Feb. 21, 1950 W. BLACKMORE 2,498,520

RAILWAY JOURNAL AND FREE OILING SYSTEM THEREFOR

Filed March 6, 1945 3 Sheets-Sheet 1

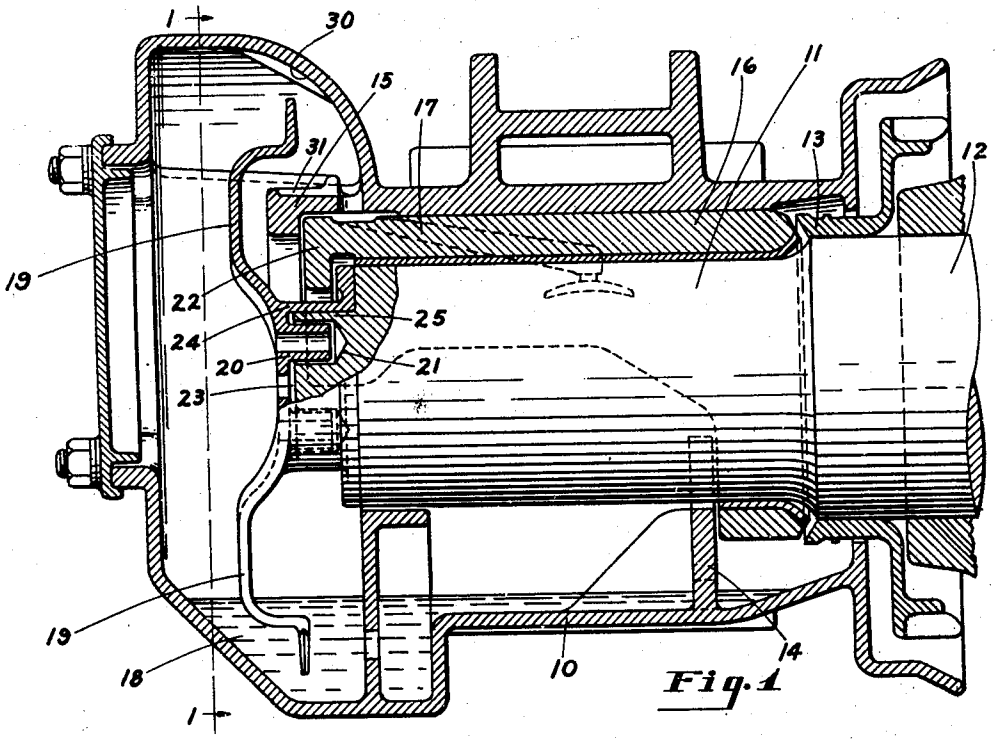


Fig. 1

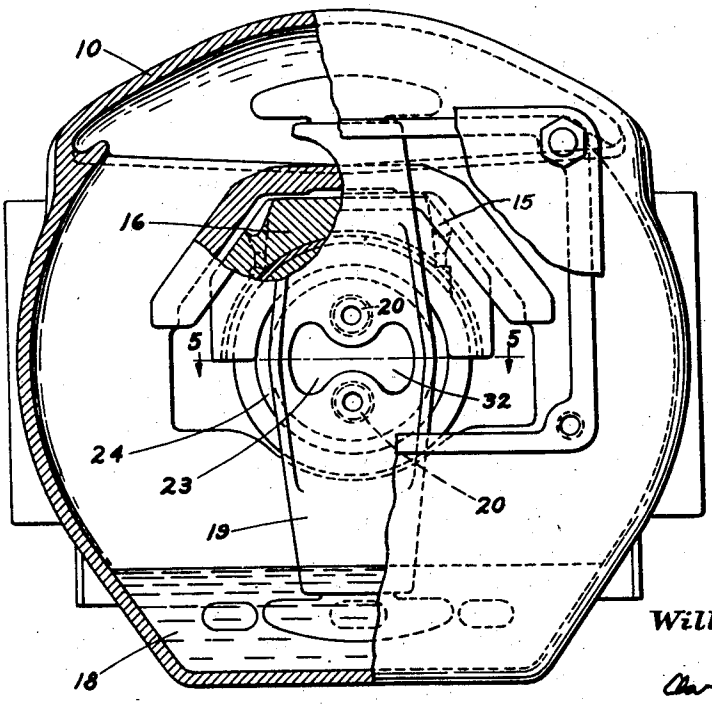


Fig. 2

INVENTOR
William Blackmore
BY
Clarence O'Brien
ATTORNEY

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RAILWAY JOURNAL AND FREE OILING SYSTEM THEREFOR

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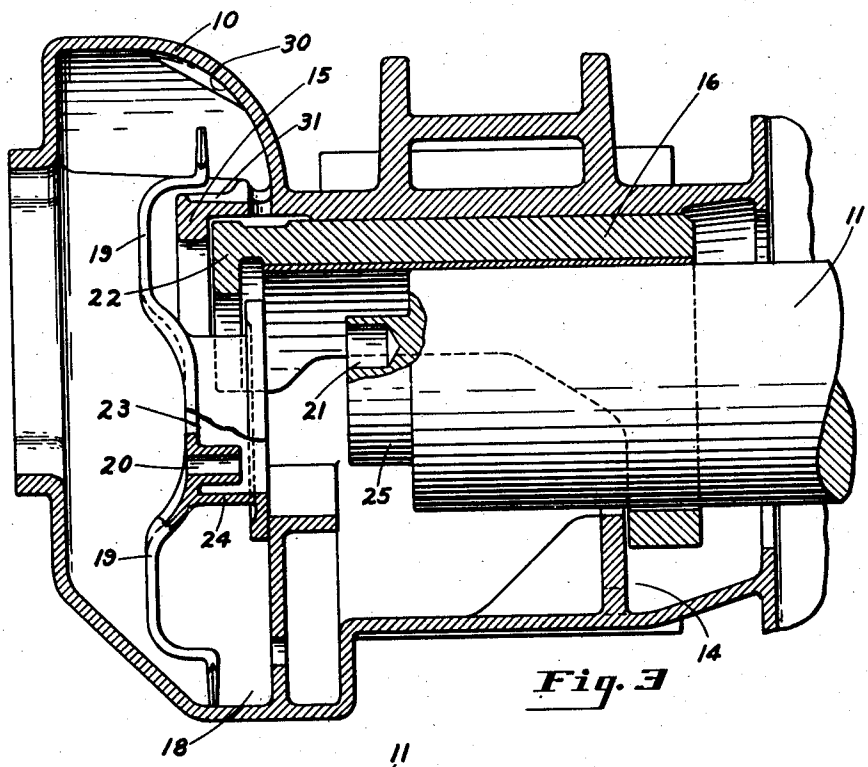


Fig. 3

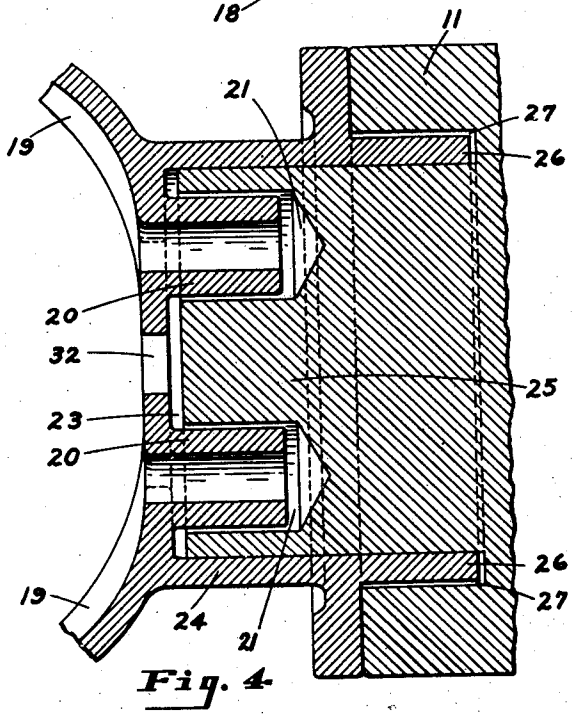
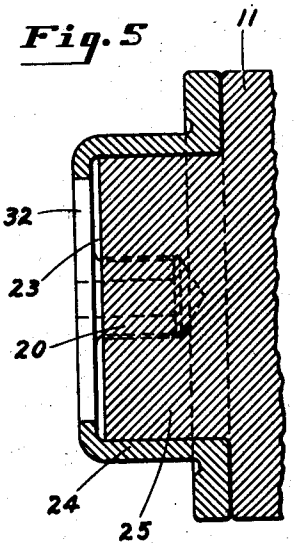


Fig. 4

Fig. 5



INVENTOR
William Blackmore
BY
Clarence B. Kern
ATTORNEY

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RAILWAY JOURNAL AND FREE OILING SYSTEM THEREFOR

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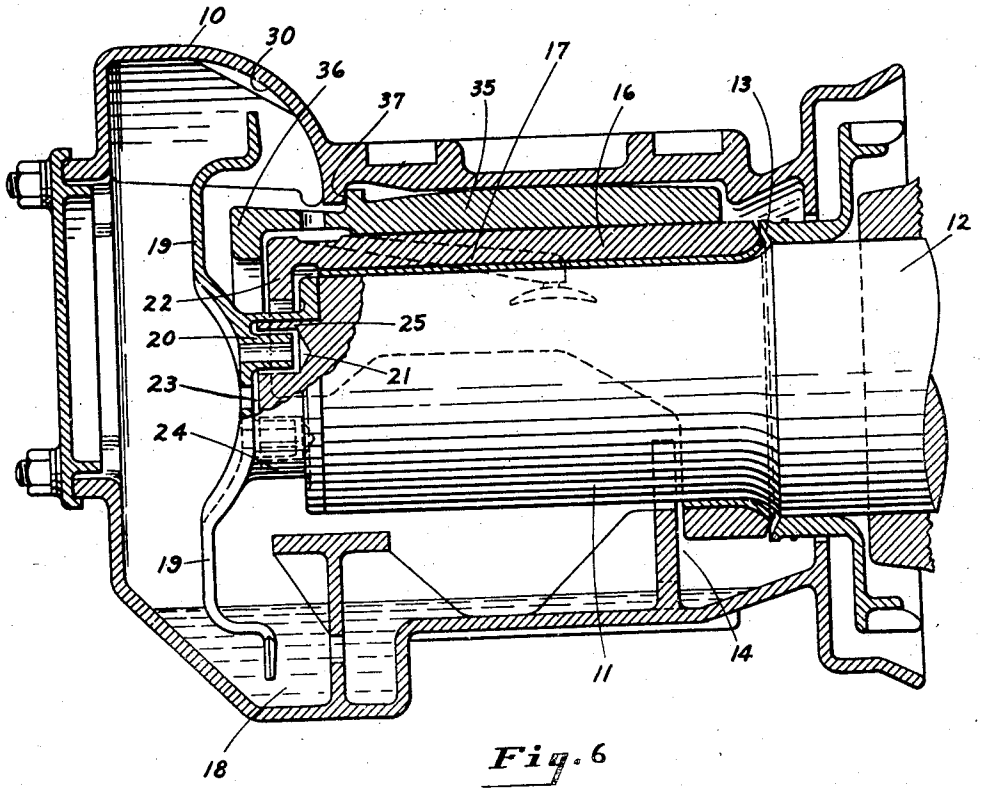


Fig. 6

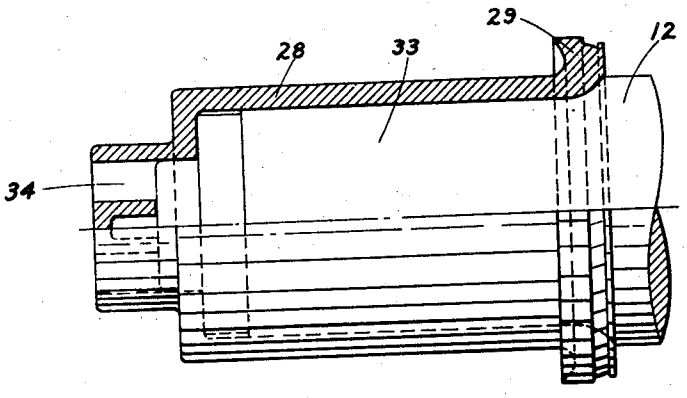


Fig. 7

INVENTOR
William Blackmore
BY Clarence O'Brien
ATTORNEY

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UNITED STATES PATENT OFFICE

2,498,520

RAILWAY JOURNAL AND FREE OILING SYSTEM THEREFOR

William Blackmore, Cleveland Heights, Ohio, assignor to National Malleable and Steel Castings Company, Cleveland, Ohio, a corporation of Ohio

Application March 6, 1945, Serial No. 581,251

6 Claims. (Cl. 308—86)

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This invention relates to journal boxes for railway and, more particularly, to improvements in a free oiling system for the lubrication of journals.

An object of this invention is to provide means for more equally distributing thrusts between the journal box and journal.

Another object of this invention is to provide interlocking means between the oil conveying means and the journal which holds the oil conveying means in operating relation to the journal without the use of additional fastening means.

Another object of this invention is to provide a floating connection between the oil conveying means and the journal without the use of bolts or other fastening means.

In some cases, railway journal boxes should remain substantially perpendicular to the journal with which they are associated. In the conventional type of pedestal railway journal box, the thrust is transmitted from the journal box to the journal on only one side of the longitudinal axis of the journal. This tends to cause tipping of the journal box producing unequal wear on the pedestal guides and unequal loading of the journal.

In accordance with this invention, the tipping of journal boxes, upon transmission of thrusts, is substantially avoided by providing a pair of thrust-resisting means coacting above and below the longitudinal axis of the journal. These thrust-resisting means are adapted for limiting movement of the bearing and may comprise two thrust stops integral with the journal box, one above and the other below the longitudinal axis of the journal. In one embodiment of this invention, which is particularly applicable to journals lubricated by the free oil system of lubrication, an annular thrust ring is fixedly attached to the axle immediately adjacent to the journal. The journal bearing associated with the journal in this embodiment is adapted, and has an integral configuration at one end, for contacting completely the thrust surface of the thrust ring. The thickness and depth of the portion of the journal bearing which is in contact with the thrust ring is sufficient to withstand the thrusts incident to the normal operation of the journal.

In accordance with another feature of this invention, which is particularly applicable to the free oil method of journal lubrication, the oil-conveying arms of the oil-conveying means employed in such systems are interlocked with the journal thus avoiding the use of bolts, which not infrequently break and detach the arm from the

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journal. These oil-conveying arms or means are held by, and are responsive to, the rotation of the journal by interlocking means, such as a key or a plurality of keys, eccentrically located with respect to the axis of the journal, on the conveying means or the front end of the journal. The key or keys are adapted for insertion into a corresponding receptacle or receptacles on the front end of the journal if the key or keys are located on the conveying means. If the key or keys are on the journal, corresponding receptacle or receptacles are located on the oil conveying means. Lateral motion of the oil-conveying means is limited by a flange on the journal bearing adapted for contact with a thrust stop on the journal box, which serves under some conditions the dual purpose of restricting longitudinal motion of the journal as well as that of the means for conveying the oil for the lubrication of the journal.

The oil-conveying means is adapted to be fit onto the stub end of an axle, and there is located a reservoir on this oil-conveying means adjacent the point of contact of the journal and oil-conveying means. The oil-conveying means comprises an oil-gathering means, such as a plurality of arms which dip into the oil of the journal box and deposit some of the oil so gathered to the journal. In addition, some of the oil, due to the rotation of the arms, ricochets to the reservoir adjacent the point of contact of the axle and oil conveying means. The oil is collected in the reservoir by centrifugal force due to the rotation of the axle and passes by hydrostatic pressure to form a film in the seat between the axle and oil-conveying means. The presence of this film acts as a cushion, has a damping effect on vibrations produced in the oil-conveying means, assures lubrication between the oil-conveying means and the axle, and prevents the wearing of metal parts at the points of contact.

A more comprehensive understanding of this invention is obtained by reference to the accompanying drawings in which:

Fig. 1 is a vertical sectional view of a journal box embodying this invention.

Fig. 2 is a front elevation, partly in section, of the journal box shown in Fig. 1 along the line 1—1 thereof.

Fig. 3 is a vertical sectional view of the journal box embodying this invention and shows the manner of inserting the journal box over the journal.

Fig. 4 is a vertical cross-sectional view of a

modification of a part of the system shown in Fig. 1.

Fig. 5 is a horizontal cross-section of a part of the system shown in Fig. 2 along the lines 5—5 thereof and illustrates the manner of lubrication between the parts shown.

Fig. 6 is a longitudinal view in vertical section of a journal box embodying a modification of the invention shown in Fig. 1.

Fig. 7 is a longitudinal view, partly in section, and shows the manner of rendering a roller bearing journal adapted for use with a system of this invention.

Referring to the drawings in which like references denote like parts, a journal box 10 houses a journal 11 of an axle 12 and is constructed for the free-oiling method of journal lubrication. Fixedly attached to the axle 12 is thrust ring 13. Integral with the journal box is a pair of thrust stops 14 and 15 which limit the lateral movement of the journal bearing in one direction. These thrust stops are adapted to be engaged by a journal bearing 16 having a channel 17 for the supply of oil to the journal for the lubrication thereof. The thrust stop 15 engages the front end of the journal bearing, while the thrust stop 14 engages the rear end of the journal bearing, and the thrust stops 14 and 15 coact above and below the horizontal axis of the journal. The journal bearing 16 has an integral configuration at the end adjacent the thrust ring 13 to contact completely the thrust surface of the thrust ring 13 and at that end completely surrounds the journal 11. At the end adjacent the thrust stop 15 it covers a transverse arc of less than 180° so that it may readily be assembled with the other parts. The thickness of the portion of the bearing which completely surrounds the journal 11 depends upon the depth of that portion of the bearing. Both the thickness and depth should be sufficient to withstand the thrust incident to the normal operation of the journal.

An oil-conveying means for transferring the oil contained in a well 18 of the journal box 10 comprises a pair of arms 19. These arms 19 are interlocked with the journal by means of one or a plurality of keys, such as dowels 20 located on the oil-conveying means eccentrically with respect to the axis of the journal and which are inserted into corresponding receptacles 21 on the front end of the journal 11. This construction renders the oil-conveying means responsive to the rotation of the journal whereby oil is transmitted from the well 18 to the bearing 16, thence through a channel 17 to the journal 11. Instead of having the key or keys on the oil-conveying means, they may be located on the front end of the journal, in which case the receptacles are located on the oil-conveying means. Lateral motion of the oil-conveying means is restricted by a flange 22 on the journal bearing 15. On the oil-conveying means adjacent the points of contact with the journal is a reservoir 23 which comprises, in the embodiment shown, a hollow portion of the cylindrical cup 24 fixedly attached to the oil-conveying means and which fits over the stub end 25 of the journal 11. When the journal rotates, oil is gathered on the arms 19 of the oil-conveying means and is either thrown onto surface 30 on the inside of the journal box or drips into channels 31 on lug 15 from whence it is conveyed to the journal and bearing. Due to this rotation, some of the oil richochets through an opening 32 to the reservoir 23 and is retained therein due to centrifugal force. As

illustrated by the heavy lines in Fig. 5, the oil so collected in the reservoir 23 passes by hydrostatic pressure to form a film between the cylindrical cup 24 and stub end 25 of the journal. This oil acts as a cushion, so that the oil-conveying means substantially floats on the journal. As a consequence, vibrations of the oil-conveying means are substantially damped and material wearing of contacting parts of the oil-conveying means and the journal is avoided.

A modification of the manner of attaching the oil-conveying means to the journal is shown in Fig. 4. The cylindrical cup 24 is extended to protrude into the body of the journal. These extensions indicated in the drawing by the numeral 26 fit into a corresponding receptacle 27 in the stub end of the journal. In this manner the oil-conveying means has greater bearing area on the journal to prevent tipping.

A standard journal adapted for use with roller bearings can be converted to a journal for use in the system of this invention by placing a sleeve over the journal, the sleeve being provided with receptacles for the accommodation of the oil-conveying means. The manner of converting the roller bearing journal to render it adaptable for use in this invention is illustrated in Fig. 7. A sleeve 28 is shrunk on a roller bearing type of journal 33 which is of smaller diameter than a plain bearing type of journal. The outer diameter of sleeve 28 is the same as that of the journal shown in Fig. 1. This sleeve has a thrust ring 29 which is integral with the sleeve and is also provided with receptacles 34 for the accommodation of the keys, such as the dowels 20.

If it is desired to employ a wedge, as in the conventional type of journal box assembly, the system in Fig. 6 may be employed. This structure is substantially the same as that shown in Fig. 1 except that a wedge 35 is inserted over the journal bearing 16. This wedge 35 has a lug 36 which limits the movement of the journal bearing 16 outwardly from the box. The wedge 35 is, in turn, restricted in its outward movement by a thrust stop 37 integral with the journal box 10. The other parts of the journal box assembly shown in Fig. 6 are the same as that shown in Fig. 1.

The journal box in accordance with this invention may be readily inserted over the journal as shown in Fig. 3. The journal bearing 16 is first placed on the journal 11. The journal box 10 is then partially slid over the journal and bearing to a position such as is shown in Fig. 3. The oil-conveying means is then assembled with the bearing by inserting it through the opening in the front of the box and moving it from the position shown in Fig. 3 to the position shown in Fig. 1. The oil-conveying means including the cylindrical cup 24 together with the journal box and bearing are moved in the direction of the journal until the dowels 20 completely engage the receptacles 21. To assure ease of assembly, it is essential that the forward portion of the bearing covers an arc which is not greater than 180° so that the oil conveying means can be moved upwardly from the position shown in Fig. 3 to that shown in Fig. 1.

The terms and expressions which are employed herein are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions of excluding any mechanical equivalents of the features shown and described or portions thereof, but it is recognized that various structural modifications are

possible within the scope of the invention claimed.

What is claimed is:

1. A journal box having a journal, a journal bearing associated with said journal, an oil-conveying means on the front of said journal for the lubrication of said journal, stop means on said bearing for limiting movement of said oil-conveying means away from the end of said journal, and stop lugs on said oil conveying means received in openings in the end of said journal for holding substantially securely said oil-conveying means to said journal when rotating in operation.

2. A journal box having a journal therein, a journal bearing associated with said journal, an oil-conveying means on the front end of said journal for conveying oil to said journal bearing, stop means on said bearing for limiting movement of said oil-conveying means outwardly of the end of said journal, an off-centered receptacle on the front end of said journal, and an off-centered key on said oil-conveying means adapted for insertion in said off-centered receptacle, said oil-conveying means comprising a recessed portion for receiving the end of said journal, said portion forming with the end of said journal an oil receiving reservoir to provide a floating contact between said oil-conveying means and said journal.

3. In a journal box, a journal, a journal bearing associated with said journal, oil-conveying means on the front end of said journal for conveying oil to said journal bearing, said means having a cup-shaped portion for receiving the end of said journal, said portion forming with the end of said journal an oil collecting reservoir to provide a floating contact between said oil-conveying means and the end of said journal, a plurality of off-centered receptacles on the front end of said journal, a plurality of off-centered keys on said oil-conveying means adapted for insertion in said plurality of off-centered receptacles, and stop means on said bearing overlapping said oil-conveying means for limiting movement of said oil-conveying means outwardly of the end of said journal.

4. In a journal box a journal extending into said box, a journal bearing associated with said journal, an oil-conveying member adapted for attachment to the end of said journal for rotation therewith, said member comprising a pair of arms, a chambered portion for receiving a portion of the end of said journal and lugs extending into openings in the end of said journal, and stop means on said bearing for limiting movement of said member outwardly of the end of said journal.

5. A journal box having a journal therein, a journal bearing associated with said journal, oil-conveying means mounted on the front end of said journal for rotation therewith, said oil-conveying means being adapted for limited movement in a direction lengthwise of said journal, said oil-conveying means comprising a cup-shaped portion for receiving the end of said journal and flange means extending radially outwardly from said cup-shaped portion for engagement with the end of said journal to limit movement of said oil-conveying means inwardly of the end of said journal, and stop means on said bearing overlapping said flange means for limiting movement of said oil-conveying means outwardly of the end of said journal.

6. In a system for lubricating a journal, a journal, a journal bearing associated with said journal, oil-conveying means for conveying oil to said journal bearing, said oil-conveying means being adapted for limited movement in a direction lengthwise of said journal, said oil-conveying means comprising stop means received in openings in said journal for interlocking said oil-conveying means to said journal for rotation therewith, a cylindrical portion surrounding the end of said journal and a radial flange extending from said cylindrical portion for engagement with the end of said journal to limit movement of said oil-conveying means inwardly of said journal, and stop means on said bearing adapted for engagement with said flange to limit movement of said oil-conveying means outwardly of the end of said journal.

WILLIAM BLACKMORE.

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