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(54) CLUTCH RELEASE BEARING ASSEMBLY

(71) We, KOYO SEIKO CO., LTD., a Japanese Company, of No. 60, 4-chome, Nakagawa-cho, Ikuno-ku, Osaka-shi, Osaka, Japan, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a clutch release bearing assembly.

It is an object of the invention to provide a clutch release bearing of simplified construction.

The invention accordingly provides a clutch release bearing assembly consisting of an inner race, an outer race and a plurality of balls arranged therebetween, said inner race being elongated axially in one direction and having mounted on the elongated portion a flange member formed separately from the inner race and comprising a sleeve portion fitting around the circumference of said elongated portion a radially inwardly extending flange portion overlying the end of said elongated portion and a radially outwardly extending flange portion providing a surface for engagement by a clutch release fork.

The invention is illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is a longitudinal sectional view of one embodiment of clutch release bearing according to the invention,

Fig. 2 is a longitudinal sectional view of another embodiment of clutch release bearing according to the invention, and

Fig. 3 is a longitudinal sectional view of a further embodiment of clutch release bearing according to the invention.

Referring to Fig. 1, a clutch release bearing assembly in accordance with the present invention is indicated generally at 10 and comprises an inner race ring 11 having an axially extending portion, an outer race ring 12, provided with a radially and inwardly extending annular flange portion 121, a plurality of balls 13 interposed between the inner and outer race rings and maintained in predetermined

spaced relative positions by a cage 16, a metal cover 14 mounted on the outer race ring 12, and an annular flange member 17 referred to in more detail below. All these elements are combined in a unit and are slidably mounted in a cylindrical retainer 21 which is in turn fixed to a speed change gear box 20. An input shaft 22 connected with the rear portion of an engine crank shaft, not shown, is provided in said retainer 21.

The inner race ring 11 of the bearing assembly 10 is directly slidably mounted on the outer periphery of the cylindrical retainer 21 as illustrated. The inner race ring 11 is relatively long in the axial direction along the input shaft 22 and is provided, at the end opposite to the speed change gear box, with a raceway 112 in the peripheral direction. The outer race ring 12 is provided with a raceway 122, and the plurality of balls 13 are provided between the raceways 112 and 122. With the outer surface of the flange portion 121 thereof is engaged a clutch thrust plate not shown. Outside the outer race ring 12 is mounted a metal cover 14 as in a conventional clutch release bearing assembly. The metal cover 14 is supported on the outer race ring 12 by means of a cylindrical portion 141 thereof extending parallel to the axis of the bearing and further extends radially inwardly at 142 on the opposite side thereof to said annular flange portion side. The end of the radially and inwardly extending portion 142 of the metal cover 14 extends close to the outer surface of the inner race ring 11.

At the end 111 of the extended portion of said inner race ring 11, the annular flange member 17 is mounted and has a substantially S-shaped cross-section as shown in Fig. 1. The flange member 17 comprises a cylindrical portion 172 attached to the outer surface of the inner race ring 11, a portion 171 extending radially inward at one end of said cylindrical portion 172 and engaging said end 111 of the inner race ring 11, and a radially outwardly extending portion 173 at the other end of said cylindrical portion 172. The portion 173 of the annular flange member 17 is engaged with

[Price 33p]

Price 75p

a clutch release fork, not shown, on the side of said speed change gear box. The bearing assembly as a whole can thus be slid along the retainer 21 when a force is applied to the portion 173 in the direction as indicated with an arrow A in Fig. 1.

With a release bearing constructed substantially as described above, the provision of the separate annular flange member 17 for engagement with the clutch release fork simplifies the construction of the inner race ring 11 which acts as the hub of the bearing. Accordingly the construction as a whole can be made compact in size. Furthermore, in addition to the metal cover 14, the rising portion 173 of the annular flange member 17 engaged with the clutch release fork serves to prevent the penetration of dust and moisture or dirty water into the interior of the bearing assembly effectively.

Referring to Fig. 2, the shape of an annular flange member 170 mounted to the inner race ring is different from that of the annular flange member 17 shown in Fig. 1. Since the construction of the retainer 210, the bearing 100 and other elements shown in Fig. 2 are all the same as that shown in Fig. 1, they will not be referred to in detail. The annular flange member 170 employed in this second embodiment also has a cylindrical portion 175 extending in the axial direction of the bearing, a radially and inwardly extending portion 174 formed at the speed change gear box end of said cylindrical portion 175, and a radially and outwardly extending portion 176 formed at the other end of said cylindrical portion 175, as in the first embodiment shown in Fig. 1. In addition, the annular flange member 170 is provided with a second cylindrical portion 177 formed at the outer peripheral end of said portion 176 and extending in the axial direction of the bearing over the outer race ring. The length of the portion 177 is preferred partially to cover the outer race ring as shown in Fig. 2. By providing the second cylindrical portion 177 at the outer peripheral end of the rising portion 176 of the annular flange member 170, the penetration of dust and the like into the interior of the bearing is far more effectively prevented.

Referring to Fig. 3, in the arrangement shown the end of the inner race ring 111 is provided with an annular flange 180 comprising a radial portion 178, a cylindrical portion 179, and a radial portion 181 as the first embodiment shown in Fig. 1. The outer race ring 122 provided outside the inner race ring and retaining balls 131 therebetween has no flange corresponding to the flange 121 and no cover corresponding to the cover 14 shown in Fig. 1 and 2. The outer race ring 122 in this embodiment is instead extended axially to form an extension 123 and is provided with suitable annular seals 221. The seals 221 are so mounted in seal mounting grooves formed

at the opposite internal peripheries of the outer race ring 122, that the seals close the annular space between the inner and outer race rings 111 and 122, respectively. The seals 221 are made of annular elastic bodies of rubber, or any similar resilient material, in which a rigid reinforcing ring formed of metal, or other similar material, is embedded. The construction of the seals is well known and accordingly, description thereof in detail is omitted. In the arrangement of Fig. 3, the clutch release lever or diaphragm spring is engaged with the axially extended portion 123 of the outer race ring and an inwardly and radially extending flange portion, such as the flange 121 as shown in Fig. 1, is not necessary. By eliminating the flange portion of the clutch release bearing assembly, it becomes possible to mount an oil-seal at both sides of the bearing assembly. Therefore, if a contact seal is used with respect to the inner ring, it will be understood that the penetration of dust and moisture or dirty water into the interior of the bearing made is effectively prevented without the requirement for the portion 177 as in the second embodiment shown in Fig. 2.

WHAT WE CLAIM IS:—

1. A clutch release bearing assembly consisting of an inner race, an outer race and a plurality of balls arranged therebetween, said inner race being elongated axially in one direction and having mounted on the elongated portion a flange member formed separately from the inner race and comprising a sleeve portion fitting around the circumference of said elongated portion a radially inwardly extending flange portion overlying the end of said elongated portion and a radially outwardly extending flange portion providing a surface for engagement by a clutch release fork.

2. An assembly as claimed in Claim 1, wherein said outer race has, at the end of the assembly opposite the said elongated portion of the inner race, a radially inwardly extending annular flange for engagement with a clutch release lever or diaphragm spring.

3. An assembly as claimed in Claim 2, wherein a metal cover is secured on the outer surface of the said outer race, said cover having a radially inwardly extending flange portion at the end of the outer race opposite to said inwardly extending flange, and the inner most periphery of the flange portion of the metal cover being located close to an outer surface of the inner race.

4. An assembly as claimed in any one of Claims 1—3, wherein said flange member is provided, at the outward extremity of said radially outwardly extending flange portion, with a cylindrical portion extending axially towards the outer race of said assembly.

5. An assembly as claimed in Claim 1, wherein said outer race has an axially extended portion, at the opposite end of the



a clutch release fork, not shown, on the side of said speed change gear box. The bearing assembly as a whole can thus be slid along the retainer 21 when a force is applied to the portion 173 in the direction as indicated with an arrow A in Fig. 1.

With a release bearing constructed substantially as described above, the provision of the separate annular flange member 17 for engagement with the clutch release fork simplifies the construction of the inner race ring 11 which acts as the hub of the bearing. Accordingly the construction as a whole can be made compact in size. Furthermore, in addition to the metal cover 14, the rising portion 173 of the annular flange member 17 engaged with the clutch release fork serves to prevent the penetration of dust and moisture or dirty water into the interior of the bearing assembly effectively.

Referring to Fig. 2, the shape of an annular flange member 170 mounted to the inner race ring is different from that of the annular flange member 17 shown in Fig. 1. Since the construction of the retainer 210, the bearing 100 and other elements shown in Fig. 2 are all the same as that shown in Fig. 1, they will not be referred to in detail. The annular flange member 170 employed in this second embodiment also has a cylindrical portion 175 extending in the axial direction of the bearing, a radially and inwardly extending portion 174 formed at the speed change gear box end of said cylindrical portion 175, and a radially and outwardly extending portion 176 formed at the other end of said cylindrical portion 175, as in the first embodiment shown in Fig. 1. In addition, the annular flange member 170 is provided with a second cylindrical portion 177 formed at the outer peripheral end of said portion 176 and extending in the axial direction of the bearing over the outer race ring. The length of the portion 177 is preferred partially to cover the outer race ring as shown in Fig. 2. By providing the second cylindrical portion 177 at the outer peripheral end of the rising portion 176 of the annular flange member 170, the penetration of dust and the like into the interior of the bearing is far more effectively prevented.

Referring to Fig. 3, in the arrangement shown the end of the inner race ring 111 is provided with an annular flange 180 comprising a radial portion 178, a cylindrical portion 179, and a radial portion 181 as the first embodiment shown in Fig. 1. The outer race ring 122 provided outside the inner race ring and retaining balls 131 therebetween has no flange corresponding to the flange 121 and no cover corresponding to the cover 14 shown in Fig. 1 and 2. The outer race ring 122 in this embodiment is instead extended axially to form an extension 123 and is provided with suitable annular seals 221. The seals 221 are so mounted in seal mounting grooves formed

at the opposite internal peripheries of the outer race ring 122, that the seals close the annular space between the inner and outer race rings 111 and 122, respectively. The seals 221 are made of annular elastic bodies of rubber, or any similar resilient material, in which a rigid reinforcing ring formed of metal, or other similar material, is embedded. The construction of the seals is well known and accordingly, description thereof in detail is omitted. In the arrangement of Fig. 3, the clutch release lever or diaphragm spring is engaged with the axially extended portion 123 of the outer race ring and an inwardly and radially extending flange portion, such as the flange 121 as shown in Fig. 1, is not necessary. By eliminating the flange portion of the clutch release bearing assembly, it becomes possible to mount an oil-seal at both sides of the bearing assembly. Therefore, if a contact seal is used with respect to the inner ring, it will be understood that the penetration of dust and moisture or dirty water into the interior of the bearing made is effectively prevented without the requirement for the portion 177 as in the second embodiment shown in Fig. 2.

WHAT WE CLAIM IS:—

1. A clutch release bearing assembly consisting of an inner race, an outer race and a plurality of balls arranged therebetween, said inner race being elongated axially in one direction and having mounted on the elongated portion a flange member formed separately from the inner race and comprising a sleeve portion fitting around the circumference of said elongated portion a radially inwardly extending flange portion overlying the end of said elongated portion and a radially outwardly extending flange portion providing a surface for engagement by a clutch release fork.

2. An assembly as claimed in Claim 1, wherein said outer race has, at the end of the assembly opposite the said elongated portion of the inner race, a radially inwardly extending annular flange for engagement with a clutch release lever of diaphragm spring.

3. An assembly as claimed in Claim 2, wherein a metal cover is secured on the outer surface of the said outer race, said cover having a radially inwardly extending flange portion at the end of the outer race opposite to said inwardly extending flange, and the inner most periphery of the flange portion of the metal cover being located close to an outer surface of the inner race.

4. An assembly as claimed in any one of Claims 1—3, wherein said flange member is provided, at the outward extremity of said radially outwardly extending flange portion, with a cylindrical portion extending axially towards the outer race of said assembly.

5. An assembly as claimed in Claim 1, wherein said outer race has an axially extended portion, at the opposite end of the

assembly from said flange member, for engagement with a clutch thrust plate.

6. An assembly as claimed in Claim 1 or 5, wherein a seal member is arranged in the annular gap between the outer and the inner race respectively at each end of the bearing assembly.

10 7. An assembly as claimed in Claim 6, wherein each seal member is mounted within an inner annular surface of the outer race.

8. A clutch release bearing assembly, substantially as described herein with reference to any one of Figs. 1—3 of the accompanying drawings.

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