

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year)	30.08.2017
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Applicant's or agent's file reference 17LWV012PC01
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FOR FURTHER ACTION See paragraph 2 below
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International application No. PCT/KR2017/006115	International filing date (day/month/year) 13.06.2017	Priority date (day/month/year) 25.08.2016
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International Patent Classification (IPC) or both national classification and IPC A47L5/24 (2006.01) i, A47L9/28 (2006.01) i, A47L9/26 (2006.01) i, A47L9/32 (2006.01) i
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Applicant LG ELECTRONICS INC.

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

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Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed
 - a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the international application as filed:
 - in the form of an Annex C/ST.25 text file.
 - on paper or in the form of an image file.
 - b. furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. furnished subsequent to the international filing date for the purposes of international search only:
 - in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
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1. Statement			
Novelty (N)	Claims	1-15	YES
	Claims	None	NO
Inventive step (IS)	Claims	14-15	YES
	Claims	1-13	NO
Industrial applicability (IA)	Claims	1-15	YES
	Claims	None	NO

2. Citations and explanations:	
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Reference is made to the following documents:

D1: JP 2016-131777 A (MITSUBISHI ELECTRIC CORP. et al.) 25 July 2016

D2: EP 2215947 A2 (MAKITA CORPORATION) 11 August 2010

D3: JP 2007-305408 A (HITACHI KOKI CO., LTD.) 22 November 2007

D4: JP 2010-123299 A (TOSHIBA CORP.) 03 June 2010

D5: KR 10-1552437 B1 (LG ELECTRONICS INC.) 10 September 2015

1. Novelty and Inventive Step

1.1 Independent Claim: Claim 1

Document D1, which is closest to the invention as set forth in claim 1, discloses an electric cleaning appliance comprising: a reception part (13); a battery unit (8) separably coupled to the reception part (13); a first and a second battery case (8f, 8g); a plurality of batteries (8a) received in the first and the second

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battery case (8f, 8g); a holder body (8d) including partitioning walls for surrounding a plurality of batteries (8a) and separating a plurality of rows; a battery control board (8b) on which a device for controlling the output voltages of the plurality of batteries (8a) is mounted; and a divider body (8e) (see paragraphs [0011], [0013], and [0050]-[0055] and figures 1, 7, and 15-17).

Claim 1 differs from document D1 in that the former includes a feature wherein a barrier is disposed between a plurality of battery cells and a battery management unit. However, said difference could be easily derived by a person skilled in the art through a design change from the feature disclosed in document D1 wherein the divider body (8e) is disposed between the battery control board (8b) and a main body control board (8c) which are located above the plurality of batteries (8a) (see paragraph [0051] and figures 15-16). Therefore, the invention as set forth in claim 1 would be obvious in view of document D1 and thus lacks an inventive step (PCT Article 33(3)).

1.2 Dependent Claims: Claims 2 to 15

1.2.1 Claim 2

Claim 2 sets forth an additional feature wherein a direction in which a battery is disposed in a battery housing is parallel to the direction in which the plurality of battery cells extend respectively while being supported by a battery holder. The additional feature is not disclosed in document D1, but document D2 discloses a feature wherein a direction in which a

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battery pack (60) is mounted in a battery mounting part (58) of a handy cleaning appliance (50) is parallel to the direction in which three battery cells are arranged in the battery pack (60) (see paragraphs [0052]-[0055] and figures 10-12). Documents D1 and D2 belong to the same technical field, and it is not considered that combining of the above elements of documents D1 and D2 would require a modification of core parts of the elements before the combining or a new technical concept. Therefore, the invention as set forth in claim 2 would be obvious in view of documents D1 and D2 and thus lacks an inventive step (PCT Article 33(3)).

1.2.2 Claim 3

Claim 3 sets forth an additional feature wherein the battery holder comprises: a first holder disposed at the upper side of a partitioning wall and surrounding upper side portions of the plurality of battery cells; and a second holder disposed at the lower side of the partitioning wall and surrounding lower side portions of the plurality of battery cells. The additional feature could be easily conceived by a person skilled in the art from the feature disclosed in document D1 wherein the holder body (8d) comprises: a holder part for surrounding each of one side portions of the plurality of batteries (8a); and a holder part for surrounding each of the other side portions of the plurality of batteries (8a) (see figures 15-16). Therefore, the invention as set forth in claim 3 would be obvious in view of document D1 and thus lacks an inventive step (PCT Article 33(3)).

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1.2.3 Claim 4

Claim 4 sets forth an additional feature wherein each of the holders comprises: a plurality of first cell cases for entirely surrounding the circumference of some battery cells among the plurality of battery cells; and a plurality of second cell cases for only partially surrounding the circumference of some other battery cells among the plurality of battery cells. The additional feature could be easily conceived by a person skilled in the art from the feature disclosed in document D1 wherein the plurality of holder parts of the holder body (8d) are configured to have: a shape for entirely surrounding the circumference of a battery (8a); and a shape for only partially surrounding the circumference of the battery (8a) (see figure 15). Therefore, the invention as set forth in claim 4 would be obvious in view of document D1 and thus lacks an inventive step (PCT Article 33(3)).

1.2.4 Claim 5

Claim 5 sets forth an additional feature wherein two adjacent second cell cases are disposed spaced apart from each other with reference to the partitioning wall, and the distance between the centers of the two adjacent second cell cases is shorter than the distance between the centers of two adjacent first cell cases. The additional feature could be easily derived by a person skilled in the art through a design change from the feature disclosed in document D1 wherein the plurality of holder parts of the holder body (8d) are configured to have: a shape for entirely surrounding the circumference

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of a battery (8a); and a shape for only partially surrounding the circumference of the battery (8a) (see figure 15). Therefore, the invention as set forth in claim 5 would be obvious in view of document D1 and thus lacks an inventive step (PCT Article 33(3)).

1.2.5 Claim 6

Claim 6 sets forth an additional feature wherein each of the holders further comprises a third cell case which is disposed on a region corresponding to the region between the plurality of second cell cases and partially surrounds the circumference of some other battery cells among the plurality of battery cells. The additional feature could be easily derived by a person skilled in the art through a design change from the holder part, among the plurality of holder parts of the holder body (8d), having a shape for only partially surrounding the circumference of a battery (8a), disclosed in document D1 (see figure 15). Therefore, the invention as set forth in claim 6 would be obvious in view of document D1 and thus lacks an inventive step (PCT Article 33(3)).

1.2.6 Claim 7

Claim 7 sets forth an additional feature wherein a frame includes a contact rib which can contact a battery cell exposed out of each of the second cell case and the third cell case. The additional feature is not disclosed in document D1, but could be easily conceived by a person skilled in the art from the feature disclosed in document D3 wherein an engagement protrusion (11h) and a groove

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part (11e), which contact battery cells (C2) exposed out of a separator (21), are formed on the inside of a battery case (11) (see paragraph [0034] and figure 6). Document D1 relates to a cleaning appliance which has a battery including a plurality of battery cells, and document D3 relates to a power tool battery pack including a plurality of battery cells. In this regard, it would be obvious to a person skilled in the art to derive the claimed invention by combining documents D1 and D3. Therefore, the invention as set forth in claim 7 would be obvious in view of documents D1 and D3 and thus lacks an inventive step (PCT Article 33(3)).

1.2.7 Claim 8

The additional feature set forth in claim 8 is substantially identical to the engagement protrusion (11h) of document D3, which is formed rounded at a curvature corresponding to the curvature of the battery cell (C2) (see figure 6). Therefore, the invention as set forth in claim 8 would be obvious in view of documents D1 and D3 and thus lacks an inventive step (PCT Article 33(3)).

1.2.8 Claim 9

Claim 9 sets forth an additional feature wherein the battery management unit comprises a circuit board, the barrier comprises a plate spaced apart from the circuit board, and the extension direction of the plurality of battery cells intersects with the circuit board and the plate. The additional feature is not disclosed in

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document D1, but document D4 discloses a feature of comprising: a battery monitoring circuit board (14); and a cover body (28) spaced apart from the battery monitoring circuit board (14), wherein the extension direction of a plurality of secondary batteries (10) intersects with the battery monitoring circuit board (14) and the cover body (28) (see paragraphs [0009]-[0011] and figures 1-5). Document D1 relates to a cleaning appliance which has a battery including a plurality of battery cells, and document D4 relates to a secondary battery pack including a plurality of secondary batteries. In this regard, it would be obvious to a person skilled in the art to derive the claimed invention by combining documents D1 and D4. Therefore, the invention as set forth in claim 9 would be obvious in view of documents D1 and D4 and thus lacks an inventive step (PCT Article 33(3)).

1.2.9 Claim 10

Claim 10 sets forth an additional feature wherein the barrier comprises: a guide protrusion protruding from the plate in order to guide the location for coupling the circuit board; and a coupling boss to which a coupling member inserted through the circuit board is coupled. Said feature could be easily derived by a person skilled in the art through a design change from the feature disclosed in document D4 wherein a boss (34), to which a screw (62) inserted through the battery monitoring circuit board (14) is coupled, is formed on the cover body (28) (see paragraphs [0015] and [0023] and figure 3). Therefore, the invention as set forth in claim 10

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would be obvious in view of documents D1 and D4 and thus lacks an inventive step (PCT Article 33(3)).

1.2.10 Claim 11

Claim 11 sets forth an additional feature wherein the circuit board comprises: a protrusion passage hole for allowing the guide protrusion to pass therethrough; and a coupling hole for allowing the coupling member to pass therethrough. Said feature could be easily derived by a person skilled in the art through a design change from the feature disclosed in document D4 wherein an engagement hole (46) and a hole, through which the screw (62) passes, are formed through the battery monitoring circuit board (14) (see figure 3). Therefore, the invention as set forth in claim 11 would be obvious in view of documents D1 and D4 and thus lacks an inventive step (PCT Article 33(3)).

1.2.11 Claim 12

Claim 12 sets forth an additional feature of further comprising: an upper conductor disposed at the upper side of the plurality of battery cells so as to connect two battery cells; and an upper conducting plate connected to the upper conductor and connected to the battery management unit, wherein the plate comprises a first guide part for guiding the upper conducting plate to the circuit board side, and the circuit board comprises a second guide part through which the upper conducting plate passes. The additional feature could be easily derived by a person skilled in the art through a design

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change from the feature, disclosed in document D4, of further comprising: a bus bar (18) disposed on the plurality of secondary batteries (10) so as to connect two secondary batteries (10) and formed of a conductive material; and a connection terminal (36) connected to the bus bar (18) and connected to the battery monitoring circuit board (14), wherein the cover body (28) has an opening (32) in which a connection part (18a) of the bus bar (18) is located, and the battery monitoring circuit board (28) has an engagement hole (46) through which the connection terminal (36) passes (see paragraphs [0009] and [0015]-[0021] and figures 3-5). Therefore, the invention as set forth in claim 12 would be obvious in view of documents D1 and D4 and thus lacks an inventive step (PCT Article 33(3)).

1.2.12 Claim 13

Claim 13 sets forth an additional feature of further comprising: a lower conductor disposed at the lower side of the plurality of battery cells so as to connect two battery cells; a lower conducting plate connected to the lower conductor; and a wire for connecting the lower conducting plate and the battery management unit, wherein the plate comprises a first wire guide part for guiding the wire, and the circuit board comprises a second wire guide part for guiding the wire. The additional feature is not disclosed in documents D1 or D4, but could be easily derived by a person skilled in the art through a design change from the conductor (138) for connecting two adjacent cells among a plurality of cells in a battery assembly (120); and the electric wire (139a) for

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connecting the conductor (138) to a battery management system (139), disclosed in document D5 (see paragraphs [0082]-[0095] and figures 4-10), and the opening (32) of the cover body (28); and the cut part (60) of the battery monitoring circuit board (14), disclosed in document D4 (see paragraphs [0015] and [0031], and figures 6-10). Each of documents D1 and D5 relates to a cleaning appliance having a battery including a plurality of battery cells, and document D4 relates to a secondary battery pack including a plurality of secondary batteries. In this regard, it would be obvious to a person skilled in the art to derive the claimed invention by combining documents D1, D4, and D5. Therefore, the invention as set forth in claim 13 would be obvious in view of documents D1, D4, and D5 and thus lacks an inventive step (PCT Article 33(3)).

1.2.13 Claim 14

The invention as set forth in claim 14 differs from the inventions disclosed in documents D1 to D5 in that the former includes a feature wherein the frame comprises a movement preventing rib protruding from the inner peripheral surface of the frame and preventing the movement of the barrier and the battery management unit, the circuit board comprises a rib passage slot through which the movement preventing rib passes, and the barrier comprises a rib receiving groove in which the rib passing through the rib passage slot is received. Further, said difference would not be obvious to a person skilled in the art. Therefore, claim 14 is novel and involves an inventive step (PCT Article 33(2) and (3)).

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1.2.14 Claim 15

The invention as set forth in claim 15 differs from the inventions disclosed in documents D1 to D5 in that the former includes a feature wherein the frame includes a feature wherein the frame comprises a movement preventing rib protruding from the inner peripheral surface of the frame and preventing the movement of the barrier and the battery management unit, the barrier comprises a reinforcing rib upwardly extending from the edge of the plate, and the movement preventing rib is seated on the reinforcing rib. Further, said difference would not be obvious to a person skilled in the art. Therefore, claim 15 is novel and involves an inventive step (PCT Article 33(2) and (3)).

2. Industrial Applicability

The invention as set forth in claims 1 to 15 is industrially applicable (PCT Article 33(4)).

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Box No. VIII **Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 5 includes a phrase "the distance between the centers of two adjacent second cell cases is shorter than the distance between the centers of two adjacent first cell cases". However, paragraph [198] in the description includes a phrase "the distance between the centers of the two second cell cases is longer than the distance between the centers of the two first cell cases".

Therefore, claim 5 is not supported by the description and thus fails to satisfy the requirement under PCT Article 6.