(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 821 093 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
28.01.1998 Bulletin 1998/05

(51) Int Cl.[6]: **D06F 37/00**

(21) Application number: **97202247.9**

(22) Date of filing: **17.07.1997**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV RO SI

(30) Priority: **22.07.1996 IT MI961521**

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(54) Process for assembling a shaft and a flange for the support of a rotating basket of a washing machine, and assembly thus obtained

(57) A process for assembling a supporting and driving shaft (3) of a rotating basket for a washing machine with a flange (1) for coupling the shaft to the basket includes: formation of a cylindrical seat (2) in said flange which is able to receive a first portion (8) of the larger diameter of the said shaft (3), said cylindrical seat being frontally provided with a hole (4) having a reduced diameter for passage of a second portion (9, 10, 11) of said shaft; insertion of said shaft (3) in said seat (2) in such a way that said first portion abuts against an edge (6) of said hole (4); swaging of at least one part of said second portion (9, 10 , 11) against said edge (6) of hole (4), so that said edge (6) of hole (4) is closed between said first portion (8) and said second swaged portion (9, 10, 11) of the shaft.

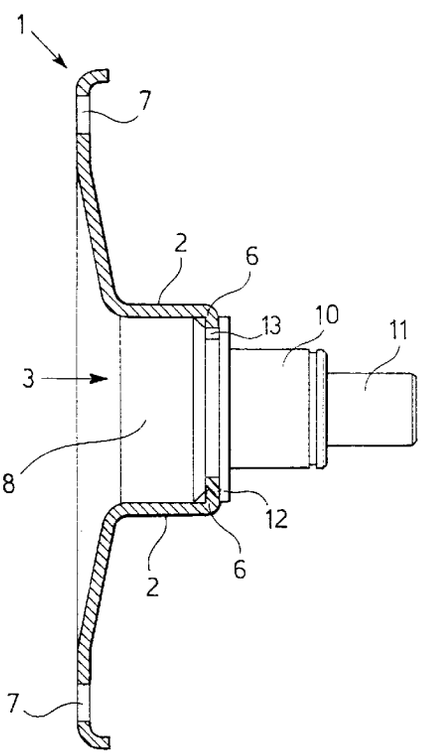


Fig. 5

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Description

The present invention refers to a process for assembly a shaft and a flange for the support of a rotating basket of a washing machine, particularly but not exclusively of the type with topside loading, and the shaft-flange assembly thus obtained.

In the traditional laundry washing machines, the flange-shaft assembly that supports the rotating basket is normally obtained by die-casting the flange on a worked shaft having an incorporated rolled bushing with which, once the shaft has been assembled with the flange, a seal cooperates to guarantee the water-proof sealing.

As an alternative, the flange is obtained by pressing a sheet of Inox steel, so as to form a central protruding bulge for water sealing, and on said bulge the worked shaft is butt-welded. This solution is for instance employed in laundry washing machines with topside loading.

These assemblage systems prove to be rather laborious and, moreover, do not guarantee a perfect positioning and alignment of the shaft. This second aspect is of particular importance in washing machines with topside loading, in which the basket is sustained by two opposing shafts, whose perfect axial alignment is essential for correct operation of the machine and for guaranteeing the reliability of the rotating mechanical components.

In view of the described state of the art, an object of this invention is to provide a process for assembling the shaft to the flange that is simple and that guarantees a better positioning and alignment of the shaft.

In accordance with the present invention, such an object is reached by a process for assembling a supporting and driving shaft for a rotating basket of a washing machine with a flunge for coupling the shaft to the basket, characterized in that it includes the following steps:

formation of a cylindrical seat in said flunge which is able to receive a first portion of larger diameter of said shaft, said cylindrical seat being frontally provided with a smaller diameter hole for passage of a second portion of said shaft;
insertion of the shaft into said seat so that said first portion abuts against an edge of said hole and said second portion comes out of said hole;
swaging of at least one part of said second portion against said edge of the hole, so that said edge of the hole is locked between said first portion and said second swaged portion of the shaft.

Preferably said swaging involves only a sub-portion of said second portion of the shaft, adjacent to said first portion.

In accordance with a preferred solution, the process also includes formation of at least one material relief in said edge of the hole in the cylindrical seat of the flange, so that, during said swaging, the swaged material of the said sub-portion of the second portion of the shaft fills up said relief to prevent any rotation of the shaft with respect to the flange.

Preferably, a plurality of said material relieves are formed in said edge of the hole.

The process according to the invention, besides being simple, guarantees a perfect positioning and alignment of the shaft.

Always in accordance with the present invention, a shaft and flange assembly for supporting and driving a rotating basket for washing machine is provided, which is characterized in that said flange has a cylindrical seat able to receive a first portion of larger diameter of said shaft and with a smaller diameter hole for passage of a second portion of the shaft, and in that said second portion of the shaft comprises a ring that cooperates with said first portion of the shaft to lock an edge of said hole.

The features of the present invention will appear evident from the following detailed description of an embodiment thereof, illustrated as a non-limiting example in the attached drawings, in which:

Figure 1 is a front view of a flange before assemblage with a shaft;
Figure 2 is a section view according to line II-II of Figure 1;
Figure 3 is a front view of a shaft before assemblage with the flange of Figures 1 and 2;
Figure 4 is a side view of the shaft; and
Figure 5 is a section view, analogous to the one of Figure 2, of the flange and the shaft put together.

With reference to Figures 1 and 2, there is shown a flange 1 for coupling of a respective supporting shaft 3, shown in Figures 3 and 4, with a rotating basket (not shown) of a laundry washing machine.

Flange 1 is preferably of metal, in particular Inox steel, and is obtained by pressing and blanking. Flange 1 is shaped so as to form a cylindrical seat 2 for accommodating shaft 3. The cylindrical seat 2 is open in the back and, in the front, it is provided with a circular hole 4; an edge 6 of the hole 4 forms a shoulder having a small diameter with respect to the internal diameter of the cylindrical seat 2. Along the edges of the hole 4 four relieves 5 are provided, obtained by blanking, arranged in a circumferential succession. Along the periphery of the flange 1 there is also provided a circumferential succession of holes 7 for fastening the flange to the basket by means of screws.

Shaft 3 comprises a portion 8 of larger diameter, substantially corresponding to the internal diameter of the cylindrical seat 2, followed by a portion 9 having a smaller diameter, substantially equal to the diameter of the hole 4 in the cylindrical seat 2, by a fust 10 having an even smaller diameter on which, when in use, a ball bearing is keyed and ends with a tang 11 having an even

smaller diameter provided with an internal threaded hole.

For assembling the shaft with the flange, the shaft is first inserted into seat 2 so that the tang 11, the fust 10 and the portion 9 come out frontwise from the flange by passing through the hole 4.

Successively, by means of an idoneous machine tool, portion 9 is pressed up against edge 6 of the hole 4. The material that constitutes portion 9, once upsetted, determines the formation of a ring 12 (Figure 5) that co-operates with portion 8 of the shaft to block the shaft 3 into flange 1. The material that constitutes portion 9 of the shaft, during the upsetting, also fills the relieves 5, forming an equal number of teeth 13 which, in this way, prevent the rotation of the shaft with respect to the flange.

Thank to the process of assemblage in accordance with the invention the correct position and alignment of the shaft is guaranteed.

Claims

1. Process for assembling a supporting and driving shaft (3) for a rotating basket of a washing machine with a flange (1) for coupling the shaft to the basket, characterized in that it includes the following steps:

   formation of a cylindrical seat (2) in said flange which is able to receive a first portion (8) of larger diameter of said shaft (3), said cylindrical seat being frontally provided with a smaller diameter hole for passage of a second portion (9, 10, 11) of said shaft;
   insertion of the shaft (3) into said seat (2) so that said first portion abuts against an edge (6) of said hole (4) and said second portion (9, 10, 11) comes out of said hole (4);
   swaging of at least one part of said second portion (9, 10, 11) against said edge (6) of the hole (4), so that said edge (6) of the hole (4) is tightly held between said first portion (8) and said second swaged portion (9, 10, 11) of the shaft.

2. Process according to claim 1, characterized in that said swaging involves only a sub-portion (9) of said second portion of the shaft (3), adjacent to said first portion (8).

3. Process according to claim 2, characterized in that it further includes formation of at least one material relief (5), in said edge (6) of the hole (4) in the cylindrical seat (2) of the flange (1), so that during said swaging the swaged material of said sub-portion (9) of the second portion (9, 10, 11) of the shaft (3) fills up said relief (5) to prevent any rotation of the shaft with respect to the flange.

4. Process according to claim 3, characterized in that a plurality of said discharges of material (5) are formed in said edge (6) of the hole (4).

5. Shaft and flange assembly for supporting and driving a rotating basket for a washing machine, characterized in that said flange (1) is provided with a cylindrical seat (2) able to receive a first portion (8) of larger diameter of said shaft (3) and with a smaller diameter hole (4) for passage of a second portion (9, 10, 11) of the shaft (3), and in that said second portion (9, 10, 11) of the shaft (3) comprises a ring (12) that co-operates with said first portion (8) of the shaft to lock the edge (6) of said hole (4).

6. Assembly according to claim 5, characterized in that said edge (6) of the hole (4) of flange (1) is provided with at least one material relief (5) in which a respective tooth (13) of said ring (12) is engaged to prevent any rotation of the shaft with respect to the flange.

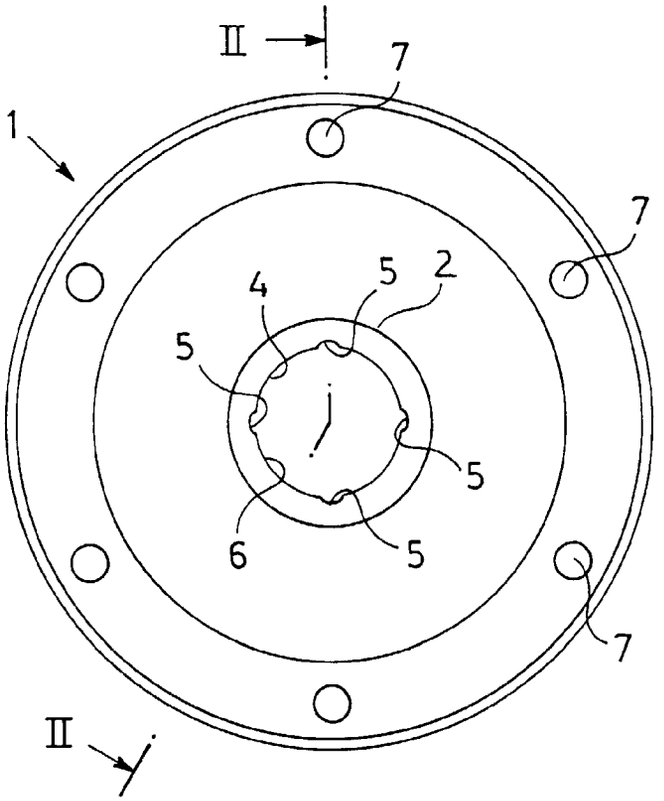


Fig.1

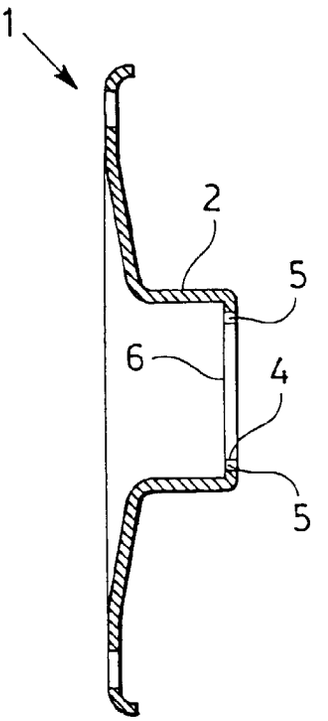


Fig.2

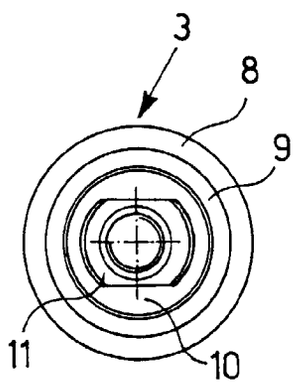


Fig.3

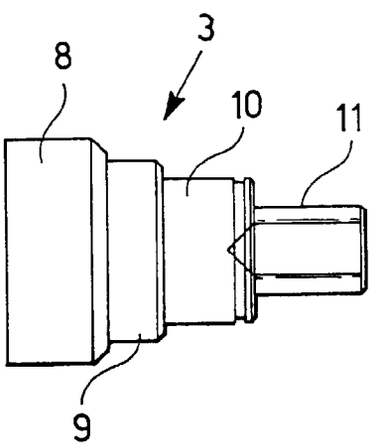


Fig.4

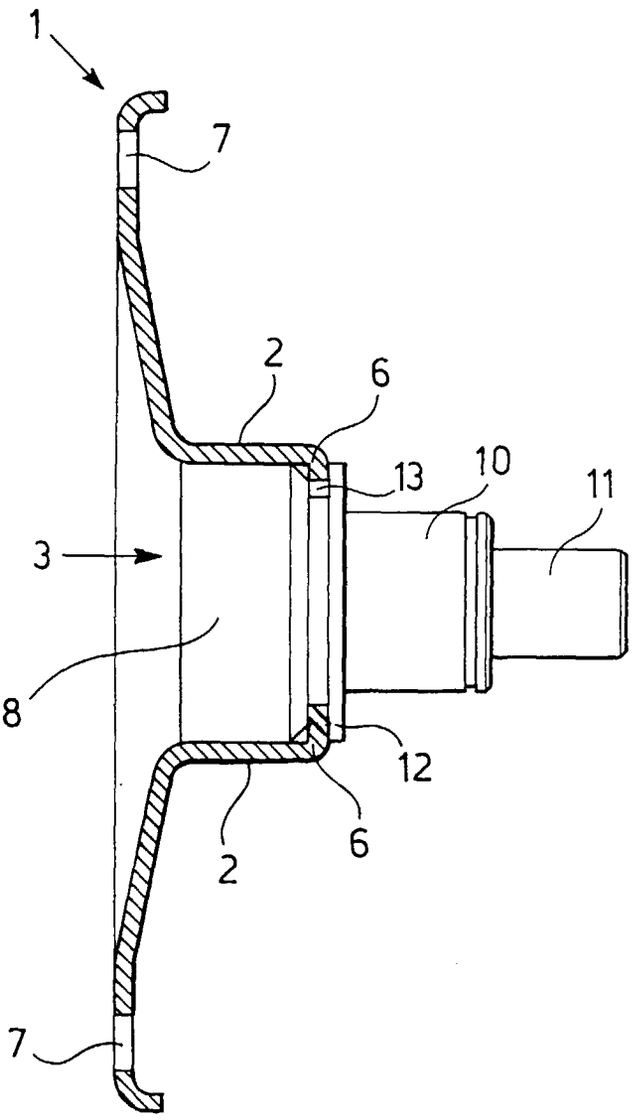


Fig. 5