Aug. 10, 1937. R. J. VEDOVELL ET AL 2,089,773

OIL SEAL

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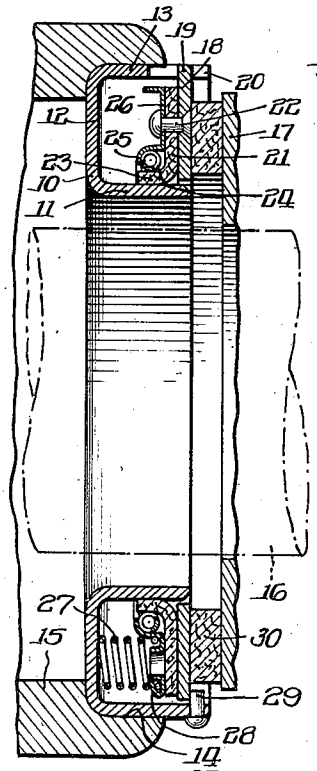


Fig. 1.

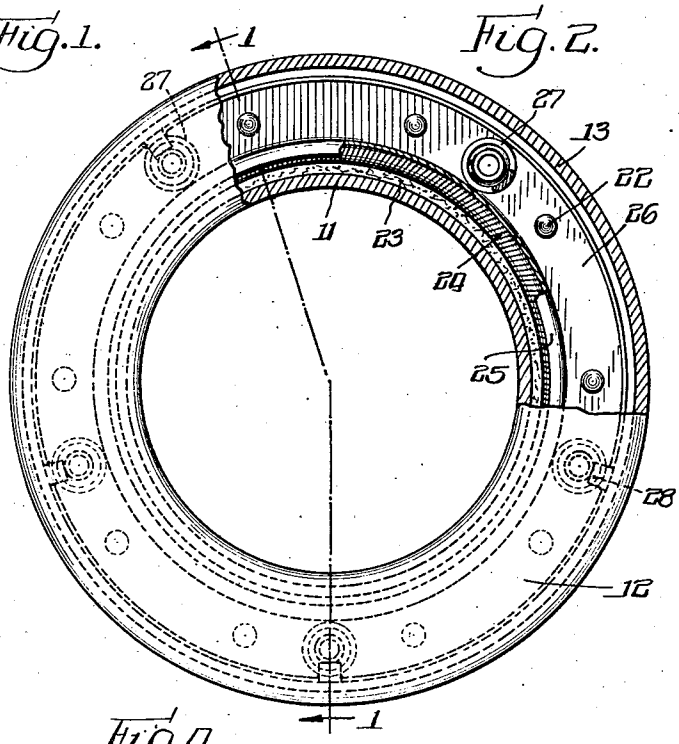


Fig. 2.

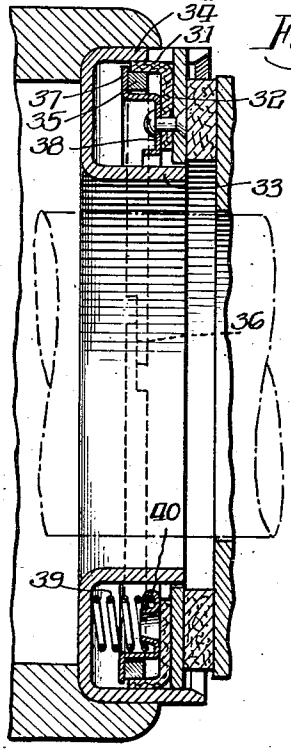


Fig. 3.

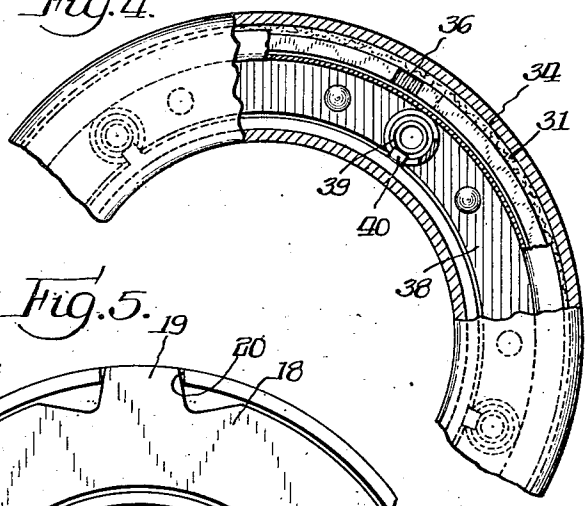


Fig. 4.

Fig. 5.

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OIL SEAL

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4 Claims. (Cl. 288—1)

The purpose of this invention is to provide an improved sealing device of novel construction for use in closing off the space present about a shaft between the end of a housing and some associated part which is capable of either endwise or sidewise movement relative to the housing.

Other more specific objects and advantages will be apparent to those skilled in the art upon a full understanding of the construction, arrangement and operation of the new seal.

Two different embodiments of the invention are presented herein for the purpose of exemplification, but it will of course be appreciated that the invention is susceptible of embodiment in still other structurally modified forms coming equally within the scope of the appended claims.

In the accompanying drawing:

Fig. 1 is a diametric section through a seal constructed in accordance with the invention, the section being taken through the seal on the irregular line 1—1 of Fig. 2;

Fig. 2 is a partially broken away end view of the seal shown in Fig. 1;

Fig. 3 is a diametric section through a seal which embodies another form of the invention;

Fig. 4 is a partially sectioned fragmentary end view of the seal shown in Fig. 3; and

Fig. 5 is a fragmentary opposite end view of either the seal shown in Figs. 1 and 2 or the seal shown in Figs. 3 and 4.

The seal which is shown in Figs. 1 and 2 includes a sheet metal stamping 10 in the form of a centrally apertured cup. This cup-shaped stamping is provided about the edge of the aperture therein with an inner rim 11 which projects from the bottom 12 of the cup in the same direction as the outer rim 13. The cup is adapted to be press-fitted into a bore 14 in one end of a housing 15, about a shaft 16 which passes through the housing at that point in axially spaced relation to the inner edge of the cup. When so installed the cup, together with the other hereinafter described parts of the seal, are intended to close off the opening present about the shaft between the end of the housing 15 and some associated housing member or shaft part 17, which part may have some end play or sidewise movement with respect to the housing, depending upon the nature of the particular assembly in which the seal is used.

A metal disk 18 is positioned in the open end of the cup 10 in the annular space present between the inner and outer rims 11 and 13 thereof, with the plane of the disk parallel with the bottom 12 of the cup. The disk is maintained in concentric relation to the cup by engagement with either the inner rim or the outer rim of the latter and is prevented from rotating with respect to the cup by means of projections 19 on the outer edge of the disk which fit within axially extending notches 20 in the outer rim of the cup.

A flanged packing ring 21 of leather or other suitable material is secured to the inner face of the disk 18, by means of rivets 22, and the flange 23 of the packing, which is positioned about the inner edge of the ring, is snugly sleeved over the inner rim 11 of the cup 10 in axially slidable but effectively sealed association with such rim. The flange 23 of the packing ring is constricted resiliently about the inner rim 11 of the cup by a tensioned garter spring 24 which fits about the flange 23 and is held in proper position by an inturned flange 25 on the inner edge of a thin sheet metal stamping 26, which stamping is clamped against the inner face of the packing ring 21 by the previously mentioned rivets 22.

The disk 18 and the packing ring 21 are urged away from the bottom 12 of the cup 10 by a plurality of compressed coil springs 27 which are positioned at regular intervals about the seal in the space present between the bottom 12 of the cup and the opposed face of the spring-retaining stamping 26. The springs 27 engage with the stamping 26 and are fastened thereto by inturned flange portions 28 on the outer periphery of the stamping, which flange portions are bent inwardly into interlocked engagement with the end turns on the springs.

In the fully expanded position of the seal, the disk 18 is prevented from moving out of the cup 10 by a plurality of studs 29 which are mounted in the edge of the outer rim 13 of the cup and project inwardly into overlapped engagement with the outer edge of the disk.

A flat packing ring 30 is positioned on the outside of the seal between the outer face of the disk 18 and the opposed surface of the member 17, in which position it is partially enclosed by the edge of the outer rim 13 of the cup.

From the foregoing description it will be understood that the improved seal closes off the opening about the shaft which is present between the end of the housing 15 and the member 17 and serves to compensate for any endwise or radial movement of the member 17 relative to the housing without in any way disturbing the effectiveness of the seal, the flange 23 of the packing ring 21 inside of the seal being maintained at all

times by the spring 24 in snugly sleeved but readily slidable engagement with the inner rim 11 of the cup 10, and the outside packing ring 30 being maintained at all times in engagement with both the end thrust disk 18 and the member 17 by the action of the pressure springs 27.

This seal assembly, which can be inexpensively constructed and easily installed, will prevent oil or grease from leaking out through the gap between the housing 15 and the member 17 and will at the same time prevent any foreign matter from working its way in.

In the modification which is shown in Figs. 3 and 4, the flange 31 of the inside packing ring 32, instead of being located about the inner edge of the ring in engagement with the inner rim 33 of the cup, is located about the outer edge of the ring in engagement with the outer rim 34. The flange 31 of the packing ring is pressed against the rim 34 by an expansible spring metal ring 35 which contains a stepped split at 36. The spring ring 35 is held in proper position relative to the flange 31 of the packing ring by an outturned flange 37 on the outer edge of the stamping 38, and the expansion springs 39 are secured to the stamping 38 by reversely bent flanges 40 on the stamping, just as in the first described embodiment.

As a further modification, the packing ring might be flanged about both its inner edge as shown in Fig. 1 and its outer edge as shown in Fig. 3, in a composite form of U-shaped radial section, with the inner flange pressed to form a sealed joint against the inner rim of the cup by any suitable spring means, such as the tensioned coil spring 24 of Fig. 1, and the outer flange pressed to form a second sealed joint against the outer rim by any suitable spring means, such as the split expander ring 35 of Fig. 3, and with both flange-engaging spring means held in their proper positions by the offset formations on the inner and outer edges of the ring which is used to position the end-thrust springs.

We claim:

1. In a seal of the character described, a centrally apertured cup for pressed fit insertion in one end of a housing about a centrally located shaft, a centrally apertured end thrust disk which is positioned within the rim of the cup in axially spaced parallel relation to the bottom of the latter, a flanged packing ring which is secured to the inner face of the disk with the flange of the ring in snugly sleeved but slidable association with a portion of the cup, spring means for pressing the flange against the cup, spring means for moving the disk and packing ring away from the bottom of the cup without disturbing such sleeved association, and means on the cup for limiting said movement.

2. In a seal of the character described, a centrally apertured cup for pressed fit insertion in one end of a housing about a centrally located shaft, which cup is flanged about such aperture to provide an inner rim in concentrically spaced relation to its outer rim, a centrally apertured end thrust disk which is positioned between the inner and outer rims of the cup in axially spaced relation to the bottom of the latter, a flanged packing ring which is secured to the inner face of the disk with the flange of the ring in snugly sleeved but slidable association with the inner rim of the cup, spring means for pressing the flange against the cup, spring means for moving the disk and packing ring away from the bottom of the cup without disturbing such sleeved association, means on the cup for limiting said movement, and a connection between the disk and the outer rim of the cup for preventing any relative rotation of the disk and cup without interfering with the movement of the disk toward or away from the bottom of the cup.

3. In a seal of the character described, a centrally apertured sheet metal stamping provided with a radially extending flange and an axially extending flange, a centrally apertured end thrust disk which is associated with the stamping in axially spaced parallel relation to the radial flange thereof, a flanged packing ring which is positioned against the disk with the flange of the ring in snugly sleeved but slidable association with the axial flange of the stamping, spring means for pressing the flange of the packing ring against the axial flange of the stamping, spring means for moving the disk and packing ring away from the radial flange of the stamping without disturbing such sleeved association, and means on the stamping for limiting said movement.

4. In a seal of the character described, a centrally apertured cup for pressed fit insertion in one end of a housing about a centrally located shaft, a centrally apertured end thrust disk which is positioned within the rim of the cup in axially spaced parallel relation to the bottom of the latter, a flanged packing ring which is secured to the inner face of the disk with the flange of the ring in snugly sleeved but slidable association with a portion of the cup, spring means for moving the disk and packing ring away from the bottom of the cup without disturbing such sleeved association, other spring means for pressing the flange of the packing ring radially against the portion of the cup with which it is sleeved, and a spring-retaining member which is secured against the packing ring and is provided with means for positioning both said first and second mentioned spring means.

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