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(54) Title: A ROLLER BEARING FOR A WASHING MACHINE COMPRISING A FRONT LOADING ROTARY DRUM AND PRODUCTION METHOD THEREOF

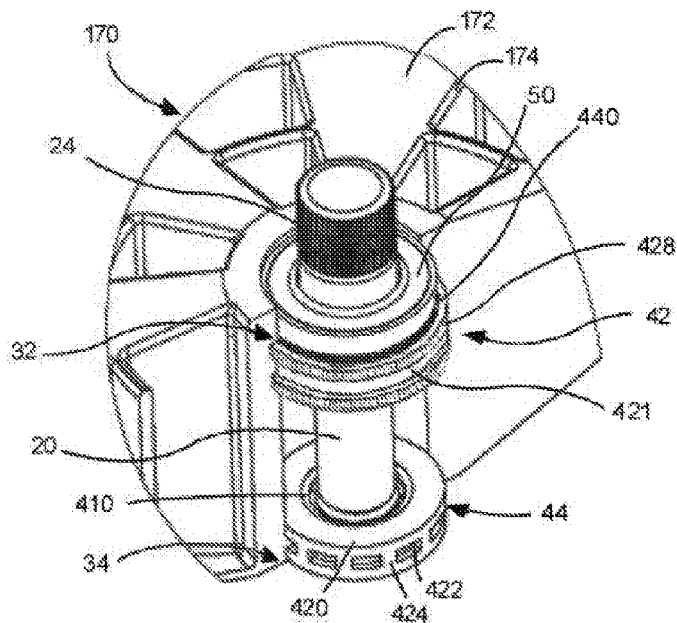


Figure 2

(57) Abstract: Invention relates to a roller for bearing a rotor or a rotary shaft (20) comprising an inner and an outer bushing (410, 420) and a plurality of rolling elements that provide movement to inner bushing (410) and a plastic part having a bearing opening. Roller further comprises, at least one outer bushing (420) being mounted to the plastic part is comprising a holding channel (421) filled with the material of plastic part in the form of a radial recess along the circumference of the outer lateral surface of at least one roller, which is adjusted in accordance with the geometry and length of the opening on the plastic part.



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A ROLLER BEARING FOR A WASHING MACHINE COMPRISING A FRONT
LOADING ROTARY DRUM AND PRODUCTION METHOD THEREOF

TECHNICAL FIELD

5 The invention relates to bearing roller of a drum that suitable for use in washing machines or washing dryers nowadays, and relates to an economic, resistance increased, environmentally sensitive roller embodiment.

THE PRIOR ART

At the front loading washing machines, the washing operation is carried out according to the type and pollution of the laundry with the help of a control knob located on the machine.

10 Constituent parts of the washing machine can be sorted as tub, drum, shaft, roller recess, drum metal sheets, balance weight, motor.

There is a bearing part which consists of bearing elements in the bearing area where a shaft is connected to a tub in a drum for the drum movement, the drum shaft is attached to the drum rotatably in one end, and the other ends being free to rotate the attached tub in the machine housing and connects the drum to the tub in front-loading washing machines where it is
15 mounted. In the known state of the art, an American patent US2014076006 discloses that a bearing recess can be disposed on the rear wall of the tub to support the shaft rotatably. The bearing recess is made of aluminum alloy and is attached to the rear wall of the tub while the tub is being molded. Rollers are disposed between the bearing recess and shaft to facilitate
20 rotation of the shaft. First and second rollers mounted on the shaft at a distance from each other are disposed on the tub combined part and the motor combined part. The bearing recess hub which rollers settled are formed integrally with the bearing recess center.

In the current situation used roller bear produced from casting material is heavy, creates a cost due to frequently use of the material.

25 Also, the fact that the manufacturers are always putting the washing machines with higher rotational speeds to the market causes the mechanical bending and torsional load to increase every time the shaft on the drum bearing in the washing machine tub. This leads to erroneous settings, reduced life span of the parts, and the like, resulting in high costs in the parts used for bearing shaft of the washing machine drum and their materials.

30 In some of these applications, pinching the shaft with a product that takes up an extra space instead of strengthening the structure of the shaft brings both extra cost and design difficulty.

Nowadays, the bushes used in the drum shaft bearings of washing machines are made of brass or cast and are not economical and lightweight. Cost improvements made on the bearing

part and the shaft are generally geometric changes such as diameter changes on the shaft metal part, height measurements or profile changes on the outer surface. The tub material is made of plastic metal, the drum shaft and the elements in the bear are made of metal. The work of the washing machines causes different fatigue of the two different materials, and warplings distortions occurs over time. Accordingly, there is a need in the art for a new bearing element or bearing assembly that bearing drum-moving shaft in the opening on the tub to reduce economic and the effect of fatigue in the current situation. Particularly, it is expected that the new embodiment will prevent the erosion, fatigue, and strength reductions that may occur over time. At the same time it is important to reduce the cost of production.

BRIEF DESCRIPTION OF THE INVENTION

The purpose of the invention is to provide a movable rotating member in a plastic hole or a roller which is capable of bearing the shaft in a robust and efficient manner and which does not cause deformation of the hole in which the shaft bearing is located as a result of movement of said shaft. Particularly in high speed washing machines, to provide a roller embodiment that provides an economical solution to the problems of mechanical damage and physical change that occur in a shaft bearing connected to a rotary drum. For example in bearing part of drum shaft of washing machine as washer, it is aimed to be more robust due to the fact that it is the same basic material as the tub body to be combined with plastic coated, to save bearing parts and to obtain a more economical, cost saving product which does not require extra parts such as the housing part which is put on the roller.

A roller for bearing a rotor or a rotary shaft comprising an inner and an outer bushing and a plurality of rolling elements that provide movement to inner bushing and a plastic part having a bearing opening wherein at least one outer bushing being mounted to the plastic part is comprising a holding channel filled with the material of plastic part in the form of a radial recess along the circumference of the outer lateral surface of at least one roller, which is adjusted in accordance with the geometry and length of the opening on the plastic part. Thus a good and effective bonding is provided with the plastic tub and the part with the bearing mechanism.

The roller of the invention is particularly preferably applied on washing machines with a front loading rotating drum, a plastic tub surrounding the drum with the loading door open, a shaft that provides motion to the hole on the tub rear wall and to the drum in the contact hole. It includes a front roller and a rear roller which are positioned in the hole front orifice and in the hole rear orifice to be connected directly to the tub, are adjusted to the geometry and diameter of the rear wall hole. At this point the connection is made between the inlet and outlet of the hole bear, so that effective bonding between the shaft and the plastic tub is provided.

The invention includes an outer bushing having a roughened lateral surface along its radial periphery and / or having recessed protrusions formed on the lateral surface, preferably formed

with bridges separating a plurality of cavities and cavities from each other. In a preferred embodiment, the invention comprises at least one holding bridge that divide the holding channel in such a way that it continues to be cut at least one place at certain predetermined distances along the circumference of the holding channel and at least two holding recesses
5 formed holding bridge. At this point the connection is made between the inlet and outlet of the hole bear, so that effective assembling between the shaft and the plastic tub is provided.

The invention comprises at least one fin band, which is formed by a orthogonal fin extending radially outwardly circumference the lateral surface of the the ring-form roller outer bushing so as to form a gap at a predetermined distance between the ends. Said distance is preferably a
10 distance of 2 mm, 3 mm or 4 mm between the orthogonal fins, and in different embodiments this distance has a value of 1 to 7 mm, in particular 2 to 5 mm. In this way, effective bonding is obtained between the bearing roller and the plastic tub in the moving working environment. This will prevent deformations on the tub by the action of the drum shaft.

The invention includes fin band which consist of the bushing has been inclined at a certain
15 angle and / or preferably to an horizontal acute angle smaller than 90° and / or horizontal fins. Preferably, in the action of rotation of the drum shaft, angles are formed which are to cover the moment of inertia. In a preferred embodiment, the invention comprises at least two fin bands with a numerous of orthogonal fins formed to extend radially outwardly on the lateral surface so as to complement the circumference of the outer bushing, and at least one holding
20 channel at the distance between the two bands. Thus a strong and stable contact will be provided even in the moving working conditions of the shaft.

Thus in the plastic bearing to which the roller is connected the material of the plastic part fills the recesses of the roller is provided an active connection. In a preferred embodiment of the invention, the distance between said orthogonal fin band is preferably set to a distance of 2
25 mm, 3 mm or 4 mm between them and in different embodiments may be in the range of 1 to 7 mm, in particular 2 to 5 mm.

In a preferred application the invention includes outer bushings having an axial diameter set in accordance with the geometry and length of the tub rear wall hole which are outer part of a front and a rear roller. The geometry of said hole is a conical structure which narrows towards
30 the front of the tub and expands towards the rear for a selected application as a washing machine. In different applications there are gradual decreasing holes in cylinder-like or prismatic shapes. According to this the roller diameters are also adjusted, the front roller has a smaller diameter than the rear roller. The invention in bearing mechanisms having at least two rollers, comprises at least one channel and/or at least one recess and/or at least one
35 bridge and/or at least one orthogonal fin and/or at least one horizontal fin and/or at least one fin band as recessed protrusions formed in different geometries on the lateral surface of

the front and rear roller outer bushing. In a preferred application of the invention said bearing comprises an outer bushing that structured in polygonal form.

In a preferred embodiment, the invention comprises at least one cover that is a front and / or a rear roller component also to prevent the escape of grease and the entrance of outside
5 foreign matter to the roller inside so as to cover the drum shaft and rolling elements that support the motion to increase the life time of a roller bear.

In a preferred embodiment of the present invention, in a method of production for obtaining a bearing member, comprising at least one of the steps of forming the fin and recessed and / or
10 channeled structures in different geometries on different radial outer lateral surfaces of the roller outer bushing, roughening the surface of the outer bushing, mounting drum tub that produced directly from the plastic by injection molding technology in drum tub that produced directly from the plastic by molding process on the roller with rolling element on the shaft or combinations thereof.

The invention preferably is applied in a washer that is a washing machine or laundry-drying
15 machine which comprises bearing part with a recessed corrugated outer bushing a front and a rear roller.

BRIEF DESCRIPTION OF THE FIGURES

This invention is anymore explained in more detail with attached drawings and preferred
20 embodiments given in the detailed description, in these drawings;

Figure 1 A side elevational view of a known application of a bear to which an oscillation group shown in the schematic drawing of a front load washing machine is connected.

Figure 2 A perspective view of a preferred embodiment of a roller bearing outer bushing that is the invention subject in which a known drum shaft is positioned, which is connected to the
25 tub rear body to bear the drum shaft.

Figure 3 A top view of a roller bearing outer bushing that is the invention subject which is mounted on the washing machine tub rear wall.

Figure 4 A sectional view from the axis A-A of the Figure 3 of a roller outer bushing that is the invention subject in which the sealing is mounted, is mounted on the tub rear wall hole of the
30 washing machine.

Figure 5 A perspective view of a preferred embodiment of a roller bearing outer bushing that is the invention subject in which a known drum shaft is positioned, which is connected to the tub rear body to bear the drum shaft.

Figure 6 A perspective view of a alternative embodiment of a roller bearing outer bushing that is the invention subject in which a known drum shaft is positioned, which is connected to the tub rear body to bear the drum shaft.

Figure 7 A disassembled view of a alternative embodiment of a roller outer bushing that is the invention subject is located at the drum shaft front endpiece and which provides more durable holding to tub of bear and also a coaxial shape is formed, with the sealing will be connected at the front orifice of this bushing.

REFERANCE NUMBERS

1 Washing machine	11 Laundry loading door
12 Detergent dispenser	13 Drum
14 Motor	15 Motor shaft
16 Pulley	17 Tub
170 Tub rear wall	172 Tub hole
174 Tub rear wall rib	176 Tub rear wall groove
18 Fixing member	19 Clamp nut
20 Drum shaft	24 Drum shaft front endpiece
26 Drum shaft rear Endpiece	30 Bearing mechanism
32 Bearing hole front orifice	34 Bearing hole rear orifice
36 Bearing housing	40 Roller
42 Front roller	44 Rear roller
410 Movable inner bushing	420 Outer bushing
421 Holding channel	422 Holding recess
424 Holding bridge	426 Orthagonal corrugated fin
427 Oblique corrugated fin	428 Fin band
430 Rolling element	440 Roller cover
50 Sealing	A-A Axial section

DETAILED DESCRIPTION OF THE INVENTION

10 The invention subject roller (40) generally comprises an inner and an outer bushing (410, 420) and multiple number of rolling elements (430) which provide movement to inner bushing (410). In the use of a preferred embodiment of the invention, rollers (40) have been developed for

bearing a rotating rotor or shaft (20) in which it is disposed in a piece made of plastic with a bearing gap.

In the present invention, there are preferably a plurality or at least one holding channel (421) filled by the material of the plastic part, in the form of a radial recess along the circumference of the outer lateral surface of at least one roller (40) which is adjusted in accordance with the geometry and length of the opening on the plastic part which the outer bushing (420) mounted to the plastic part provide bearing. In a preferred embodiment the said plastic part is a tub (17) of a washer and rear wall (176) of tub which washer is a front loading washing machine (1) or a washing machine with a laundry-drying machine.

In all kinds of industrial electric motors fan and pump, machine tools shafts, automobile axle, axle, gear box, belt tensioner system, alternator and steering systems, water pumps and doors, washing machines and vacuum cleaners, agricultural machinery, heavy duty machines, wind turbines, in short in all kinds of rotating mechanism the roller (40) is used. The roller (40) is a member of every rotating mechanism. The basic task of the roller (40) is to minimize friction between the two components (410, 420), which have a relative rotational motion between them and to provide smooth load transfer. In alternative invention embodiments, the assembly of the roller (40) is provided with different plastic parts. The invention subject roller (40) comprises a front and a rear roller (42, 44) which are disposed one in the front orifice (32) and one in the rear orifice (34) of the groove (176), are adjusted in accordance with the geometry and diameter of the rear wall groove (176), for washing machines (1) having a front load rotary drum (13), a plastic tub (17) surrounding the drum (13) such that the loading door (11) is open, a connecting groove (176) on the rear wall (170) of the tub and a shaft (20) providing movement of the drum (13) in the connecting groove (176).

FIG. 1 schematically shows a washing machine (1), preferably a horizontal axis, in which the bearing mechanism of the invention is located, a drum (13) being visible. There is shown a washing machine (1) and the part of the drum (13) which is a moving part thereof and the tub (17) in the body so that the drum (13) can rotate in a stable manner.

The washing machine (1) body has a laundry loading door accessible from the front. The interior of the drum (13) is accessible from the laundry loading door (11). A plastic tub (17) is disposed in the body in a wrapping around the drum (13). Figure 1 shows the mechanism of the pulley (16) for ensuring that the said moving system operates stably and undisturbed, the fixing member (18) and the clamp nut (19) at the points where the motor shaft (15) and the drum shaft (20) are connected to the pulley (16).

A laundry loading door (11), which allows the laundry to be disposed into and to be removed after laundry has been disposed, comprises a detergent dispenser (12) in which the cleaning materials are disposed in the panel area in which the parts containing the control group are

disposed. The washing machine (1) comprises a tub (17) having a tub rear wall (170) on which the tub rear wall groove (172) and the tub rear wall rib (174) are presented in order to provide mechanical stable strength during operation and material cost reduction.

The washing machine (1) preferably comprises a front loading door (11), a detergent dispenser (12) for receiving the cleaning material used for washing laundry and a motor (14) for moving the shaft (20) rotating the drum (13) at the rear of the drum (17), a pulley (16) and motor shaft (15) which form a link between the motor (14) and the drum shaft (20).

In Figure 1 the bearing mechanism (30) with the components of the roller (40) are shown enlarged in the marked section (X), by circling the view in the present embodiment. There is the standard roller (40) embodiments that provides movement of the shaft (20), the bearing mechanism (30) made of cast iron in existing applications. There is one roller (40) on the front endpiece (24) and the rear endpiece (26) of the drum shaft (20).

Preferably in one embodiment, as shown in Figure 2, there are an inner bushing (410), an outer bushing (420), and rolling elements (430) that provide movement to the inner bushing (410) between and a holding channel (421) which preferably surrounds the entire circumference of the outer bushing (420) in order to increase the permanence of the lubricant which can be made between the components that provide strength connection to the tub (17) which on the outer lateral surface of the roller (42, 44), which is formed from the cover (440).

The width of said channel (421) is preferably between 1 mm and 4 mm. It will also have the width of the channel (421) which varies with the size of the hole (176). The number of holding channels (421) referred to in the various embodiments may preferably be more than one. At least two rollers (40) having the holding channel (421) which are an application of the invention, the front and rear rollers (42, 44) that disposed to the said hole in the plastic injection molded which are bearing to the shaft (20) while providing the rotational movement. In contrast to the present embodiments, the bearing housing (36) of the bearing mechanism (30) is eliminated to save material. As is well known, assembly with fewer parts provides reduced complexity in the coaxialization. In the new embodiment, the recessed and protruded lateral surface of the components of the roller (40) of the bearing mechanism (30) is roughened to provide strength bonding to the tub (17), even at high rotational speeds of the shaft (20).

In a preferred embodiment, the rollers (42, 44) on the front and rear other orifice (32, 34) of the bearing mechanism (30) may have an outer bushing (420) comprising recesses and protrusions that are disposed differently thereon.

The Figure 2 shows that at least one holding bridge (424) connecting the two knurles around the channel (421) which cuts off the channel (421) having the front roller (42) at least a predetermined distance from the predetermined positions with forming a holding channel

(421), which is continuous along its circumference, instead of a holding channel (421) running on the circumference of the outer bushing (420) of the rear roller (44).

Said bridge (424) forms at least one holding recess (422) on the circumference of the outer bushing (420). In a preferred exemplary embodiment, the holding recess (422) and the holding
5 bridge (424) are formed in multiple numbers.

In a preferred embodiment of the present invention, the outer bushing (420) may be identical to the front and rear roller (42,44). In a different embodiment, as shown in FIG. 2, the outer bushing (420) has different recess forms.

Figure 2 shows a perspective representation of a preferred embodiment of the invention
10 subject inner and outer bushing (410, 420) which form the invention subject front and rear rollers (42, 44), in which a known drum shaft (20) is disposed, that are attached with tub rear wall (170) to bear to the drum shaft (20). There are also rolling elements (430) for moving the drum shaft (20), which is another component of the roller (40). Sealing (50) is disposed between the front roller (42) and the drum as the environment is moist or wet due to the function
15 of the working environment. In the preferred embodiment which is shown in Figure 2, as a component of the invention subject roller (40), an inner bushing (410) preferably cylindrical shape and an outer bushing (420) with recesses and protrusions on it, composed bearing mechanism (30) front orifice (32) and rear orifice (34) at least two. Figure 3 is based on mounting into the plastic tub (17) preferably by injection as seen in figure 3, with plastic molding
20 technology to a groove (176) which is preferably located at the center of the tub (17) rear wall (170) of the bearing mechanism (30). The recessed corrugated and roughed lateral surface of the outer bushing (420) has a hardness that is not to be exposed to adverse physical effects such as buckling, crushing, slipping off as a result of the rotation of the drum (13) and therefore of the load. The outer bushing (420) of said roller (40) is preferably turned into a corrugated
25 shape after a series of forming operations.

In an exemplary embodiment, as seen from a side view of Figure 4 of the bearing mechanism (30) having the invention subject rollers (40), said forward hole (176) has a form expanding towards the front orifice (32) of the bearing hole. Bearing hole rear orifice (34) is smaller than each other.

30 In an exemplary embodiment, the front roller (42) has a larger radius than the rear roller (44) and preferably has an outer radius ranging from 50 mm to 60 mm. The preferred distance with respect to the different shaft (20) sizes and speeds the motor (14) will provide can be increased or decreased.

During the plastic injection, a gap is formed in the tub rear wall (170) with the arbour mold forming the tub hole, through which the shaft (20) passes. During plastic injection, an outer bushing (420) of the roller (42, 44) is embedded in the tub (17) to form an integral shape.

On the front roller (42), a sealing (50) is disposed to prevent water leaking from the drum (13) which will be rotated by liquid. In an exemplary embodiment, the roller (40) components inner bushing (420) that do not include the cover (440), the outer bushing (420) which with the holding channel (421) on thereof preferably for secure engagement with the plastic material and the rolling elements (430) disposed therebetween are shown in the figure.

In Figure 5 in an embodiment of the invention, said recesses, knurles and rough which are on the outer bushing (420) have at least one orthogonal corrugated fin (426) to supply the inertia torque caused by rotational movement of the drum (13) in such a way as to prevent the drum shaft (20) from being displaced. Preferably the distance between them varies from 1 to 7 mm, particularly preferably from 2 to 5 mm. In an exemplary embodiment of the invention, it is preferably arranged to surround the entire lateral face of the outer bushing (420). Preferably the numerous of fins (426) having a predetermined distance therearound along the circumference of the lateral surface of the outer bushing (420) form a fin band (428). In a preferred embodiment as shown, the outer bushing (420) of the roller (40) has two fin bands (428). Between the knurles formed by said fins (426), a holding channel 421 is formed as a recess on the lateral surface of the outer bushing 420, which can be entered by the tub (17) plastic during assembly. In another embodiment of the invention said number of channels (421) may be more than one. The channel (421) is preferably between 2 mm and 5 mm. Most preferably, there is a 3 mm wide recess between said fin bands (428). In an alternative embodiment of the invention, the exemplary widths of the rollers (40) vary in diameter depending on the diameter of the shaft (20).

In another exemplary embodiment of the invention, the fins (426) formed on the lateral surface of the outer bushing (420) of the roller (40) are formed as oblique corrugated fin (427), preferably in such a way as to form a predetermined angle with the radial axis particularly a narrow angle.

As shown in FIG. 6, said oblique corrugated fins (427) preferably form a fin band (428) which surrounds the lateral surface of the entire outer bushing (420). The said obliquity is preferably formed in such a way that the moment of inertia of the drum shaft (20) can be met. During operation of the drum shaft (20), it tends to twist and lean out of its axis in time due to its rotation. Such leaning out and twisting will be avoided by the corrugated fins (421) formed in the opposite direction of the bending direction. Thus, the Oblique corrugated fins (427) are preferably formed in a direction that can meet the moment of inertia of the drum shaft (20). This opposite direction detection is determined by trial tests.

In figure 7 the holding bridge (424) which formed on the holding channel (421) of the invention subject embodiment forming the holding recesses (422) on the outer bushing (420). In this respect, the plastics material of the tub (17) is filled to recesses (422) on the roller to provide effective holding. As shown in FIG. 7, in the exemplary embodiment, the numerous of recesses (422) and the holding bridges (424) separating the recesses (422) are formed along the circumference of the outer bushing (420). Figure 7 shows the invention subject inner bushing (410) of the roller (40) and the outer bushing (420) with the numerous of recesses (422) and the holding bridges (424) on it as an exploded picture. Furthermore, in the application of the invention to a wet working environment, preferably a washing machine (1), the sealing (50) in the bearing front orifice (32) near the drum (13) is seen in the exploded view.

In an exemplary embodiment of the invention, there is also an embodiment of the cover (440) intended for roller lubricant chemicals and rolling elements (430). The present invention will be made by using the outer bushing (420) of the rollers with rolling element (430), which are used as a tight fit on the drum shaft (20), with the surfaces being of different geometries by a series of operations thus with directly mounting the drum (13) on the rollers (40) of this rolling element (430) without using any other roller (40) or any other complementary element. For this reason, design and modification are made to meet the geometry in the tub (17) molding.

The basic task of the roller (40) is to minimize friction between the tub (17) and the shaft (20), which are the two components of relative rotational movement between them, and to provide smooth load transfer. Thus, a member of the rotating drum shaft (20) mechanism associated with the drum (40) is also bearing (40). A perfect roller (40) provides an excellent mechanism. The roller mechanism (40) that is the invention subject, which is preferably applied to the bearing part of the drum shaft (20) of the washers such as a washing machine (1), a washing machine with dryer can also be used in alternative embodiments of the invention in rotary mechanism bearings in different sectors to provide cost reduction.

In alternative embodiments of the present invention, cages that can be called inner and outer used as the roller components, preferably rolling elements (430) selected as balls not to disperse, hold the inner and outer bushings (410, 420) rolling elements (430) circumferentially equally spaced and in order to prevent friction with each other during rotation. The rolling elements (430) provide the power transmission while the inner and outer bushings (410, 420) do not act. In a preferred embodiment of the invention, said inner and outer bushings (410, 420) may be made from different materials. When one of the inner or outer bushing (40) of a roller (40) is fixed, the other moves in the radial or axial direction. This amount of movement is called the roller gap. Roller gaps are taken into account both radially and axially. The material used for the bushings (410, 420) and the rolling elements (430); The bushings (410, 420) and the rolling elements (430) are made of a low-alloy, high-carbon, special, DIN 1.3505-100Cr6

roller steel which can be hardened along the section. Other than 100Cr6, 100Cr6 alloys, carburisation steels, ceramics and some other special steels can also be used in the production of the bushing (410, 420) and rolling element (430). Cages that keep the rolling elements (430) in a circumferentially equally spaced relationship and prevent friction against each other during rotation will be used. The covers (440) which used in the invention prevent the grease in the roller from coming out and foreign matter to enter the roller from the outside. They can be produced as metal sheet or rubber cover (440).

In a preferred embodiment of the invention, said rolling path elements (430) in rollers (40) provide force transmission and play a key role in the classification of the rollers (40). The rolling elements (430) are preferably spherical in shape, in the bearings they are used the frictional forces are lower than the other rollers (40) and preferably used in rotating rolling bearing mechanism parts (30) having very high rotational speeds in one embodiment of the invention.

In a preferred embodiment of the invention, rolling elements (430) made of ceramic material are used as well as rolling elements (430) made of steel material. The rolling elements (430) contact is point with the roller (40). In an alternative embodiment of the invention, instead of the rolling elements 430 providing the point contact of the rollers 40, conical, cylindrical, spherical and needle-type rollers that carrying load with linear contact (not shown) can be used. There is bump on their surface to minimize the load distribution at the contact tips. Due to the fact that it has a linear contact, they carry more load than the roller with the same size rolling element (430).

CLAIMS

1. A roller (40) for bearing a rotor or a rotary shaft (20) comprising an inner and an outer bushing (410, 420) and a plurality of rolling elements (430) that provide movement to inner bushing (410) and a plastic part having a bearing opening characterized in that, at least one outer bushing (420) being mounted to the plastic part is comprising a holding channel (421) filled with the material of plastic part in the form of a radial recess along the circumference of the outer lateral surface of at least one roller (40), which is adjusted in accordance with the geometry and length of the opening on the plastic part.
2. A roller (40) for a washing machine (1) comprising a front loading rotary drum (13), a plastic tub (17) surrounding the drum (13) so that the loading door (11) is open, a tub rear wall (170) connection groove (176), a shaft (20) providing movement of the drum (13) in the connection groove (176) according to claim 1, wherein a front and a rear roller (42, 44) disposed in such a way that are connected directly to the tub (17) in a front orifice (32) and in a rear orifice (34) of the groove (176) are adjusted in accordance with the geometry and diameter of the rear wall groove (176).
3. A roller (40) according to any one of the preceding claims, wherein the outer bushing (420) is having a lateral surface roughened along its radial circumference and / or formed with recesses, knurles and / or creases.
4. A roller (40) for a front loading washing machine according to any one of the preceding claims, wherein at least one holding bridge (424) dividing the channel (421) along the circumference of the holding channel (421) so as to continue intermittently at least at one location at predetermined distances and at least two holding recesses (422) which consist of the holding bridge.
5. A roller (40) for a front loading washing machine according to any one of the preceding claims, wherein at least one fin band (428) formed by a radially outwardly extending fin (426) on the circumference of the lateral surface of the ring-shaped roller outer bushing (420) in such a way that there will be a gap in a predetermined distance between end to end.
6. A roller (40) according to claim 5, wherein the distance between said fins (426) is preferably between 1 and 7 mm, in particular between 2 and 5 mm.
7. A roller (40) according to claim 5, wherein the fin band 428 which is inclined at an angle and / or in such a way as to make the horizontal narrow angle, preferably smaller than 90° and / or consists of horizontal fins (427).

8. A roller (40) for a front loading washing machine according to any one of the preceding claims, wherein at least two fin bands (428) having a plurality of vertical fins (426) formed to extend radially outwardly on the lateral surface so as to complete the circumference of the outer bushing (420) from end to end and at least one holding channel (421) between the two bands (428).
9. A roller (40) according to claim 8, wherein the distance between the said fin band (428) is preferably between 1 and 7 mm, in particular between 2 and 5 mm.
10. A roller (40) for a front loading washing machine according to any one of the preceding claims, wherein the channel (421) and/or the recess (422) and/or the bridge (424) and/or the orthogonal fin (426) and/or the horizontal fin (427) and/or the fin band (428) in bearing mechanisms (30) having at least two rollers (40) as recessed protrusions formed in different geometries on the lateral surface of the front and rear roller (42, 44) outer bushing (420).
11. A roller (40) for a front loading washing machine according to any one of the preceding claims, wherein an outer bushing (420) configured in a polygonal form.
12. A roller (40) for a front loading washing machine according to any one of the preceding claims, wherein at least one cover (440) that is a front and / or a rear roller (42, 44) component also to prevent the escape of grease and the entrance of outside foreign matter to the roller (40) inside so as to cover the drum shaft (20) and rolling elements (430) that support the motion to increase the life time of a roller bear (40).
13. A production method for obtaining a bearing member (30) having A roller (40) for a front loading washing machine according to any one of the preceding claims, wherein comprising at least one of the steps of forming the fin and recessed and / or channeled structures in different geometries on different radial outer lateral surfaces of the roller outer bushing, roughening the surface of the outer bushing, mounting drum tub that produced directly from the plastic by injection molding technology in the drum tub that produced directly from the plastic by molding process on the roller with rolling element on the shaft or combinations thereof.
14. A roller (40) for a front loading washing machine according to any one of the preceding claims, wherein a washer that is a washing machine (1) or laundry-drying machine which comprises bearing part (30) having a front and a rear roller (42, 44) with a recessed corrugated outer bushing (420) .

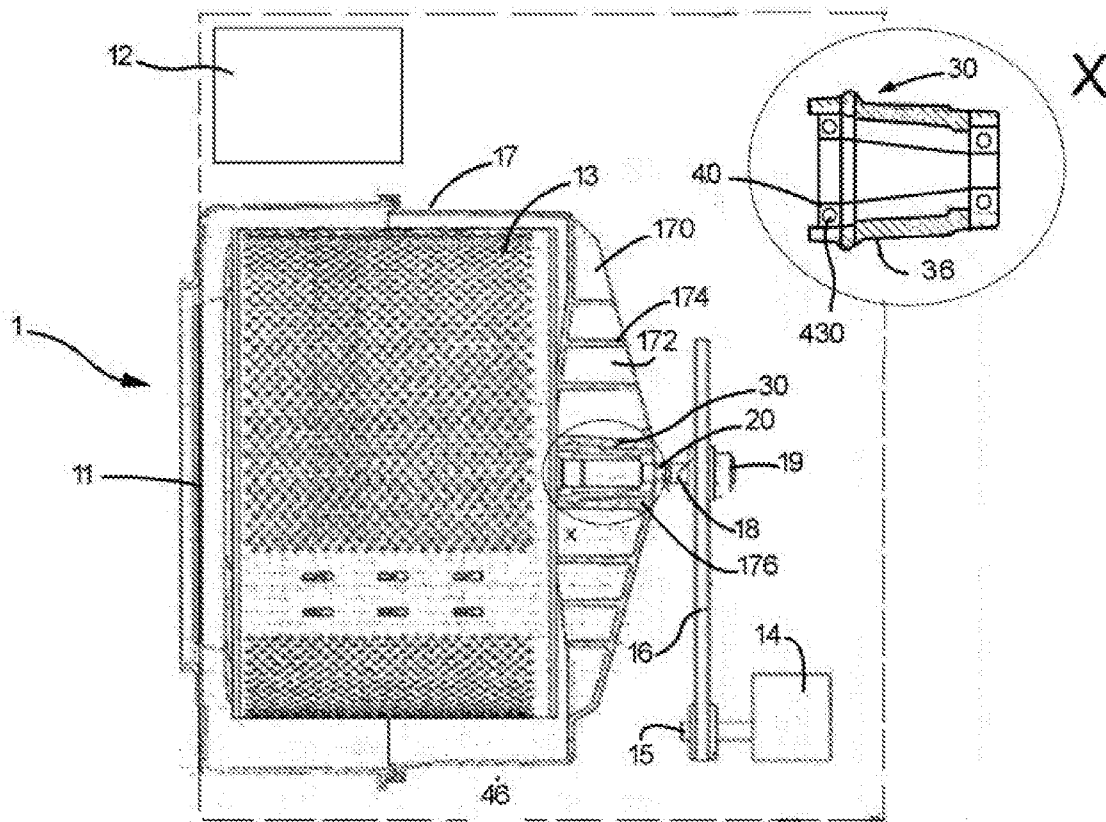


Figure 1

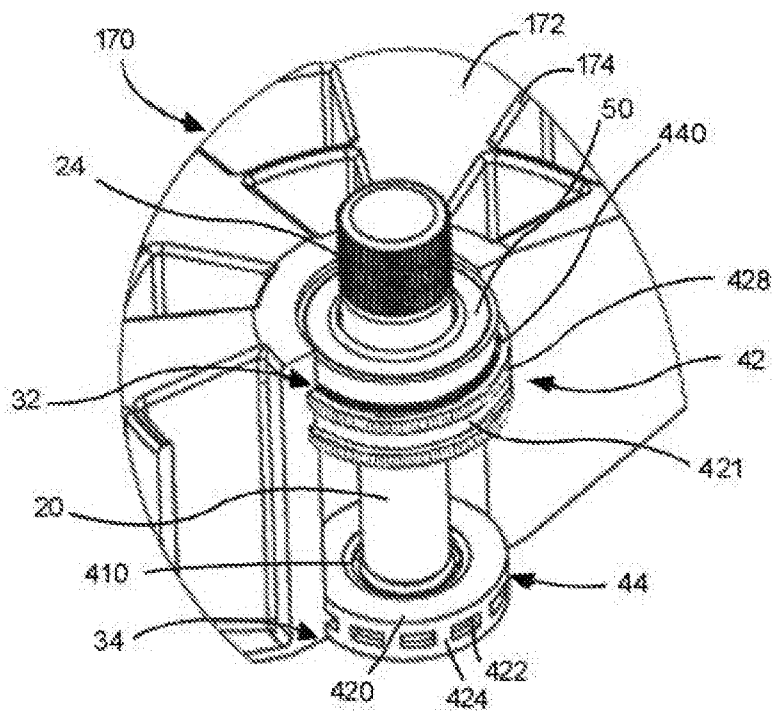


Figure 2

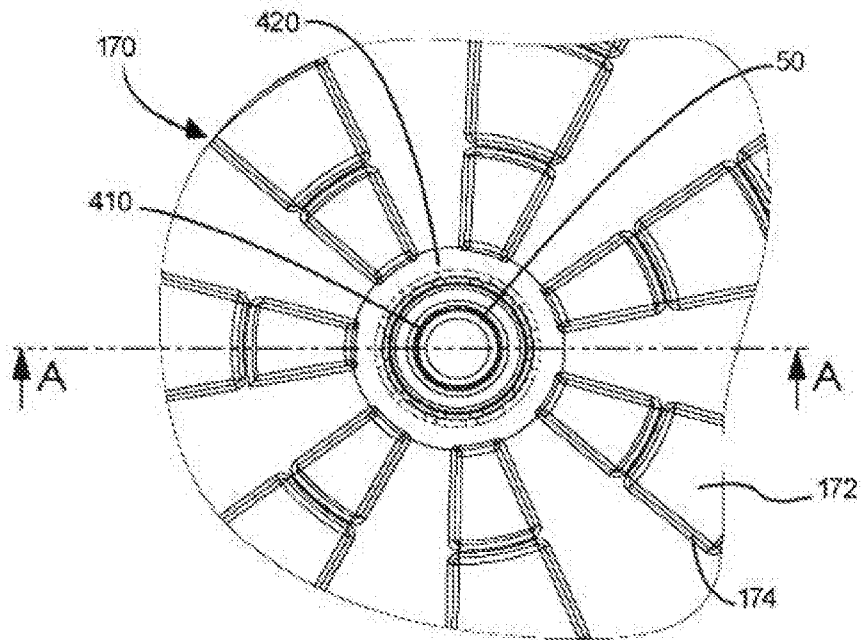


Figure 3

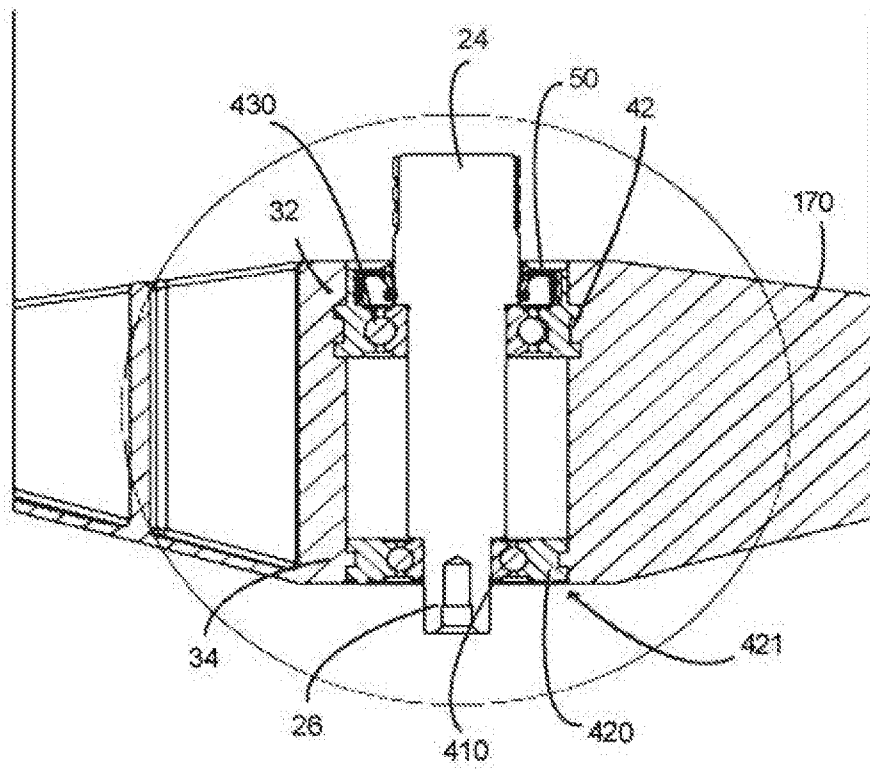


Figure 4

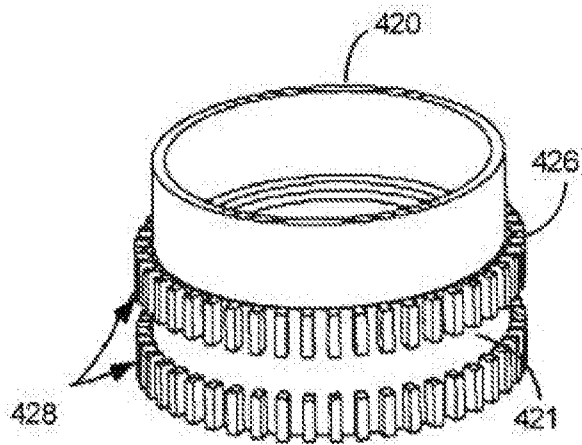


Figure 5

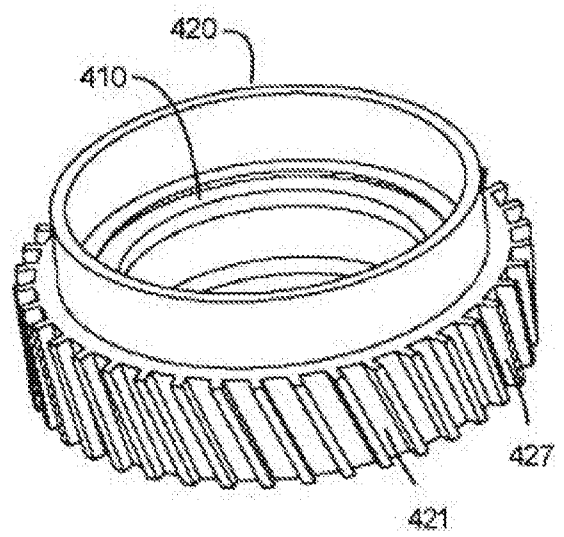


Figure 6

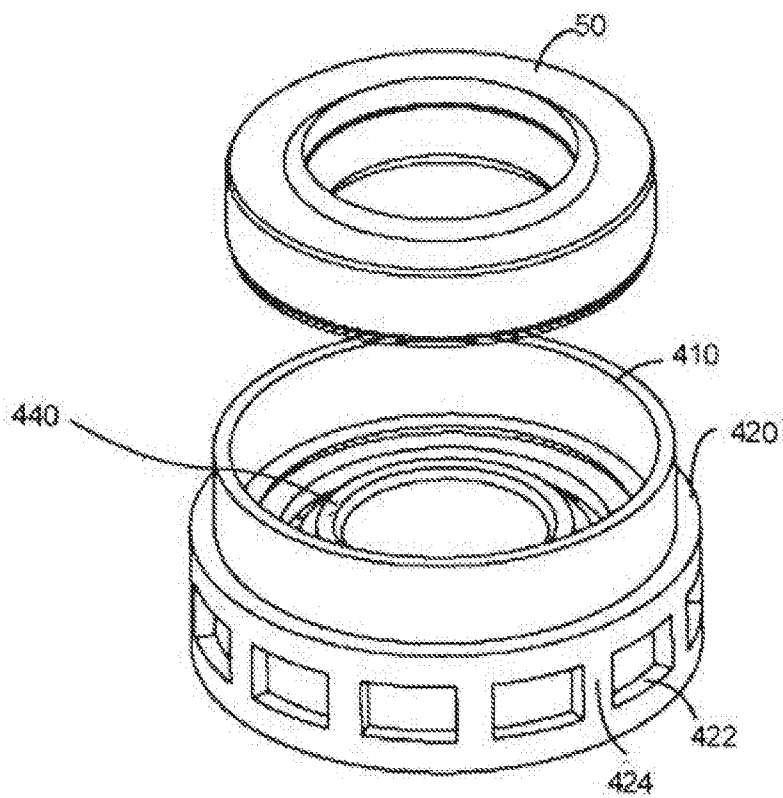


Figure 7

INTERNATIONAL SEARCH REPORT

International application No

PCT/TR2017/050090

A. CLASSIFICATION OF SUBJECT MATTER

INV. F16C35/067 D06F37/26
 ADD. F16C19/56 F16C33/58

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)

F16C 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

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 767 684 A1 (SKF AB [SE]) 28 March 2007 (2007-03-28)	1,2,4, 10,11, 13,14
Y	paragraph [0012] - paragraph [0022]; figures	3,5-9
Y	----- JP 2007 315537 A (HITACHI POWDERED METALS) 6 December 2007 (2007-12-06) abstract; figures 4,6	3
Y	----- JP 2008 249131 A (JTEKT CORP) 16 October 2008 (2008-10-16) abstract; figures 7-8	5-7
Y	----- JP 2001 003916 A (TEIMUZU FACTRY KK; AKAHA HIROSHI) 9 January 2001 (2001-01-09) abstract; figures 7,8 ----- -/-	8,9



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

24 July 2017

Date of mailing of the international search report

07/08/2017

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Authorized officer

Daehnhardt, Andreas

INTERNATIONAL SEARCH REPORT

International application No

PCT/TR2017/050090

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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X	EP 2 372 008 A1 (SKF AB [SE]) 5 October 2011 (2011-10-05) paragraphs [0005] - [0006], [0008] - [0018]; figure 2 -----	1,12

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International application No

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