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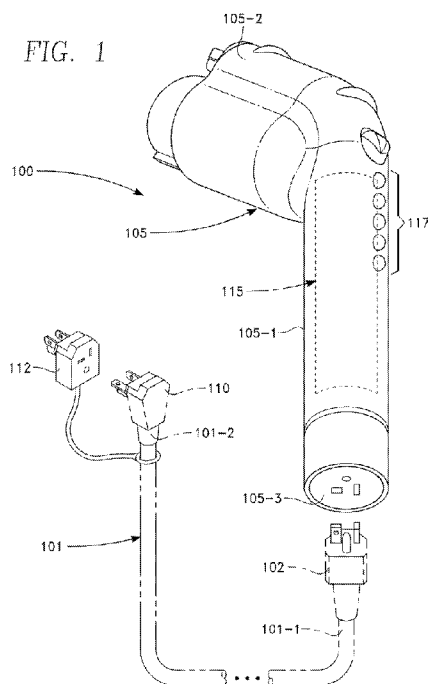
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OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD,

[Continued on next page]

(54) Title: ELECTRIC VEHICLE DOCKING CONNECTOR WITH EMBEDDED EVSE CONTROLLER



(57) Abstract: A portable electric vehicle supply equipment (EVSE) kit or system includes a docking connector having a docking head engagable with the charging port of an electric vehicle and a barrel or handle fixed to the docking head and having a barrel electrical connector. An EVSE controller is embedded within the docking connector. An electric power cable has a first connector for engaging the barrel electrical connector and a second connector at an opposite end of the cable for connection to an electrical utility receptacle. The embedded EVSE controller enables the docking connector to function as an EVSE unit.



SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2012/021751

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H01M 10/44 (2012.01)

USPC - 320/107

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC(8) - H01M 10/00, 10/44, 10/46 (2012.01)

USPC - 320/107, 109, 132, 149

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

MicroPatent, Google Patents, Google Scholar

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2010/0174667 A1 (VITALE et al) 08 July 2010 (08.07.2010) entire document	1-30, 39-42
Y	US 5,627,448 A (OKADA et al) 06 May 1997 (06.05.1997) entire document	1-30, 39-42
Y	US 4,193,655 A (HERRMANN) 18 March 1980 (18.03.1980) entire document	4, 21, 40, 42
Y	US 4,895,530 A (GUGELMEYER et al) 23 January 1990 (23.01.1990) entire document	5, 13, 21, 41-42
Y	US 2010/0238020 A1 (PELLEN) 23 September 2010 (23.09.2010) entire document	15-20
Y	US 6,194,854 B1 (UCHIBORI et al) 27 February 2001 (27.02.2001) entire document	27, 29
A	US 2010/0079105 A1 (IWANAGA et al) 01 April 2010 (01.04.2010) entire document	39-42
A	US 6,905,362 B2 (WILLIAMS) 14 June 2005 (14.06.2005) entire document	1-30, 39-42
A	US 6,114,833 A (LANGSTON et al) 05 September 2000 (05.09.2000) entire document	1-30, 39-42
A	US 2010/0289451 A1 (TUFFNER et al) 18 November 2010 (18.11.2010) entire document	1-30, 39-42
A	US 6,157,162 A (HAYASHI et al) 05 December 2000 (05.12.2000) abstract; figures 1, 4, 5, 9-10; column 3 lines 16-34; column 4 lines 9-18; column 5 lines 36-62; column 7 lines 26-column 9 line 24	1-30, 39-42

☐ Further documents are listed in the continuation of Box C.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

12 July 2012

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2012/021751

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See extra sheet.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-30, 39-42

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2012/021751

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-30, 39-42, drawn to an electric vehicle supply equipment kit and system comprising a docking connector comprising head having a head end engagable with the charging port, a barrel docking end and a barrel cable end, said barrel docking end attached to said head; a first plurality of conductors extending into said barrel from said barrel cable end and a second plurality of conductors extending into said head from said head end.

Group II, claims 31-32, 43, drawn to an electric vehicle supply equipment system and kit comprising an outlet proximity sensor adjacent said external surface, a power interrupter switch connected between said plural outlet conductors and a source of electrical power, a logic circuit connected to said outlet proximity sensor and connected to said power interrupter switch.

Group III, claims 33-38, drawn to an electric vehicle supply equipment system comprising at least one of (a) an insertable outlet post on said external surface or (b) a post-receiving outlet hole in said external surface.

Group IV, claims 44-47, drawn to an electric vehicle supply equipment kit comprising an outer insulating jacket surrounding said plural cable conductors, a sheath within said outer insulating jacket surrounding said plural cable conductors and extending between said first and second cable ends; a sheath sensor.

Group V, claims 48-50, drawn to an electric vehicle supply equipment kit comprising a rounded hand-grip extending from the barrel and defining a gripping space, plural finger rests in said hand-gripping surface.

The inventions listed as Groups I, II, III, IV and V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention: head end engagable with the charging port, a barrel docking end and a barrel cable end, said barrel docking end attached to said head; a first plurality of conductors extending into said barrel from said barrel cable end and a second plurality of conductors extending into said head from said head end, as claimed therein is not present in the invention of Groups II, III, IV or V. The special technical feature of the Group II invention: an outlet proximity sensor adjacent said external surface, a power interrupter switch connected between said plural outlet conductors and a source of electrical power, a logic circuit connected to said outlet proximity sensor and connected to said power interrupter switch, as claimed therein is not present in the invention of Groups I, III, IV or V. The special technical feature of the Group III invention: at least one of (a) an insertable outlet post on said external surface or (b) a post-receiving outlet hole in said external surface, as claimed therein is not present in the invention of Groups I, II, IV or V. The special technical feature of the Group IV invention: an outer insulating jacket surrounding said plural cable conductors, a sheath within said outer insulating jacket surrounding said plural cable conductors and extending between said first and second cable ends; a sheath sensor, as claimed therein is not present in the invention of Groups I, II, III or V. The special technical feature of the Group V invention: a rounded hand-grip extending from the barrel and defining a gripping space, plural finger rests in said hand-gripping surface, as claimed therein is not present in the invention of Groups I, II, III or IV.

Groups I, II, III, IV and V lack unity of invention because even though the inventions of these groups require the technical feature of charging an electric vehicle through a charging port of the electric vehicle, a docking connector; an embedded EVSE controller inside said

docking connector comprising a head and a barrel; a power cables comprising plural cable conductors, an electrical power outlet, logic circuits, cables connected to the controllers, insulated paths, power connector external surface, sensors, this technical feature is not a special technical feature as it does not make a contribution over the prior art in view of US 6,157,162 A (HAYASHI et al) 05 December 2000 (05.12.2000) abstract; figures 1, 4, 5, 9-10; column 3 lines 16-34; column 4 lines 9-18; column 5 lines 36-62; column 7 lines 26-column 9 line 24.

Since none of the special technical features of the Group I, II, III, IV or V inventions are found in more than one of the inventions, unity of invention is lacking.