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W. J. COULTAS ET AL

2,125,489

GEAR HOUSING

Filed June 27, 1934

FIG-1

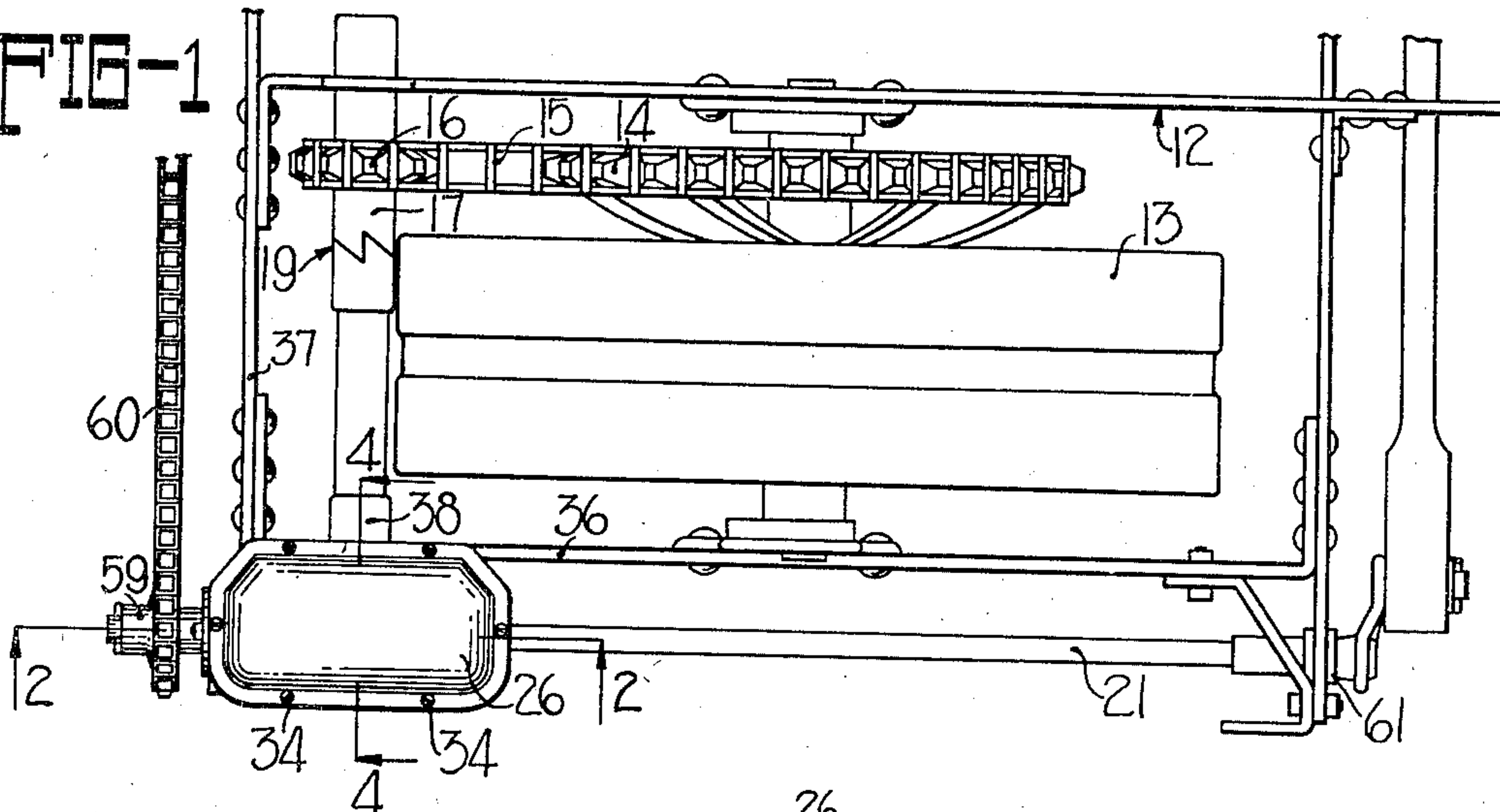


FIG-3

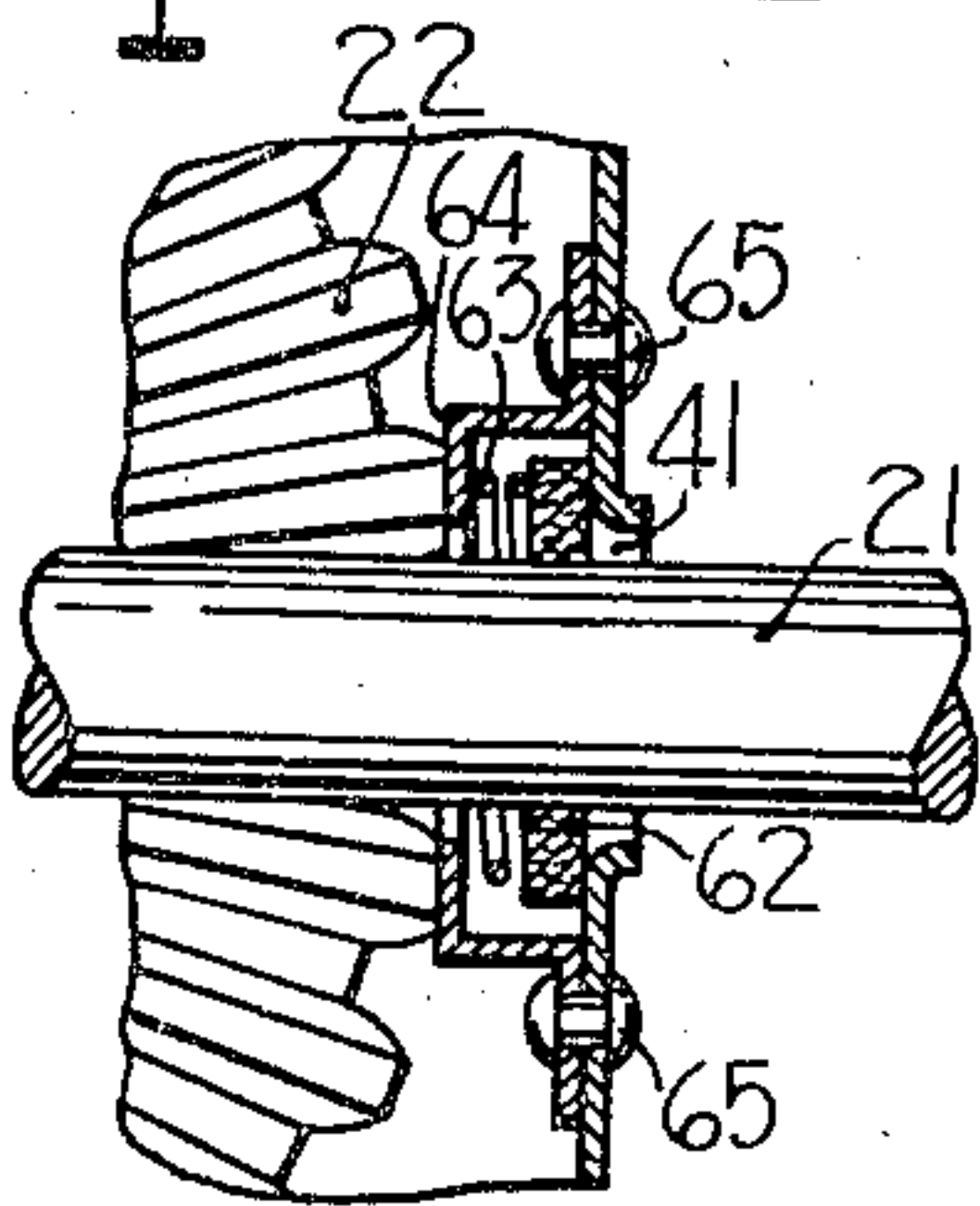


FIG-2

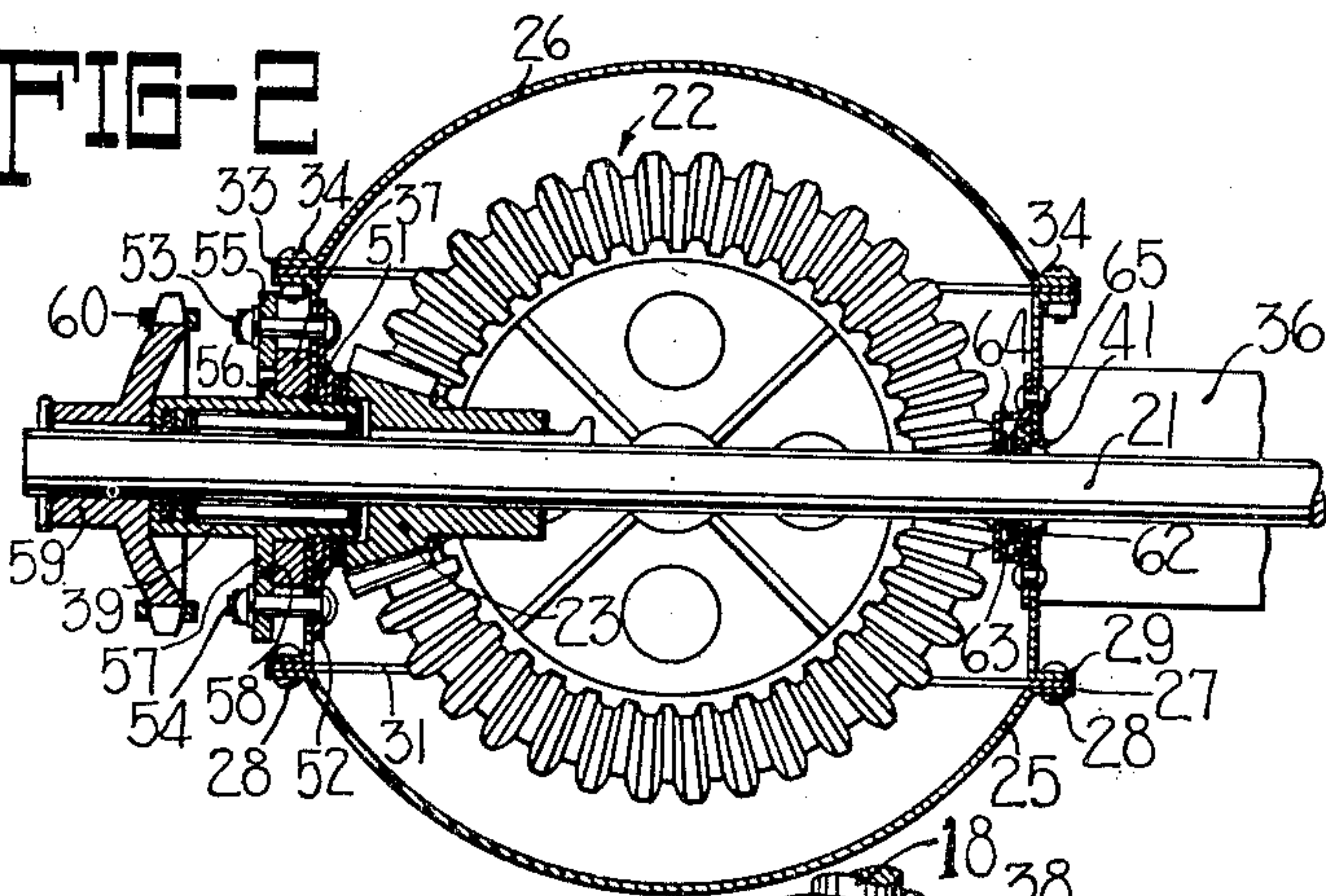


FIG-4

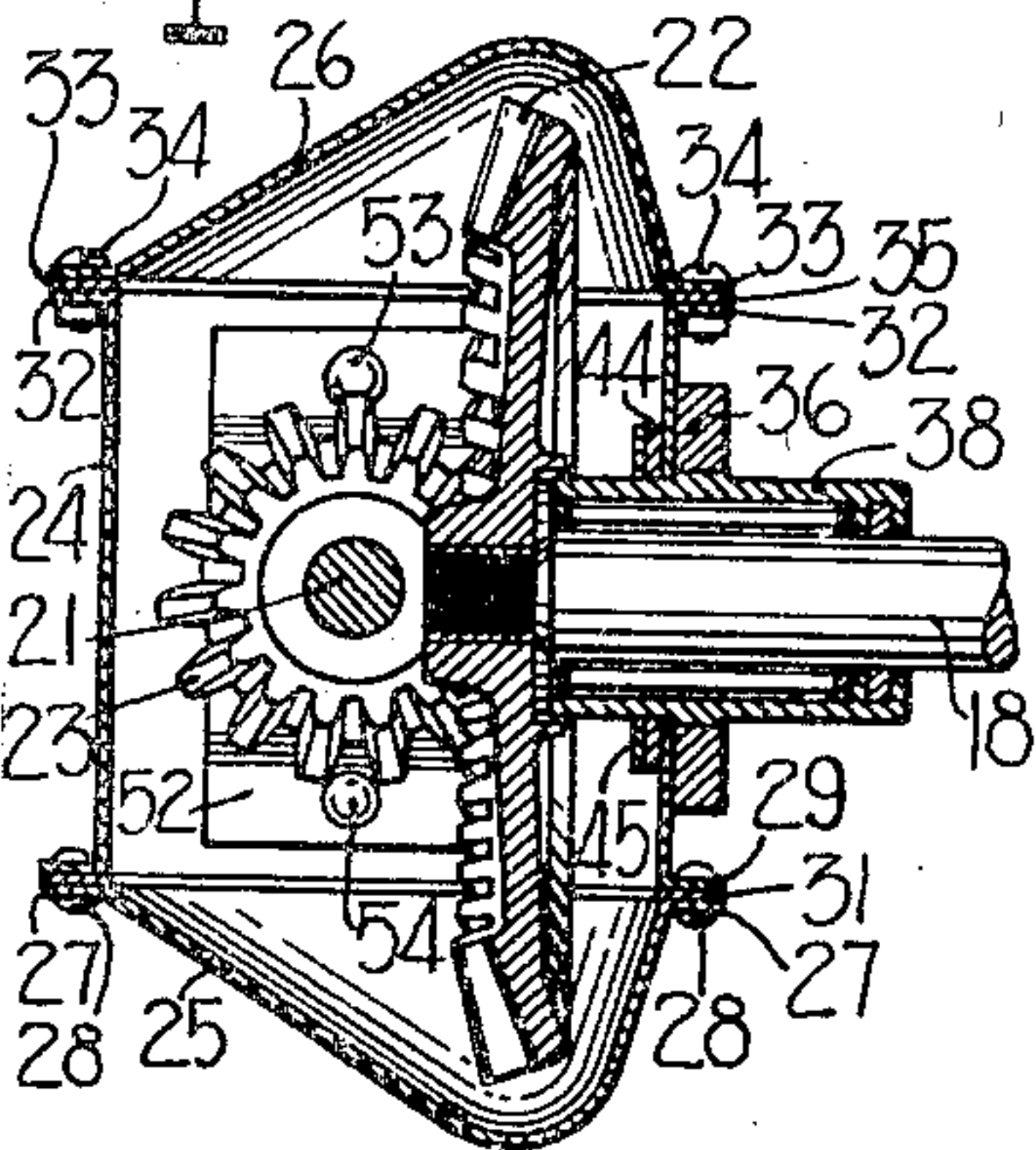
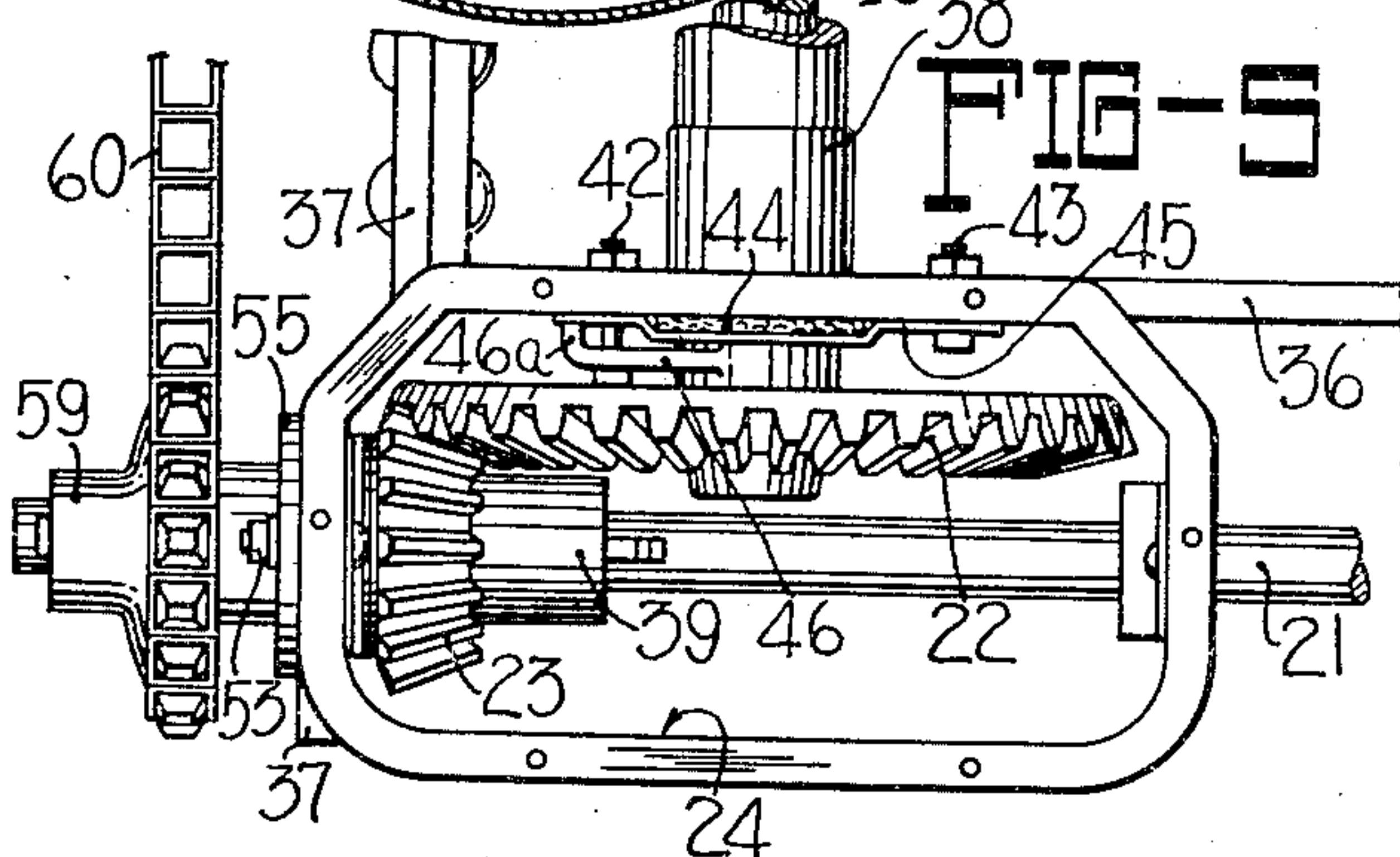


FIG-5



By

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UNITED STATES PATENT OFFICE

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GEAR HOUSING

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10 Claims. (Cl. 308—36.1)

The present invention relates to gear housings of the type ordinarily employed on agricultural implements of various types for enclosing certain of the gearing in the driving train, and more particularly has to do with housings of this type formed of sheet metal. In the present instance the improved gear housing has been shown as enclosing the bevel gear and bevel pinion of the driving train through which the sickle of a binder is driven.

As is well known, it is desirable in connection with binders and other agricultural implements to enclose certain of the driving gears in a housing so that the gears will always be properly lubricated and kept free from dirt and grit, and the principal object of the present invention is to provide an improved grease-tight gear housing of this type.

Another object of the invention is the provision of improved means for securing the gear housing to the frame of an implement or other structure.

A further object of the invention is the provision of improved means for sealing the openings in the housing through which openings the shafts connected with the gears within the housing extend.

A still further object of the invention is to provide improved means for locking the shaft bearings in position in the housing, such means including means for securing the housing to the frame.

Further objects and advantageous features of the present invention will be apparent from the following description of the preferred embodiment of the invention illustrated in the accompanying drawing, in which:

Figure 1 is a top plan view of a portion of a commercial type of binder to which our improved gear housing has been applied;

Figure 2 is a vertical cross sectional view, on an enlarged scale, taken on the plane of the line 2—2 of Figure 1 and illustrating the means for sealing the openings in the end walls of the gear case through which the pitman shaft of the binder extends;

Figure 3 is an enlarged fragmentary view of certain of the parts shown in Figure 2, and illustrating the means for sealing the opening in the front end wall of the gear casing;

Figure 4 is a vertical cross sectional view, on an enlarged scale, taken on the plane of the line 4—4 of Figure 1 and illustrating the means for sealing the opening in the casing through which the main drive shaft extends; and

Figure 5 is a fragmentary top plan view with

the cover plate of the gear casing removed and illustrating the means for sealing the opening in the side wall of the casing through which the main drive shaft extends.

While the present invention has been illustrated in connection with a binder, it is to be understood that this showing is exemplary only and that our improved gear casing and the sealing means therefor may be incorporated in any other implement or structure to which it may be adapted.

The binder in connection with which this invention is illustrated is of conventional construction, comprising a frame 12 supported on a bull wheel 13, and the operating mechanism of the binder is driven by power derived from the bull wheel 13. To this end, a sprocket 14 is secured to the hub of the bull wheel 13 in any suitable manner, and a driving chain 15 operatively connects the sprocket 14 with a sprocket 16 that is fixed to a sleeve 17 (Figure 1) journaled over the main drive shaft 18 (Figures 4 and 5). The sleeve 17 operates to drive the drive shaft 18 through a slip clutch 19. The means for operating the clutch have not been illustrated in the drawing as they have nothing to do with the present invention and therefore their illustration is believed to be unnecessary. The main drive shaft 18 drives a pitman shaft 21 through a bevel gear 22 fixed in any suitable manner on the end of the drive shaft 18 and meshing with a bevel pinion 23 suitably fixed to the rear end of the pitman shaft 21, as best shown in Figure 5.

The improved gear housing of the present invention is shown as enclosing the bevel gear 22 and the bevel pinion 23. The housing extends fore and aft of the binder and comprises a main body portion 24 and two similar upper and lower end portions 25 and 26. The lower end portion 25 forms the bottom of the housing and is provided with an outwardly turned flange 27 by which it is secured by rivets 28 or other suitable means to an outwardly turned flange 29 of the main body portion 24, as best shown in Figure 4. A gasket 31 is inserted between the flanges 27 and 29 of the members 25 and 24, respectively, to provide a grease-tight connection. The upper edge of the main body portion 24 is provided with an outwardly extending flange 32 that cooperates with an outwardly extending flange 33 provided on the upper end portion 26 of the housing, as best shown in Figure 4, these flanges 32 and 33 being secured together by bolts 34, as shown, or similar means, so that the upper or top portion 26 of the housing forms a cover plate and is re-

movable, whereby access may be had to the interior of the housing for replenishing the lubricant therein or when otherwise necessary. A gasket 35 is inserted between the flanges 32 and 33 to make the connection between the parts 24 and 26 grease-tight.

The main body portion 24 of the housing is shaped to fit into the corner formed between the frame members 36 and 37 of the binder in a position to surround the bevel gear 22 and the bevel pinion 23. As above mentioned, the bevel gear is fixed to the end of the main drive shaft 18, the latter being journaled in conventional roller bearings supported in a bearing box 38 which projects through and is supported in an opening provided therefor in the frame member 36, as shown in Figure 4. The bevel pinion 23 is keyed or otherwise suitably secured to the pitman drive shaft 21, and the shaft 21 is journaled at its rear end in suitable roller bearings supported in a bearing box 39 projecting through and supported in an opening in the frame member 37. Suitable openings are also provided in the adjacent side walls of the main body portion 24 of the housing to receive the inner ends of the bearing boxes 38 and 39, and a suitable opening 41 is provided in the front wall of the main body portion 24 of the housing through which the pitman shaft 21 extends, this opening being somewhat larger than the diameter of the shaft 21 (see Figure 3) for a purpose to be hereinafter described.

The housing is fixedly supported in position by means including bolts 42 and 43 which pass through perforations provided therefor in the side wall of the main body portion 24 of the housing and through perforations provided in the frame member 36 in alignment with said first perforations and on opposite sides of the bearing box 38. These bolts 42 and 43 also perform a function in addition to securing the housing to the frame, as will now be described.

The opening in the body portion of the housing through which the bearing box 38 for the main drive shaft 18 projects is sealed so as to be grease-tight by means of a leather washer 44 provided with a central opening equal to or slightly smaller than the outer diameter of the bearing box 38, said washer being forced over the inner end of the bearing box and clamped against the inner side of the wall of the housing by means of a bracket 45 which likewise is provided with a central opening embracing the bearing box 38, see Figure 4. The bracket 45 is clamped in position against the washer 44 by means of a lug 46 formed integral with the bearing box 38 and extending laterally therefrom, the lug being provided with a laterally turned end 46a that contacts with the bracket 45, see Figure 5. The bolt 42 passes through a hole in the lug 46 and a hole in the bracket 45 which is aligned with the hole in the lug. By thus passing the bolt through the lug 46 the bolt acts to rigidly hold the bearing box 38 in proper position at all times. The opposite side of the bracket 45 is held in position by the bolt 43 which passes through a perforation provided therefor in the bracket.

As shown in Figure 2, means is also provided for sealing, against the leakage of grease or other lubricant, the opening in the housing 24 through which the bearing box 39 projects, and for this purpose a leather washer 51 is provided, said washer having a central opening equal to or slightly smaller than the diameter of the inner

end of the bearing box 39. This washer 51 is forced over the inner end of the bearing box 39 and is held tightly against the inner side of the rear wall of the housing by a bracket 52 fixedly held in position in the housing by bolts 53 and 54. These bolts 53 and 54 extend through aligned perforations in the bracket 52, in the rear wall of the housing, pass on opposite sides of the frame member 37, and extend through perforations provided therefor in a plate 55 which bears against the rear side of the frame member 37. The plate 55 is provided with a central opening large enough to clear a flange 56 formed integral with and extending radially outwardly from the bearing box 39 as shown in Figure 2. The bearing box is held against rotation by a lug 57 that is formed integral with and projects outwardly from the flange 56, said lug engaging in a recess 58 provided in the plate 55 (see Figure 2). The bearing box 39 is held against rearward movement relative to the shaft 21 by a sprocket 59 fixed in any suitable manner to the rear end of the shaft 21, this sprocket being operatively connected by a chain 60 with certain operating parts of the binder which have not been illustrated herein. The flange 56, bearing against the frame member 37, holds the bearing box 39 against movement in the opposite direction, as will be readily understood.

The opening 41 in the front or forward wall of the main portion 24 of the housing through which the shaft 21 extends, as above described, is made substantially larger than the diameter of the shaft 21 to take care of any misalignment between the bearing box 39 and the bearing 61 at the forward end of the shaft 21, and also to provide for any oscillations the shaft might execute in operation due to its not being perfectly straight. Means is provided for sealing the opening 41 against the escape of grease or other lubricant therethrough, as shown in Figure 3, said means including a leather washer 62 which embraces the shaft 21 sufficiently tight to prevent the escape of grease between the washer and the shaft. The washer 62 is held in grease-tight contact against the inner surface of the front wall of the housing 24 by a coiled spring 63 which bears against a U-shaped bracket 64 supported from the wall of the housing by rivets 65. With this construction of sealing means, if the shaft should oscillate as above mentioned, due to its not being perfectly straight, the washer 62 will move with it and slide upon the inner surface of the wall of the housing, such movement being permitted through the flexibility of the spring 63. The washer 62 is made sufficiently large in diameter so that it will always cover the opening 41 during any oscillations that the shaft 21 may execute, and the spring will function at all times to maintain the washer 62 in grease-tight contact with the wall of the housing during such sliding movement of the washer, as will be readily understood.

In this connection, it is to be noted that the U-shaped bracket 64 has been placed in a vertical position, and the purpose of positioning the bracket in that manner is so that such grease as is carried around by the bevel gear 22 and thrown or dripped therefrom will not drop directly on the washer 62, but will drop on the bracket 64, thus ensuring that the escape of grease will be entirely eliminated at this point.

While the present invention has been illustrated and described as incorporated in a binder, it is to be expressly understood that the inven-

tion is not limited to such use, as it may be employed in connection with any other structure for which it may be adapted, and the claims hereinafter made are to be construed accordingly.

5 We claim:

10 1. The combination with a frame member and a shaft journaled in a bearing supported by said frame member, of a housing enclosing a portion of said shaft, one wall of said housing disposed adjacent said frame member and having an opening through which said bearing projects, means for sealing said opening against the escape of lubricant therefrom, said means comprising a washer tightly embracing the inner end of said bearing and disposed against the inner side of said wall of the housing, a bracket engaging said washer, and means serving to hold said bracket in compressing engagement with said washer and to fix said housing to said frame member.

20 2. The combination with a frame member and a shaft journaled in a bearing projecting through a perforation in and supported by said frame member, of a housing enclosing a portion of said shaft, one wall of said housing disposed adjacent said frame member and having an opening through which said bearing projects, means for sealing said opening against the escape of lubricant comprising a washer tightly embracing the inner end of said bearing and bearing against the inner side of said wall of the housing, a bracket engaging said washer, and means independent of the support of said bearing on said frame member for holding said bracket in compressing engagement with said washer and for fixing said housing to said frame member comprising a part passing through aligned perforations in said bracket, said wall, and said frame member.

30 3. The combination with a frame member and a shaft journaled in a bearing projecting through a perforation in said frame member, of a housing enclosing a portion of said shaft, one wall of said housing disposed adjacent said frame member and having an opening through which said bearing projects, means for sealing said opening against the escape of lubricant comprising a washer tightly embracing the inner end of said bearing and bearing against the inner side of said wall of the housing, a bracket engaging said washer, and means for holding said bracket in compressing engagement with said washer and for fixing said housing to said frame member and for locking said bearing in position comprising a lug formed integral with said bearing and engaging against said bracket and a bolt passing through aligned perforations in said lug, said wall, and said frame member.

40 4. The combination with a frame member and a shaft journaled in a bearing projecting through a perforation in and supported by said frame member, of a housing enclosing the end of said shaft, one wall of said housing disposed adjacent one side of said frame member and having an opening through which said bearing projects, means on the side of said housing opposite said frame member for sealing the opening in said housing against the escape of lubricant therefrom comprising a washer tightly embracing the inner end of said bearing on the inside of said housing and bearing against the inner side of said wall of the housing, a bracket for holding said washer in lubricant-tight engagement with the inner surface of the wall of the housing, and means for fixing said housing to said frame member and for locking said bearing in position com-

prising a lug formed integral with said bearing and a part passing from the side of the frame member opposite said housing through aligned perforations in said lug, said wall, and said frame member.

5 5. The combination with a frame member and a shaft journaled in a bearing projecting through a perforation in and supported by said frame member, of a housing enclosing the end of said shaft, one wall of said housing having an opening through which said bearing projects, means for sealing said opening against the escape of lubricant comprising a washer tightly embracing the inner end of said bearing and bearing against the inner side of said wall of the housing, a bracket engaging said washer, and means independent of the support of the bearing on said frame member for locking said bearing against rotation including means for holding said bracket in compressing engagement with said washer.

6 6. The combination with a frame member and a shaft journaled in a bearing projecting through a perforation in said member, of a housing enclosing a portion of said shaft, one wall of said housing having an opening through which said bearing projects, means for sealing said opening against the escape of lubricant comprising a washer tightly embracing the inner end of said bearing and bearing against the inner side of said wall of the housing, a bracket engaging said washer, and means for locking said bearing against rotation including a plate having an opening through which said bearing extends, a lug extending radially outwardly from said bearing and engaging in a radial recess in said plate, and means for securing said plate to said frame member.

7 7. The combination with a frame member and a shaft journaled in a bearing projecting through a perforation in said member, of a housing disposed against one side of the frame member and enclosing the end of said shaft, one wall of said housing having an opening through which said bearing projects, means for sealing said opening against the escape of lubricant comprising a washer tightly embracing the inner end of said bearing and bearing against the inner side of said wall of the housing, a bracket engaging said washer, and means for locking said bearing against rotation including a plate disposed on the opposite side of said frame member from said housing and having an opening through which said bearing extends, a lug extending outwardly from said bearing and engaging in a recess in said plate, and means for securing said plate to said frame member, said securing means operating to hold said bracket in compressing engagement with said washer to seal the opening against the leakage of lubricant therethrough.

8 8. In combination, a frame member, a bearing housing supported by said frame member, a shaft journaled in a bearing in said bearing housing, a second housing enclosing a portion of said shaft, one wall of said second housing having an opening through which said bearing housing projects, means for sealing said opening against the escape of lubricant therefrom, said means comprising a washer tightly embracing the inner end of said bearing housing and disposed against the inner side of said wall of the second housing, a bracket engaging said washer, and means serving to hold said bracket in compressing engagement with said washer and to fix said second housing to said frame member.

9. In combination, a frame member, a shaft

journaled in a bearing sleeve projecting through a perforation in said member, a housing enclosing a portion of said shaft, one wall of said housing having an opening through which said bearing sleeve projects, means for sealing said opening against the escape of lubricant comprising a washer tightly embracing the inner end of said bearing and bearing against the inner side of said wall of the housing, a bracket engaging said washer, and means for locking said bearing sleeve against rotation including means for holding said bracket in compressing engagement with said washer.

10. In combination, a frame member, a shaft

journaled in a bearing housing supported by said member, a second housing enclosing a portion of said shaft, one wall of said second housing having an opening through which said shaft projects, means for sealing said opening against the escape of lubricant therefrom, said means comprising a washer embracing the shaft and disposed against the inner side of said wall of the second housing, a bracket engaging said washer, and means serving to hold said bracket in compressing engagement with said washer and to fix said second housing to said frame member.

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