



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
03.10.2018 Bulletin 2018/40

(51) Int Cl.:
D06F 39/12 ^(2006.01)

(21) Application number: **16868001.5**

(86) International application number:
PCT/CN2016/107033

(22) Date of filing: **24.11.2016**

(87) International publication number:
WO 2017/088778 (01.06.2017 Gazette 2017/22)

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(72) Inventors:
• **LV, Peishi**
Qingdao
Shandong 266101 (CN)
• **LI, Liping**
Qingdao
Shandong 266101 (CN)
• **ZHU, Kai**
Qingdao
Shandong 266101 (CN)

(30) Priority: **24.11.2015 CN 201510821996**

(71) Applicant: **Qingdao Haier Drum Washing Machine
Co., Ltd.**
Shandong 266101 (CN)

(74) Representative: **Pfenning, Meinig & Partner mbB**
Patent- und Rechtsanwälte
Theresienhöhe 11a
80339 München (DE)

(54) **WASHING MACHINE TUB AND WASHING MACHINE**

(57) Provided are a washing machine tub and a washing machine. The washing machine tub includes a front plate (3) and a tub body formed by two side plates (1) and a rear plate (2). The tub body is formed integrally. The tub body and the front plate (3) are respectively provided with a main body flange (4) and a front plate flange (5) at binding ends. A protruding rib (9) and a groove (8) are cooperatively provided at the main body flange (4) and the front plate flange (5) respectively, along a length direction thereof to prevent deformation of the tub.

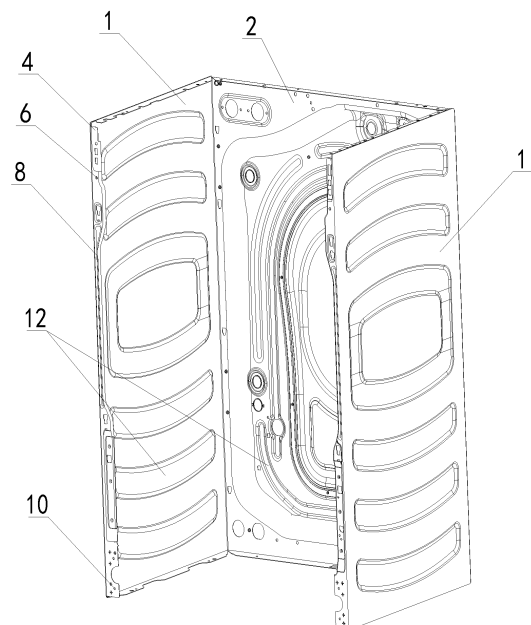


FIG. 1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to a field of washing machines, for example, it relates to a washing machine tub and a washing machine.

BACKGROUND

[0002] With the popularization of washing machines, the manufacturers are paying more and more attention to reducing costs and increasing efficiency while enhancing the functions and aesthetics of the washing machines. On one hand, they continue to develop new functions of products, and on the other hand, they pay more attention to the improvement based on related products. When new structures and processes are adopted, the products become material-saving and have higher structural strengths, and can be easily produced and suitably assembled, thereby minimizing costs of raw materials and production cost of the product, so that an overall competitiveness of the products is improved.

[0003] The tub of a roller washing machine is usually made of a material of a steel plate having a thickness range of 0.6 mm-0.7 mm, and a tub formed by the front plate body, the rear plate body and the plate bodies at both side is formed. The tub mainly provides a function to support internal components, such as an inner drum, an outer drum, and the control panel, etc., and connect an outer housing simultaneously. In order to meet the requirements of installing the internal components, one of the panels can be opened.

[0004] For a large-capacity washing machine, the size of the tub is increased. Under the condition that the thickness of the steel plate of the tub is not directly increased, it is objectively required to improve the structure of the tub, so that the tub can have a higher overall strength and avoid the vibration and noise caused after the tub is assembled, which meets the requirements of production, transportation and use.

SUMMARY

[0005] The present disclosure provides a washing machine tub and a washing machine, which enhances an overall strength of a tub.

[0006] In a first aspect, an embodiment of the present disclosure provides a washing machine tub, which includes a front plate and a tub body formed by two side plates and a rear plate. The tub body is formed integrally. At binding ends between the tub body and the front plate, a main body flange and a front plate flange are respectively provided. A protruding rib and a groove are cooperatively provided at the main body flange and the front plate flange respectively, along a length direction thereof to prevent deformation of the tub.

[0007] In one embodiment, the washing machine tub

includes a locking structure, which is formed by cooperatively providing a protruding strut and a hanging hole on the front plate flange and the main body flange. The locking structure is matched with a screw and a screw hole for performing a fastening. In one embodiment, the tub body is formed by pressing a steel plate having a thickness range of 0.6 mm to 1.2 mm.

[0008] In one embodiment, the locking structure formed by the protruding strut and the hanging hole is disposed at an upper portion of the binding ends, the screw and the screw hole are disposed at the lower portion of the binding ends, and the protruding rib and the groove are disposed in the middle of the binding ends.

[0009] In one embodiment, a longitudinal section of the protruding strut perpendicular to a plane in which the protruding strut is disposed in a "T" shape, the hanging hole is an opening with a small upper end and a large lower end, and the protruding strut passes through a large end of the hanging hole and slides to a small end to form a locking.

[0010] In one embodiment, a height from a lower surface of a "T" shape of the protruding strut to an upper surface of the main body flange is slightly larger than a thickness of the plate at an opening of the hanging hole.

[0011] In one embodiment, the opening is a combination of an upper rectangular hole and a lower oblong hole.

[0012] In one embodiment, cross sections of the protruding rib and the groove are in an arc shape.

[0013] In one embodiment, convex and/or concave blocks are pressed on the two side plates and the rear plate to reinforce the tub body.

[0014] In a second aspect, the embodiment of the present invention provides a washing machine, which adopts a washing machine tub in any one of the embodiments in the present disclosure.

[0015] Regarding the present disclosure, the protruding rib and the groove that are matched with each other in the length direction are formed on a flange of the binding end of the front plate of the washing machine tub and the tub body so as to reinforce the rigidity in a vertical direction and achieve a limit in a horizontal direction after the tub is combined and assembled, which solves a problem of left and right misalignment and swing caused after a large-sized tub is produced and assembled with a thin plate, increases the overall strength of the tub to avoid the vibration and the noise caused by the deformation of the tub after it is assembled, and meets the requirements for the production, the transportation and the use of a large-sized washing machine without increasing the thickness of the used material. Regarding the washing machine tub, the protruding strut and the hanging hole are provided on the flange to form a locking structure, and the screw and the screw hole are cooperated to perform a fastening, which replaces the conventional manner of fastening with the screw and the screw hole. During assembly, the front plate can be easily mounted firstly and locked on the protruding strut to form a combination of the tub body and the front plate, and afterwards, it is

fastened. The assembling is simple and easily performed, and there is no requirement for assisting other measures to make the two together. As a result, time and efforts are saved, and the assembly efficiency is improved.

BRIEF DESCRIPTION OF DRAWINGS

[0016]

FIG. 1 is a schematic view of a tub body of a washing machine formed by a rear plate and two side plates according to an embodiment of the present disclosure;

FIG. 2 is a schematic view of a front plate of a washing machine tub according an embodiment of the present disclosure;

FIG. 3 is a schematic view illustrating a locking structure formed by a protruding strut and a hanging hole at a flange of a binding end of the washing machine tub in an embodiment of the present disclosure;

FIG. 4 is a sectional view taken along line A-A shown in FIG. 3;

FIG. 5 is a transverse cross-sectional view of a groove on a flange of a binding end of the tub body according to an embodiment of the present disclosure;

FIG. 6 is a transverse cross-sectional view of a protruding rib on a flange of a binding end of the front plate in an embodiment of the present disclosure; and

FIG. 7 is a schematic view of cooperation of a groove and a protruding rib on the flange when the box body is combined with the front plate according to an embodiment of the present disclosure.

Description of the symbols

[0017] 1: Side plate; 2: Rear plate; 3: Front plate; 4: Main body flange; 5: Front plate flange; 6: Protruding strut; 7: Hanging hole; 8: Groove; 9: Protruding rib; 10 and 11: Screw hole; 12: Convex block

DETAILED DESCRIPTION

[0018] A description for the present disclosure is given as follows by showing selectable embodiments. In a case of no conflicts, the embodiments and the features in the above embodiments can be arbitrarily combined.

[0019] As shown in FIG. 1 and FIG. 2, a composition structure of a washing machine tub is shown. The tub includes a front plate 3 and a tub body having a U-shaped cross section and formed by two side plates 1 and a rear plate 2. The tub body is formed by integrally pressing a piece of steel with a thickness range of 0.6 mm to 1.2 mm. For enabling the tub to have a higher strength and meet a requirement for supporting the inner components of the washing machine, convex blocks 12 can be

pressed on the side plate 1 and the rear plate 2 at the same time, concave blocks also can be pressed, or both the convex blocks and the concave blocks are pressed, all of which can serve to reinforce the box.

[0020] For the present embodiment, the front plate 3 can be separately formed by pressing an entire plate. In one embodiment, for integrally forming a complete washing machine tub by assembling and combining the tub body, the tub body and the front plate 3 are manufactured with a main body flange 4 and a front plate flange 5 respectively on the binding ends. The main body flange 4 and the front plate flange 5 are respectively provided with protruding ribs and grooves along the length direction, and the protruding rib can fall into the grooves to form a matching. For the present embodiment, it is an option that a groove 8 is pressed on the main body flange 4, and the shape of the cross section of the groove 8 is an arc shape as shown in FIG. 5. A protruding rib 9 is pressed on the front plate flange 5 of the front plate, and the shape of the cross section of the groove 9 is an arc shape as shown in FIG. 6. The corresponding groove 8 and protruding rib 9 form a pair and have an identical shape. When the assembly and the combination are performed, as shown in FIG. 7, the protruding rib 9 falls into the groove 8, and the corresponding protruding rib 9 and groove 8 reinforce the rigidity of the front plate flange 5 and the main body flange 4 in the vertical direction, and can achieve a limit in a horizontal direction after the tub is combined and assembled, which solves a problem of left and right misalignment and swing caused after a large-sized tub is produced and assembled with a thin plate, increases the overall strength of the tub to avoid the vibration and the noise caused by the deformation of the tub after it is assembled, and meets the requirements for the production, the transportation and the use of a large-sized washing machine without increasing the thickness of the used material.

[0021] As shown in FIG. 1 and FIG. 2, on the tub described in this embodiment, the tub main body and the upper portion of the binding ends of the front plate are sequentially formed with a protruding strut 6 and a hanging hole 7 to form a locking structure, and the lower portion of the binding end is provided with the screw holes 10 and 11 for performing a fastening with the screws. A cooperation structure of the protruding rib 9 and the groove 8 is provided in the middle of the binding end.

[0022] In one embodiment, an assembled locking structure is as shown in FIG. 3 and FIG. 4, and a protruding strut 6 is disposed on the main body flange 4. A longitudinal section of the protruding strut 6 perpendicular to a plane in which the protruding strut 6 is disposed in a "T" shape. The hanging hole 7 is opened in the front plate flange 5 correspondingly, and it is an opening with a small upper end and a large lower end. It can be formed in a combination of an upper rectangular hole and a lower oblong hole as shown in the figures. At the time of assembly and combination, the protruding strut passes through the large end of the hanging hole 7 and slides

to a small end to form a locking so that the front plate 3 hangs on the tub body and cannot be pulled out. Meanwhile, since a height from a lower surface of a "T" shape of the protruding strut to an upper surface of the main body flange 4 is slightly larger than a thickness of the plate at the opening of the hanging hole, the front plate 3 and the tub body form a locking at the binding end. A screw is inserted into the screw holes 10 and 11 at the lower portion part so as to form a locking of the lower portion of the binding end, and at the same time, the protruding rib 9 falls into the groove 8 to form a matching.

[0023] The above assembling manner replaces the conventional manner of fastening with the screw and the screw hole. During assembly, the front plate can be easily mounted firstly and locked on the protruding strut to form a combination of the tub body and the front plate, and afterwards, it is fastened. The assembling is simple and easily performed, and there is no requirement for assisting other measures to make the two together. As a result, time and efforts are saved, and the assembly efficiency is improved.

[0024] The washing machine adopting the above tub has higher ergonomics in the production and assembly process, and at the same time, has a more solid and stable overall structure, which satisfies the reliability requirements for production, transportation and use in mass production.

[0025] The foregoing embodiments are merely optional embodiments of the present disclosure, and do not constitute limitations on the scope of protection of the present disclosure. Any implementation manner falling within the protection scope of the present disclosure constituted by the features or equivalent features of the present disclosure infringes the patent right of the present disclosure.

Industrial applicability

[0026] The embodiments of the present disclosure provide a washing machine tub and a washing machine. As for washing machine tub, the protruding rib and the groove reinforce the rigidity of the flange in a vertical direction and achieve a limit in a horizontal direction after the tub is combined and assembled, which solves the problem of left and right misalignment caused after a large-sized tub is produced and assembled with a thin plate, increases the overall strength of the tub to avoid the vibration and the noise caused by the deformation of the tub after it is assembled, and meets the requirements for the production, the transportation and the use of a large-sized washing machine without increasing the thickness of the used material.

Claims

1. A washing machine tub, comprising:
a front plate and a tub body formed by two side plates

and a rear plate, wherein the tub body is integrally formed, a main body flange and a front plate flange are respectively provide at binding ends of the tub body and the front plate, and a protruding rib and a groove are cooperatively provided at the main body flange and the front plate flange respectively, along a length direction thereof to prevent deformation of a tub.

2. The washing machine tub according to claim 1, further comprising:
a locking structure, which is formed by cooperatively providing a protruding strut and a hanging hole on the front plate flange and the main body flange respectively, wherein the locking structure is matched with a bolt and a screw for performing a fastening.
3. The washing machine tub according to claim 1, wherein the tub body is formed by pressing a steel plate having a thickness range of 0.6 mm to 1.2 mm.
4. The washing machine tub according to claim 2, wherein the locking structure formed by the protruding strut and the hanging hole is disposed at an upper portion of the binding ends, the bolt and the screw are disposed at a lower portion of the binding ends, and the protruding rib and the groove are disposed in the middle of the binding ends.
5. The washing machine tub according to claim 2, wherein a longitudinal section of the protruding strut perpendicular to a plane in which the protruding strut is disposed is in a "T" shape, the hanging hole is an opening with a small upper end and a large lower end, and the protruding strut passes through a large end of the hanging hole and slides to a small end to form a locking.
6. The washing machine tub according to claim 5, wherein a height from a lower surface of a "T" shape of the protruding strut to an upper surface of the main body flange is slightly larger than a thickness of the plate at the opening of the hanging hole.
7. The washing machine tub according to claim 5, wherein the opening is a combination of an upper rectangular hole and a lower oblong hole.
8. The washing machine tub according to any one of claims 1 to 7, wherein cross sections of the protruding rib and the groove are in an arc shape.
9. The washing machine tub according to any one of claims 1 to 8, wherein convex blocks and/or concave blocks are pressed on the two side plates and the rear plate to reinforce the tub body.
10. A washing machine, comprising any washing ma-

chine tub in claims 1 to 9.

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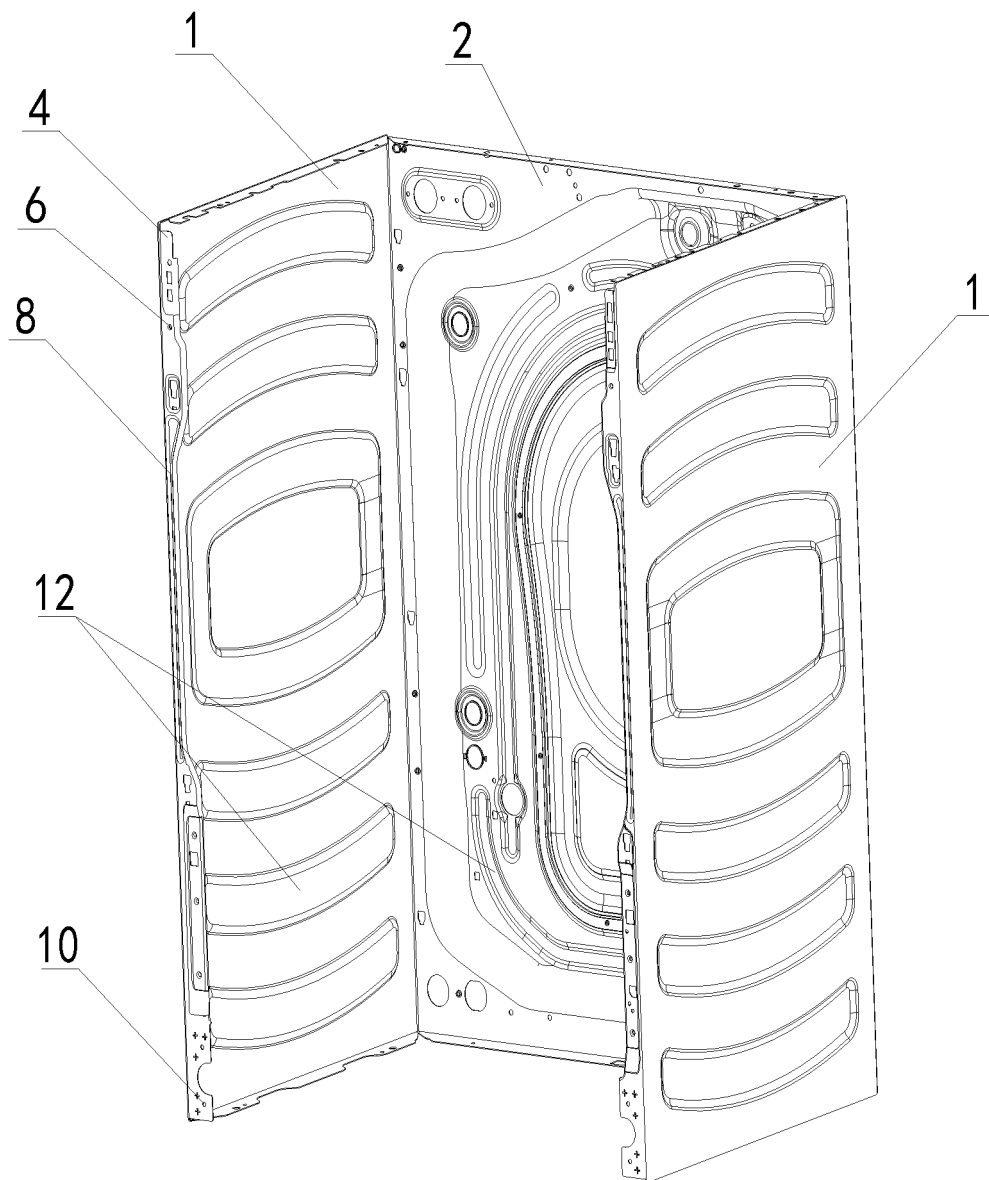


FIG. 1

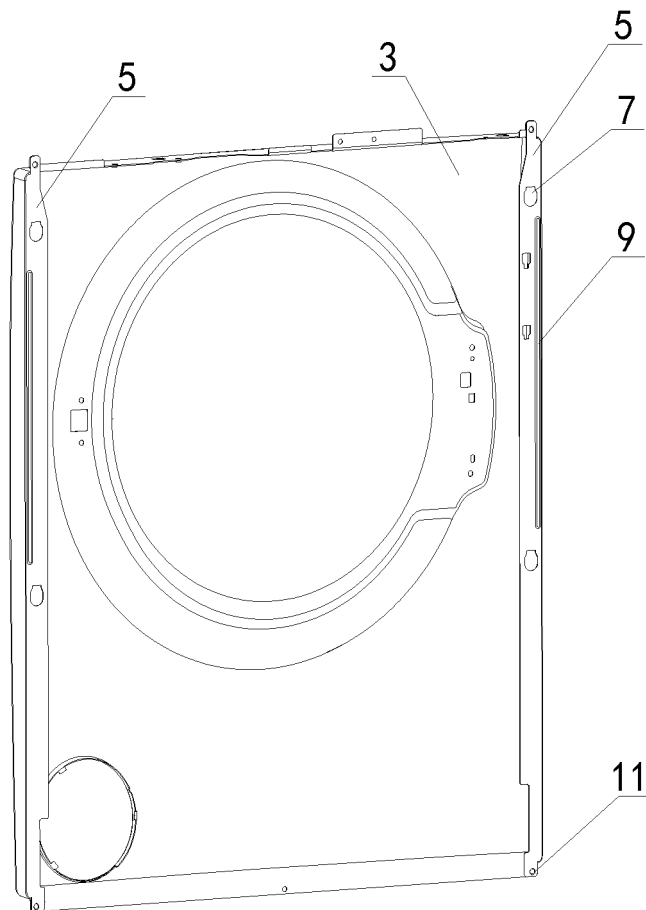


FIG. 2

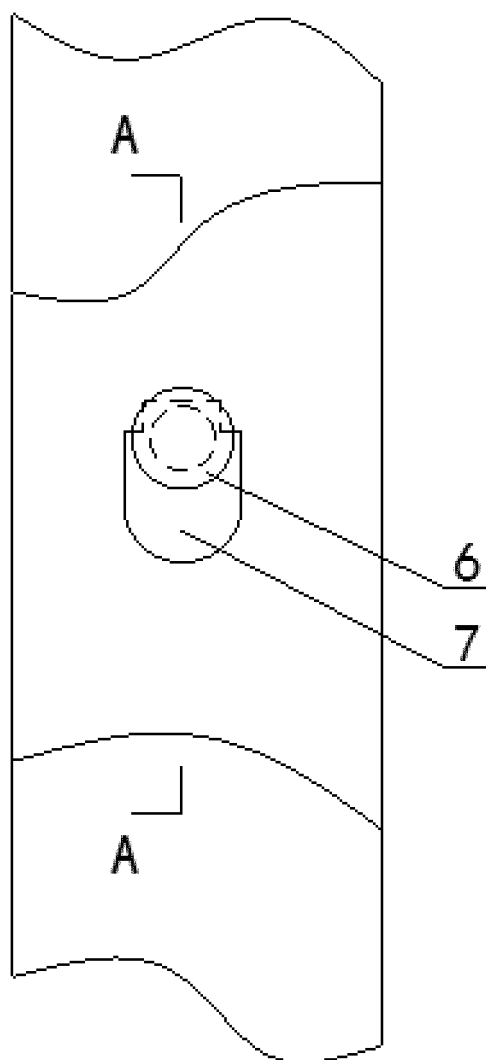


FIG. 3

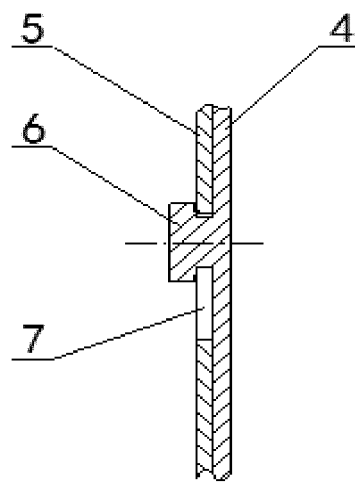


FIG. 4

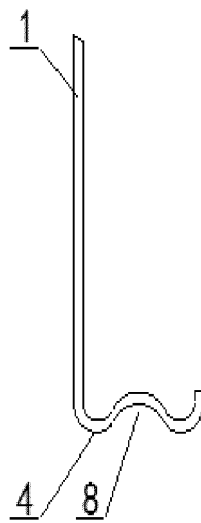


FIG. 5

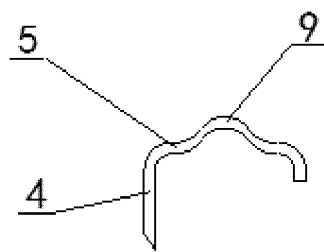


FIG. 6

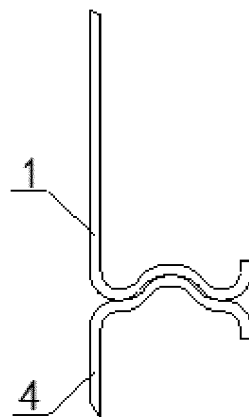


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2016/107033

A. CLASSIFICATION OF SUBJECT MATTER

D06F 39/12 (2006.01) i

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)

D06F

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)

CNTXT; CNABS; DWPI; SIPOABS: HAIER; LG; washing machine, clothes dryer, washing-drying integral machine, drying machine, rib, strip, column, arris, block, assemble, connect, deform, fasten, install, location, fix, shell, engine case, box, revers, dig, insert, board, orific+, lid?, protuberan+, protrusion, convex+, claw+, protrud+, project+, notch+, groov+, swell, clamp+, concav+, recess+, clasp+, clip+, bulg+, slit+, hook+, slot+, pawl?, heav+, wedg+, hole

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 20060114119 A (DAEWOO ELECTRONICS CORP.), 06 November 2006 (06.11.2006), abstract, description, pages 3-4, and figures 3-5	1-10
X	CN 1540074 A (LG ELECTRONICS (TIANJIN) APPLIANCES CO., LTD.), 27 October 2004 (27.10.2004), description, pages 3-4, and figure 3	1-10
A	CN 1683669 A (LG ELECTRONICS (TIANJIN) APPLIANCES CO., LTD.), 19 October 2005 (19.10.2005), the whole document	1-10

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:	"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
"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	"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
"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)	"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
"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	"&" document member of the same patent family

Date of the actual completion of the international search

18 February 2017 (18.02.2017)

Date of mailing of the international search report

08 March 2017 (08.03.2017)

Name and mailing address of the ISA/CN:
State Intellectual Property Office of the P. R. China
No. 6, Xitucheng Road, Jimenqiao
Haidian District, Beijing 100088, China
Facsimile No.: (86-10) 62019451

Authorized officer

BAI, Ying

Telephone No.: (86-10) 62084625

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2016/107033

5	Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
	KR 20060114119 A	06 November 2006	None	
10	CN 1540074 A	27 October 2004	None	
	CN 1683669 A	19 October 2005	None	
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