



(51) International Patent Classification:
D06F 37/26 (2006.01)

(21) International Application Number:

PCT/EP2018/062733

(22) International Filing Date:

16 May 2018 (16.05.2018)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

A 2017/08309 06 June 2017 (06.06.2017) TR

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(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP,
KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME,
MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,

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

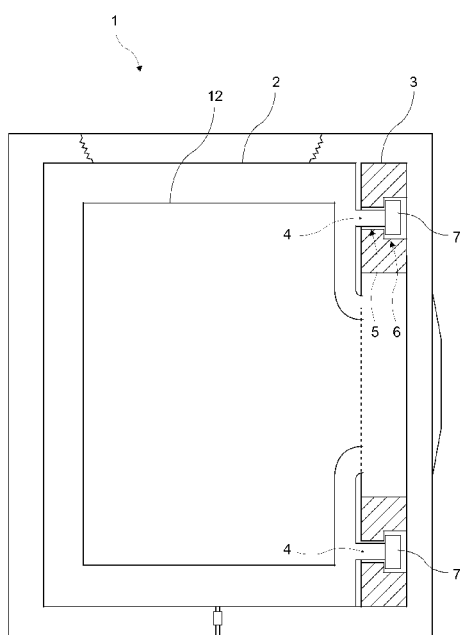
(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,
MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))

(54) Title: WASHER-DRYER COUNTERWEIGHT CONNECTION

Figure 1



(57) Abstract: The present invention relates to a washer-dryer (1) comprising a drum (12) in which laundry is placed, a tub (2) made of plastic material, in which the drum (12) moves, at least one counterweight (3) preferably made of concrete material, one or more bosses (4) provided on the tub (2), produced integrally with the tub (2) by plastic injection, enabling mounting the counterweight (3) to the tub (2), at least one mounting bore (5) provided on the counterweight (3), through which the boss (4) passes, and a niche (6) opened on the counterweight (3) in alignment with the boss (4), joined to the mounting bore (5) and wider than the mounting bore (5). At least one fixing piece (7) made of plastic is fixed to the end of the boss (4) by plastic welding and extends from the mounting bore (5) to the niche (6). This enables the counterweight (3) to be permanently fastened to the tub (2).



Description**WASHER-DRYER COUNTERWEIGHT CONNECTION**

- [0001] The present invention relates to fastening a counterweight on a tub used in a washer-dryer.
- [0002] In washing machines, it is known to use concrete counterweights fastened on a plastic tub to stabilize the loads occurring during operation. In general, an upper counterweight is placed on the upper portion, and a front counterweight is placed on the front portion of the plastic tub, and, if required, an additional counterweight is fastened on a third region other than the upper and the front portions of the tub. The counterweight is screwed after being mounted on the plastic extensions called the “bosses” provided generally on the tub. In mass production, apparatuses applying torque to the screw and systems controlling screwing torques are used in the process of fastening the counterweight. In general, a tensile force is applied on plastic by the screw connections formed on the plastic material, or the plastic extension is widened by being forced from within by the screw, thereby enabling the counterweight to stay fixed on the tub. In case of fixing performed by widening the plastic extensions, loads form in tensioning direction around the holes engaging the plastic extensions of the concrete counterweight, and this leads to formation of fissures on the concrete. Size changes in the mounting bore of the counterweight and deformations on the plastic extensions likely to occur in time, decrease the value of the force fixing the counterweight. In such a case, the counterweight begins coming loose, increases its movement amplitude by making room for itself on the plastic extensions in time, and causes the operating noise to increase. In the state of the art, a screw's own pre-tension is utilized to provide a pre-tensioned connection so as to inhibit the counterweight from coming loose, or the desired pre-tension is provided by a spring washer.
- [0003] The international patent application no. WO 2014 007 764 (A1) discloses joining a coupling member placed in the counterweight used in a washing machine, with the tub.
- [0004] The European patent application no. EP 1 426 477 (A2) discloses a

snap-fit connection between a counterweight and tub used in a washing machine.

- [0005] The international patent application no. WO 2007 129 353 (A1) relates to a system for fixing to a tub, a counterweight used in a washing machine.
- [0006] The aim of the present invention is to realize a washer-dryer in which a counterweight is enabled to be fastened elastically and without space on a tub, and is prevented from untighten and coming loose in time.
- [0007] In the washer-dryer realized to achieve the aim of the present invention, after mounting the counterweight on the bosses provided on the plastic tub, plastic fixing pieces are placed in the niches provided on the counterweight in order to fix the counterweight-tub connection. The fixing pieces are fixed to the ends of the bosses in the niches by vibration welding or by using one of the plastic welding methods such as spin, ultrasonic, laser, infrared, or hot plate welding, thereby enabling the counterweight to be permanently fastened on the tub.
- [0008] In an embodiment of the invention, at least one plastic welding protrusion is disposed at the region where the fixing piece joins the boss, reinforcing the welding connection.
- [0009] In another embodiment of the invention, centering protrusions are provided in the niche on the counterweight, enabling seating the fixing piece in the niche concentrically with the boss.
- [0010] In another embodiment of the invention, a screw orifice is provided in the fixing piece and in the boss, enabling reinforcing the fixing piece-boss connection by means of a screw.
- [0011] The washer-dryer realized to achieve the aims of the present invention is illustrated in the accompanying drawings, wherein:
- [0012] Figure 1 is a schematic view of the washer-dryer of the invention, on which a counterweight is fastened.
- [0013] Figure 2 is a detail sectional view of the counterweight-tub connection.
- [0014] Figure 3 is a detail sectional view of the counterweight-tub connection in an embodiment of the invention.
- [0015] Figure 4 is a view of the detail A of Figure 3.
- [0016] Figure 5 is a detail sectional view of the counterweight-tub connection in

another embodiment of the invention.

[0017] Figure 6 is a view of the detail B of Figure 5.

[0018] The elements in the figures are numbered individually and the correspondence of these numbers are given hereinafter.

1. Washer-dryer
2. Tub
3. Counterweight
4. Boss
5. Mounting bore
6. Niche
7. Fixing piece
8. Plastic welding protrusion
9. Centering protrusion
10. Screw
11. Screw orifice
12. Drum

[0019] The washer-dryer (1) comprises a drum (12) in which laundry is placed, a tub (2) made of plastic material, in which the drum (12) moves, at least one counterweight (3) preferably made of concrete material, helping damping the forces acting during operation by increasing the inertia of the tub (2), one or more bosses (4) provided on the front wall of the tub (2), produced integrally with the tub (2) by plastic injection, enabling mounting the counterweight (3) to the tub (2), at least one mounting bore (5) provided on the counterweight (3), through which the boss (4) passes, and at least one niche (6) opened on the counterweight (3) in alignment with the boss (4), joining with the mounting bore (5) and wider than the mounting bore (5).

[0020] The washer-dryer (1) of the invention comprises at least one fixing piece (7) made of plastic material, seated in the niche (6), fixed to the end of the boss (4) extending from the mounting bore (5) to the niche (6) by plastic welding, and enabling the counterweight (3) to be permanently fastened on the tub (2).

[0021] While fastening the concrete counterweight (3) on the tub (2), the bosses

(4) on the tub (2) are inserted in the mounting bores (5) provided on the counterweight (3) and the counterweight (3) is seated on the tub (2). Each one of the bosses (4) extends from the mounting bore (5) towards the niche (6) by plugging into the counterweight (3). The plastic fixing piece (7) is seated to the niche (6), and is also fastened on the end of the boss (4) such that it cannot be removed unless damaged. The counterweight (3) is fastened on the tub (2) without space and elastically, preventing the counterweight (3) from coming loose on the tub (2) in time and thus causing noise.

[0022] In an embodiment of the invention, the washer-dryer (1) comprises at least one plastic welding protrusion (8) provided at the connection region of the fixing piece (7) and the boss (4), extending from the fixing piece (7) into the boss (4) and/or from the boss (4) into the fixing piece (7), and reinforcing the plastic welding connection between the fixing piece (7) and the boss (4) by increasing the surface area of the connection region (Figures 3, and 4).

[0023] In another embodiment of the invention, the washer-dryer (1) comprises at least one centering protrusion (9) provided in the niche (6) on the counterweight (3) on the resting surface of the fixing piece (7), enabling the fixing piece (7) to be seated in the niche (6) concentrically with the boss (4) (Figure 5, and 6).

[0024] In another embodiment of the invention, the washer-dryer (1) comprises at least one screw orifice (11) provided in the fixing piece (7) and in the boss (4), enabling reinforcing the fixing piece (7) - boss (4) connection and therefore the counterweight (3) - tub (2) connection by means of a screw (10) as an additional reinforcement to the plastic welding fixing the fixing piece (7) to the boss (4) (Figures 3 to 6).

[0025] After mounting the counterweight (3), the fixing piece (7) is fastened on the boss (4) on the tub, (2) by using one of the plastic welding methods such as spin, ultrasonic, hot plate, laser, infrared or vibration welding.

[0026] In another embodiment of the invention, the fixing piece (7) is produced integrally with the tub (2) in the same plastic injection mold, is separated from the tub (2) by being broken after plastic injection, and is fastened on

the boss (4) by plastic welding method after the counterweight (3) is mounted to the tub (2).

[0027] In another embodiment of the invention, the fixing piece (7) is fastened on the bosses (4) provided on the tub (2) by over injection. The fixing piece (7) is produced by injecting plastic material into the niche (6) on the counterweight (3), and is also fastened at the end of the boss (4) extending into the niche (6).

[0028] The plastic fixing piece (7) enables the counterweight (3) to be fastened on the tub (2) without space and by an elastic connection method. The counterweight (3) is prevented from untighten in time and the washer-dryer (1) is prevented from operating loudly.

Claims

1. A washer-dryer (1) **comprising** a drum (12) in which laundry is placed, a tub (2) made of plastic material, in which the drum (12) moves, at least one counterweight (3), one or more bosses (4) provided on the tub (2), produced integrally with the tub (2) by plastic injection, enabling mounting the counterweight (3) to the tub (2), at least one mounting bore (5) provided on the counterweight (3), through which the boss (4) passes, and at least one niche (6) opened on the counterweight (3) in alignment with the boss (4), joining with the mounting bore (5), **characterized by** at least one fixing piece (7) made of plastic material, seated in the niche (6), fixed by plastic welding on the end of the boss (4) extending from the mounting bore (5) to the niche (6), and enabling the counterweight (3) to be permanently fastened on the tub (2).
2. A washer-dryer (1) according to claim 1, **characterized by**, at least one plastic welding protrusion (8) provided on the connection region of the fixing piece (7) and the boss (4), extending from the fixing piece (7) into the boss (4) and/or from the boss (4) into the fixing piece (7), and reinforcing the plastic welding connection between the fixing piece (7) and the boss (4).
3. A washer-dryer (1) according to claim 1, **characterized by** at least one centering protrusion (9) provided in the niche (6) on the counterweight (3) on the resting surface of the fixing piece (7), enabling the fixing piece (7) to be seated in the niche (6) concentrically with the boss (4).
4. A washer-dryer (1) according to any one of the claims 1 to 3, **characterized by** at least one screw orifice (11) provided in the fixing piece (7) and in the boss (4), enabling reinforcing the fixing piece (7) - boss (4) connection by means of a screw (10).
5. A washer-dryer (1) according to any one of the claims 1 to 3, **characterized by** the fixing piece (7) fastened on the boss (4) on the tub (2) by vibration welding or by using one of the plastic welding methods such as spin, ultrasonic, laser, infrared or hot plate welding.
6. A washer-dryer (1) according to any one of the claims 1 to 3, **characterized by** the fixing piece (7) produced integrally with the tub (2) in the same plastic injection mold, separated from the tub (2) by being broken after plastic injection, and fastened on the boss (4) by plastic welding after the

counterweight (3) is mounted to the tub (2).

7. A washer-dryer (1) according to any one of the claims 1 to 3, **characterized by** the fixing piece (7) produced by over injection on the bosses (4) on the tub (2).

Figure 1

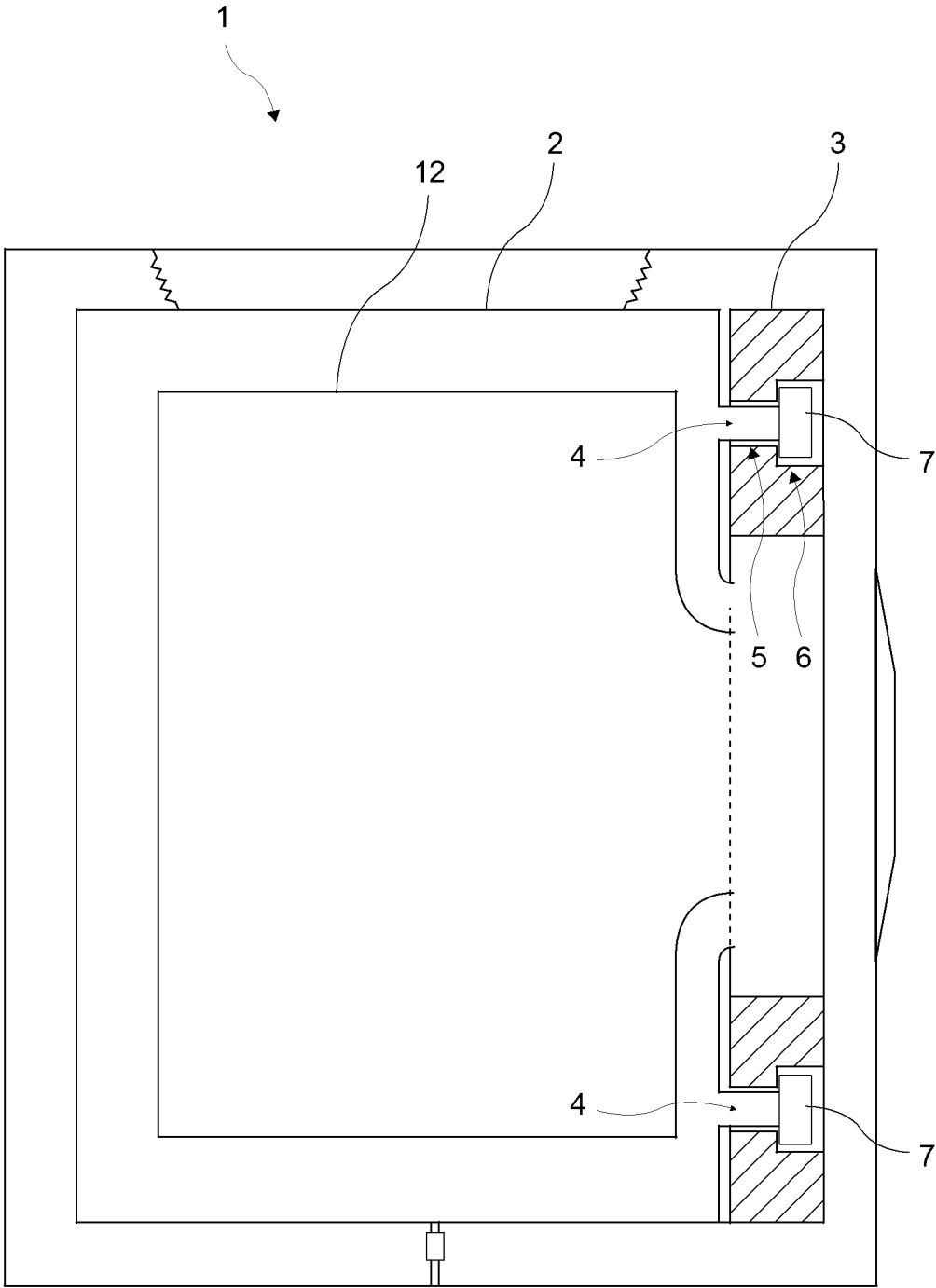
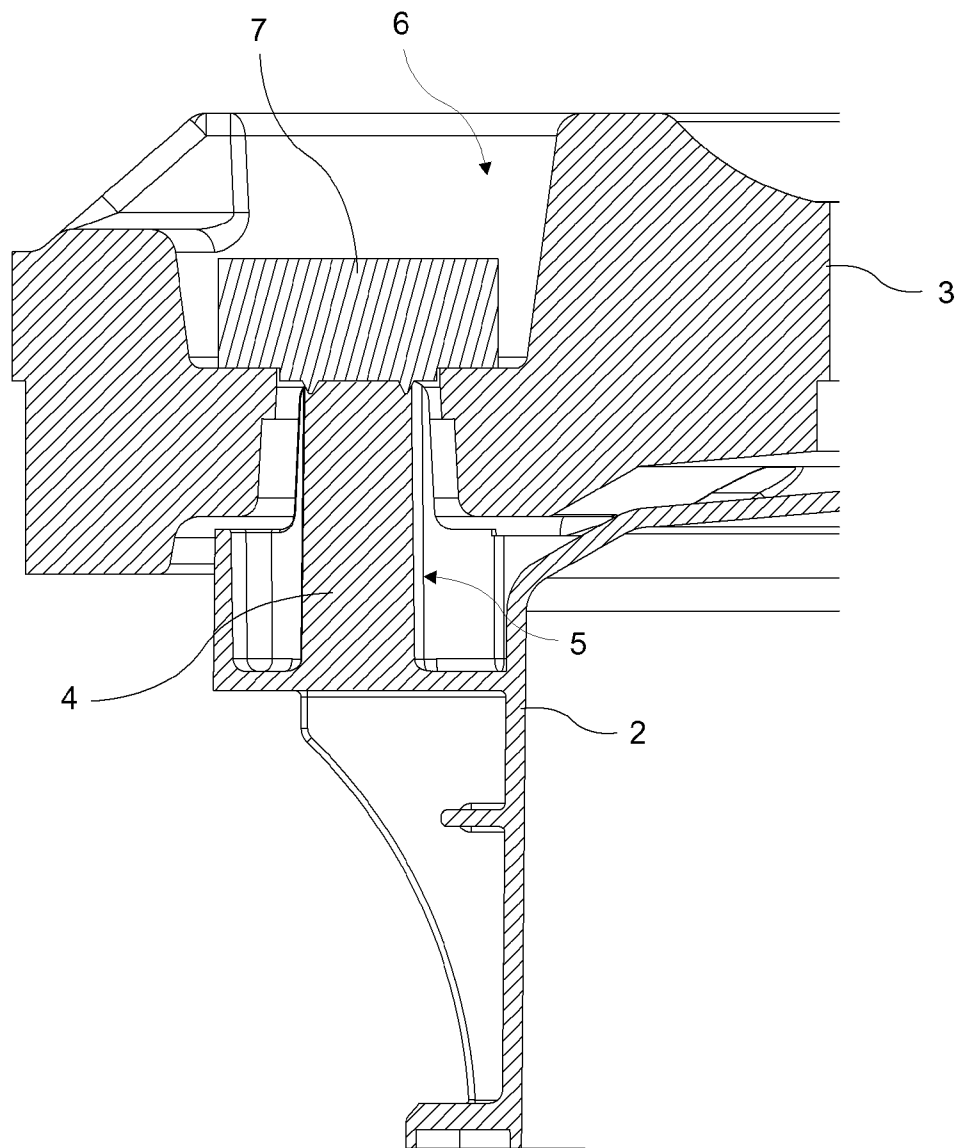


Figure 2



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Figure 3

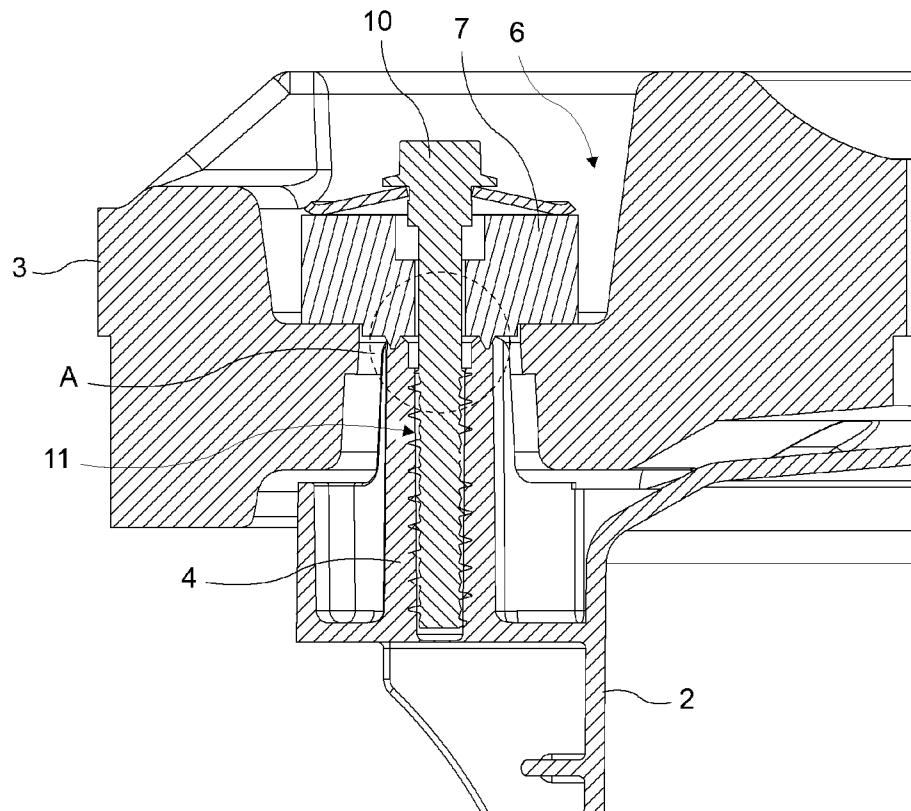


Figure 4

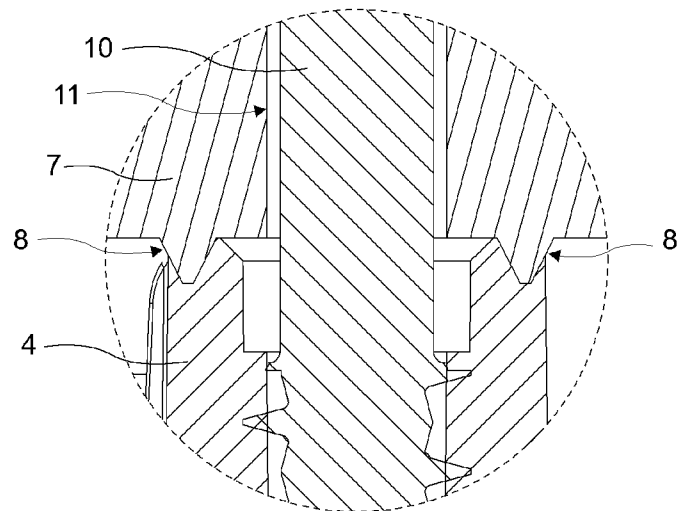


Figure 5

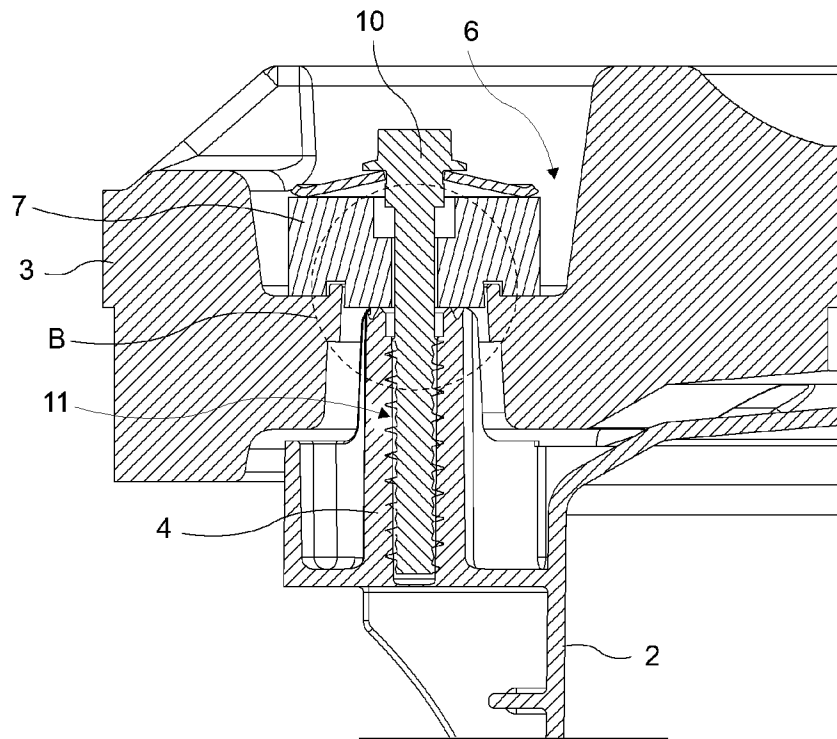
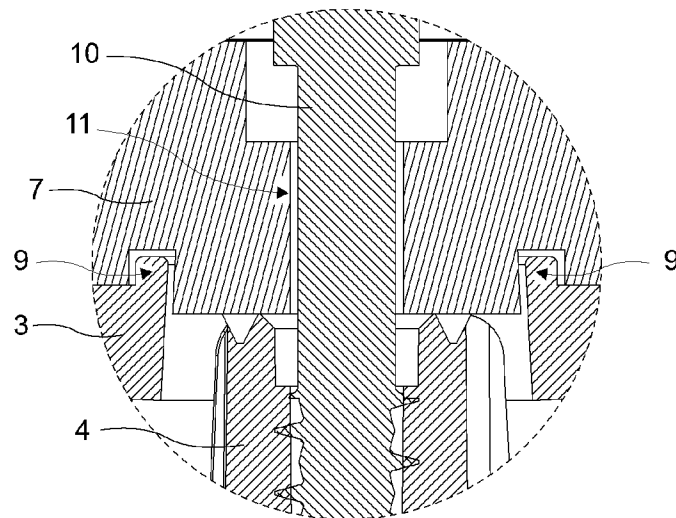


Figure 6



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/062733

A. CLASSIFICATION OF SUBJECT MATTER
INV. D06F37/26
ADD.

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	EP 2 551 397 A2 (SAMSUNG ELECTRONICS CO LTD [KR]) 30 January 2013 (2013-01-30) paragraph [0004] paragraph [0029] - paragraph [0033]; figure 1 paragraph [0035] - paragraph [0047]; figures 2-8	1-3,5
Y	DE 10 2006 010788 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 13 September 2007 (2007-09-13) paragraph [0003] paragraph [0029] - paragraph [0034]; figure 1 paragraph [0043]; figure 6 ----- -/-	1-3,5



Further documents are listed in the continuation of Box C.



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Date of the actual completion of the international search

2 August 2018

Date of mailing of the international search report

13/08/2018

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2018/062733

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2018/062733

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