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WASHING MACHINE

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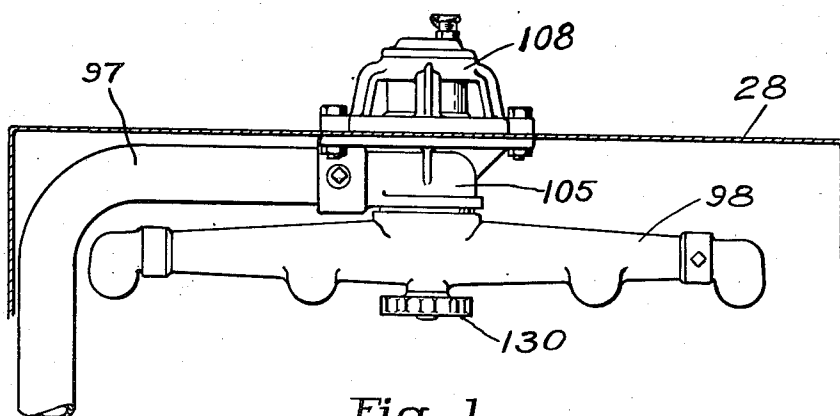


Fig. 1

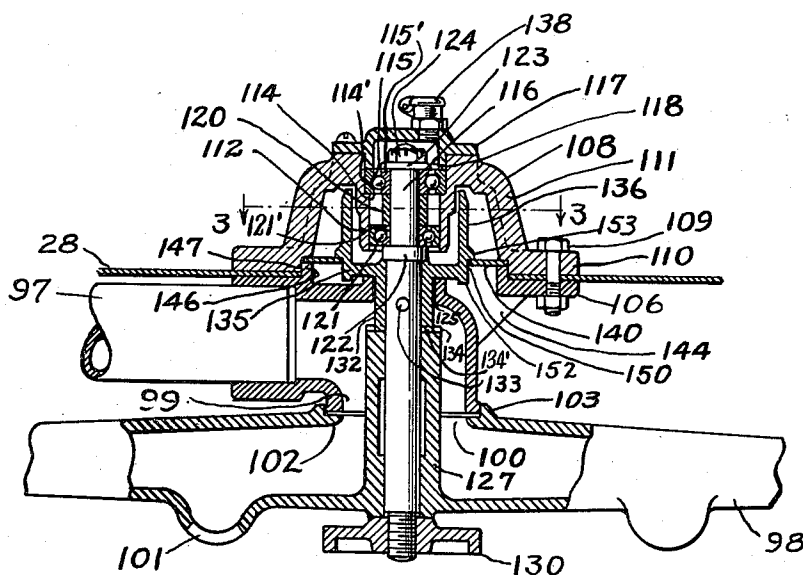


Fig. 2

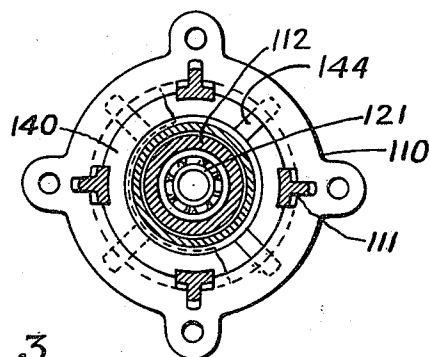


Fig. 3

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WASHING MACHINE

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478,978. Divided and this application July 29,
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1931

20 Claims. (Cl. 141—9)

This invention relates to washing machines.

One of the principal objects of the invention is the provision in a washing machine having a rotatable wash arm of an improved bearing mounting for the rotatable wash arm, which is economical in construction, highly effective in operation, has long life, and which is protected against leakage liquid and the damp atmosphere within a washing machine while at the same time adequate lubrication of the bearing is afforded.

Another object of the invention is the provision in a washing machine of a rotatable wash arm mounted within the washing compartment, and supported upon a bearing positioned on the exterior of the washing compartment and effectively sealed from the atmosphere of the washing compartment.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawing and the appended claims.

This is a division of my copending application Serial No. 478,978, filed August 30, 1930.

In the drawing, in which like characters of reference designate like parts throughout the several views thereof—

Fig. 1 is a partial side elevational view of a washing machine having a rotatable wash arm and exterior bearing support therefor, constructed in accordance with this invention, the washing machine casing being broken away and shown in section for clearness in illustration;

Fig. 2 is a vertical sectional view of the wash arm and its supporting structure shown in Fig. 1; and

Fig. 3 is a horizontal sectional view taken on the plane of the line 3—3 of Fig. 2.

Referring to the drawing, which discloses a preferred embodiment of the invention, the casing of a washing machine for the washing of dishes and other articles, is illustrated generally at 28. It will be understood that the washing machine is provided with means for supporting dishes or other articles within the casing, where they are subjected to sprays of washing liquid from the rotatable wash arm 98. The wash liquid is supplied to the wash arm through the conduit 97 mounted entirely within the washing machine casing, and connected to the elbow 105. The latter has a downwardly directed opening 99 which communicates with an upwardly directed opening 100 in the central or hub portion of the wash arm, so that the wash liquid supplied to the elbow by the conduit 97

is in turn directed into the hollow branches of the wash arm 98. The wash arm may be of conventional construction, having two or more radially extending arms which branch off of the hub portion, each arm having downwardly directed spray ports 101 for the discharge of the washing liquid. Certain of the spray ports are inclined, so that the wash arm is rotated by the reactive force of the discharge liquid. The wash arm is rotatably supported in closely spaced relationship with the downwardly extending end of the elbow 105, so as to provide for the free rotation of the wash arm, while restraining liquid leakage. As shown, the wash arm is provided with an inwardly extending annular flange 102 which is spaced just beneath the lower end of the elbow 105, and also an upwardly extending annular flange 103 which surrounds this lower end of the elbow.

Elbow 105 is formed with an annular flange 106 which is bolted to the interior side of the casing 28 about a circular opening provided in this casing. A bearing supporting member 108 is positioned on the exterior of the casing 28 in substantial alignment with member 105, and carries a cylindrical attaching flange 110 on the outer side of the casing 28 opposite the flange 106. The casing 28 is securely bolted between flanges 106 and 110 by the bolts 109.

The member 108, as shown, comprises the attaching flange 110, upwardly extending ribs 111, and a cylindrical bearing retainer or sleeve 112 within which are mounted suitable bearings for the support and free rotational movement of the upper wash arm 98. The interior of the downwardly extending cylindrical sleeve 112 is provided with a step 114 for the support of the outer race 114' of a ball bearing 115. The inner race 115' for bearing 115 is carried upon a shaft 116 which is removably attached to and supports the wash arm 98. The bearing is constructed to sustain the thrust loads on the shaft 116. A cap member 117 secured to the portion 112 has a downwardly extending cylindrical flange 118 which is adapted to bear against and position the outer race 114' of this bearing. The inner race 115', a spacing sleeve 120 and the inner race 121' of a second bearing 121 are secured to the shaft 116 by being clamped between a collar 122 shown formed as an integral part of the shaft, and a washer 123 which is held in clamped engagement against the bearing assembly by means of a nut 124 threadedly engaging the end of the shaft 116. The outer race of the lower bearing 121 contacts with the interior cylin-

drical surface of the sleeve 112, and is held in place by the balls and inner race. The bearings 115 and 121 serve to maintain the shaft 116 in correct alignment. The shaft 116 extends downwardly through an opening 125 provided in the elbow 105 and at its lower end is engaged by a sleeve 127 which is provided on the wash arm 98 and extends upwardly upon the axis thereof to within the area of the member 105. The lower end of the shaft 116 is threaded to receive a nut 130 which holds the member 98 in position upon the shaft. Upon assembling the wash arm 98 upon the shaft 116 and drawing the nut 130 tight the wash arm 98 is held securely in location by contact of the sleeve 127 against a collar 132 which is held to the shaft as by means of a pin 133. The collar 132 is provided with downwardly extending tongues 134 which fit within corresponding grooves 134 in the upper end of the sleeve 127 to form a positive driving connection between the wash arm 98 and the shaft 116.

The collar 132 is provided with a disk like extension 135 having attached to its peripheral edge an upstanding cylindrical collar 136 which encircles the portion 112 of the member 108. The disk 135 and collar 136 form a substantially cup shaped retainer for the retention of oil supplied to the bearings 115 and 121; a suitable oil feeding means such as the oil cup 138 being provided upon the cap member 117. The cup shaped retainer cooperates with a disk like member 140 which is positioned between the flanges 106 and 110 to prevent the passage of washing fluid from the interior of the casing through the opening provided in the casing cover 28 through which the supporting shaft of the wash arm passes to the exterior of the casing. As shown, the body of the member 105 and the flange portion 106 are connected together by a plurality of webs 144 between which are openings which provide communicating passages to the interior of the casing. The flange 106 is provided with an upstanding collar 146 which is adapted to be received within the cylindrical groove 147 provided in the flange portion 110 of the member 108. The disk like retaining member 140 is positioned within the groove 147 and is held in place by the sleeve 146 when the members 105 and 108 are clamped in position. The member 140 is provided with an opening of such size that a small clearance space, indicated at 150, is provided between the disk like member 140 and the sleeve 136. Suitable peripheral ridges 152 and 153 are provided on the sleeve 136 adjacent the member 140 to prevent the passage of washing fluid between these members and to direct back into the washing compartment any fluid which may enter this area. Any washing fluid which may escape from the conduit 105 through the opening 125 adjacent the shaft 116 will, upon rotation of the member 132, be carried outwardly on the disk like face 135 and will be discharged therefrom by being thrown centrifugally from the flange 152 whereupon it returns to the interior of the washing machine casing through the passages in the member 105.

Leakage liquid from the wash arm and conduit is thus returned to the interior of the casing and effectively prevented from splashing to the exterior through the opening in the casing receiving the wash arm. Any steam or water vapor that tends to pass through the passages between the body portion and flange 106 of the member 105 is restrained from reaching the exterior of the washing machine casing by the close fitting

and overlapping relationship between the disk 140 and the flange 153. This construction which positions the wash arm bearings on the exterior of the housing thus not only provides an effective means of retaining the bearing lubricant, but also protects, by the close fitting relationship between the stationary disk 140 and the flange 153 of the rotatable lubricant retainer, against the passage of washing liquid to the exterior of the housing and tends to prevent the escape of the damp atmosphere and steam from the interior of the washing compartment housing through this small clearance space. However, if any steam or water vapor should escape between the disk 140 and flange 153 this is promptly dissipated into the outer atmosphere by the normal circulation of air accessible to this area by the ribbed construction of the bearing supporting member 108 which thus forms a vent for the space surrounding the bearing retainer. The damp atmosphere of the washing compartment does not, therefore, have an opportunity to come into contact with the wash arm bearings. The bearing lubricant retainer sleeve 136 terminates in close fitting relationship to the portion 112 of the bearing support and thus functions not only as a lubricant retainer but also as a protecting enclosure to further minimize the likelihood of the ingress of dampness or steam from the washing compartment into the bearing enclosure.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In a washing machine, a casing providing a washing compartment and having an opening therein, a movable nozzle within said casing, a shaft fixed to and extending from the nozzle through the casing at the opening to the casing exterior, said shaft passing through the casing at the opening in friction free relationship therewith, shaft supporting bearing means positioned exteriorly of the casing and adjacent the opening, said exterior bearing means affording the sole guide and support for said nozzle and shaft, and means on the shaft adjacent the opening for isolating the bearing means from the atmosphere of the washing compartment, said isolating means being spaced from the casing and affording a venting gap for the casing at the opening.

2. In a washing machine, a casing providing a washing compartment and having an opening therein, a movable nozzle within said casing, a nozzle supporting shaft extending through the opening to the exterior of the casing, a bearing supporting member positioned exteriorly of the casing over the casing opening and extending to the casing, said member having an opening therein affording a free venting passage from the casing opening, a shaft supporting bearing carried by said member, and means on the shaft cooperatively related to and spaced from the bearing supporting member for isolating the bearing from the atmosphere of the washing compartment.

3. In a washing machine, a casing having an opening therein, a rotatable wash arm positioned within said casing, a shaft attached to said wash arm and providing a pivotal axis therefor, said shaft passing through said opening, a supporting member positioned on the exterior of said cas-

shaped retainer and the bearing supporting means having closely spaced cooperating surfaces to further restrain ingress of damp atmosphere from within said casing into said bearing.

- 6 12. In a washing machine, a casing providing a washing compartment and having an opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, a conduit for supplying liquid to said wash arm, a shaft for rotatably supporting said wash arm extending through said opening to the exterior of said casing, a bearing for said shaft on the exterior of said casing, means for supporting said bearing overlying said opening, a lubricant retainer carried by said shaft and surrounding said bearing, and a sealing member carried by said bearing supporting means and cooperating in closely spaced relationship with said lubricant retainer to restrain leakage from within said casing to the exterior thereof between said retainer and said bearing supporting means, said retainer having an extending flange positioned on the inner side of said sealing member to provide a liquid finger for returning liquid leakage to the interior of said casing.

13. In a washing machine, a casing providing a washing compartment and having an opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, a conduit for supplying liquid to said wash arm, a shaft for rotatably supporting said wash arm extending through said opening to the exterior of said casing, a bearing for said shaft on the exterior of said casing, means for supporting said bearing overlying said opening, said conduit having an annular flange extending about said opening on the inner side of said casing, said bearing supporting means having an annular flange extending about said opening on the outer side of said casing, and means for clamping said flanges together with said casing therebetween.

14. In a washing machine, a casing providing a washing compartment and having an opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, a conduit for supplying liquid to said wash arm, a shaft for rotatably supporting said wash arm extending through said opening to the exterior of said casing, a bearing for said shaft on the exterior of said casing, means for supporting said bearing overlying said opening, said conduit having an annular flange extending about said opening on the inner side of said casing, said bearing supporting means having an annular flange extending about said opening on the outer side of said casing, means for clamping said flanges together with said casing therebetween, and a sealing member for restraining leakage through said opening fastened in place between said conduit and said bearing supporting means.

15. In a washing machine, a casing providing a washing compartment and having an opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, a conduit for supplying liquid to said wash arm, a shaft for rotatably supporting said wash arm extending through said opening to the exterior of said casing, a bearing for said shaft on the exterior of said casing, means for supporting said bearing overlying said opening, said conduit having an annular flange extending about said opening on the inner side of said casing, said bearing supporting means having an annular flange extending about said opening on the outer side of said casing, means for clamping said flanges to-

gether with said casing therebetween, and a sealing member for restraining leakage through said opening, said conduit flange having an opening therethrough inwardly of said sealing member to provide for the return of leakage liquid to the interior of said casing.

16. In a washing machine, a casing providing a washing compartment and having an opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, a conduit for supplying liquid to said wash arm, a shaft for rotatably supporting said wash arm extending through said opening to the exterior of said casing, a bearing for said shaft on the exterior of said casing, means for supporting said bearing overlying said opening, said conduit having an annular flange extending about said opening on the inner side of said casing, said bearing supporting means having an annular flange extending about said opening on the outer side of said casing, means for clamping said flanges together with said casing therebetween, a sealing member for restraining leakage through said opening, said conduit flange having an opening therethrough inwardly of said sealing member to provide for the return of leakage liquid to the interior of said casing, and a finger carried by said shaft inwardly of said sealing member for positively returning liquid leakage through said flange opening to the interior of said casing.

17. In a washing machine, a casing providing a washing compartment and having an opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, a conduit for supplying liquid to said wash arm, a shaft for rotatably supporting said wash arm extending through said opening to the exterior of said casing, a bearing for said shaft on the exterior of said casing, means for supporting said bearing overlying said opening, said conduit having a portion positioned within said casing adjacent said opening and surrounding said shaft, a flange on said conduit fastened to said casing, a sealing member for restraining leakage through said opening, said conduit flange having an opening therethrough inwardly of said sealing member to provide for the return of leakage liquid to the interior of said casing, and a bearing lubricant retainer carried by said shaft, said retainer having a liquid finger means and within the space enclosed by said conduit flange for both positively returning liquid leakage through said flange opening to the interior of said casing and preventing leakage into said bearing while confining lubricant therein.

18. In a washing machine, a casing providing a washing compartment and having an opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, a conduit for supplying liquid to said wash arm, a shaft for rotatably supporting said wash arm extending through said opening to the exterior of said casing, a bearing for said shaft on the exterior of said casing, means for supporting said bearing overlying said opening, said conduit having a portion positioned within said casing adjacent said opening and surrounding said shaft, a flange on said conduit fastened to said casing, a sealing member for restraining leakage through said opening, said conduit flange having an opening therethrough inwardly of said sealing member to provide for the return of leakage liquid to the interior of said casing, and a bearing lubricant retainer carried by said shaft, said retainer having an offset portion and having

ing and forming a bearing support for said wash arm shaft, a bearing carried thereby, and means carried by the shaft adjacent the opening and free of contact with any part other than the shaft for isolating said bearing from the casing opening.

4. In a washing machine, a casing having an opening therein, a rotatable wash arm positioned within said casing, a member positioned on the interior of the casing adjacent the opening and comprising a fluid conduit to supply washing fluid to said wash arm, said interior member having passages providing communication between the exterior and interior of the casing through said opening, supporting means for said wash arm comprising a member positioned on the exterior of said casing in cooperative relationship with said interior member, and means associated with said members to restrain the passage of washing fluid from the casing through said passages and opening.

5. In a washing machine, a casing having an opening therein, a rotatable wash arm within said casing, an axially mounted member on said wash arm, supporting means for said wash arm comprising a member positioned on the exterior of said casing, overlying the opening, said supporting member comprising a bearing for said axially mounted member, a member positioned on the interior of the casing adjacent the opening in cooperative relationship with said supporting member, said interior member providing a liquid conduit and having a passage for said axially mounted member and a passage providing communication between the interior and the exterior of said casing through said opening, and means for directing into the casing leakage liquid passing between the axially mounted member and the interior member.

6. In a washing machine, a casing having an opening therein, a rotatable wash arm positioned within said casing, a shaft for said wash arm extending through said opening, a supporting member for said wash arm shaft, said supporting member being positioned exteriorly of said casing and comprising a downwardly extending bearing retainer, and an upwardly extending cup shaped lubricant retainer on said shaft surrounding said bearing retainer and isolating said bearing retainer from the casing opening.

7. In a washing machine, a casing providing a washing compartment and having a venting opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, a conduit within said casing having an open end communicating with said wash arm for supplying liquid to said wash arm and having an opening for passage of a shaft, a shaft fixed to and rotatably supporting said wash arm and extending from the wash arm through the conduit open end and shaft passage and the casing opening to the exterior of said casing, a bearing for said shaft on the exterior of said casing, said exterior bearing affording the sole guide and support for said shaft, means for supporting said bearing overlying said casing opening, and means associated with the shaft substantially closing the conduit shaft passage and casing opening to restrain liquid leakage through said opening and for isolating said bearing against ingress of damp atmosphere from within said casing.

8. In a washing machine, a casing providing a washing compartment and having an opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, a

conduit for supplying liquid to said wash arm, a shaft for rotatably supporting said wash arm extending through said opening to the exterior of said casing, a bearing for said shaft on the exterior of said casing, means for supporting said bearing overlying said opening, and a lubricant retainer carried by said shaft and surrounding said bearing for isolating said bearing against ingress of damp atmosphere from within said casing.

9. In a washing machine, a casing providing a washing compartment and having an opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, a conduit for supplying liquid to said wash arm, a shaft for rotatably supporting said wash arm extending through said opening to the exterior of said casing, a bearing for said shaft on the exterior of said casing, means for supporting said bearing overlying said opening, a lubricant retainer carried by said shaft and surrounding said bearing, and a sealing member carried by said bearing supporting means and cooperating in closely spaced relationship with said lubricant retainer to restrain leakage from within said casing to the exterior thereof.

10. In a washing machine, a casing providing a washing compartment and having an opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, a conduit for supplying liquid to said wash arm, a shaft for rotatably supporting said wash arm extending through said opening to the exterior of said casing, a bearing for said shaft on the exterior of said casing, means for supporting said bearing overlying said opening, a cup-shaped lubricant retainer carried by said shaft and surrounding said bearing, and a sealing member carried by said bearing supporting means and cooperating in closely spaced relationship with said cup-shaped lubricant retainer to restrain leakage from within said casing to the exterior thereof between said cup-shaped retainer and said bearing supporting means, said bearing supporting means having ventilating openings communicating with atmosphere surrounding said cup-shaped retainer and on the outer side of said sealing member to thereby provide a vent to atmosphere for the space surrounding said cup-shaped retainer.

11. In a washing machine, a casing providing a washing compartment and having an opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, a conduit for supplying liquid to said wash arm, a shaft for rotatably supporting said wash arm extending through said opening to the exterior of said casing, a bearing for said shaft on the exterior of said casing, means for supporting said bearing overlying said opening, means for lubricating said bearing, an outwardly opening cup-shaped lubricant retainer carried by said shaft and surrounding said bearing, a sealing member carried by said bearing supporting means and cooperating in closely spaced relationship with said cup-shaped lubricant retainer to restrain leakage from within said casing to the exterior thereof between said cup-shaped retainer and said bearing supporting means, said bearing supporting means having ventilating openings communicating with atmosphere surrounding said cup-shaped retainer and on the outside of said sealing member to thereby provide a vent to atmosphere for the space surrounding the open end of said cup-shaped retainer, the said cup-

a liquid finger positioned inwardly of the sealing means and within the space enclosed by said conduit flange for both positively returning liquid leakage through said flange opening to the interior of said casing and preventing leakage into said bearing while confining lubricant therein, said sealing member cooperating in closely spaced relationship with the offset portion of the lubricant retainer to restrain passage of the damp atmosphere within said casing to the exterior thereof.

19. In a washing machine, a casing having a cover portion provided with an opening therein, a rotatable wash arm suspended from said cover portion for spraying liquid within said casing, said wash arm having a centrally arranged upper opening, a conduit having a down-turned elbow provided with an opening communicating with said opening in the wash arm for supplying liquid to said wash arm, said conduit having an upper opening aligned with said opening in the cover portion of the casing, a shaft for rotatably supporting said wash arm extending through the aligned openings in said conduit and casing to the exterior of the casing, a bearing for said shaft on the exterior of said casing, a bearing supporting member on the exterior of said casing mounted about said casing opening and having a downwardly depending sleeve for confining said bearing, an upwardly opening cup-shaped lubricant retainer carried by said shaft and surrounding said depending sleeve

in closely spaced relationship, said bearing supporting means having a ribbed portion with intermediate openings positioned about the upper portion of said cup-shaped lubricant retainer to vent the space surrounding the upper portion of said lubricant retainer, and a sealing member arranged between said bearing supporting member and the exterior of said cup-shaped lubricant retainer inwardly of said ribbed portion of the bearing supporting member.

20. In a washing machine, a casing providing a washing compartment and having an opening therein, a rotatable wash arm within said washing compartment for spraying liquid therein, said wash arm having a shaft member extending through the casing opening, means for supplying liquid to said wash arm comprising a conduit having an opening for passage of the shaft member, an anti-friction bearing positioned on the exterior of said casing opposite said casing opening for rotatably supporting said shaft member and wash arm, means cooperatively related to and out of contact with said shaft member for restraining the passage of liquid and damp atmosphere from within said casing through said opening to the exterior thereof about said shaft member, and means on the shaft member for returning liquid leakage from the conduit opening at the shaft passage to the interior of said casing and for sealing said bearing against ingress of both liquid leakage and the damp atmosphere from within said casing.

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