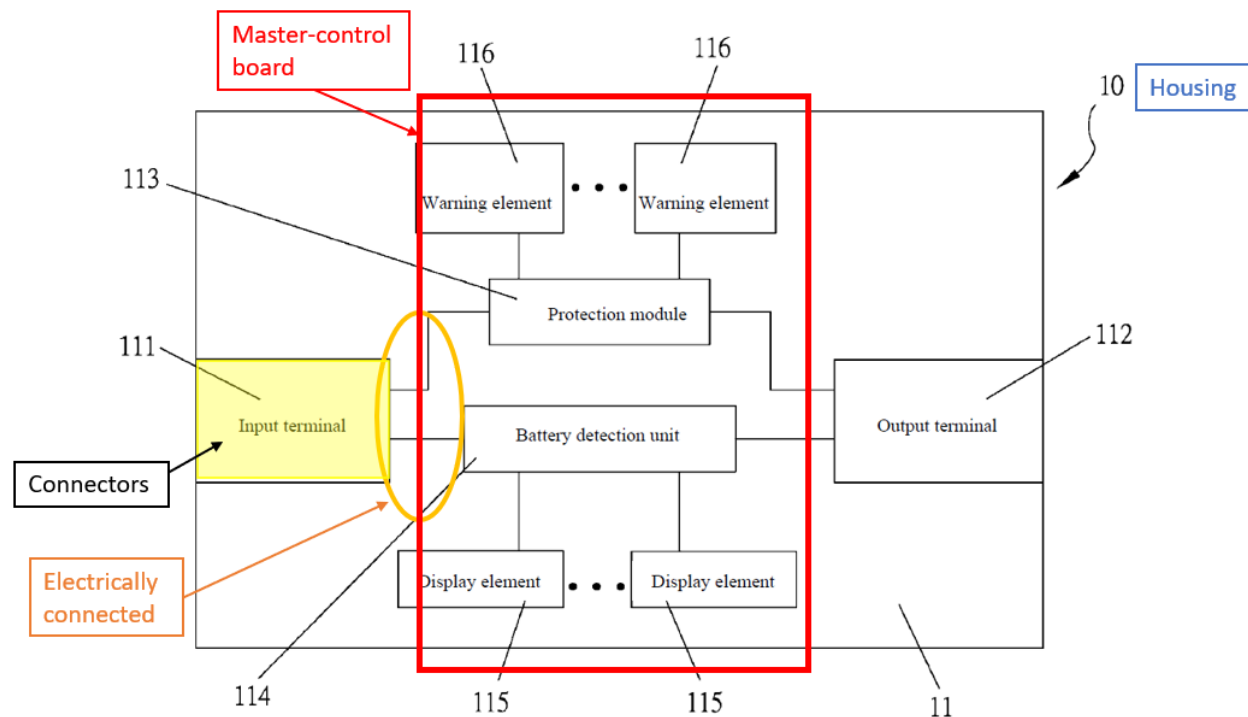


FIG. 2

Annotated Figure 2 of Zonesking.

Referring to FIG. 1 and FIG. 2, the present invention provides a smart jump starter cable with current detection function for automobile or motorcycle batteries, which comprises: an adapter element 10, wherein a circuit board 11 is arranged in the adapter element 10, a protection module 113, an input terminal 111, an output terminal 112, a battery detection unit 114, at least one display element 115 and at least one warning element 116 are arranged on the circuit board 11, ***one end of the protection module 113 can be electrically connected to the input terminal 111***, the other end of the protection module 113 can be electrically connected to the output terminal 112, ***one end of the battery detection unit 114 can be electrically connected to the input terminal***

111, the other end of the battery detection unit 114 can be electrically connected to the output terminal 112, each display element 115 can be electrically connected to the battery detection unit 114, and each warning element 116 can be electrically connected to the protection module 113...

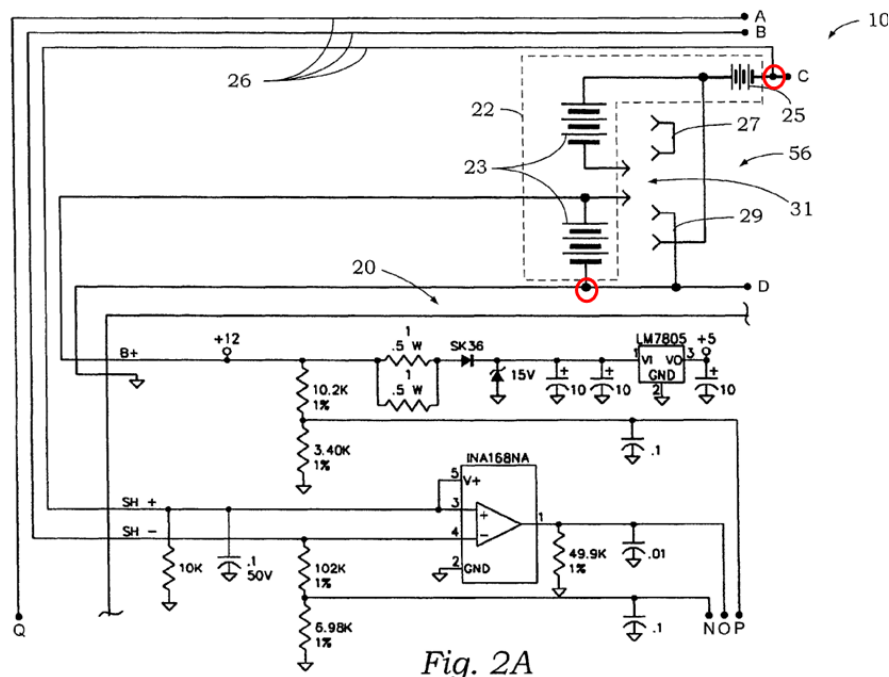
(EX1007, Zonesking at [0012] (emphasis added).)

220. The “input terminal 111” (i.e., “connectors”) is shown as being mounted on or within the “circuit board 11.”

221. A POSITA would have understood that Zonesking’s “input terminal 111” or connectors would likewise still be required for connection to the external power source even when modified to include the control circuitry of Richardson. A POSITA would have understood how to electrically connect the “input terminal 111” for use with Richardson’s control circuitry. For instance, a POSITA would have understood Zonesking’s “input terminals 111” could be included within Richardson’s control circuitry using known soldering techniques. Such a modification was within the knowledge and skill of a POSITA. Also, including the “input terminals 111” for use with Richardson’s control circuitry would allow Zonesking to remain operable with the disclosed external power source.

222. Or the “input terminals 111” could be used for connection to Richardson’s “jump starter battery 22.” While Richardson’s schematic below shows the “battery 22” as being connected at two points, a POSITA would have understood

the “jump starter batter 22” could be separate and external from Richardson’s control circuitry. A POSITA would have known and understood how to add connectors like “input terminal 111” at the two connection points I have circled in red. A POSITA would have recognized the use of connectors would allow the control circuitry to be separate from the “jump starter battery 22.” A POSITA would have recognized the capability to have an external “battery 22,” outside the housing for the control circuitry, could be advantageous if the “jump starter battery 22” was not operable. If inoperable (e.g., uncharged or defective), the control circuitry could be used with a replacement “jump starter batter 22” or external power source. This would ensure the control circuitry could still be used to jump start a vehicle battery even when a given “jump starter battery 22” was not operable.



Annotated Richardson Figure 2A.

f. Limitation 1.5

... at least a first and second electrode connectors, which are connected to an external power supply for receiving power, and

223. With regards to this limitation, the '105 patent states the “connectors 10 comprise a positive electrode connector 101” and a “negative electrode connector 102.” (EX1001, 4:36-38.) The '105 Patent also states the “positive electrode and negative electrode connectors 101, 102 are connected to the external power supply 200 for receiving power supply.” (EX1001, 4:42-44.)

224. Zonesking discloses the first and second electrode connectors, which are connected to an external power supply for receiving power as contemplated by

the '105 Patent.

225. As stated in the prior limitation, Zonesking discloses “input terminal 111” that can be “connected” to a “mobile power supply 40” to “achieve a power supply state by mutual plugging in.” (EX1007, Zonesking [0018], Figures 3 and 4.)

Referring to FIG. 4, according to the present invention, jump starting can be conducted using the mobile power supply 40. In the present invention, an input terminal 111 is arranged, wherein the input terminal 111 and a mobile power supply 40 can be connected to achieve a power supply state by mutual plugging in. In addition to mutual plugging in with a mobile power supply 40 to achieve a power supply state, the battery detection unit 114 according to the invention can be used to synchronously detect the status of the battery 30 of the automobile or motorcycle during the jump starting process, such that one is informed about the amount of current of the battery 30 of the automobile or motorcycle at all times during the jump starting to achieve the function of a smart jump starter cable.

(EX1007, Zonesking [0018].)

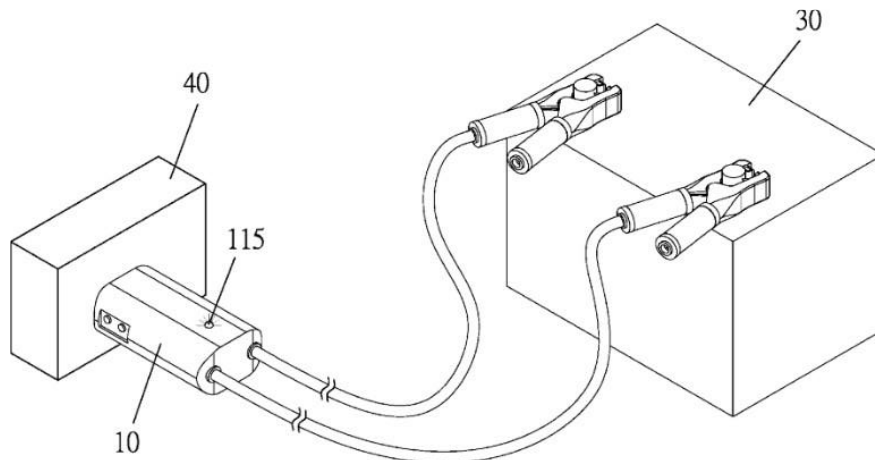


FIG. 4

Zonesking Figure 4.

226. A POSITA would understand that the input terminal necessarily includes a first and second electrode connector for both positive and negative connection to the external mobile power supply 40 in order to receive power. (EX1007, Zonesking Figures 3 and 4.) A POSITA would understand a positive and negative connection would be required to provide the positive and negative starting power to the “battery 30” illustrated by Figure 4.

227. A POSITA would have further understood that even if modified with the control circuitry of Richardson, Zonesking would still include the positive and negative connection, which would be required to provide the positive and negative starting power to the “battery 30” illustrated by Figure 4.

g. Limitation 1.6

... at least one communication connector connected to the external power supply for receiving status information of the external power supply, and sending the status information to the master-control board;

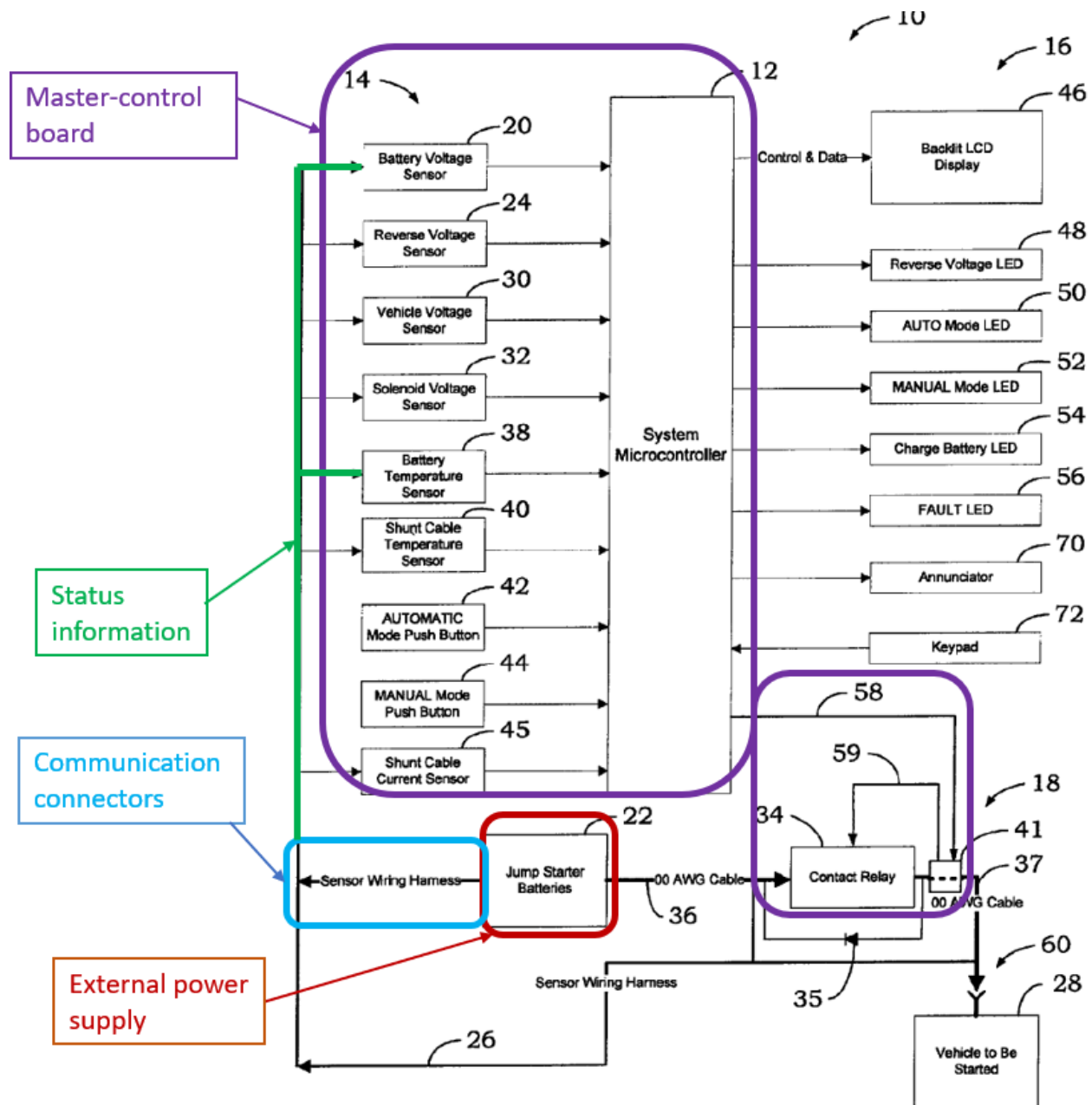
228. Richardson discloses a jumper cable circuit comprising a system microcontroller and jump starter batteries wherein there is a communication connector connected to the power supply for receiving status information of the external power supply and sending the status information to the master-control board. It would have been obvious at the time of the invention to provide the communication connector and control circuitry of Richardson to the Zonesking jump starter cables.

229. A POSITA would look to Richardson, which discloses a battery sensor which monitors the status of the supply battery, such as its temperature (i.e., status information). Richardson discloses that such detection of the external battery temperature is important to detect overheating of the battery during jump starting. (EX1008, Richardson at 2:64-66 (“A battery temperature sensor 38 monitors the temperature of the jump starter's batteries 22 to detect overheating due to excess current draw from the batteries during jump starting.”).)

230. Richardson further discloses that the temperature is monitored as part

of the decision process of whether to connect the supply battery to the vehicle. (EX1008, Richardson at 5:13-19 (“If the battery temperature measured by sensor 38 rises above a maximum safe threshold 232, an error flag is set and the event recorded in non-volatile memory 234. An error message ‘Battery Over Temperature’ is displayed 236 on the LCD 46 and the Fault LED 56 is illuminated. The system prevents any further operation until the battery temperature falls below a safe level.”).)

231. Richardson discloses that this temperature measurement, and other status information, is received from the jump starter battery and sent to the master control board via a communication connector (“sensor wiring harness”) as shown in blue in Richardson Fig. 1 below.



Annotated Richardson Figure 1.

232. While Zonesking does not disclose the temperature monitoring disclosed by Richardson, Zonesking does disclose the adapter element 10 can include a master control unit (“MCU”). (EX1007, Zonesking at [0014], (“the battery detection unit 114 may be an MCU, a comparator or an amplifier.”).) It would have

been obvious to a POSITA at the time of the invention to provide a sensor wiring harness between the supply battery and master control unit of Zonesking as taught by Richardson. A POSITA would do so to monitor the temperature of the jump starter to avoid the battery from overheating due to excess current draw. (EX1007, Zonesking at [0017].)

233. A POSITA would immediately recognize that when a controller is implemented for controlling the operation of the jumper cables, modifying the controller to receive and process additional signals such as temperature would be clearly contemplated and easily within the capabilities of one of skill in the art. In the alternative, a POSITA could also simply use the master control board and sensor wiring harness of Richardson in place of the connector and microprocessor of the Zonesking smart jumper cables, which would also be clearly contemplated and easily within the capabilities of one of skill in the art.

234. Hence, a POSITA would be motivated to modify Zonesking to include the Richardson communication connector to monitor the status information of the supply battery and send the status information to either the Zonesking or Richardson master control board to control whether it is safe to provide power to an external device.

h. Limitation 1.7

... a first and second wire clamps, each having an end configured to receive power from the external power supply via the control device, and another end connected to the external device for supplying power to the external device;

235. Zonesking alone or in combination with Richardson discloses this limitation.

236. For instance, Zonesking discloses first and second wire clamps disclosed as being “power transmission terminal 21” which are shown as conventional and well-known battery clamps in Figures 1, 3, and 4.

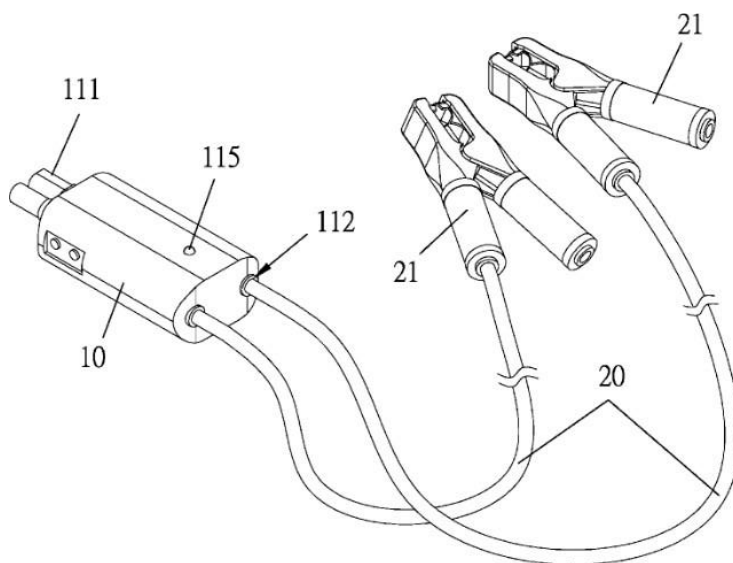


FIG. 1

Zonesking Figure 1.

Here, each power transmission terminal 21 may be a **transmission clamp** or a transmission terminal.

(EX1007, Zonesking [0013].)

237. Zonesking also discloses the clamps “21” receive power from a “power transmission element 20” or electrical wiring attached to the “output terminal 112” of the “adapter element 10.”

Referring to FIG. 1 and FIG. 2, the present invention provides a smart jump starter cable with current detection function for automobile or motorcycle batteries, which comprises:

an adapter element 10, wherein a circuit board 11 is arranged in the adapter element 10, a protection module 113, an input terminal 111, an output terminal 112, a battery detection unit 114, at least one display element 115 and at least one warning element 116 are arranged on the circuit board 11, one end of the protection module 113 can be electrically connected to the input terminal 111, the other end of the protection module 113 can be electrically connected to the output terminal 112, one end of the battery detection unit 114 can be electrically connected to the input terminal 111, the other end of the battery detection unit 114 can be electrically connected to the output terminal 112, each display element 115 can be electrically connected to the battery detection unit 114, and each warning element 116 can be electrically connected to the protection module 113;

and a power transmission element 20, wherein the power transmission element 20 has at least one power transmission terminal 21, and the

power transmission element 20 can be electrically connected to the output terminal 112 of the adapter element 10.

(EX1007, Zonesking [0012] (emphasis added).)

238. According to Zonesking, when jump starting a vehicle, one side of the housing (adapter element 10) is connected to an external power supply 40. (EX1007, Zonesking at [0018].) At the other end of the housing, Zonesking discloses first and second wire clamps. As shown in Fig. 4 of Zonesking below, connectors (as I discussed above) connect to the external power source (40) via the control device (adapter element 10) and another end that connects to the terminals of an external device (i.e., “battery 30”) to be charged.

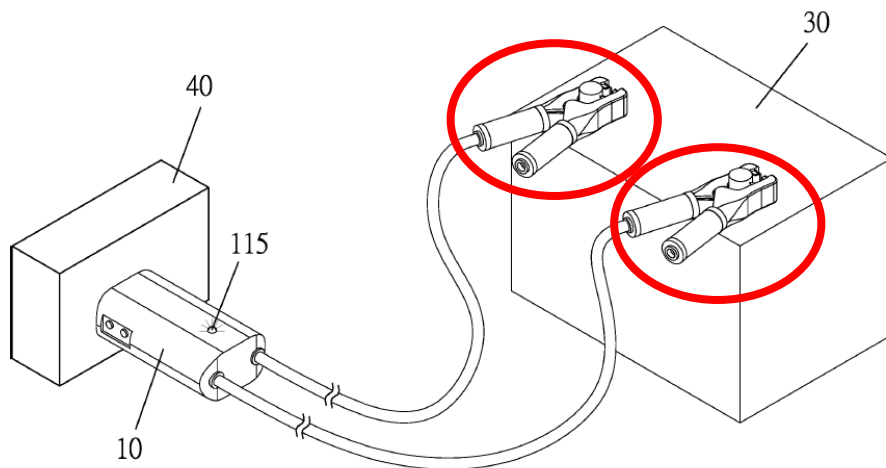


FIG. 4

Annotated Figure 4 of Zonesking.

When the user wants to jump start the battery 30 of the automobile or motorcycle, the output terminal 112 can be connected to the power transmission element 20 in advance, connecting each of the power transmission terminals 21 of the power transmission element 20 to the battery 30, and thereby the power state is detected by the battery detection unit 114.

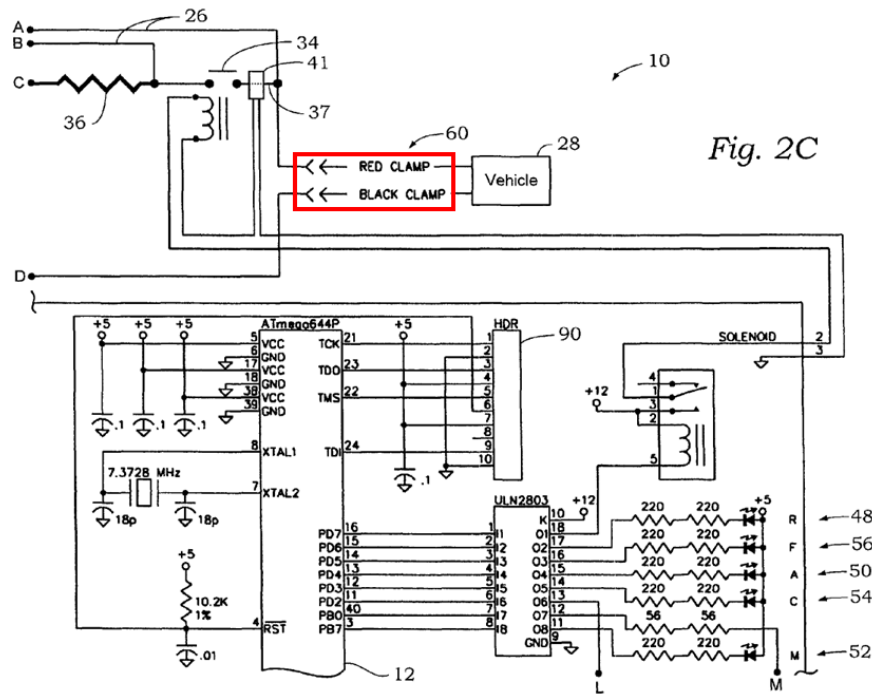
(EX1007, Zonesking at [0017].)

Referring to FIG. 4, according to the present invention, jump starting can be conducted using the mobile power supply 40. In the present invention, an input terminal 111 is arranged, wherein the input terminal 111 and a mobile power supply 40 can be connected to achieve a power supply state by mutual plugging in. In addition to mutual plugging in with a mobile power supply 40 to achieve a power supply state, the battery detection unit 114 according to the invention can be used to synchronously detect the status of the battery 30 of the automobile or motorcycle during the jump starting process, such that one is informed about the amount of current of the battery 30 of the automobile or motorcycle at all times during the jump starting to achieve the function of a smart jump starter cable.

(EX1007, Zonesking at [0018].)

239. Again, Richardson does not illustrate the housing and wire clamps with the same level of detail as Zonesking. But Richardson does disclose and illustrate a “RED CLAMP” and “BLACK CLAMP” which are used to connect the jump starter

control circuitry (and jump starter battery) to the battery of the vehicle to be charged. Richardson discloses these as being “jumper cables.” (EX1008, Richardson at 4:40-44 (“If the system does not detect a battery charging voltage 212, ***once jumper cables 60 have been connected to the vehicle to be started 28***, the voltage is measured by the reverse voltage sensor 24 to determine if the cables have been properly connected to the vehicle 214.”).) A POSITA would have understood this disclosure to mean the wiring and jumper cables shown by Zonesking are similar to the wiring and “jumper cables” disclosed by Richardson. A POSITA would have understood Zonesking’s jumper cables as being a commonly used and well-known type of jumper cables used for connecting to a battery to be jump started. A POSITA would have therefore understood Richardson’s disclosure as using the same or similar jumper cables.



Annotated Richardson a Figure 2C.

i. Limitation 1.8

... wherein the control device is configured to control power supply from the external power supply to the external device based on the status information.

240. As discussed above for Limitation 1.6, Richardson discloses the control device is configured to control power supply from the power supply to the external device based on the status information.

241. In Richardson, the system microcontroller 12 operates a contact relay 34 to connect/disconnect the jumper battery to/from the power output based on the status information, such as the temperature. (EX1008, Richardson Abstract (“a

processor for controlling the relay to selectively apply electrical power to the engine electrical system.”); *see also* Richardson at 3:8-12 (“As long as the temperature of the cable 37 is below a predetermined limit, the input on line 58 is passed through sensor 41 to line 59 to enable the contact relay 34 as controlled by system microcontroller 12.”).)

242. Richardson describes a control circuit as shown in Fig. 1 and Fig. 2A – 2D. The control circuit has a microcontroller which receives various status information and makes decisions whether to supply power from the supply battery to the external device. (EX1008, Richardson at 2:29-35 (“Jump starter 10 includes a programmable microprocessor 12 which receives inputs 14 and produces informational outputs 16 and control outputs 18.”).)

243. In Fig. 1 of Richardson, “the portable supplemental power source (jump starter)” (EX1008, Richardson at 2:27-28, Fig. 1) is indicated by numeral 10. As indicated at Fig. 1, the control circuit relies on the battery voltage, vehicle voltage and battery temperature, among other status information, when deciding whether to connect the supply batteries to the vehicle electrical system.

244. Figure 5 of Richardson, shown below, provides an algorithm for operation of the controller of the Richardson battery jump starter demonstrating that the delivery of power from the power supply to the external device is controlled based on the status information.

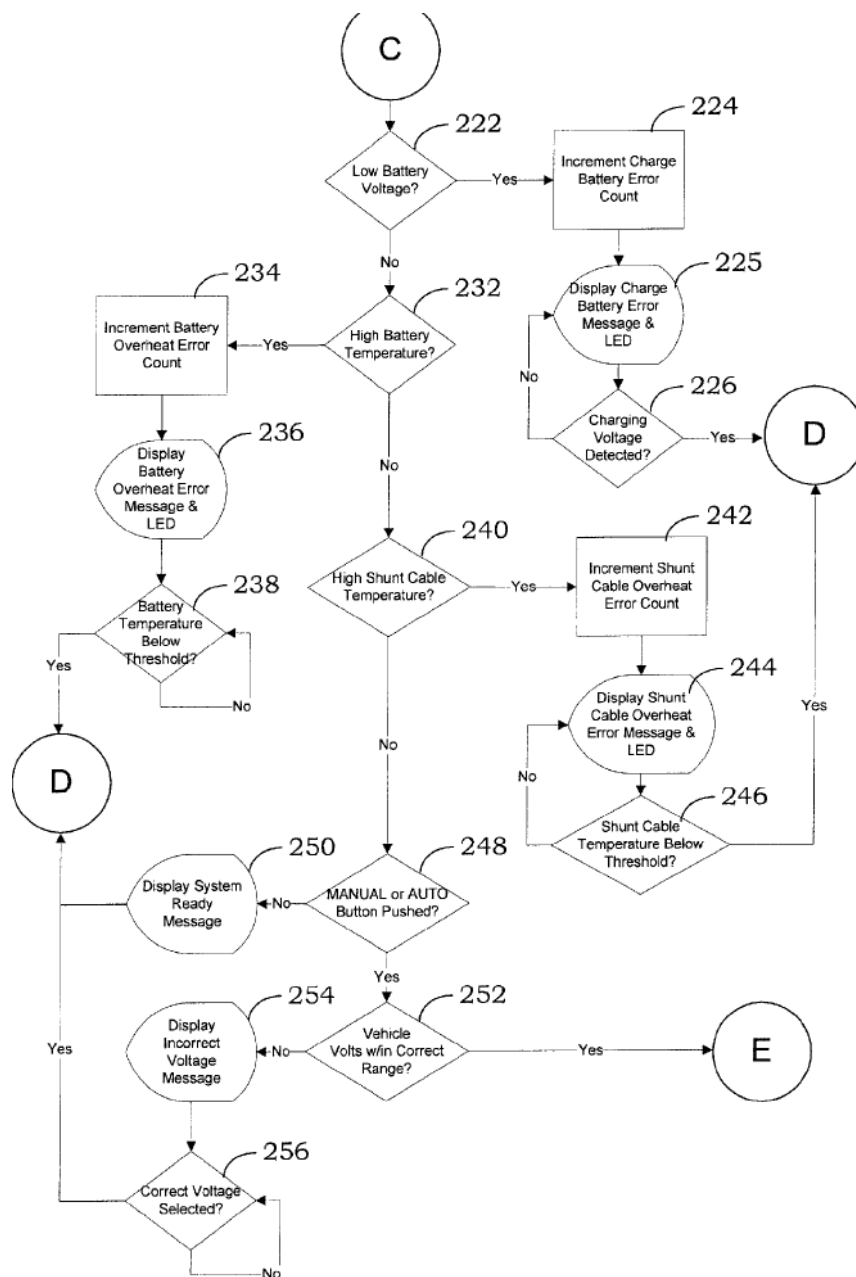


Fig. 5

Richardson at Figure 2C.

245. As described above, a POSITA would be motivated to modify Zonesking to include the Richardson communication connector to monitor the status

information of the supply battery and send the status information to either the Zonesking or Richardson master control board to control whether it is safe to provide power to an external device. A POSITA would be motivated to prevent damage to the supply battery due to overheating during charging.

2. Claim 2 is Rendered Obvious by Zonesking in View of Richardson

a. Limitation 2.0

... The battery clamp of claim 1, wherein the control device is configured to allow the power supply from the external power supply to the external device when the status information is normal

246. Richardson discloses that control device is configured to allow the power supply from the external power supply to the external device when the status information is normal.

247. Richardson relies on the battery temperature among other parameters as status information.

248. Richardson discloses a battery sensor which monitors the temperature of the jumper batteries. (EX1008, Richardson at 2:64-66 (“A battery temperature sensor 38 monitors the temperature of the jump starter’s batteries 22 to detect overheating due to excess current draw from the batteries during jump starting.”).)

249. Richardson further discloses that the temperature is monitored as part

of the decision process of whether to connect the power supply battery to the device to be charged. (EX1008, Richardson at 5:13-19 (“If the battery temperature measured by sensor 38 rises above a maximum safe threshold 232, an error flag is set and the event recorded in non-volatile memory 234. An error message “Battery Over Temperature’ is displayed 236 on the LCD 46 and the Fault LED 56 is illuminated. The system prevents any further operation until the battery temperature falls below a safe level 238.”).)

250. Richardson further discloses that “[a] contact relay control output 58 operates the contact relay 34 through the temperature sensor 41. When the jump starter operation has been successfully initiated, the contact relay 34 is closed and the jump starter batteries 22 are connected to the stater system or batteries of the vehicle to be started.” (EX1008, Richardson at 3:40-43.) Thus, Richardson teaches that when the status information is normal, such as a normal supply battery temperature, the control device allows the supply battery to supply power to the external device. (*Id.*)

b. Limitation 2.1

... wherein the status information comprises at least one of the following: temperature, voltage of a battery unit of the external power supply

251. Richardson discloses that the status information comprises at least one

of the following: temperature, voltage of a battery unit of the external power supply.
(EX1008, Richardson at 5:13-21.)

252. As I discuss in my Reason to Combine section below, a POSITA would be motivated to combine Zonesking with Richardson. Once combined, Zonesking and Richardson would satisfy both Limitations 2.0 and 2.1.

3. Claim 3 is Rendered Obvious by Zonesking in View of Richardson

a. Limitation 3.0

... The battery clamp of claim 1, wherein the master-control board comprises: a first and second voltage input ports electrically connected to the first and second electrode connectors respectively

253. Zonesking alone or in combination with Richardson discloses this limitation.

254. For instance, Zonesking discloses a battery clamp wherein the master-control board comprises: a first and second voltage input ports electrically connected to the first and second electrode connectors respectively.

255. As shown in annotated Zonesking Fig. 2 below, Zonesking discloses a master-control board (circuit board in red) which has first and second voltage input ports (green), which are electrically connected to the first and second electrode connectors (input terminals 111 in yellow), as discussed in Limitation 1.5 above.

(EX1007, Zonesking Fig. 1 and Fig. 2.)

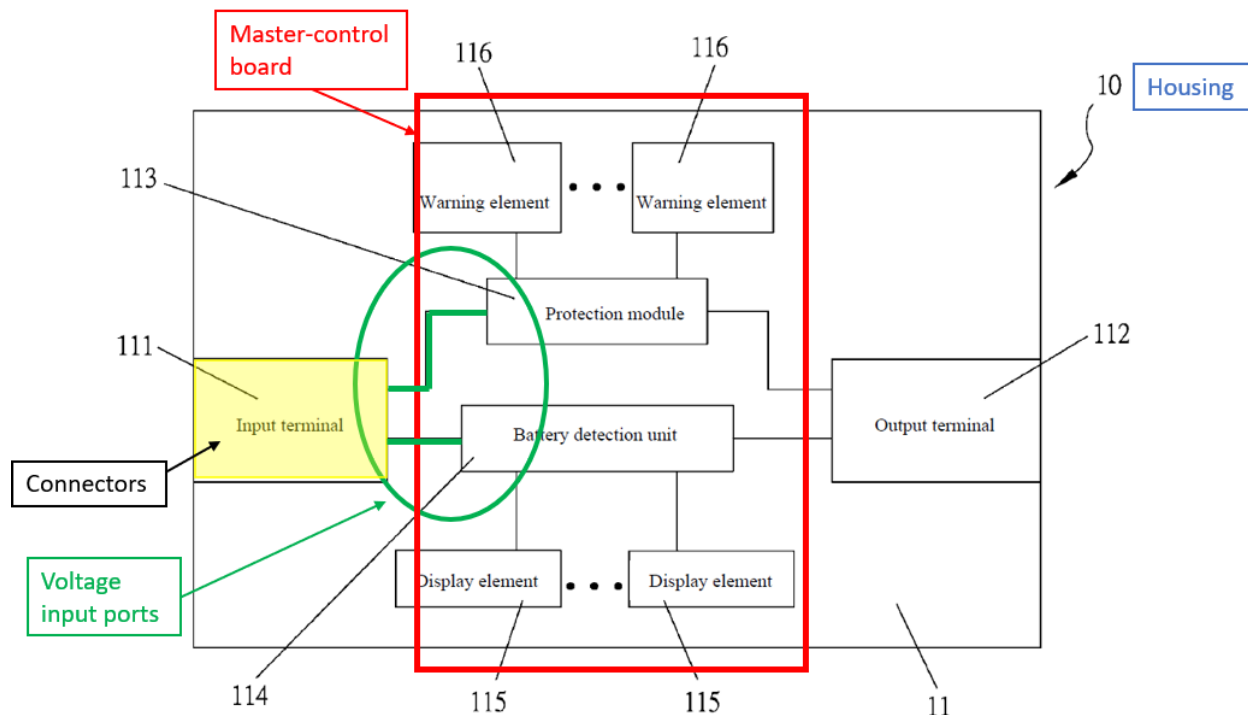


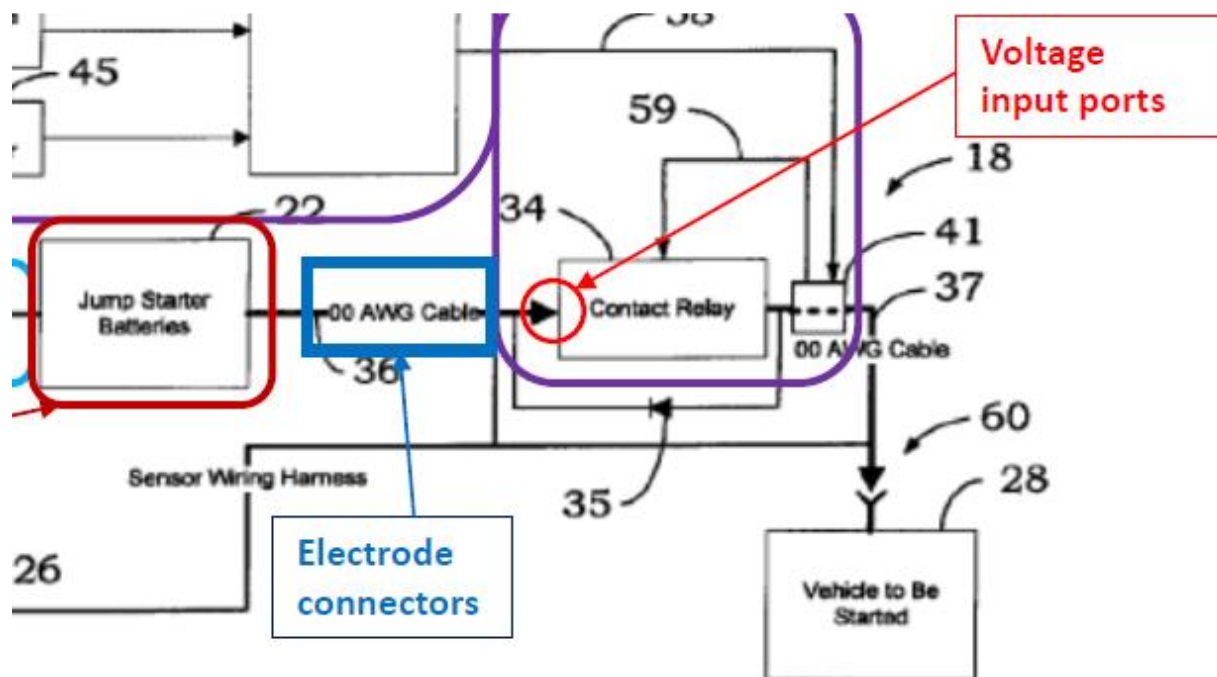
FIG. 2

Annotated Zonesking Figure 2.

256. Richardson likewise discloses first and second voltage input ports electrically connected to the first and second electrode connectors.

257. Richardson discloses “[w]hen the contacts are closed, the voltage difference between the batteries 22 and the contact relay 34 is used to measure the voltage drop across a temperature-and-resistance calibrated 00 AWG shunt cable 36 in order to calculate the current being delivered by the jump starter batteries 22 to the vehicle’s electrical system 28.” (EX1008, Richardson 2:52-57.) A POSITA

would understand this AWG shunt cable comprises both the first and second electrode connectors. The voltage input ports on the master control board (shown in annotated Fig. 1 below) are necessary for the contact relay 34 to receive power from the AWG shunt cable 36. A POSITA would understand both first (+) and second (-) voltage input ports are necessary to conduct electricity. (See annotated Figure 1 below.)



Annotated Partial Richardson Figure 1.

258. Richardson does not disclose nor illustrate how its control circuitry (i.e., circuit board, microprocessor, and sensors) are laid out on a circuit board.

259. A POSITA would have understood that Richardson's control circuitry (master control board) as disclosed in Fig. 2A-2D would have to be placed on a

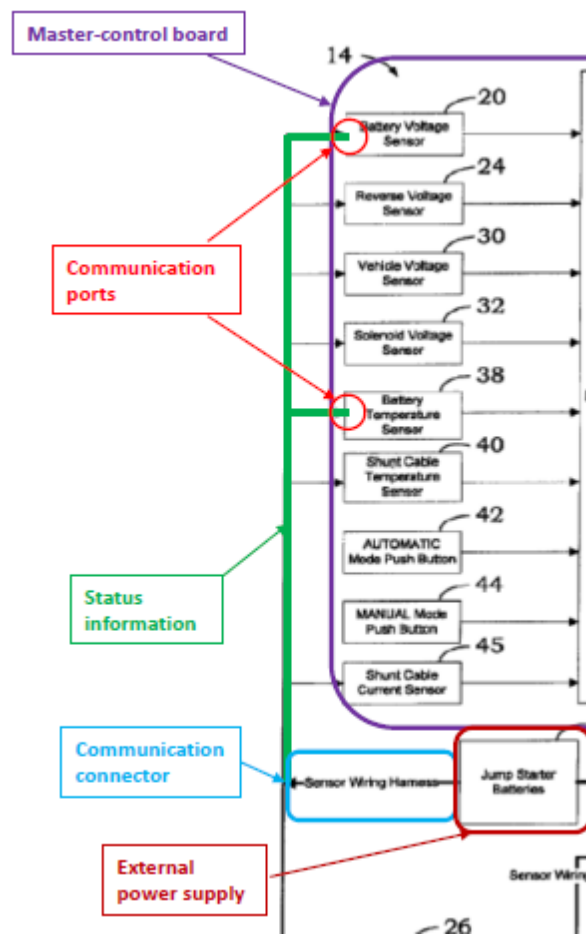
circuit board for a functioning product. Generally, for ease of implementation a single master control board is the most ideal solution in terms of design simplicity and cost.

260. Finally, even if Richardson's control circuit were to include some components, e.g., the relay, mounted on a separate "daughter" circuit board, this board and the "main" board that includes the rest of the components would still, together be considered a master-control board.

b. Limitation 3.1

... a communication port electrically connected to the communication connector

261. Richardson discloses a communication port electrically connected to the communication connector. The communication connector (sensor wiring harness below in blue) connects to the master control board at the communication port. (See Limitation 1.6 herein; *see also* EX1008, annotated Richardson Fig. 1 below (communications ports in red).)



Annotated Partial Richardson Figure 1.

262. As I discussed in Limitation [1.6], it would have been obvious at the time of the invention to provide a sensor wiring harness between the supply battery and master control unit of Zonesking as taught by Richardson. A POSITA would do so to monitor the temperature of the jump starter to avoid the battery from overheating due to excess current draw. (EX1007, Zonesking [0017].) A POSITA would immediately recognize that when a controller is implemented for controlling the operation of the jumper cables, modifying the controller to receive and process

additional signals such as temperature would be clearly contemplated and easily within the capabilities of one of skill in the art.

c. Limitation 3.2

... a first and second voltage output ports electrically connected to the first and second wire clamps for supplying power to the external device via the first and second wire clamps

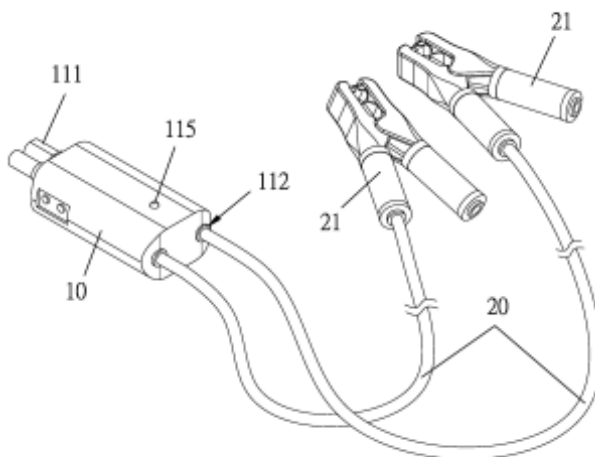
263. Zonesking alone or in combination with Richardson discloses this limitation.

264. For instance, Zonesking discloses a master control board with first and second voltage output ports (green) for supplying power to the external device through first and second wire clamps. (See Zonesking Annotated Fig. 2 below, Zonesking Figures 1 and 4.)



Annotated Figure 2 of Zonesking.

WINPLUS Ex. 1004



Zonesking Figure 1.

266. Richardson discloses a master control board with first and second voltage output ports (red) for supplying power to the external device (“vehicle to be started”) through first and second wire clamps (ref. no. 60). (See EX1008, Richardson Annotated Fig. 1 below.) A POSITA would have understood that once modified to include Richardson’s control board, Zonesking’s voltage output ports would still be electrically connected to the first and second wire clamps (21) via the output terminal 112 for supplying power to the external device via the first and second wire clamps.



... a switch control unit for controlling connection between the first voltage input port and the first voltage output port; and

268. For instance, Zonesking discloses a switch control unit for controlling connection between the first voltage input port and the first voltage output port.

269. Zonesking discloses a protection module. (EX1007, Zonesking Fig. 2 below (annotated).) This protection module is a “switch control unit” that controls

the connection between the input and output of the circuit.

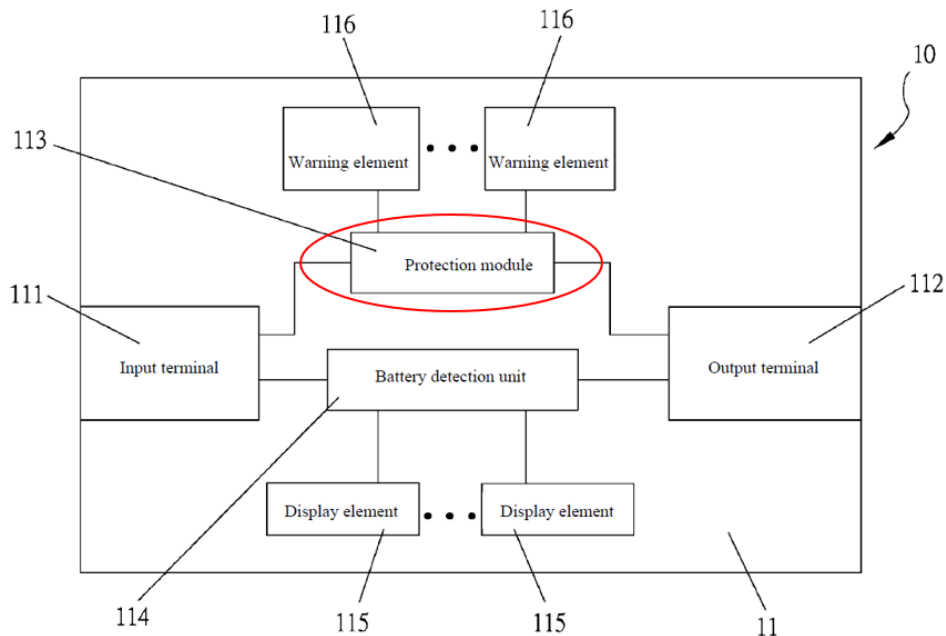
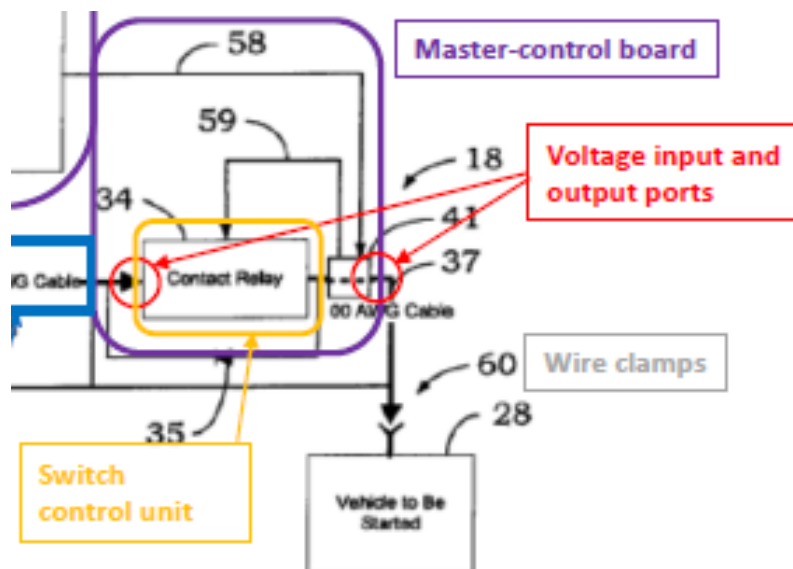


FIG. 2

Annotated Zonesking Figure 2.

270. According to Zonesking, the protection module is connected to the input terminals at one end and “can” be connected to the output terminal at the other end. (EX1007, Zonesking at [0005] (“one end of the protection module **can be electrically connected** to the input terminal, the other end of the protection module can be electrically connected to the output terminal.”) (emphasis added).) As such, the protection module offers both an opened and a closed state; i.e. switching. Thus, it controls the connection between the first voltage input port (see Limitation 3.0 above) and the first voltage output port (see Limitation 3.0 above).

272. Richardson discloses “[i]f the maximum number of start attempts has not been exceeded 266, the contact relay 34 is closed and the contact relay on timer is started 268, connecting the jump starter's batteries 22 to the vehicle's starting system 28.” (EX1008, Richardson 6:4-9.) As shown in annotated Figure 1 in part below, the contact relay 34 (“switch control unit” in yellow) controls the connection between the first voltage input port and first voltage output port.



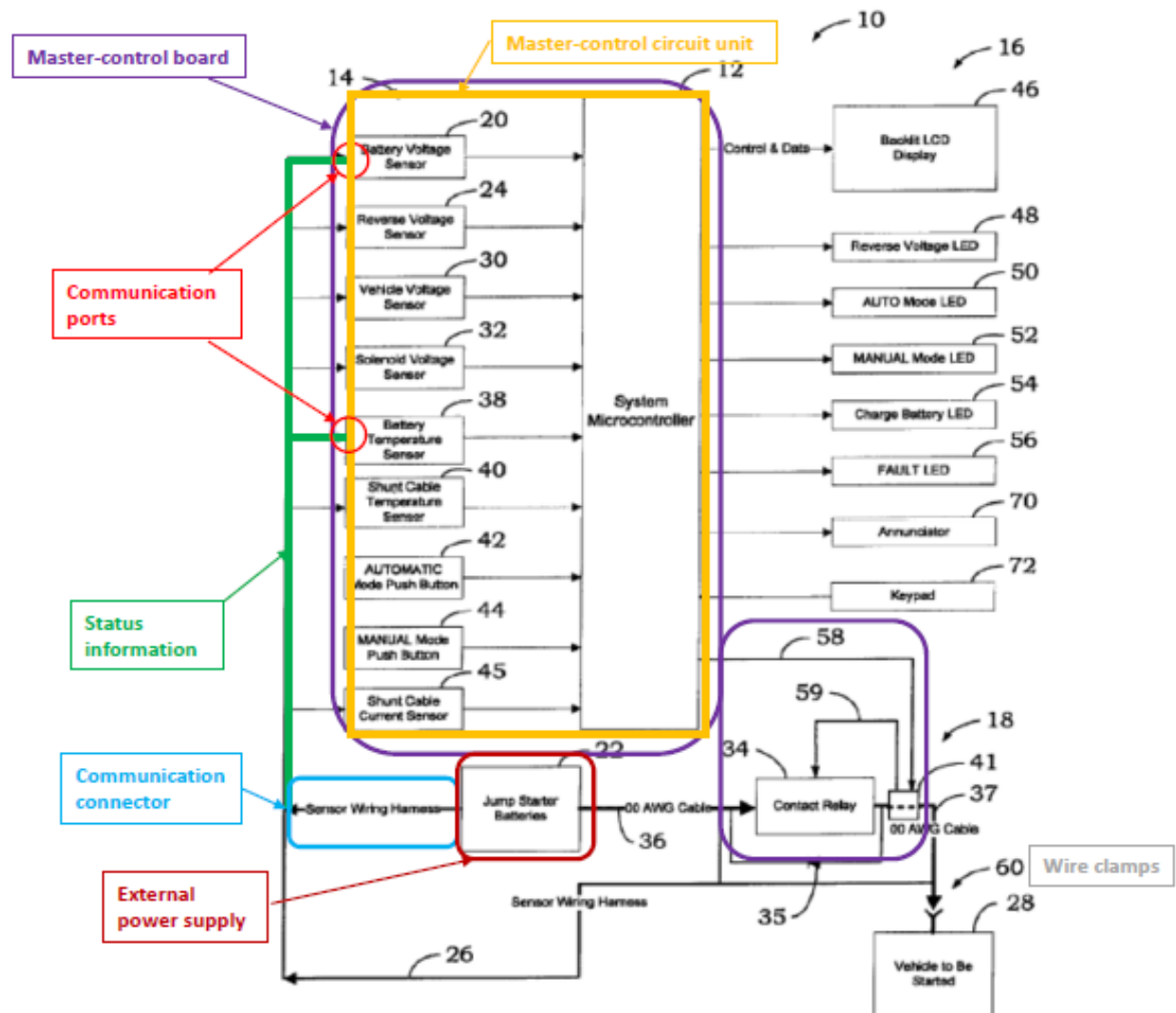
Annotated Partial Richardson Figure 1.

e. Limitation 3.4

... a master-control circuit unit connected to the communication port for obtaining the status information of the external power supply;

273. Zonesking discloses a master-control circuit unit (master control unit “MCU”), but there is no express disclosure of a connection to a communication port for obtaining the status information of the external power supply.

274. Richardson discloses a master-control circuit unit (shown below in orange) on the master control board connected to the communication port (shown in red below) for obtaining the status information (green) of the external power supply (maroon). *See* Limitation 1.3 above.



Annotated Richardson Figure 1.

f. Limitation 3.5

... wherein the master-control circuit unit is configured to control the switch control unit based on the status information of the external power supply, thereby controlling connection on/off between the first voltage input port and the first voltage output port.

275. Richardson discloses that the master-control circuit unit is configured to control the switch control unit (contact relay) based on the status information of the external power supply (e.g., temperature), thereby controlling connection on/off between the first voltage input port and the first voltage output port.

276. In Richardson, the system microcontroller 12 operates the contact relay 34 to connect/disconnect the input of power from supply battery to the power output based on particular status information, such as the temperature. (EX1008, Richardson at Abstract (“a processor for controlling the relay to selectively apply electrical power to the engine electrical system.”); *see also Id.* at 3:8-12 (“As long as the temperature of the cable 37 is below a predetermined limit, the input on line 58 is passed through sensor 41 to line 59 to enable the contact relay 34 as controlled by system microcontroller 12.”).)

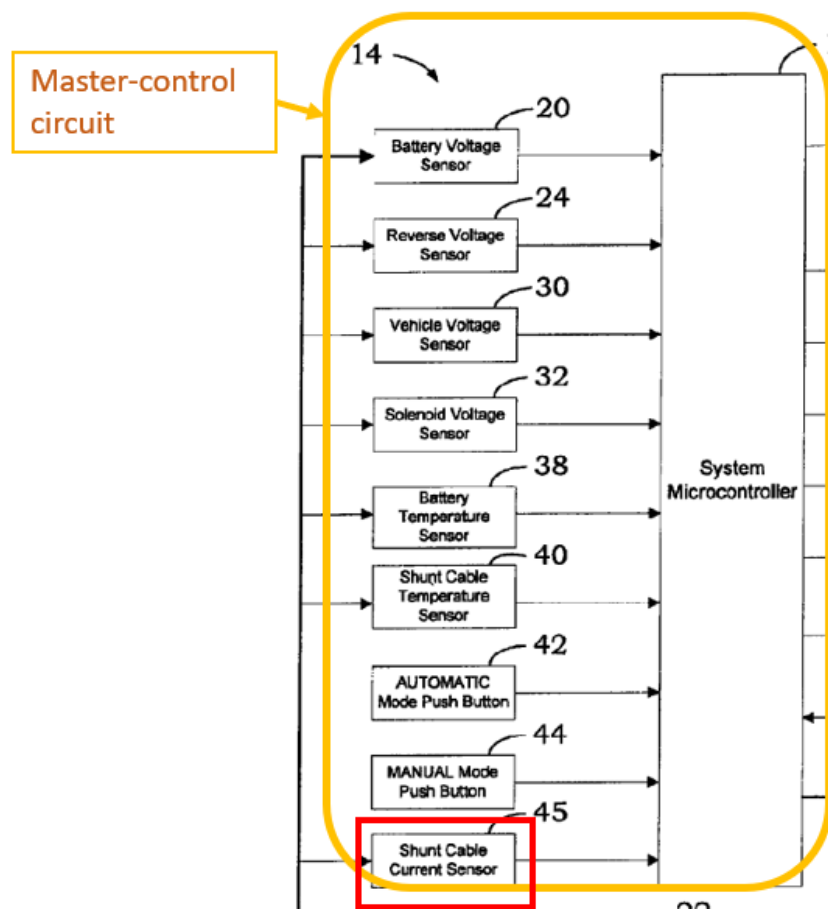
277. Richardson further teaches: “[a] contact relay control output 58 operates the contact relay 34 through temperature sensor 41. When the jump starter operation has been Successfully initiated, the contact relay 34 is closed and the jump starter batteries 22 are connected to the starter system or batteries of the vehicle to be started 28. The contact relay 34 is opened when a Successful start cycle has been completed, a start fault has occurred or the operator interrupts the jump starter cycle.” (EX1008, Richardson at 3:40-47.)

4. Claim 4 is Rendered Obvious by Zonesking in View of Richardson

a. Limitation 4.0

... The battery clamp of claim 3, wherein the master-control circuit unit further comprises: an electric current detection unit for detecting electric current from the external power supply to the external device

278. Richardson discloses a master-control circuit unit that includes an electric current detection unit (shunt cable current sensor 45) for measuring the current supplied from the source battery to the vehicle battery. (EX1008, Richardson claim 26 (“The jump starter of claim 20 further comprising a sensor for measuring the current of the shunt cable.”); *see also*, annotated Richardson Figure 1, element 45 (red box).)



Annotated Partial Richardson Figure 1.

b. Limitation 4.1

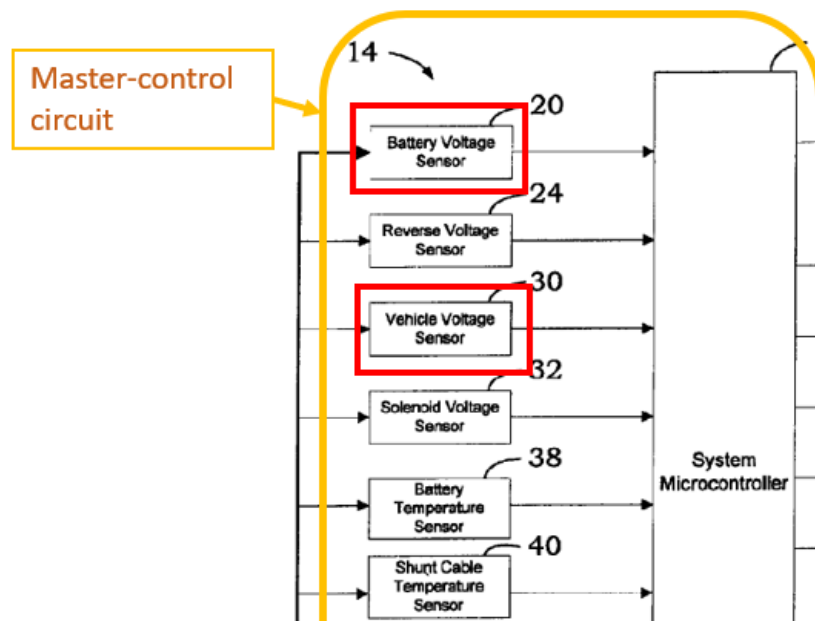
... a voltage detection unit for detecting voltage of the external power supply and the external device; and

279. Zonesking alone or in combination with Richardson discloses this limitation.

280. For instance, Zonesking discloses a voltage detection unit for detecting voltage of the external power supply and the external device.

281. Zonesking discloses a battery detection unit. According to Zonesking the battery detection unit may include a microprocessor and a comparator or amplifier. (EX1007, Zonesking at [0014] (“the battery detection unit **114** may be an MCU, a comparator or an amplifier.”); *Id.* at [0018] (“In the present invention, an input terminal 111 is arranged, wherein the input terminal 111 and a mobile power supply 40 can be connected to achieve a power supply state by mutual plugging in. In addition to mutual plugging in with a mobile power supply 40 to achieve a power supply state, the battery detection unit 114 according to the invention can be used to synchronously detect the status of the battery 30 of the automobile or motorcycle during the jump starting process ...”).)

282. Richardson likewise discloses the battery detection unit that detects voltage of both the external power supply and the external device. (EX1008, Richardson at 2:43-48 (“A battery voltage sensor 20 monitors the voltage level of one or more jump starter batteries 22. A reverse voltage sensor 24 monitors the polarity of the jumper cables on line 26 which are connected to the vehicle’s electrical system 28. A vehicle voltage sensor 30 monitors the voltage on line 37 (voltage of the vehicle).”; *see also* annotated partial Richardson Fig. 1 below (“Battery Voltage Sensor” in red box).)



Annotated Partial Richardson Figure 1.

c. Limitation 4.2

... wherein the master-control circuit unit is configured to compare the electric current value and the voltage value with a predefined electric current range and a predefined voltage range respectively, thereby controlling the switch control unit.

283. Richardson discloses a master-control circuit unit is configured to compare the electric current value and the voltage value with a predefined electric current range and a predefined voltage range respectively, thereby controlling the switch control unit.

284. Richardson discloses monitoring of the current across a shunt resistor and if the current greater than a predefined range, the contact relay is opened

disconnecting the supply from the vehicle. (EX1008, Richardson at 6:62-67 (“During the jump starting process if the current measured across the shunt cable 36 is greater than a preset maximum current such as 1400 amps for a short period of time such as 500 ms 308, the over max current error count is incremented 310, an Over MAX Starting Current error message is displayed 312 on LCD 46, the contact relay 34 is opened.”).)

285. Richardson also monitors the voltage of the supply battery and if the voltage is below a threshold, the contact relay is opened, disconnecting the supply from the vehicle. (EX1008; Richardson at 5:10-12 (“The jump starter batteries 22 only need to reach a 50% charge in order for the system to attempt to start the vehicle.”).) Since the State of Charge (SOC) is closely related to the voltage, a POSITA will immediately recognize the SOC may be readily determined by measurement of the voltage, (*Id.* at 4:54-59 (“If the jumper cables 60 are not reverse connected 214, then the state of charge of the system batteries 22 is determined 222. If the voltage level of the system batteries 22 measured by the voltage sensor 30 is equal to a state of charge of eighty percent or more below a fully charged voltage level 222, an error flag is set and the event recorded in memory 224.”).)

5. Claim 5 is Rendered Obvious by Zonesking in View of Richardson

a. Limitation 5.0

... The battery clamp of claim 4, wherein the voltage detection unit comprises: a first voltage detection unit for detecting voltage value of the external power supply; and

286. Zonesking alone or in combination with Richardson discloses this limitation.

287. For instance, Zonesking discloses a first voltage detection unit for detecting voltage value of the external power supply.

288. Zonesking discloses a battery detection unit. According to Zonesking the battery detection unit may include a microprocessor and a comparator or amplifier. (EX1007, Zonesking at [0014] (“the battery detection unit **114** may be an MCU, a comparator or an amplifier.”).)

289. Richardson discloses the first voltage detection unit for detecting voltage value of the external power supply. *See* Limitation 4.1.

b. Limitation 5.1

... a second voltage detection unit for detecting voltage value of the external device.

290. Richardson discloses a second voltage detection unit for detecting voltage value of the external device.

291. Richardson describes a voltage detection unit that detects the voltage of the vehicle. (EX1008, Richardson at 2:47-48 (“A vehicle voltage sensor 30 monitors

the voltage on line 37 (voltage of the vehicle).”).

292. *See also* Limitation 4.1.

6. Claim 6 is Rendered Obvious by Zonesking in View of Richardson

a. Claim 6

... The battery clamp of claim 4, wherein the master-control circuit unit further comprises: an indicator light circuit unit connected to the master-control chip unit for indicating operating status of the control device.

293. Zonesking alone or in combination with Richardson discloses this limitation.

294. For instance, Zonesking discloses an indicator light circuit unit connected to the master-control chip unit for indicating operating status of the control device.

295. Zonesking describes that the circuit board includes several modules, one of which is a display element which can be described as a multi-color LED chip for providing the user information. (EX1007, Zonesking at [0012] (“an adapter element **10**, wherein a circuit board **11** is arranged in the adapter element **10**, a protection module **113**, an input terminal **111**, an output terminal **112**, a battery detection unit **114**, at least one display element **115** and at least one warning element **116** are arranged on the circuit board **11**.”); *see also Id.* at [0017] (“When the display

element **115** is a light-emitting element and a multi-color LED chip and the battery condition is normal in the detection process of the battery **30** of the automobile or motorcycle, the multi-color LED chip displays a green light.”).)

296. Richardson describes that the microprocessor includes several outputs to provide a user with information including LEDs. (EX1008, Richardson at 3:20-39 (“The microprocessor includes several outputs 16 to provide information to the user and to control the application of power to the vehicle to be jump started... A fault LED 56 is turned on anytime the microprocessor 12 detects any operational, sensor or internal fault. An audible warning may also be provided 70. The fault LED 56 remains illuminated until the fault condition is cleared.”); *see also Id.* at Fig. 1.)

7. Claim 7 is Rendered Obvious by Zonesking in View of Richardson

a. Claim 7

... The battery clamp of claim 4, wherein the master-control circuit unit further comprises: a buzzing circuit unit connected to the master-control chip unit for alerting user about abnormal condition.

297. Zonesking alone or in combination with Richardson discloses this limitation.

298. The ’105 Patent states that the “buzzing circuit unit mainly comprises a loudspeaker for alerting a user about abnormal conditions.” (EX1001 at 11:14-16.)

Zonesking discloses a buzzing circuit in the form of a “warning element” and a “display element” on the circuit board connected to control circuit for alerting user about abnormal battery conditions. (EX1007, Zonesking at [0012] (“an adapter element **10**, wherein a circuit board **11** is arranged in the adapter element **10**, a protection module **113**, an input terminal **111**, an output terminal **112**, a battery detection unit **114**, at least one display element **115** and at least one warning element **116** are arranged on the circuit board **11**”); *Id.* at [0015] (“the display element **115** may be a liquid crystal display device, a light-emitting element or a voice announcer”).) A POSITA would understand that a voice announcer would include a loudspeaker that could “buzz” for alerting the user to abnormal conditions.

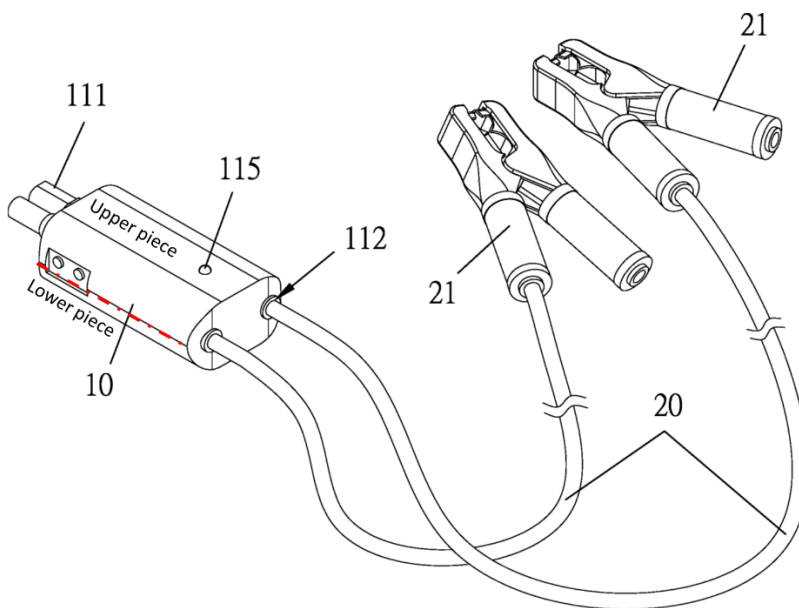
299. Richardson likewise describes a buzzing circuit unit connected to the master-control chip unit for alerting user about abnormal condition. Richardson describes that master control circuit chip (microprocessor) includes several outputs to provide a user with information including audible warnings; which would request a loudspeaker. (EX1008, Richardson at 3:20-39 (“The microprocessor includes several outputs 16 to provide information to the user and to control the application of power to the vehicle to be jump started ... A fault LED56 is turned on anytime the microprocessor 12 detects any operational, sensor or internal fault. An audible warning may also be provided 70. The fault LED 56 remains illuminated until the fault condition is cleared.”); *see also Id.* at Fig. 1, (“Annunciator 70”).)

8. Claim 9 is Rendered Obvious by Zonesking in View of Richardson

a. Claim 9.0

... The battery clamp of claim 1, wherein the housing comprises an upper piece and a lower piece, which are removably connected together, and the master-control board is mounted on the lower piece.

300. As discussed in claim 1, once modified with Richardson's control circuitry, Zonesking discloses a master-control board enclosed by a housing wherein the housing includes pieces that are removably connected. As I also annotate below (and as explained in claim 1) it would have been obvious to a POSITA that the housing 10 could be formed of an upper piece and a lower piece.



Annotated Zonesking Figure 1.

301. Zonesking does not provide details about of the parts of the housing or how the master control board is mounted therein.

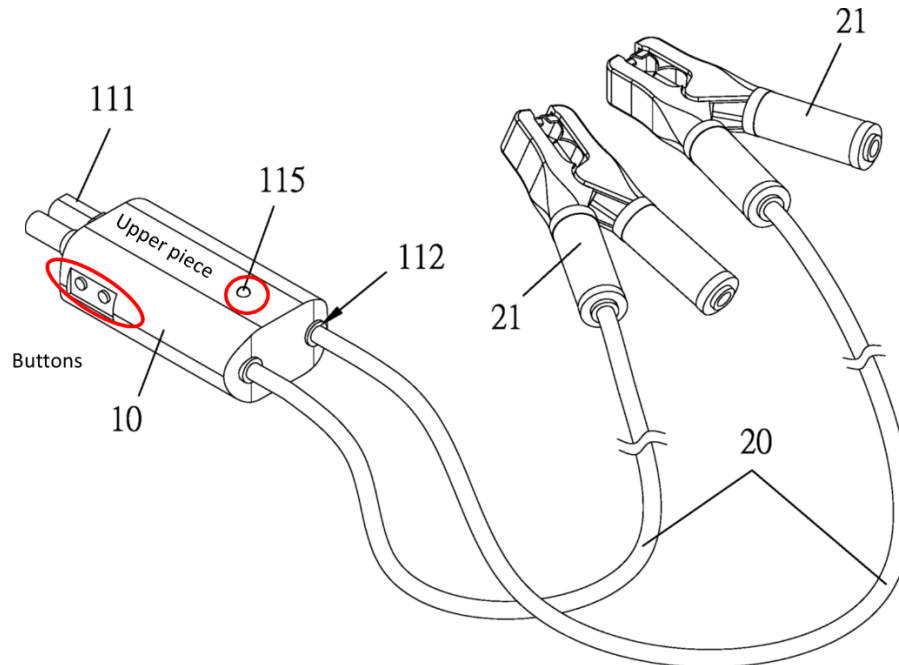
302. A POSITA would understand that the master-control board would necessarily be mounted inside the housing to avoid the components of the board from moving around and potentially being damaged. However, a two piece housing consisting of upper and lower pieces would be an obvious design choice given its simplicity and economy. Moreover, a POSITA would understand that in this scenario, the decision on how to mount the master control board, and to which piece within the housing, would simply be a design choice.

9. Claim 10 is Rendered Obvious by Zonesking in View of Richardson

a. Claim 10

... The battery clamp of claim 9, wherein one side of the upper piece is provided with openings for indicator lights and buttons.

303. Zonesking discloses a multi-piece housing, where one side of the upper piece of the housing provides openings for indicator lights and buttons. As can be seen in Figure 1, there are openings for indicator lights and buttons circled in red. (EX1007, Zonesking at [0015] “The display element 115 may be a liquid crystal display device, a light emitting element, or a voice announcer.”).)



Annotated Zonesking Figure 1.

10. Reasons to Combine Zonesking and Richardson

304. A POSITA would have been motivated to combine Zonesking and Richardson for at least the reasons set forth below.

305. Zonesking and Richardson are both in the same field of endeavor – both disclose portable, smart jumper cables for jumpstarting external devices – like vehicles. (EX1007, Zonesking at [0001], EX1008, Richardson at 1:17-20 and 1:64-67.) These smart jumper cables provide real-time monitoring of various system parameters “to increase the safety and effectiveness of the unit's operation ...” (EX1008, Richardson at 1:60-61. Both Zonesking and Richardson teach detection circuitry to monitor the voltage of the supply batteries, the result of which is used by a master control board in the decision process of whether to connect the supply

battery to the device to be charged.) (EX1007, Zonesking at [0014], (“the battery detection unit 114 may be an MCU, a comparator or an amplifier.”; *see also* EX1008, Richardson at 2:43-44 (“A battery voltage sensor 20 monitors the voltage level of one or more jump starter batteries.”).)

306. Both Zonesking and Richardson also describe the potential damage that can occur to the supply batteries if, among other things, there is an improper connection to the vehicle. (EX1007, Zonesking at [0003]; *see also* EX1008, Richardson at 1:40-53.) Richardson also describes the monitoring of the temperature of the supply battery “to detect overheating due to excess current draw from the batteries during jump starting.” (EX1008, Richardson at 2:65-66.) In order to monitor the temperature of the supply battery, Richardson discloses a communication connector (sensor wiring harness) for communication of data obtained from monitoring the supply battery to the master-control board. (EX1008, Richardson at Figure 1.)

307. Zonesking does not disclose the monitoring and communication of temperature (a form of status information) from the supply battery to the master control board through a communication connector. It would have been obvious to a POSITA at the time of the invention to modify Zonesking in view of Richardson in either of two ways: (1) using the master control board and communication connector (sensor wiring harness) of Richardson in the jumper cable of Zonesking or (2) using

the sensor wiring harness of Richardson in the jumper cable of Zonesking and adding functionality to the master control board of Zonesking to monitor the temperature of the external supply battery and use this status information to determine whether to connect the supply battery to the device to be charged.

308. A POSITA would be motivated to make either of these changes in order monitor the temperature of the power supply to avoid it from overheating due to excess current draw during charging.

309. For the first alternative, using the master control board and communication connector (sensor wiring harness) of Richardson in the jumper cable of Zonesking would be clearly contemplated by a POSITA and easily within a POSITA's capabilities. The circuitry of the master control board of Richardson is not complex and such a master control board could likely fit into the housing of the adapter element of Zonesking, with little modification. Moreover, using a sensor and wiring harness to monitor the status of the temperature of a supply battery is clearly within the skill of a POSITA at the time of the invention.

310. For the second alternative, a POSITA at the time of the invention would understand how to design a simple circuit on a master control board to control the output of power from a supply battery to an external device based on temperature status information received from the supply battery. This combination would merely be the use of a known technique to improve similar devices in a similar way.

C. Ground 3: Claim 8 is Rendered Obvious by Zonesking in View of Richardson and Liu

311. As described in Ground 2, Claims 1-7 of the '105 Patent are rendered obvious by Zonesking in view of Richardson.

1. Claim 8 is Rendered Obvious by Zonesking in View of Richardson and Liu

a. Claim 8

... The battery clamp of claim 1, wherein the communication connector is disposed between the first and second electrode connectors

312. As discussed above in Section IX.B.10, it would have been obvious to combine the teachings of Zonesking and Richardson to allow for the monitoring of the temperature of the external power supply to prevent overheating. Although the combination of Zonesking and Richardson discloses a communication connector for the communication of temperature data from the external data supply to the control device, it does not disclose that the communication connector is disposed between the first and second electrode connectors.

313. As discussed above Richardson discloses a communication connector (sensor wiring harness), but does not disclose that it is disposed between the first and second electrode connectors. A POSITA would have understood that a connector that includes both power terminals and a communication terminal, the position of

the communication terminal in relation to the power terminals would have been a mere design choice.

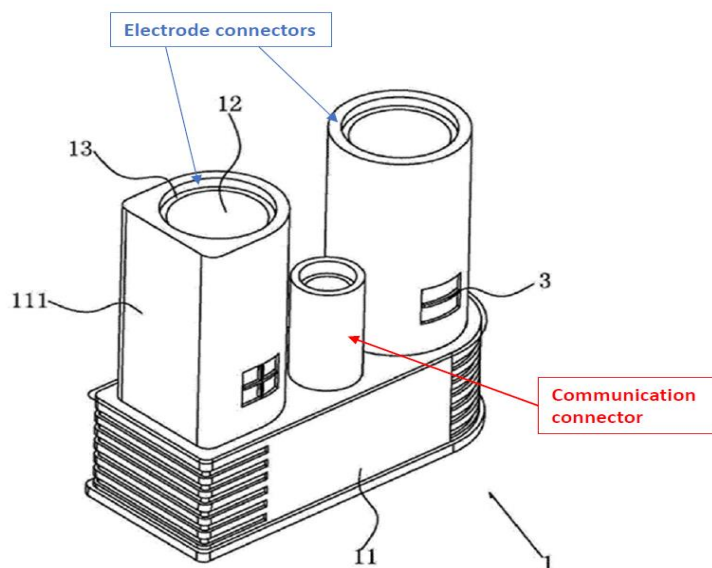
314. Moreover, a POSITA would have looked to Liu, which describes a connection with terminals for both power and communication of temperature data for an external power supply. Liu discloses a power supply connector including two terminals for power and a third terminal for the communication of data from an external power supply. (EX1006, Liu at Abstract (“The present utility model discloses a starter power supply plug, the starter power supply plug comprising: a plug and a receptacle mating therewith, wherein the plug comprises: a first base, the first base having three first holes formed thereon, each of the holes having a first terminal; the receptacle comprises: a second base, the second base having three second holes formed thereon and correspondingly connected with the three first holes, each of the second holes having a second terminal; the first terminal and the second terminal being correspondingly connected with each other.”).)

315. Liu further discloses that this connector can be used in a variety of applications including “intelligent emergency automotive battery jump starter.” (EX1006, Liu at Abstract.)

316. The third terminal of Liu’s connector is used to share temperature data between the supply battery and the controls. (EX1006, Liu at [0026] (“Therefore, with a third terminal added to enable connection between the third terminal and an

intelligent emergency automotive battery jump starter power supply, temperature data can be transmitted to the intelligent emergency automotive battery jump starter power supply through the third terminal. After connection, the switch of the power supply equipment is turned on with the user being able to directly detect the battery temperature, after which the automotive is started. After startup, the battery clamps are removed from the battery to prevent any adverse impact on the power supply equipment.”.)

317. The communication terminal of Liu’s connector is positioned between the first and second electrode connectors of the connector.



Liu Figure 1

2. Reasons to Combine Zonesking and Richardson with Liu

318. As discussed above in Section IX.B.10, it would have been obvious to a POSITA at the time of the invention to combine the teachings of Zonesking and Richardson, which are both in the same field of endeavor, to allow for the monitoring of the temperature of the external power supply to prevent overheating. It would additionally have been obvious to a POSITA to look to Liu, which also relates to smart jump starters, for the structure of a connector for an external power supply that has terminals for both power and temperature data. (EX1006, Liu at Abstract (“intelligent emergency automotive battery jump starter”).)

319. As discussed herein, a POSITA would have been motivated to modify Zonesking in light of Richardson in either of two ways: (1) using the master control board and communication connector (sensor wiring harness) of Richardson in the jumper cable of Zonesking or (2) using the sensor wiring harness of Richardson in the jumper cable of Zonesking and adding functionality to the master control board of Zonesking to monitor the temperature of the external supply battery and use this status information to determine whether to connect the supply battery to the device to be charged. Neither Zonesking, nor Richardson, describe the structure of the connector between the control device and the external battery.

320. A POSITA would have understood that in a connector that includes

both power terminals and a communication terminal, the position of the communication terminal in relation to the power terminals would have been a mere design choice.

321. Moreover, a POSITA that was modifying Zonesking in light of Richardson would have looked to Liu for the structure of a connector between the external power supply and the control device, because Liu describes a connection with terminals for both power and communication of temperature data for an external power supply. Liu discloses a power supply connector including two terminals for power and a third terminal for the communication of data (e.g., temperature) from an external power supply. (EX1006, Liu at Abstract.)

322. Furthermore, like Zonesking and Richardson, Liu discusses the potential damage that can occur to the supply batteries if, among other things, the supply battery overheats, and describes how its connector can help protect the external supply battery for such a hazard. (EX1006, Liu at [0015] (“In addition, when used on an intelligent emergency automotive jump starter power supply, this three-hole starter power supply plug is capable of protecting the battery very effectively to prevent overloading induced explosion of the battery during automotive ignition.”); *see also* Liu at [0026], (“Because the power supply lithium battery is heated up during automotive emergency jump start due to large electric current, the battery will be overheated if the startup time is too long or multiple jump

starts are performed. Overheating will either result in swollen and scrapped battery at the very least, or smoke release, combustion and explosion of battery in a worst-case scenario.”.)

323. For the above reasons a POSITA would be motivated to combine the Liu’s connector with the disclosures of Zonesking and Richardson with Liu.

D. Ground 4: Claims 1-7 and 9-10 Are Rendered Obvious by Nook in View of Zonesking/Ground 5: Claim 8 is obvious By Nook, Zonesking, and Liu

1. Ground 4: Claim 1 is Disclosed by Nook in View of Zonesking

a. Limitation 1.0

... A battery clamp for delivering an instantaneous starting current from an external power supply to an external device, the battery clamp comprising:

324. It is my understanding that a preamble is not limiting where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use of the invention. Here, the body of the claim describes the complete claimed battery clamp device, and the preamble merely states the function that is performed by the device. Thus, in my opinion, it would not be limiting.

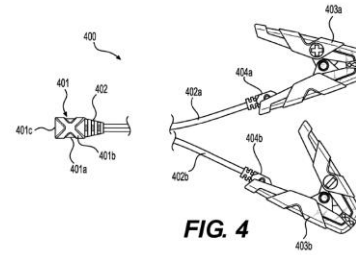
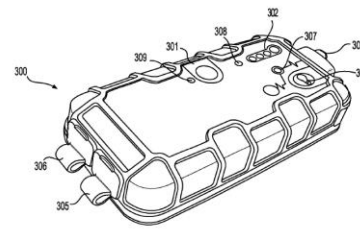
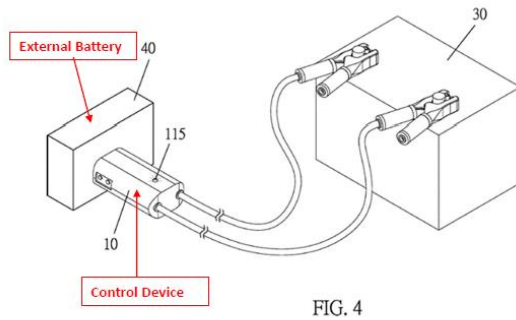
325. Notwithstanding, Nook discloses a battery clamp for delivering an

instantaneous starting current from an external power supply to an external device.

326. Nook discloses a charger that can be used to jump start a vehicle. *See* EX1009, Nook at Abstract, (“A handheld device for jump starting a vehicle engine includes a rechargeable lithium ion battery pack and a microcontroller.”); *see also* *Id.* at 1:7-9 (“The present invention relates generally to apparatus for jump-starting a vehicle having a depleted or discharged battery.”).

327. Nook further describes that this charger is able to supply the instantaneous starting current required to jump start a vehicle. *See* EX1009, Nook at 4:7-10, (“continuous discharge current is 25C (or 200 amps), and burst discharge current is 50C (or 400 amps). The maximum charging current of the battery pack is 8000 mA (8 amps)”).

328. Though Nook discloses a power supply, this power supply is located inside the housing of a single unit, together with the control unit. A POSITA would recognize that, at the time of the invention, there were two principal types of smart jump starters, those in which the battery and controller were in a single housing (such as Nook), and those in which the controller was housed in the jumper cables, which then connected to an external battery (such as in Zonesking).



Annotated Zonesking Figure 4.

Nook Figures 3 and 4.

329. A POSITA would understand the benefits of both types. For example, jump starters with a single housing for the battery and controller provide the benefits of less components, which may be easier to carry and there is a less likelihood of losing a component. However, if the internal battery became defective, the entire jump starter would have to be replaced. Jump starters that have a battery that is external to the control housing have the benefit of easy replacement of a defective battery without having to discard the controller or cables. A POSITA would have therefore recognized why it is desirable to have a battery and controller as separate units, and a POSITA would have been motivated to modify Nook to make a jump starter in which the battery was external. As I explain further below a POSITA would have also understood how to separate the battery and controller and how to make

electrical connections between the two.

b. Limitation 1.1

... a control device, comprising:

330. Nook discloses a control device.

331. Nook discloses a charger that can be used to jump start a vehicle. *See* EX1009, Nook at Abstract (“A handheld device for jump starting a vehicle engine includes a rechargeable lithium-ion battery pack and a microcontroller.”); *see also Id.* at 3:16-36 (“apparatus is provided for jump starting a vehicle engine, including: ... a microcontroller configured to receive input signals from said vehicle isolation sensor and said reverse polarity sensor, and to provide an output signal to said power FET switch, such that said power FET switch is turned on to connect said internal power supply to said output port in response to signals from said sensors indicating the presence of a vehicle battery at said output port and proper polarity connection of positive and negative terminals of said vehicle battery with said positive and negative polarity outputs.”); *see* Nook at Fig. 1.

332. Nook also discloses that the charger includes sensors for detecting the voltage and temperature of the supply battery among other parameters. *See* EX1009, Nook at 4:38-41 (“A lithium battery temperature sensor 20 monitors the temperature of the lithium battery pack 32 to detect overheating due to high ambient temperature

conditions and overextended current draw during jump 50 starting.”).

c. Limitation 1.2

... *a housing;*

333. Nook discloses a housing.

334. Nook discloses that the jump starter device includes a housing. See Nook Figure 3.

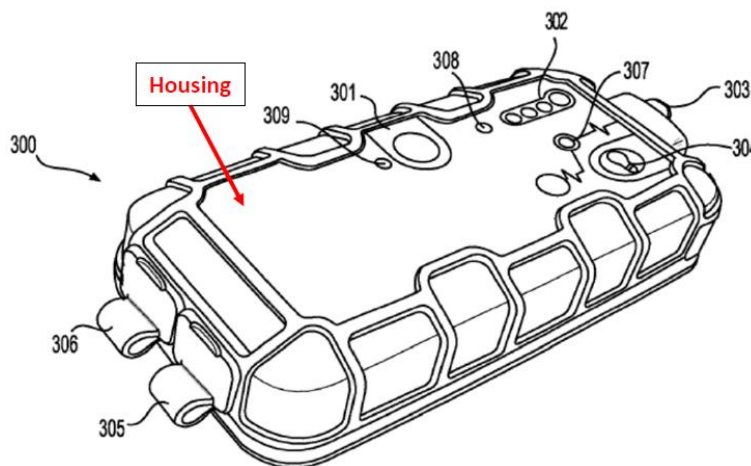


FIG. 3

Annotated Nook Figure 3.

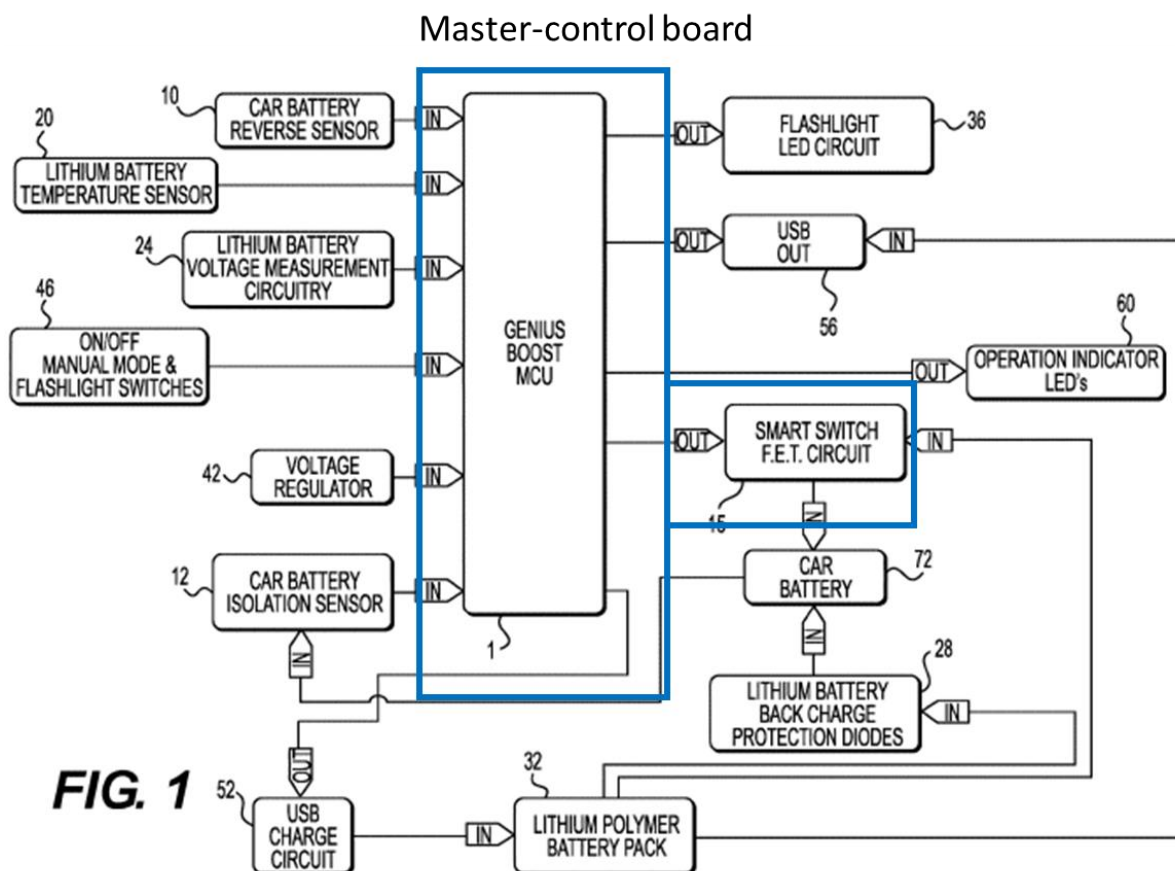
d. Limitation 1.3

... *a master-control board mounted within the housing; and*

335. Nook discloses a master-control board mounted within the housing.

336. Nook discloses a master-control board that includes a processor as well as other components within a housing. See EX1009, Nook Fig. 1 annotated below.

See also Id. at 4:11-13, (“A programmable microcontroller unit (MCU) 1 receives various inputs and produces informational as well as control outputs.”); *see also Id.* at 5:17-18, (“As shown in FIG. 2A-2, the microcontroller unit 1 is the center of all inputs and outputs.”). *See also* annotated Nook Fig. 1.



Annotated Nook Figure 1.

337. A POSITA would understand that the master control board of Nook would be mounted in the housing, as is common for most circuit boards in consumer devices such as these. Otherwise, the board would be free to move and would be at risk for being damaged during use. At a minimum, mounting the circuit board in the

housing is a mere design choice that would be motivated, or at least obvious to try, to prevent damage to the circuit board.

e. Limitation 1.4

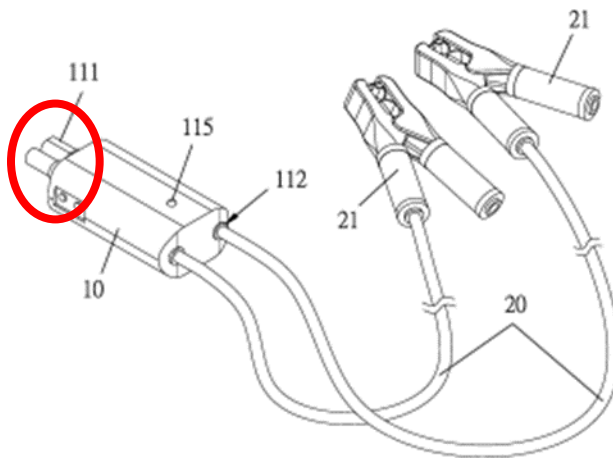
... connectors disposed at one side of the housing, and being electrically connected to the master control board, comprising:

338. Nook discloses connectors electrically connected to the master control board. Nook discloses numerous sensors and other inputs that use connectors to connect to the master control board. See EX1009, Nook at 5:16-18, (“As shown in FIG. 2A-2, the microcontroller unit 1 is the center of all inputs and outputs.”); see also *Id.* at 6:19-24, (“Still referring to FIG. 2A-1, the temperature of the internal lithium battery pack 32 can be accurately measured by two negative temperature coefficient (NTC) devices 20. These are devices that reduce their resistance when their temperature rises. The circuit is a voltage divider that brings the result to two analog-to-digital (A/D) inputs on the microcontroller 1.”).)

339. Nook does not disclose the connectors are disposed at one side of the housing. However, if a POSITA was modifying Nook to move the internal lithium battery to be external to the housing, then the POSITA would clearly contemplate locating the connectors to the external battery on one side of the housing. Indeed, when transitioning from an internal battery to an external battery, connectors would be required to allow for the power to be transmitted.

340. Furthermore, Nook already discloses such connectors in the context of recharging the internal battery. *See* EX1009, Nook at 7:14-17, (“The USB charge circuit 52 allows the internal lithium battery pack 32 to be charged using a standard USB charger. This charge input uses a standard micro-USB connector 48 allowing standard cables to be used.”).

341. A POSITA would look to Zonesking, smart jumper cables with an external battery, for guidance on where to put the connector on the control device housing. As shown below in annotated Figure 1 of Zonesking, the connectors are disposed at one end of the housing of the control device. A POSITA would understand this is a logical place – directly opposite the side with the clamps, but also understands that the side on which to put the connector is merely a design choice.



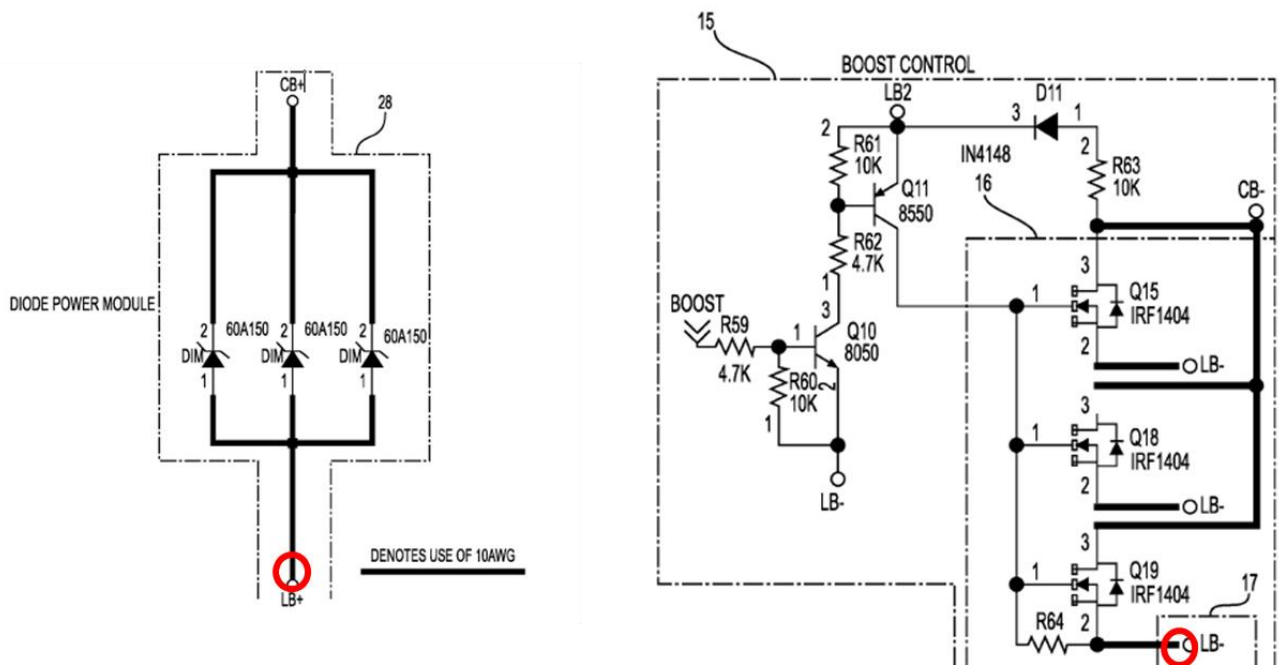
Annotated Zonesking Figure 1.

f. Limitation 1.5

... at least a first and second electrode connectors, which are connected to an external power supply for receiving power, and

342. Nook discloses at least a first and second electrode connectors, which are connected to a power supply for receiving power.

343. Fig. 2B of Nook discloses a first electrode connector that connects to the internal power supply (LB+). Fig. 2B of Nook further discloses a second electrode connector that connects to the internal power supply (LB-).



Annotated Nook Figure 2B-1 (left) and Figure 2B-2 (right).

344. As discussed herein, Nook does not disclose an external power supply. However, if a POSITA were designing a smart jump starter that utilized an external battery, it would be obvious that an electrode connector would be necessary to connect the external battery to the control device.

345. Zonesking discloses the first and second electrode connectors, which are connected to an external power supply for receiving power as contemplated by the '105 Patent.

346. Zonesking discloses “input terminal 111” that can be “connected” to a “mobile power supply 40” to “achieve a power supply state by mutual plugging in.” (EX1009, Zonesking [0018], Figures 3 and 4.)

Referring to FIG. 4, according to the present invention, jump starting can be conducted using the mobile power supply 40. In the present invention, an input terminal 111 is arranged, wherein the input terminal 111 and a mobile power supply 40 can be connected to achieve a power supply state by mutual plugging in. In addition to mutual plugging in with a mobile power supply 40 to achieve a power supply state, the battery detection unit 114 according to the invention can be used to synchronously detect the status of the battery 30 of the automobile or motorcycle during the jump starting process, such that one is informed about the amount of current of the battery 30 of the automobile or motorcycle at all times during the jump starting to achieve the function of a smart jump starter cable.

(EX1009, Zonesking [0018].)

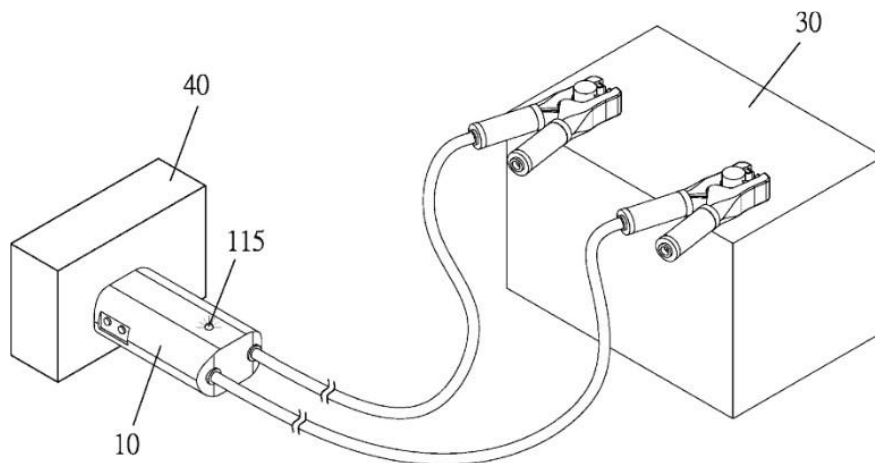


FIG. 4

Zonesking Figure 4.

347. A POSITA would understand that the input terminal necessarily includes a first and second electrode connector for both positive and negative connection to the external mobile power supply 40 in order to receive power. (EX1009, Zonesking Figures 3 and 4.) A POSITA would understand a positive and negative connection would be required to provide the positive and negative starting power to the “battery 30” illustrated by Zonesking at Figure 4.

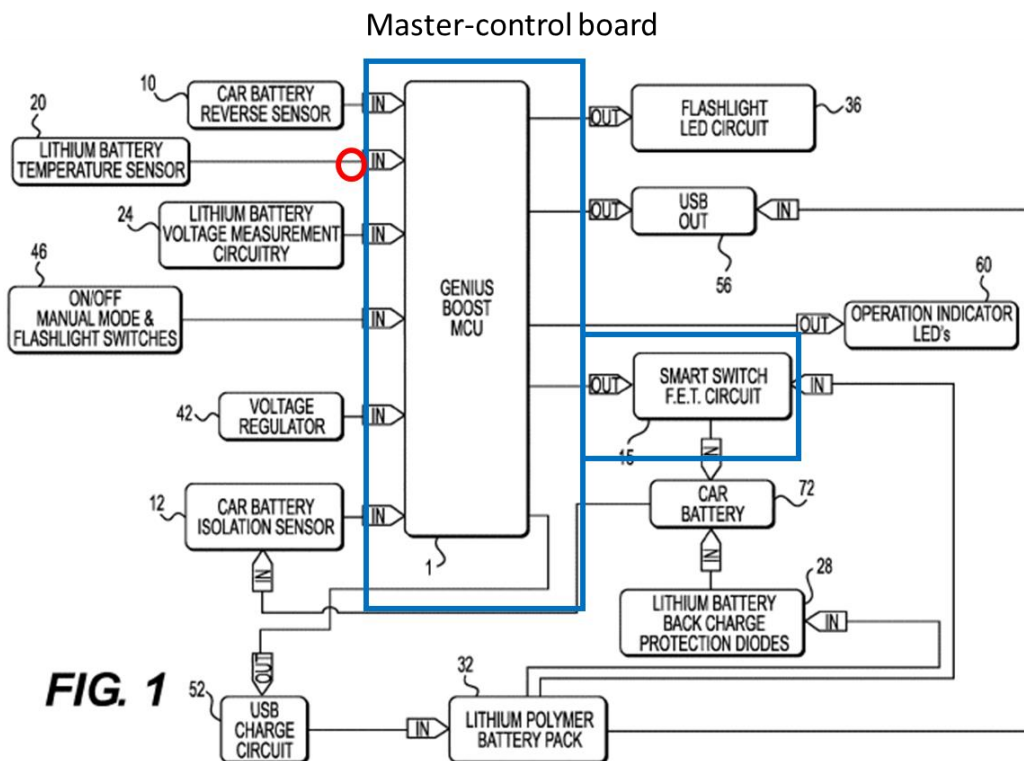
348. A POSITA would have further understood that even if modified with the control circuitry of Nook, Zonesking would still include the positive and negative connection would be required to provide the positive and negative starting power to the “battery 30” illustrated by Zonesking at Figure 4.

g. Limitation 1.6

... at least one communication connector connected to the external power supply for receiving status information of the external power supply, and sending the status information to the master-control board;

349. Nook discloses at least one communication connector connected to the power supply for receiving status information of the power supply, and sending the status information to the master-control board.

350. Nook discloses connectors which receive status information (e.g., temperature of supply battery) of the power supply battery and send this information to the master control board. See EX1009, Nook at 6:19-24, (“the temperature of the internal lithium battery pack 32 can be accurately measured by two negative temperature coefficient (NTC) devices 20. These are devices that reduce their resistance when their temperature rises. The circuit is a voltage divider that brings the result to two analog-to-digital (A/D) inputs on the microcontroller 1.”). See also Fig. 1 of Nook annotated below.



Annotated Nook Figure 1.

351. As discussed above, if a POSITA were modifying Nook so it utilized an external battery, a POSITA would look to Zonesking for the electrode connectors to the external battery. As Nook already discloses the need to monitor the battery temperature this would require a way to send the status signal to the control circuitry of Nook from an external power supply.

352. While Zonesking does not disclose the temperature monitoring disclosed by Nook, Zonesking does disclose the adapter element 10 can include a master control unit (“MCU”). (EX1009, Zonesking at [0014], (“the battery detection unit 114 may be an MCU, a comparator or an amplifier.”)). It would have been obvious to a POSITA at the time of the invention to provide a wiring between the

supply battery and master control unit of Zonesking as taught by Nook. A POSITA would do so to monitor the temperature of the jump starter to avoid the battery from overheating due to excess current draw.

353. A POSITA would immediately recognize that when a controller is implemented for controlling the operation of the jumper cables, modifying the controller to receive and process additional signals such as temperature would be clearly contemplated and easily within the capabilities of one of skill in the art. In the alternative, a POSITA could also simply use the master control board in Nook in place of the connector and microprocessor of the Zonesking smart jumper cables, which would also be clearly contemplated and easily within the capabilities of one of skill in the art.

354. Hence, a POSITA would be motivated to modify Zonesking to include the Nook communication connector to monitor the status information of the supply battery and send the status information to either the Zonesking or Nook master control board to control whether it is safe to provide power to an external device.

h. Limitation 1.7

... a first and second wire clamps, each having an end configured to receive power from the external power supply via the control device, and another end connected to the external device for supplying power to the external device;

355. Nook discloses a first and second wire clamps, each having an end configured to receive power from the power supply via the control device, and another end connected to the external device for supplying power to the external device.

356. Nook discloses “[a] pair of cables 402a and 402b are integrated with the plug 401, and are respectively connected to the positive and negative polarity battery terminal connectors (e.g. battery terminal clamps 403a and 403b) via ring terminals 404 a and 404 b. The output port 303 and plug 401 may be dimensioned so that the plug 401 will only fit into the output port 303 in a specific orientation, thus ensuring that clamp 403 a will correspond to positive polarity and clamp 403b will correspond to negative polarity, as indicated thereon.” See EX1009, Nook at 7:49-56.

357. The other ends of the wire clamps are connected to the battery for jump starting. See EX1009, Nook at 7:61-64 (“In the event that the battery voltage becomes depleted, the handheld booster device 300 could be properly connected to the battery very simply by plugging in the plug 401 to the port 303.

358. See also Limitation 1.6.

i. Limitation 1.8

... wherein the control device is configured to control power supply from the external power supply to the external device based on the status information.

359. Nook discloses that the control device is configured to control power supply from the power supply to the external device based on the status information.

360. Nook teaches a microcontroller which drives an FET smart switch which determines whether power is supplied from the supply battery to the external device. (EX1009, Nook at 5:55-6:3 (“As shown in FIG. 2B-2, the FET smart switch 15 is driven by an output of the microcontroller 1. The FET smart switch 15 includes three FETs (Q15, Q18, and Q19) in parallel, which spreads the distribution of power from the lithium battery pack over the FETs. When that microcontroller output is driven to a logic low, FETs 16 are all in a high resistance state, therefore not allowing current to flow from the internal lithium battery negative contact 17 to the car battery 72 negative contact. When the micro controller output is driven to a logic high, the FETs 16 (Q15, Q18, and Q19) are in a low resistant state, allowing current to flow freely from the internal lithium battery pack negative contact 17 (LB-) to the car battery 72 negative contact (CB-). In this way, the microcontroller software controls the connection of the internal lithium battery pack 32 to the vehicle battery 72 for jumpstarting the car engine.”).)

361. This control is based on status information (e.g., temperature) from the supply battery. (EX1009, Nook at 6:19-27 (“Still referring to FIG. 2A, the temperature of the internal lithium battery pack 32 can be accurately measured by two negative temperature coefficient (NTC) devices 20. ... The microcontroller software can then determine when the internal lithium battery is too hot to allow jumpstarting, adding safety to the design.”).)

362. *See also* Limitation 1.6.

2. Ground 4: Claim 2 is Disclosed by Nook in View of Zonesking

a. Limitation 2.0

... The battery clamp of claim 1, wherein the control device is configured to allow the power supply from the external power supply to the external device when the status information is normal,

363. Nook discloses a battery clamp of claim 1, wherein the control device is configured to allow power from the power supply to the external device when the status information is normal.

364. Nook discloses a smart jump starter wherein the “the microcontroller will enable power to be delivered from the lithium ion power pack to the output port only when a good battery is connected to the output port and only when the battery is connected with proper polarity of positive and negative terminals.” (EX1009,

Nook at Abstract); *see also Id.* at 4:41-45 (“A lithium battery voltage measurement circuit 24 monitors the voltage of the lithium battery pack 32 to prevent the voltage potential from rising too high during a charging operation and from dropping too low during a discharge operation.”).)

365. *See also* Limitation 1.6.

b. Limitation 2.1

... wherein the status information comprises at least one of the following: temperature, voltage of a battery unit of the external power supply.

366. Nook discloses that the status information comprises at least one of the following: temperature, voltage of a battery unit of the external power supply.

367. *See* Limitation 1.6 and 1.8.

3. Ground 4: Claim 3 is Disclosed by Nook in View of Zonesking

a. Limitation 3.0

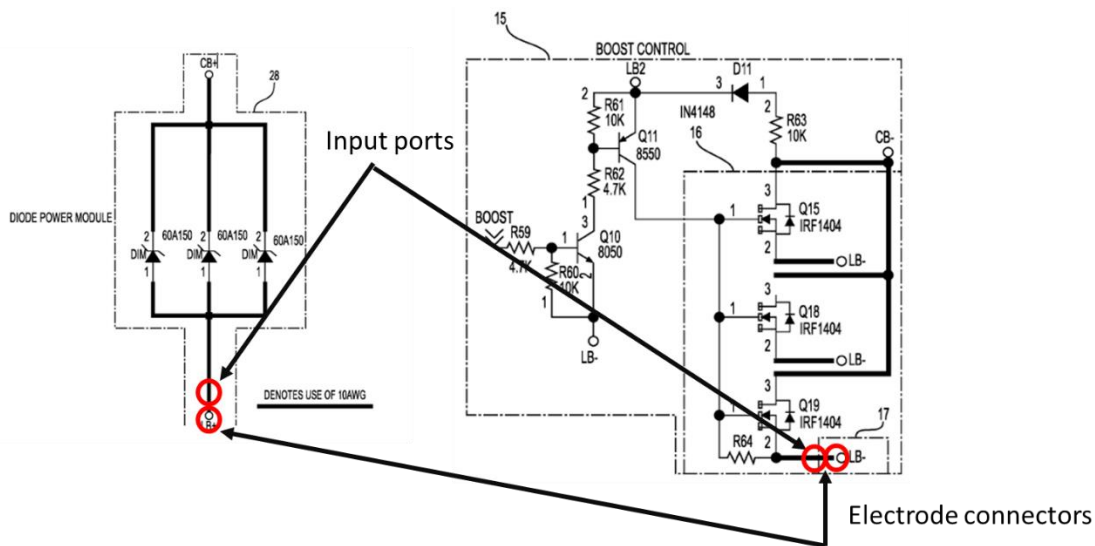
... The battery clamp of claim 1, wherein the master-control board comprises: a first and second voltage input ports electrically connected to the first and second electrode connectors respectively;

368. Nook discloses a master-control board that comprises a first and second voltage input ports electrically connected to the first and second electrode connectors

respectively.

369. According to Fig. 1 of Nook the lithium polymer battery pack 32 connects to the smart switch FET circuit 15.

370. This is further illustrated by Nook at Fig. 2B where LB+ and LB- indicate the connection to the lithium polymer battery pack. A POSITA would recognize that ports could take the form of solder pads on the printed circuit board whereas the connectors to the Lithium Battery terminal would be in the form of electrode connectors.



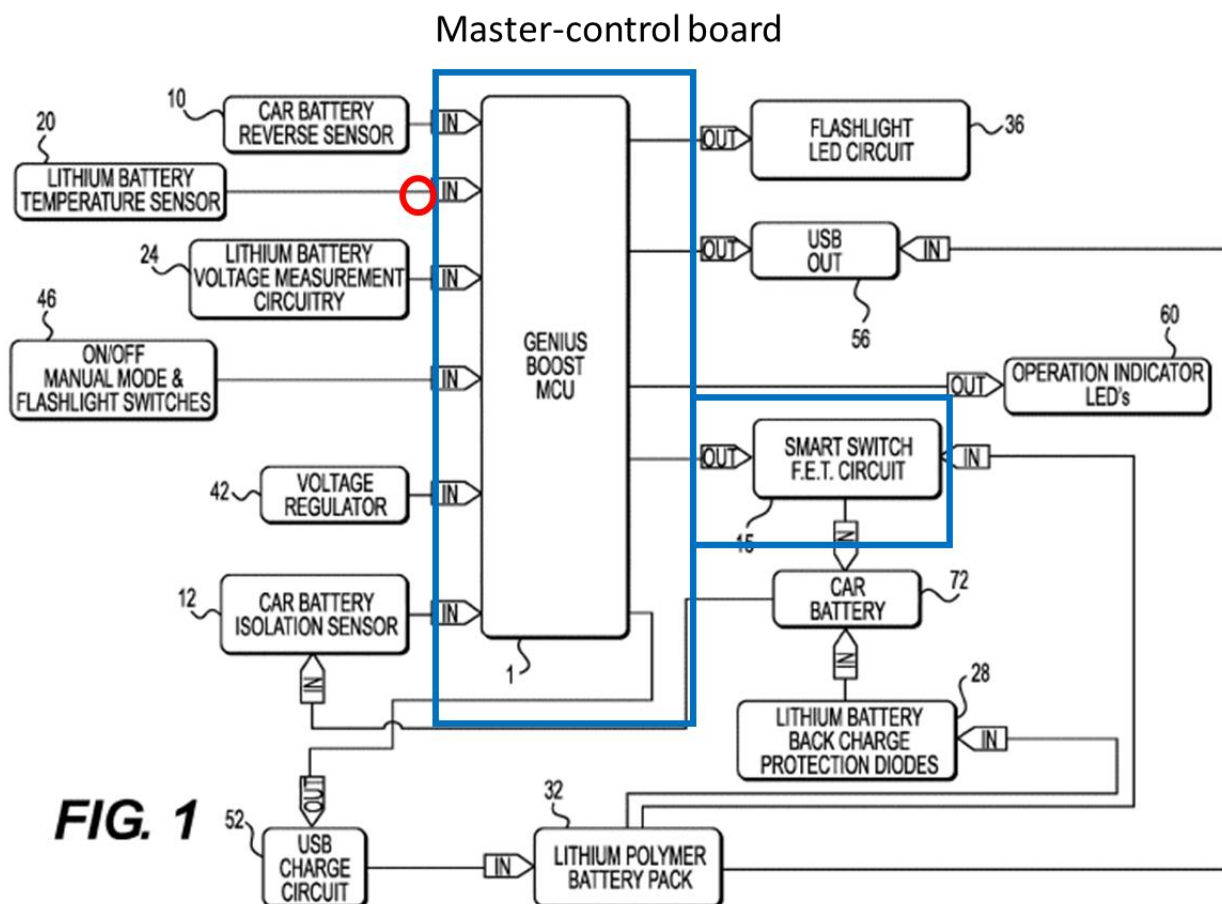
Annotated Nook Figure 2B-1 (left) and Figure 2B-2 (right).

b. Limitation 3.1

... a communication port electrically connected to the communication connector;

371. Nook discloses a communication port electrically connected to the communication connector.

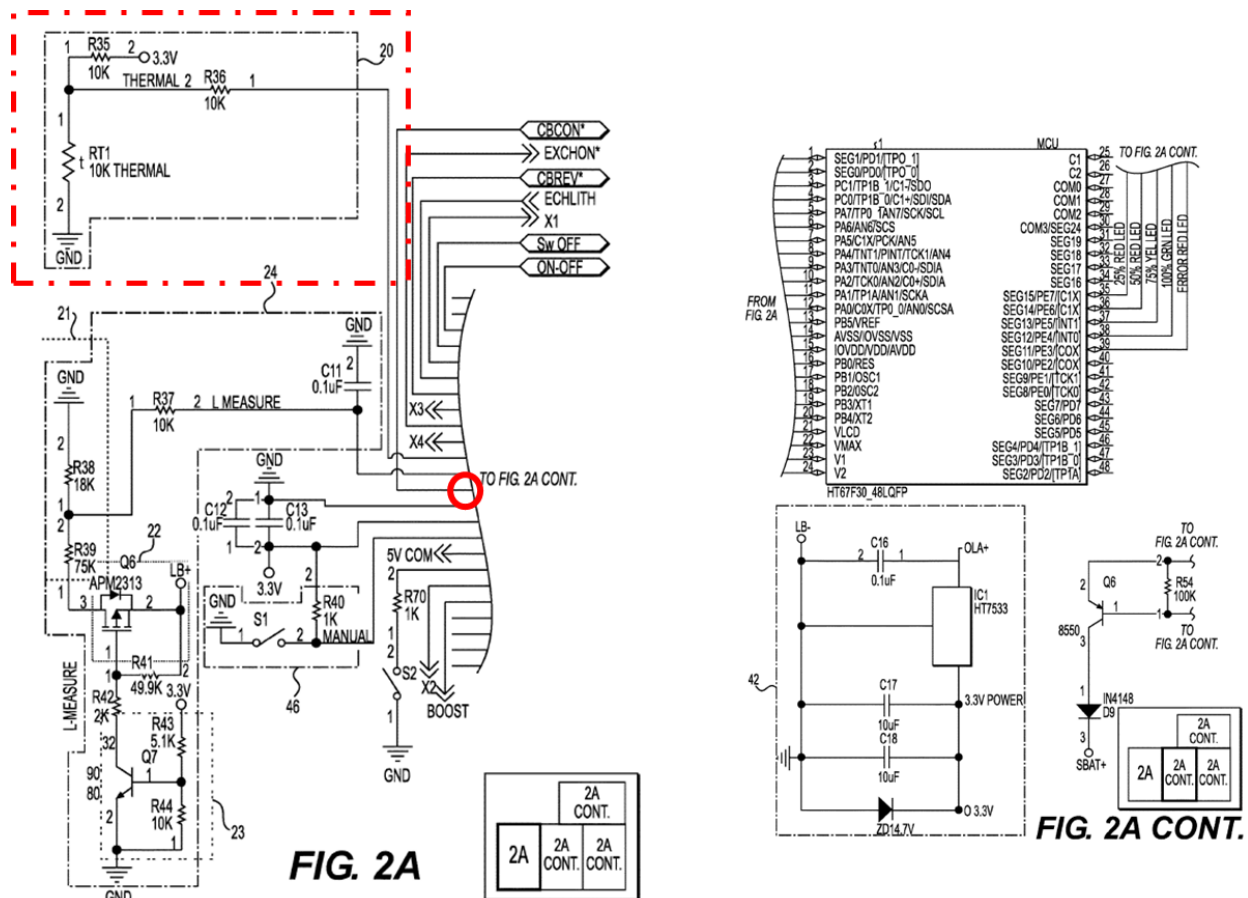
372. According to Fig.1 of Nook Lithium Battery Temperature Sensor connectors to the MCU. See EX1009, Nook at Fig. 1.



Annotated Nook Figure 1.

373. This is further illustrated in Fig. 2A-1 and Fig. 2A-2 of Nook unit 20 monitors the temperature of the battery. This signal is fed into the microcontroller as shown in Fig. 2A of Nook annotated below. See also EX1009, Nook at 4:38-41,

(“A lithium battery temperature sensor 20 monitors the temperature of the lithium battery pack 32 to detect overheating due to high ambient temperature conditions and overextended current draw during jump starting.”).



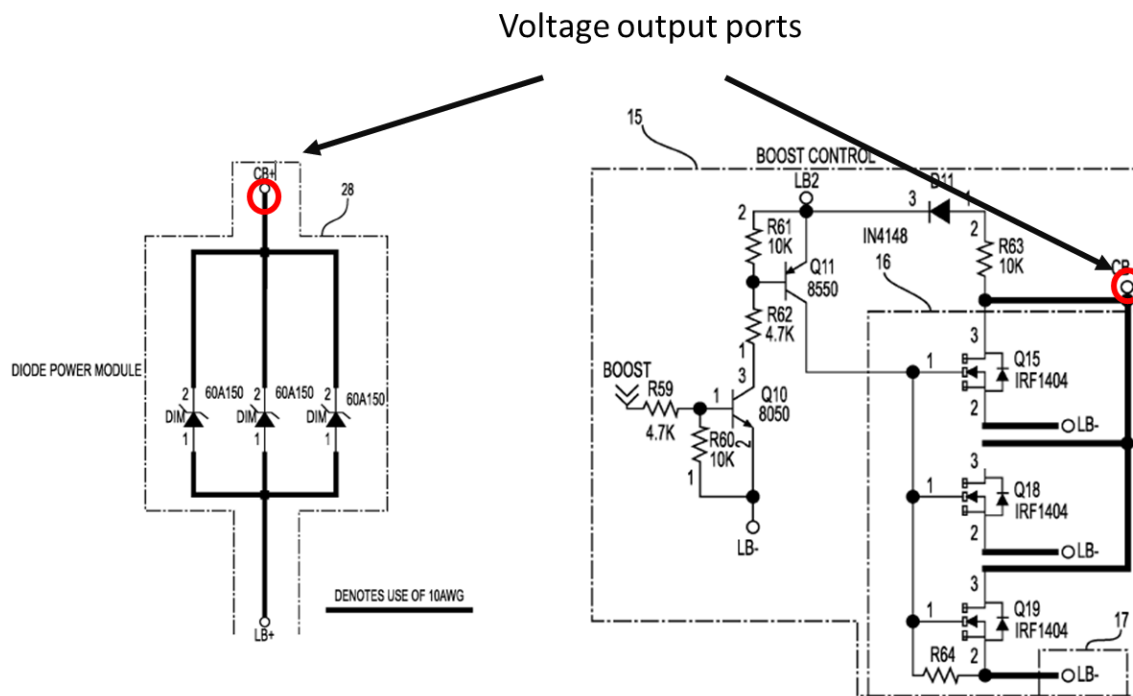
Annotated Nook Figure 2A.

c. Limitation 3.2

... a first and second voltage output ports electrically connected to the first and second wire clamps for supplying power to the external device via the first and second wire clamps;

374. Nook discloses a first a second voltage output ports electrically connected to the first and second wire clamps for supplying power to the external device via the first and second wire clamps.

375. According to Fig. 2B-1 and Fig. 2B-2 of Nook there are two voltage output ports that electrically connect to the car battery as shown below.



Annotated Nook Figure 2B.

376. According to Nook the clamps at Fig. 4 are used to connect to the car battery. See EX1009, Nook at 7:46-49, (“FIG. 4 shows a jumper cable device 400 specifically designed for use with the handheld device 300. Device 400 has a plug

401 configured to plug into 12 volt output port 303 of the handheld device 300.”).

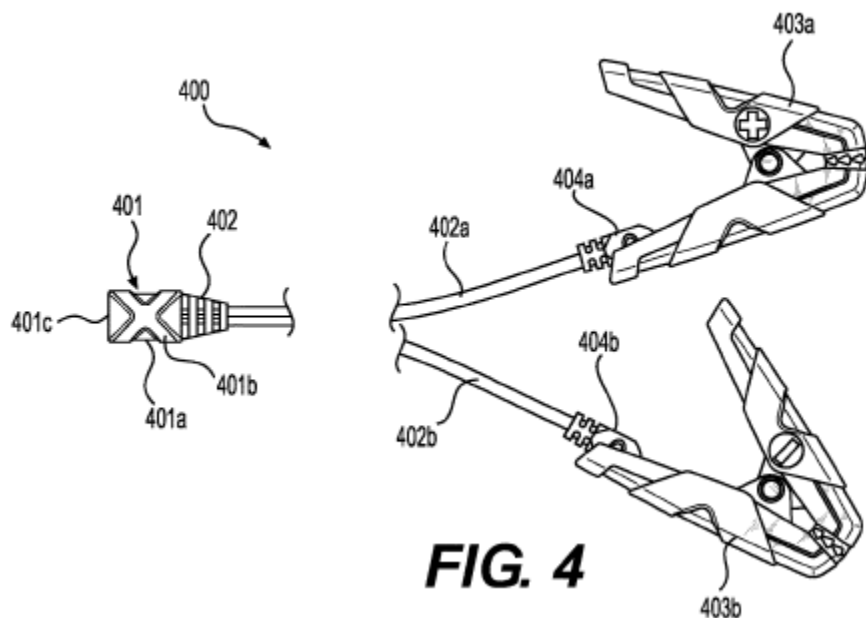


FIG. 4

Nook Figure 4.

377. A POSITA would recognize that to have a functional device the CB+ and CB- connection of Fig. 2B-1 and Fig. 2B-2 must be electrically connected to the first and second wire clamps of Fig. 4. A POSITA would recognize that ports could take the form of posts that connect to plug 401.

FIG. 4 shows a jumper cable device 400 specifically designed for use with the handheld device 300. Device 400 has a plug 401 configured to plug into 12 volt output port 303 of the handheld device 300. A pair of cables 402a and 402b are integrated with the plug 401, and are

respectively connected to battery terminal clamps 403a and 403b via ring terminals 404a and 404b. The port 303 and plug 401 may be dimensioned so that the plug 401 will only fit into the port 303 in a specific orientation, thus ensuring that clamp 403a will correspond to positive polarity, and clamp 403b will correspond to negative polarity, as indicated thereon. Additionally, the ring terminals 404a and 404b may be disconnected from the clamps and connected directly to the terminals of a vehicle battery. This feature may be useful, for example, to permanently attach the cables 302a-302b to the battery of a vehicle. In the event that the battery voltage becomes depleted, the handheld booster device 300 could be properly connected to the battery very simply by plugging in the plug 401 to the port 303.

See EX1009, Nook at 7:46-64.

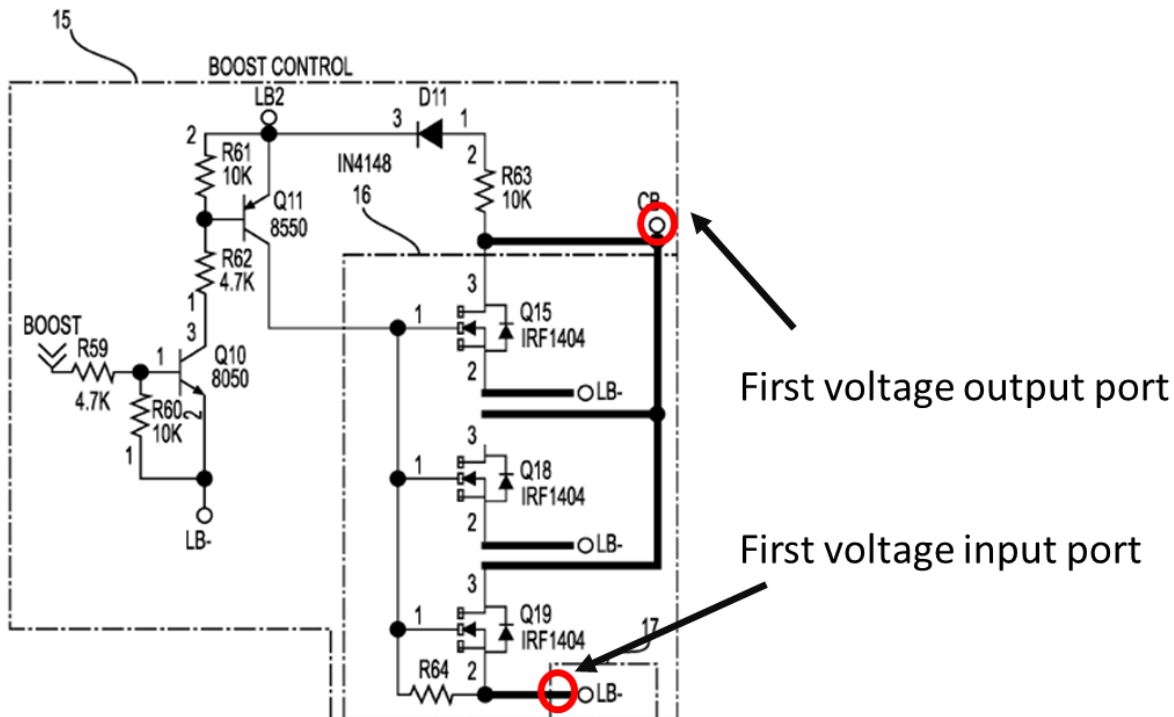
d. Limitation 3.3

... a switch control unit for controlling connection between the first voltage input port and the first voltage output port; and

378. Nook discloses a switch control unit for controlling connection between the first voltage input port and the first voltage output port.

379. According to Fig. 2B-2 of Nook the switch control unit includes transistors Q15, Q18 and Q19. See EX1009, Nook at 5:55-57, (“As shown in FIG. 2B-2, the FET smart switch 15 is driven by an output of the microcontroller 1. The FET smart switch 15 includes three FETs (Q15, Q18, and Q19) in parallel.”). As

annotated below these ports are between the two voltage ports. A POSITA would recognize that ports could take the form of solder pads on the printed circuit board.



Annotated Nook Figure 2B-2.

e. Limitation 3.4

... a master-control circuit unit connected to the communication port for obtaining the status information of the external power supply;

380. Nook discloses a master-control circuit unit connected to the communication port for obtaining the status information of the external power supply.

381. See Limitation 3.1 and Limitation 1.6.

f. Limitation 3.5

... wherein the master-control circuit unit is configured to control the switch control unit based on the status information of the external power supply, thereby controlling connection on/off between the first voltage input port and the first voltage output port.

382. Nook discloses that the master-control circuit unit is configured to control the switch control unit based on the status information of the external power supply, thereby controlling connection on/off between the first voltage input port and the first voltage output port.

383. Nook includes status information in the form of the temperature of the lithium battery. See EX1009, Nook at 6:19-27, (“Still referring to FIG. 2A-1, the temperature of the internal lithium battery pack 32 can be accurately measured by two negative temperature coefficient (NTC) devices 20. These 30 are devices that reduce their resistance when their temperature rises. The circuit is a voltage divider that brings the result to two analog-to-digital (A/D) inputs on the microcontroller 1. The microcontroller software can then determine when the internal lithium battery is too hot to allow jump-starting, adding safety to the design.”).

384. See Limitation 3.1 and Limitation 1.6.

4. Ground 4: Claim 4 is Disclosed by Nook in View of Zonesking

a. Limitation 4.0

... The battery clamp of claim 3, wherein the master-control circuit unit further comprises: an electric current detection unit for detecting electric current from the external power supply to the external device;

385. Nook discloses a master-control circuit which comprises an electric current detection unit for detecting electric current from the external power supply to the external device.

386. Nook discloses electrical current detection in the form of a shunt resistor. See EX1009, Nook at 1:55-58, (“The current through the shunt cable is monitored to determine if there is a battery explosion risk, and for excessive current conditions presenting an overheating condition, which may result in fire.”).

387. Nook further discloses a control circuit which makes decisions based on input parameters to control to switch. A POSITA would understand that electric current can be measured via a shunt and relied on as part of the decision process.

388. Furthermore, a POSITA would look to Zonesking which also discloses an electric current detection unit.

In the smart jump starter cable with current detection function for automobile or motorcycle batteries according to the present invention, the circuit board of the adapter element is equipped with a protection module and a battery detection unit, such that when the user uses the present invention for jump starting, both a protection function and a

current detection function for automobile or motorcycle batteries can be achieved by the present invention to provide a multifunctional detection application in the present invention.

EX1007 at [0006].

b. Limitation 4.1

... a voltage detection unit for detecting voltage of the external power supply and the external device; and

389. Nook discloses a voltage detection unit for detecting voltage of the external power supply and the external device.

390. Nook describes a voltage detection unit that measures the voltage of the supply lithium battery pack 32. *See* EX1009, Nook at 2:41-45, (“A lithium battery Voltage measurement circuit 24 monitors the Voltage of the lithium battery pack 32 to prevent the voltage potential from rising too high during a charging operation and from dropping too low during a discharge operation.”). *See also* Nook at Fig. 1.

391. Nook also describes that the control circuit can detect for reverse polarity. *See* EX1009, Nook at 5:50-54, (“Consequently, if the car battery 72 either is not connected to the booster device at all, or is connected with reverse polarity, the MCU 1 can keep the smart switch FET 15 from being turned on, thus prevent sparking/short circuiting of the lithium battery pack.”).

392. A POSITA would recognize that the voltage of the external device to

be charged is required to allow for protection from reverse polarity.

c. Limitation 4.2

... wherein the master-control circuit unit is configured to compare the electric current value and the voltage value with a predefined electric current range and a predefined voltage range respectively, thereby controlling the switch control unit.

393. Nook discloses a master-control circuit unit which is configured to compare the electric current value and the voltage value with a predefined electric current range and a predefined voltage range respectively, thereby controlling the switch control unit.

394. Nook discloses electrical current detection in the form of a shunt resistor. See EX1009, Nook at 1:55-58, (“The current through the shunt cable is monitored to determine if there is a battery explosion risk, and for excessive current conditions presenting an overheating condition, which may result in fire.”).

395. Nook describes a voltage detection unit that measures the voltage of the supply lithium battery pack 32. See EX1009, Nook at 4:41-45, (“A lithium battery Voltage measurement circuit 24 monitors the Voltage of the lithium battery pack 32 to prevent the voltage potential from rising too high during a charging operation and from dropping too low during a discharge operation.”). See also Nook at Fig. 1.

396. Nook further discloses a control circuit which makes decisions based

on input parameters to control to switch. A POSITA would understand that electric current can be measured via a shunt and relied on as part of the decision process.

5. Ground 4: Claim 5 is Disclosed by Nook in View of Zonesking

a. Limitation 5.0

... The battery clamp of claim 4, wherein the voltage detection unit comprises: a first voltage detection unit for detecting voltage value of the external power supply; and

397. Nook discloses a first voltage detection unit for detecting voltage value of the external power supply.

398. Nook describes a first voltage detection unit as a Lithium Battery Voltage Measurement Circuitry 24. See EX1009, Nook at Fig. 1. See also Nook at 4:41-45, (“A lithium battery voltage measurement circuit 24 monitors the voltage of the lithium battery pack 32 to prevent the voltage potential from rising too high during a charging operation and from dropping too low during a discharge operation.”).

b. Limitation 5.1

... a second voltage detection unit for detecting voltage value of the external device.

399. Nook discloses a second voltage detection unit for detecting voltage

value of the external device.

400. Nook describes a car battery reverse sensor. A POSITA would recognize that this sensor is measuring the voltage of the power supply. *See* EX1009, Nook at 4:20-22, (“A car battery reverse sensor 10 monitors the polarity of the vehicle battery 72 when the handheld battery booster device is connected to the vehicle's electric system.”).

6. Ground 4: Claim 6 is Disclosed by Nook in View of Zonesking

a. Limitation 6.0

... The battery clamp of claim 4, wherein the master-control circuit unit further comprises: an indicator light circuit unit connected to the master-control chip unit for indicating operating status of the control device.

401. Nook discloses this limitation.

402. Nook discloses an indicator light circuit unit connected to the master-control chip unit for indicating operating status of the control device. (EX1009, Nook at 5:9-13 (“Operation indicator LEDs 60 provide visual indication of lithium battery capacity status as well as an indication of smart Switch activation status (indicating that power is being provided to the vehicle's electrical system).”)).

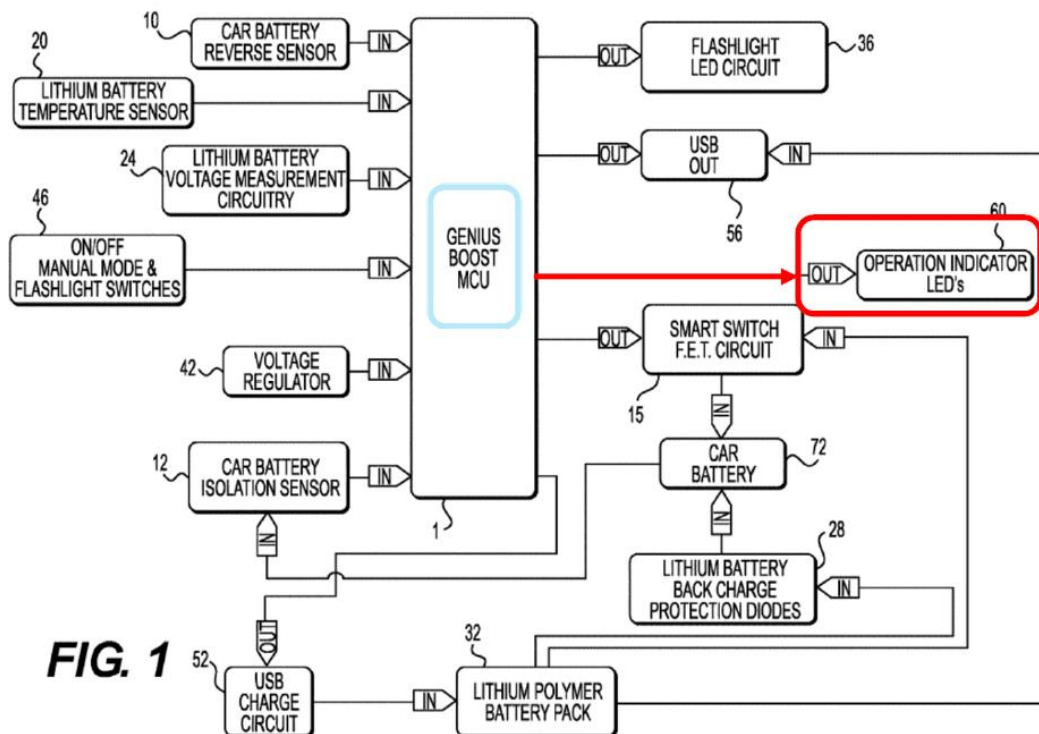


FIG. 1

Annotated Nook Figure 1.

7. Ground 4: Claim 7 is Disclosed by Nook in View of Zonesking

a. Limitation 7.0

... The battery clamp of claim 4, wherein the master-control circuit unit further comprises: a buzzing circuit unit connected to the master-control chip unit for alerting user about abnormal condition.

403. Nook in view of Liu and Zonesking discloses a buzzing circuit unit connected to the master-control chip unit for alerting a user about abnormal conditions.

404. As discussed in Claim 6, Nook discloses a visual alarm in the form of

indicator LEDs to alert the user about abnormal conditions. (EX1009, Nook at 9:8-10 (“The apparatus of claim 13, wherein said microcontroller is configured to control said at least one LED to provide a visual alarm indicating an emergency situation.”).)

405. Zonesking also discloses circuitry the use of alerts concerning the status of the device and any abnormal conditions, which includes a display element and a warning element. (EX1007, Zonesking at [0012] and [0015]); *see also* Figure 2.) Zonesking further recognizes that such alerts could be visible (e.g., light-emitting elements) or audible (e.g., voice announcer). (*Id.* at [0015].) Thus, Zonesking also recognizes the benefits of providing alerts to the user to potential hazardous conditions before or during any jump starting.

406. A POSITA understood at the time of the invention that using alerts, including visual alerts (e.g., LEDs), audible alerts (e.g., buzzing) and other sensory alerts (e.g., vibration), with jump starters, was well known in the art at the time of the invention. (*See* Section VI.D above). A POSITA would be motivated to provide both optical and audible alerts to users to warn of potentially hazardous conditions during charging and would look to Zonesking’s implementation of audible alerts for guidance. Indeed, such audible alerts, such as a buzzing circuit, would provide additional safety for the hearing-impaired, or if the charger were used in a loud environment where any audible warning may not be easily heard.

8. Ground 5: Claim 8 is Disclosed by Nook in View of Zonesking and Liu

a. Limitation 8.0

... The battery clamp of claim 1, wherein the communication connector is disposed between the first and second electrode connectors.

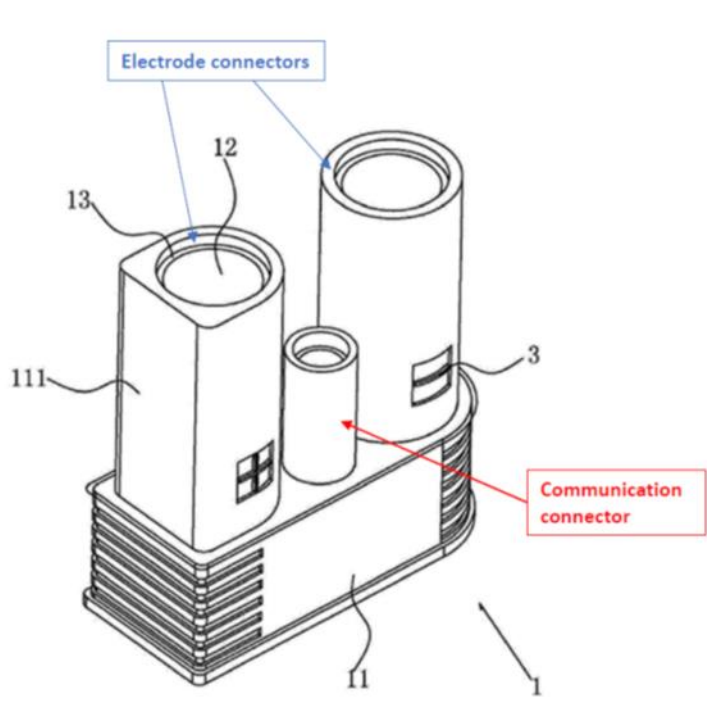
407. Nook in view of Liu discloses a communication connector disposed between the first and second electrode connectors.

408. As discussed in Limitation 1.6 above, Nook discloses communication connectors which receive status information (e.g., temperature of supply battery) of the power supply battery and send this information to the master control board. (EX1009, Nook at 6:19-24.)

409. Liu discloses a “power supply plug” that can be used in a variety of applications including for connection to an external battery for an “intelligent emergency automotive battery jump starter.” See Liu at Abstract.

410. Liu describes that these “power supply plugs ... commonly seen on the market usually have two (2) terminals connected to the anode and cathode of a power supply.” (EX1006, Liu at [0025].) Thus, Liu further teaches a third terminal for a power supply plug to allow connection and communication between the supply battery and the jump starter so that “temperature data can be transmitted.” (EX1006, Liu at [0026].)

411. Liu discloses a connector in which the third, communication terminal is disposed between the first and second electrode connectors. (EX1006, Liu at [0025]; *see also* Figure 1 below.)



Annotated Liu Figure 1.

412. As described above in Section IX.D.12, Nook, Zonesking and Liu are in the same field of endeavor. If a POSITA desired a jump starter with the functionality of Nook but instead wished to have the power supply battery outside of the control device for easy replacement, the POSITA would look to Zonesking and Liu, jump starters with external batteries, for guidance on the connection between the external power supply and the control device. A POSITA would have

reason to include the connector of Liu describe the issues related to the damaging a supply battery.

413. Furthermore, a POSITA would look to Liu for the structure of a communication connector and Liu discloses the communication connector between the first and second electrode connectors.

9. Ground 4: Claim 9 is Disclosed by Nook in View of Zonesking

a. Limitation 9.0

... The battery clamp of claim 1, wherein the housing comprises an upper piece and a lower piece, which are removably connected together, and the master-control board is mounted on the lower piece.

414. Nook renders obvious a battery clamp where the housing comprises an upper piece and a lower piece, which are removably connected together, and the master-control board is mounted on the lower piece.

415. Nook discloses a master-control board enclosed by a housing. Nook does not disclose whether the master control board is mounted on the lower or upper pieces of the housing. However, a POSITA would understand that the master-control board would necessarily be mounted inside the housing to avoid the components of the board from moving around and potentially being damaged. Thus, it would be obvious to secure the board in Nook to either the upper piece or the lower piece of

the housing. A POSITA would understand that this is simply a design choice.

10. Ground 4: Claim 10 is Disclosed by Nook in View of Zonesking

a. Limitation 10.0

... The battery clamp of claim 9, wherein one side of the upper piece is provided with openings for indicator lights and buttons.

416. Nook renders obvious one side of the upper piece of the battery clamp being provided with openings for indicator lights and buttons. See annotated Nook Figure 3 below:

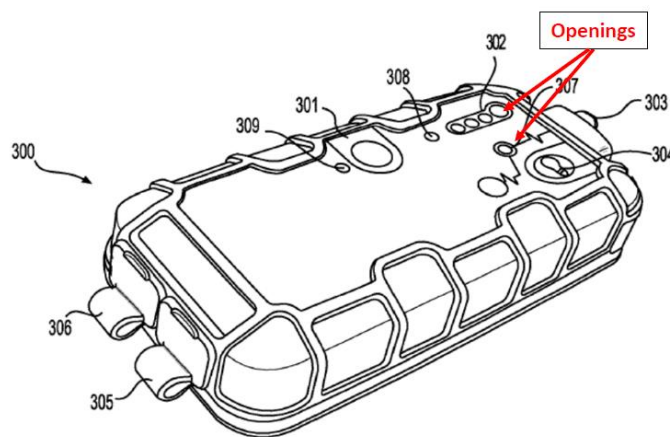


FIG. 3

Annotated Nook Figure 3.

11. Ground 4: Reasons to Combine Nook and Zonesking

417. A POSITA would have been motivated to combine Nook and Zonesking for at least the reasons set forth below.

418. Nook and Zonesking are both in the same field of endeavor – both disclose portable, smart jumper cables for jumpstarting external devices – like vehicles. *See* EX1006, Nook at 1:7-9, (“The present invention relates generally to apparatus for jump-starting a vehicle having a depleted or discharged battery.”). *See also* EX1007, Zonesking at [0001], (“The present invention relates to a smart jump starter cable with current detection function for automobile or motorcycle batteries.”)

419. Both Nook and Zonesking also describe the potential damage that can occur to the supply batteries if, among other things, there is an improper connection to the vehicle. *See* EX1006, Nook at 1:17-23, (“Problems with the prior art arose when either the jumper terminals or clamps of the cables were inadvertently brought into contact with each other while the other ends were connected to a charged battery, or when the positive and negative terminals were connected to the opposite polarity terminals in the vehicle to be jumped, thereby causing a short circuit resulting in sparking and potential damage to batteries and/or bodily injury.”). (*See* EX1007, Zonesking at [0003].)

420. Furthermore, both Nook and Zonesking teach detection circuitry to monitor the voltage of the supply batteries, the result of which is used by a master control board in the decision process of whether to connect the supply battery to the device to be charged. *See* EX1006, Nook at 4:41-45, (“A lithium battery voltage

measurement circuit 24 monitors the voltage of the lithium battery pack 32 to prevent the voltage potential from rising too high during a charging operation and from dropping too low during a discharge operation.”). See Zonesking at [0014], (“the battery detection unit 114 may be an MCU, a comparator or an amplifier.”).

421. While both references are in the same field and operate in a similar manner Nook discloses a power supply located with the control unit in a single housing while Zonesking teaches the battery being external to the housing. But a POSITA would recognize, at the time of the invention, where the battery is located is simply a design choice. A POSITA would understand either design choice includes known benefits. For example, jump starters with a single housing for the battery and controller provide the benefits of less components, which may be easier to carry and there is a less likelihood of losing a component. However, a downside to this design is the entire jump starter would have to be replaced when the internal battery became defective.

422. Jump starters that have a battery that is external to the control housing (like Zonesking) have the benefit of easy replacement of a defective battery without having to discard the controller or cables. A POSITA would have therefore recognized why it is desirable to have a battery and controller as separate units, and a POSITA would have been motivated to modify Nook to make a jump starter in which the battery was external. A POSITA would have also understood how to

separate the battery and controller and how to make electrical connections between the two.

12. Ground 5: Reasons to Combine Nook and Zonesking with Liu (Claim 8)

423. As discussed above, it would have been obvious to a POSITA at the time of the invention to combine the teachings of Nook and Zonesking because both are in the same field of endeavor, both describe the potential damage that can occur to the supply batteries, and both teach detection circuitry to monitor the voltage of the supply batteries to protect against hazards, the result of which can be used by a control circuit in the decision process of whether to connect the supply battery to the device to be charged.

424. Like Nook and Zonesking, Liu discusses the potential damage that can occur to the supply batteries and describes how its connector can help protect the external supply battery for such hazards. (EX1006, Liu at [0015] (“In addition, when used on an intelligent emergency automotive jump starter power supply, this three-hole starter power supply plug is capable of protecting the battery very effectively to prevent overloading induced explosion of the battery during automotive ignition.”); *see also* Liu at [0026].)

425. Nook describes the monitoring of the temperature of the internal supply battery. Nook discloses connectors which receive status information (e.g.,

temperature of supply battery) of the power supply battery and send this information to the master control board. See EX1009, Nook at 6:19-24. Though Nook discloses a power supply, this power supply is located inside the housing of a single unit, together with the control unit. A POSITA would recognize that, at the time of the invention, there were two principal types of smart jump starters, those in which the battery and controller were in a single housing (such as Nook), and those in which the controller was housed in the jumper cables, which then connected to an external battery (such as in Zonesking).

426. When using Nook with an external power supply, in order to allow for the same reliance on the temperature of the power supply, a conductor that carries that information from the external battery to the control circuitry would be necessary.

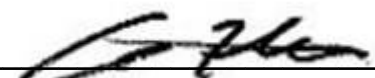
427. Additionally, it would have been obvious to a POSITA to look to Liu, which also relates to smart jump starters, for the structure of a connector for an external power supply that has terminals for both power and additional data. (EX1006, Liu at Abstract (“intelligent emergency automotive battery jump starter”).)

428. A POSITA would have understood that in a connector that includes both power terminals and a communication terminal, the position of the communication terminal in relation to the power terminals would have been a mere design choice.

429. For the above reasons a POSITA would be motivated to combine the Liu's connector with the disclosures of Nook and Zonesking.

I declare under penalty of perjury that the foregoing is true and accurate to the best of my ability.

Executed on: December 16, 2022



Alex Z. Kattamis Ph.D.