

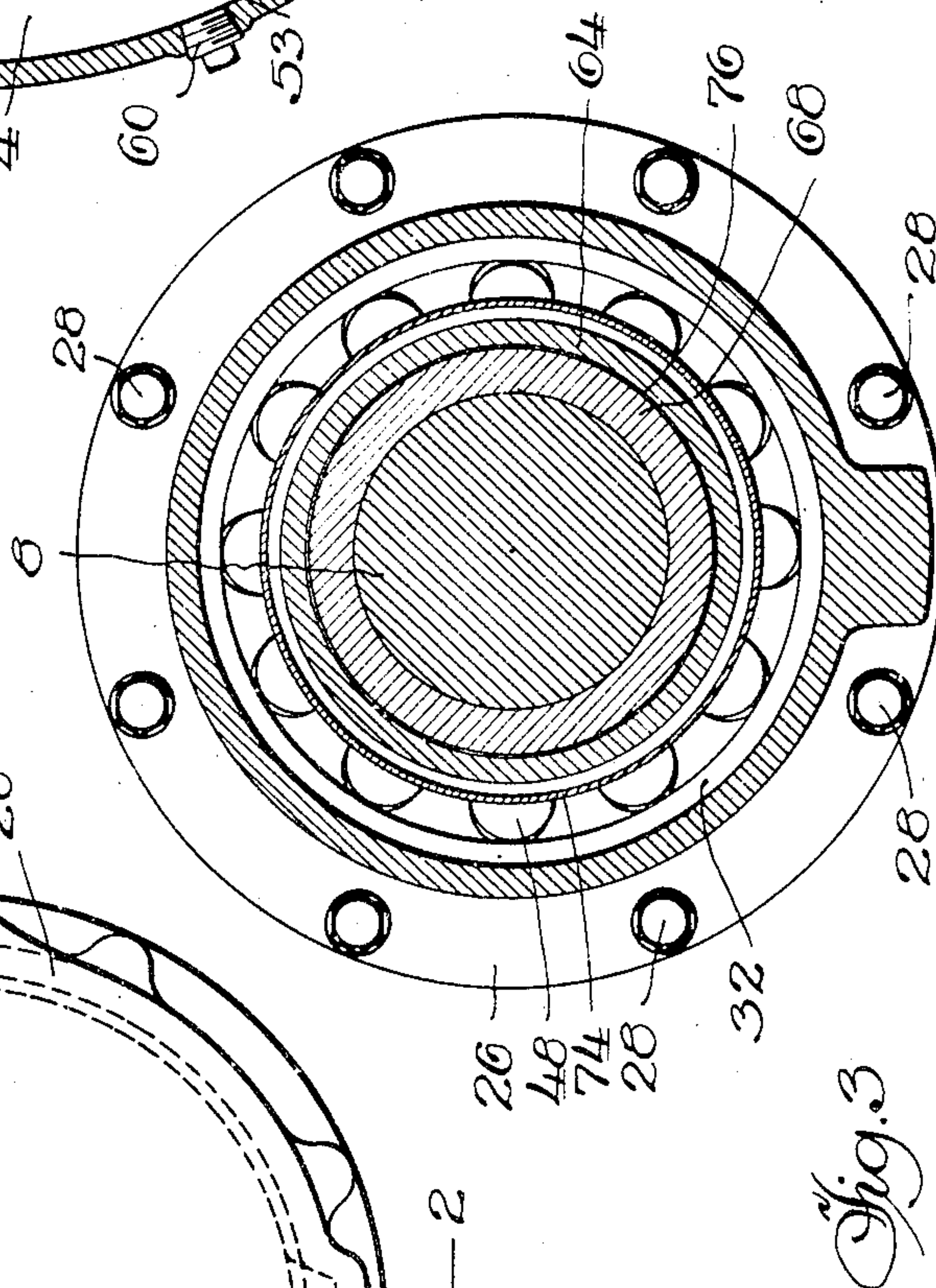
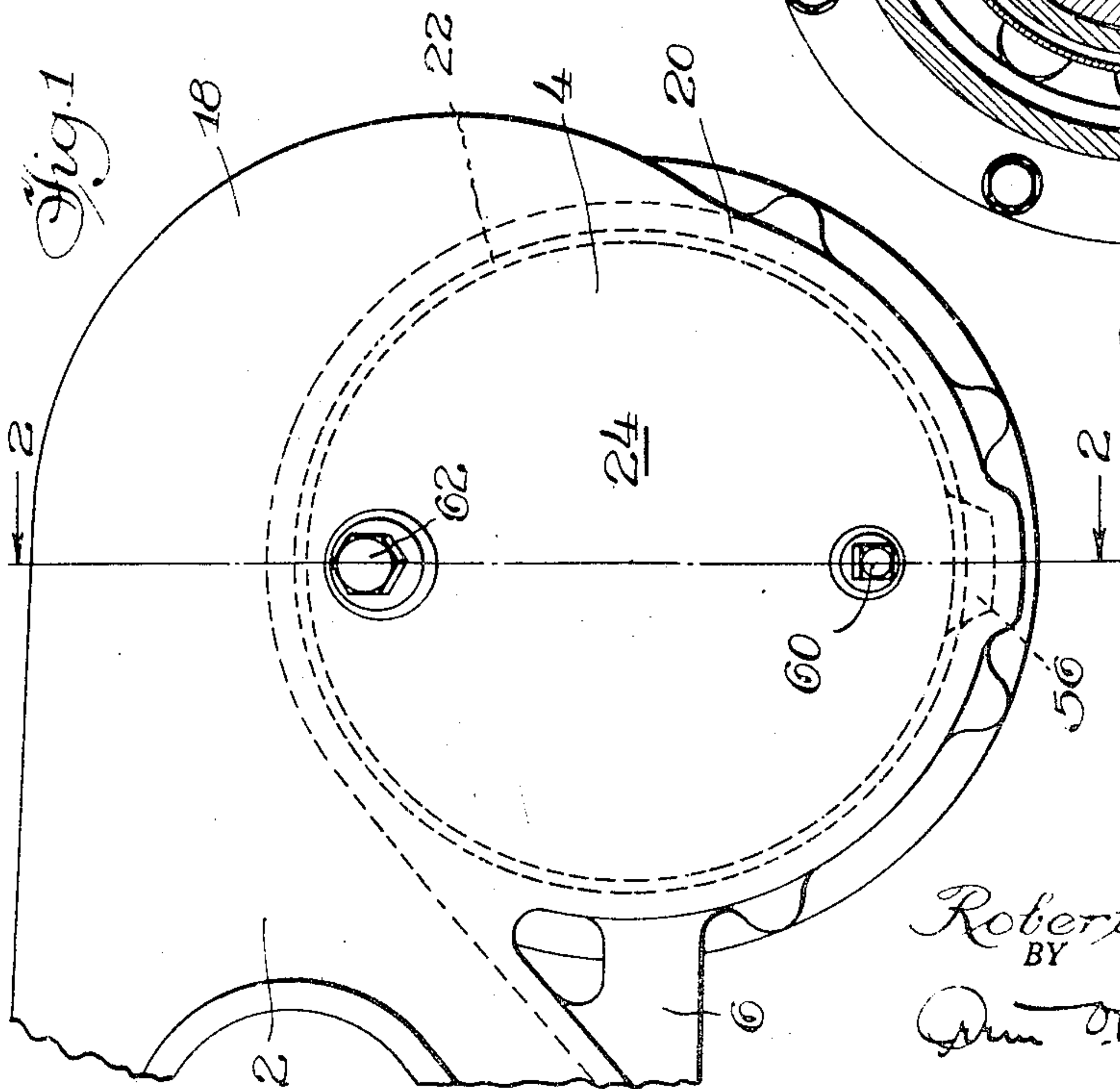
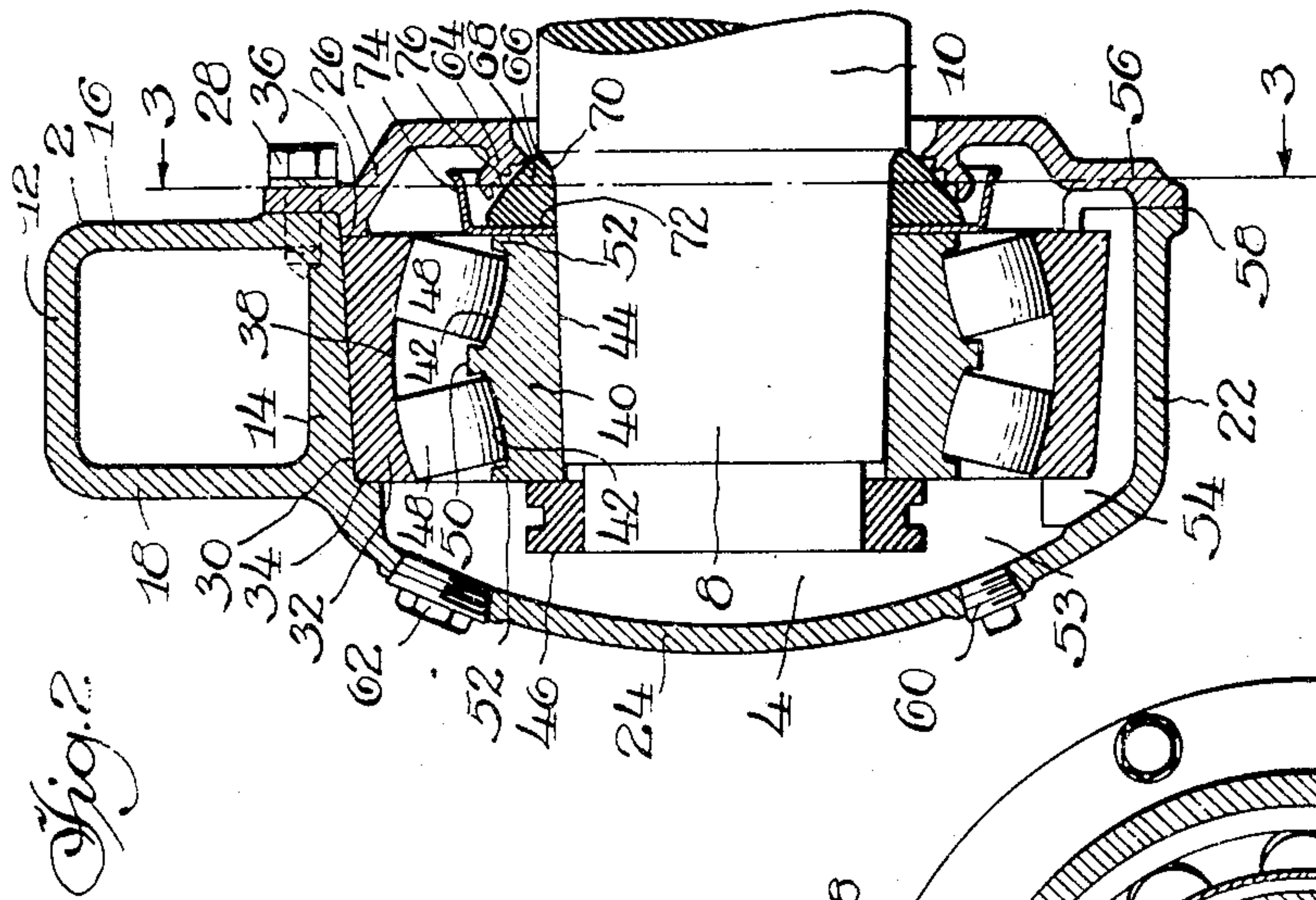
Oct. 25, 1949.

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2,486,123

JOURNAL CONNECTION

Filed July 15, 1944



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## UNITED STATES PATENT OFFICE

2,486,123

## JOURNAL CONNECTION

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Application July 15, 1944, Serial No. 545,050

7 Claims. (Cl. 105—219)

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My invention relates to railway car trucks and particularly to journal box constructions for railway car axles.

It is an object of the present invention to provide novel journal box constructions embodying roller bearing assemblies which permit angular tilting of the axle relative to the journal box under different rail conditions and which may be so constructed and arranged that the oil used as a lubricant is efficiently retained against loss by leakage from the journal box and is maintained dust-free at all times regardless of such relative movement.

Another object of my invention is to provide a novel form of journal box of such construction as to facilitate the assembly or disassembly of the journal box and axle and which may be expeditiously manufactured at a substantial saving in casting, machining and other operational costs.

My invention comprehends a novel journal box having a separable closure plate closing the same on the inboard side of the side frame, the rest of the journal box being integral with the side frame.

With these and other objects in view, the invention may consist of certain novel features of construction and operation as will be more fully described and particularly pointed out in the specification and drawings and claims appended thereto.

In the drawings:

Figure 1 is a fragmentary side elevation of one end of a car truck embodying my invention.

Figure 2 is a vertical sectional view on the line 2—2 of Figure 1.

Figure 3 is a cross-sectional view on the line 3—3 of Figure 2.

Describing the invention in detail, the truck side frame 2 has a depending journal box 4 integral with each end thereof, only one end of the side frame being shown in the drawing. Ribs 6 may be provided to extend between the side frame and journal box to reinforce the same. The reduced end portion 8 of an axle 10 extends into the journal box 4.

The side frame is of conventional type in railway usage in that it comprises top and bottom members merging at each end of the frame as clearly shown at the left in Figure 1. The frame 2 is of box section above the journal box and comprises top and bottom chords 12 and 14 and the inboard and outboard webs 16 and 18, the chords 12 and 14 curving outwardly and downwardly with said top chord merging with said bottom chord as at 20, said bottom chord being

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formed as a continuation of the upwardly sloping bottom wall or chord of the box section bottom member (Figure 1). The inboard and outboard webs 16 and 18 extend in the same direction as the chords 12 and 14 and gradually taper to merge with the top chord into the bottom chord at 20, said bottom chord 14 being continued to form the cylindrical casing 22 of the journal box which merges with the inner end of the bottom chord 14 at its juncture with the bottom wall of the bottom member. The outboard wall of the journal box defines a spherical segment forming an integral closure plate 24 which with the casing 22 comprises the body of the journal box receiving the end portion 8 of the axle 10 and the self-aligning roller bearing assembly mounted thereon.

The inboard end of the journal box 4 is open and a closure plate 26, forming the rear portion of the journal box, is secured thereto by bolts 28, said plate having an opening through which the axle end portion 8 extends in spaced relation to the plate. The casing 22, surrounding the axle end portion 8, has a tapered surface 30 engaging a corresponding surface of the outer roller bearing cup or race 32. The casing 22 constitutes a mounting for the cup 32 which is tightly fitted in the casing, said casing having a shoulder 34 for positioning the cup 32. The cup is held in place against the shoulder 34 by the annular flange 36 of the plate 26.

The roller bearing assembly comprises the outer bearing cup or race 32 having a spherical concave roller raceway 38 and the inner bearing cone or race 40 having a pair of spaced spherical concave surfaces or raceways 42, 42. The bearing cone 40 is mounted with a sliding fit on the annular tapered surface 44 of the axle end portion 8 and is retained thereon by a retaining collar 46 having a press fit with the axle extremity. Two courses of roller bearings 48 are disposed between the cup 32 and cone 40, each of the roller bearings having spherical convex surfaces for running on the roller raceways. The bearing cone 40 is provided with a guided flange 50 between roller courses and guiding flanges 52 at its edges.

It will be apparent that this construction permits pivotal tilting of the axle relative to the journal box when a wheel of the truck encounters a high or low spot on an uneven track or when one rail is elevated above the other rail, in which cases the wheel may follow its rail without exerting bending stresses on the axle. Also, any tendency of the wheels on one side of the truck to lead the wheels on the opposite side of the truck



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tending to disrupt the squared relationship of the side frames with the bolster is prevented.

To afford lubrication of the roller bearing assembly, the lower part of the journal box forms an oil reservoir 53. The casing 22 is provided with a transversely extending recess 54 which, with the superposed bearing cup 32 and the adjacent recessed portion 56 of the plate 26 forms a passageway opening into the oil reservoir at opposite sides of the cup 32, said passageway providing for the circulation of oil from the outboard roller bearings to the inboard roller bearings. A gasket 58 may be interposed between the abutting edges of the casing 22 and plate 26 to make the joint oil-tight. The closure plate 24 of the journal box is provided with an opening closed by a screw-threaded plug 60, whereby lubricant may be supplied to the journal box and the level of the lubricant therein determined. The plate 24 may also have an opening similarly closed by a plug 62 to permit inspection of the roller bearing assembly.

In addition to its roller-bearing retaining function, the closure plate 26 serves to retain the oil, spattered by the rotating roller bearing assembly, against loss by leakage between the axle and the journal box and also to maintain the oil dust-free, despite the angular movement of the axle relative to the journal box. To this end, the edge portion of the closure plate 26, defining the annular opening through which the axle extends, is formed to provide a flange 64 projecting into the journal box, said flange having a spherical concave surface cooperating with and slightly spaced from a spherical convex surface 66 of a collar 68, said collar tightly fitting on the tapered portion of the axle, and said axle having a shoulder 70 against which the collar is positioned. A suitable oil finger ring 72 is mounted on the axle between the collar 68 and the adjacent end of the bearing cone 40, said ring being provided with a flange 74 circumscribing the collar 68 and flange 64 in overlapping relationship. The spherical surface of the flange 64 is provided with a series of annular oil-collecting grooves 76 to afford a seal against the escape of lubricant between the flange 64 and collar 68. This construction also allows the oil propelled by the rollers 48 against the ring 72 to be deflected thereby to the wall of the plate 26 and to flow by gravity between the ring and the flange 64 of the plate to the oil reservoir at the bottom of the box without building up a pressure tending to force the oil between the flange 64 and the collar 68 and out of the journal box. The spherical curvature of the adjacent surfaces of the flange 64 and collar 68 are struck concentric with the spherically curved surface of the raceway 38 of the bearing cup 32 from a point on the longitudinal axis of the axle.

It will be noted that any pivotal tilting of the axle relative to the journal box will be accompanied by movement of the collar 68 in the same direction relative to the flange 64 of the plate 26 whereby an efficient oil and dust seal is had, preventing the escape of oil from the box and the passage of dust into the box.

The journal box and axle may be readily assembled or detached due to the closure plate 26, the roller-bearing assembly, and the oil-finger and retention elements being supported solely on the axle end portion 8 prior to its assembly with the journal box. Thus, before assembling the journal box and axle, these parts may be assembled in the following manner with the axle

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end portion 8 and stored until a demand for the same arises. In this assembly, the plate 26 is first passed onto the axle end portion. The collar 68, oil finger ring 72 and the roller bearing assembly may then be positioned on the tapered axle end portion in the order named and interlocked with each other by the collar 68 being urged against the shoulder 70 of the axle by the retaining collar 46 engaging the adjacent end of the cone 40. The axle assembly may then be quickly assembled with the journal box by inserting the axle assembly into the journal box and slidably engaging the tapered surfaces of the roller bearing cup 32 and the journal box until the outboard end of the cup abuts the shoulder 34 of the box, at which time, the plate 26 is bolted to the journal box with the flange 36 thereof tightly engaging the bearing cup 32. In disassembling the journal box and axle, it is only necessary to remove the bolts holding the flange 36 to the journal box whereupon the axle may be withdrawn from the journal box.

It will be seen that through the provision of forming the cover plate 24 integral with the journal box, the operations incident to the manufacture of the journal box may be greatly facilitated. In this connection, it may be noted that the journal box may be readily cast as a unit with the side frame and, by the provision of forming the closure plate 24 integral with the journal box, the operations heretofore necessary in machining a journal box for the closure plate closing the outboard side of the same and the formation and machining of the closure plate with its connecting elements are dispensed with. In the present journal box construction, the operations necessary to prepare the same for use are reduced to a minimum for it is only necessary to machine the annular tapered surface of the journal box and the annular end portion of the casing 20 and to tap the openings in the closure plate 24, the rest of the journal box being readily formed in the casting operation.

It is to be understood that I do not wish to be limited by the exact embodiment of the device shown which is merely by way of illustration and not limitation as various and other forms of the device will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. A railway car truck side frame comprising end portions of box section with spaced arcuate top and bottom chords and spaced inboard and outboard webs and a journal box formed integral with each end portion and comprising a cylindrical casing providing a seat for surrounding the outer member of an antifriction bearing and forming a portion of said bottom chord and a continuation thereof, and a plate closing the outboard opening in said casing and formed integral with said casing, said top chord and said webs merging at the extremity of said frame with said bottom chord at a point on said casing intermediate the top and bottom thereof.

2. In a railway car truck side frame, top and bottom members merging at corresponding ends into box section end portions, each end portion comprising arcuate top and bottom chords and spaced inboard and outboard webs, said bottom member comprising a bottom chord sloping upwardly and merging with the bottom chord of each end portion and forming a continuation thereof, and a journal box integrally formed with each end portion and comprising a cylindrical



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casing affording a seat for surrounding the outer member of an antifriction bearing and comprising a portion of the bottom chord of the associated end portion and merging with said bottom chord of said bottom member at its juncture with the bottom chord of the associated end portion, and an integral closure for each casing closing the outboard end thereof and merging with the bottom chord of the portion forming a portion of the casing.

3. In a railway car truck side frame, top and bottom members merging at corresponding ends into box section end portions, each end portion comprising arcuate top and bottom chords and spaced inboard and outboard webs, said bottom member comprising a bottom chord sloping upwardly and merging with the bottom chord of each end portion and forming a continuation thereof, a journal box integrally formed with each end portion and comprising a cylindrical casing affording a seat for surrounding the outer member of an antifriction bearing and comprising a portion of the bottom chord of the associated end portion and merging with said bottom chord of said bottom member at its juncture with the bottom chord of the associated end portion, an integral closure for each casing closing the outboard end thereof and merging with the bottom chord of the portion forming a part of the casing, and a reinforcing gusset extending between each casing and said bottom chord of said bottom member and integrally connecting the same.

4. In a railway car truck side frame, compression and tension members merging at corresponding ends into box section end portions, each end portion comprising arcuate top and bottom chords and spaced inboard and outboard webs, said tension member comprising a bottom chord sloping upwardly and merging with the bottom chord of each end portion and forming a continuation thereof, and a journal box integrally formed with each end portion and comprising a cylindrical casing affording a seat for surrounding the outer member of an antifriction bearing and comprising a portion of the bottom chord of the associated end portion, the top chord and webs of each end portion curving downwardly at the extremities of said frame and merging with the associated bottom chord at a point intermediate the top and bottom of the associated casing, an integral closure for each casing closing the outboard end thereof and merging with the bottom chord of the end portion forming a portion of the casing, and a reinforcing gusset extending between said tension member and an adjacent casing and connecting the same.

5. In a railway car truck side frame comprising a journal box formed integral with the frame at each end thereof, each end of said frame being of box section and comprising top and bottom chords, spaced inboard and outboard chords merging therewith, said bottom chord being continued as an arcuate segment and merging with an initially curved portion thereof to form a cylindrical casing providing a seat for surround-

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ing the outer member of an antifriction bearing, said top chord and webs of each end of the side frame curving outwardly and downwardly toward the extremity of said side frame and merging with the associated bottom chord at a point substantially medially between the top and bottom of said casing, and a closure plate for said casing formed integral with the outboard side of said casing for closing the outboard opening therein.

6. In a railway car truck side frame comprising end portions of box section with spaced arcuate top and bottom chords and spaced inboard and outboard webs merging therewith, a journal box formed integrally with each end portion and comprising a cylindrical casing providing a seat for surrounding the outer member of an antifriction bearing and forming a portion of said bottom chord and a continuation thereof, a plate formed integral with said casing and closing the outboard end thereof, and a reinforcing gusset extending between and integrally connecting said casing and said frame, said top chord and said webs merging with said bottom chord at a point on said casing located substantially diametrically opposite the point of connection between said casing and said gusset.

7. In a railway car truck side frame comprising compression and tension members, said members converging into a box-section portion toward an end of the frame, said portion comprising arcuate top and bottom chords and spaced inboard and outboard webs merging therewith, said tension member comprising a chord merging with the bottom chord of the end portion and forming a continuation thereof, and a journal box integrally formed with said portion and comprising a cylindrical casing affording a seat for surrounding the outer member of an antifriction bearing, said casing being formed as a continuation of said bottom chord, said top chord curving around said casing and with said webs merging with said bottom chord at a point on said casing intermediate the top and bottom thereof, and an integral closure for said casing closing the outboard end thereof and merging with said bottom chord.

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