(No Model.) 2 Sheets—Sheet 1.

I. METZGER.

JOURNAL AND BOX.

No. 537,059. Patented Apr. 9, 1895.

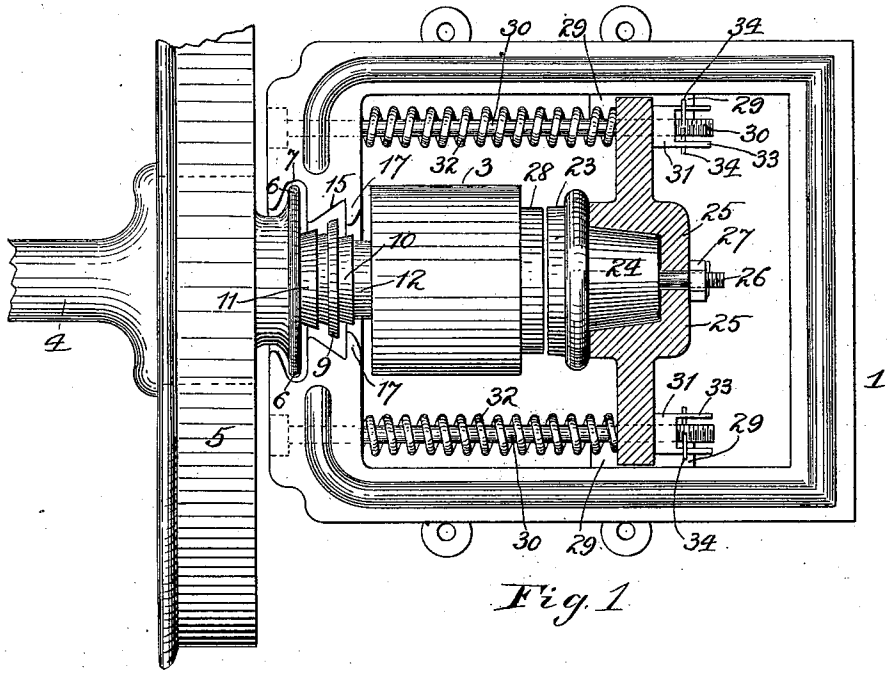

Fig. 1

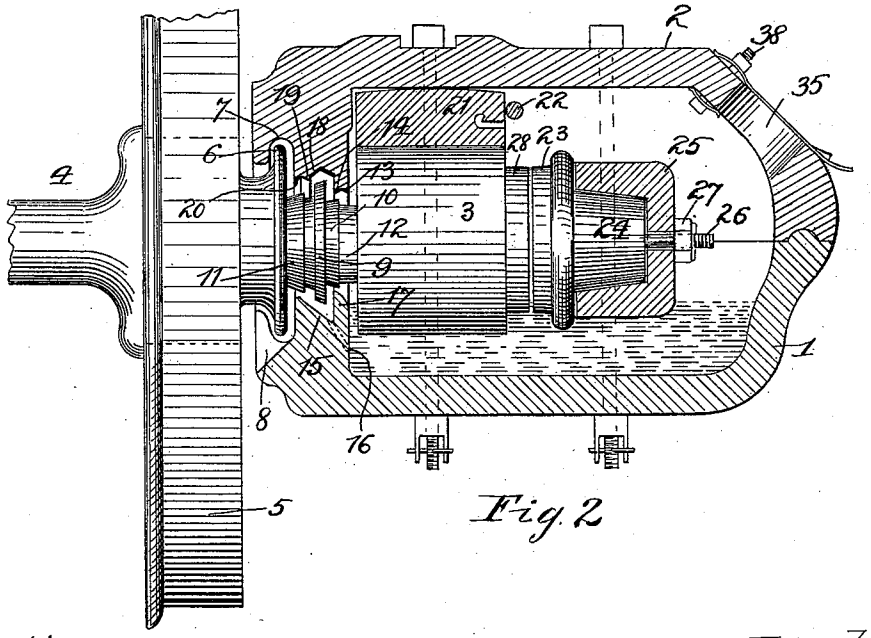

Fig. 2

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Fig 3

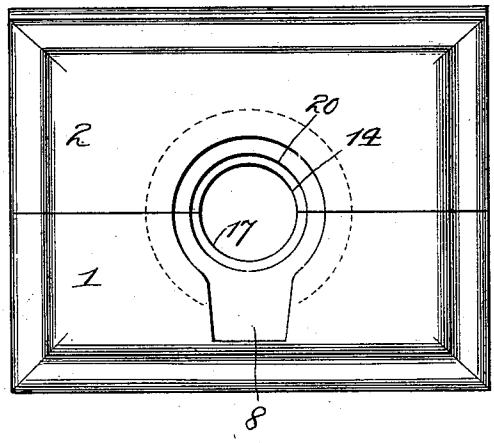


Fig 4

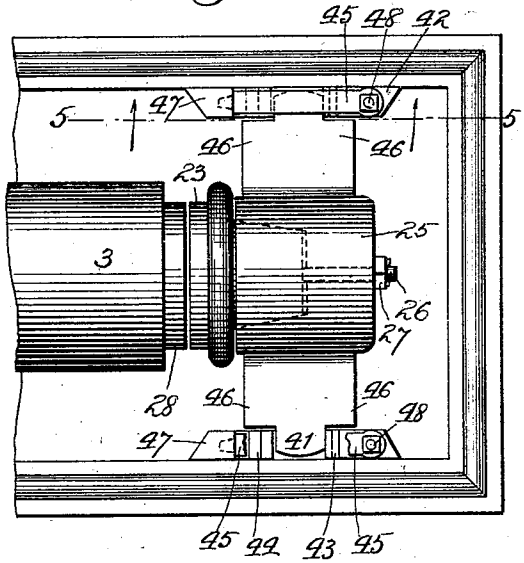


Fig 6.

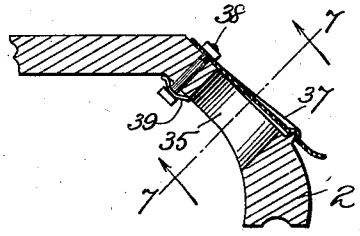


Fig 5

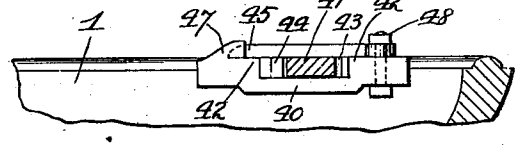


Fig 7.

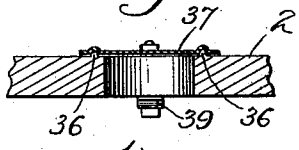


Fig 8.

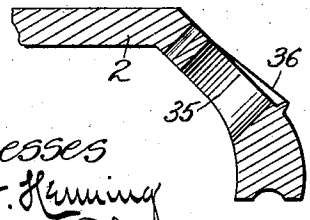
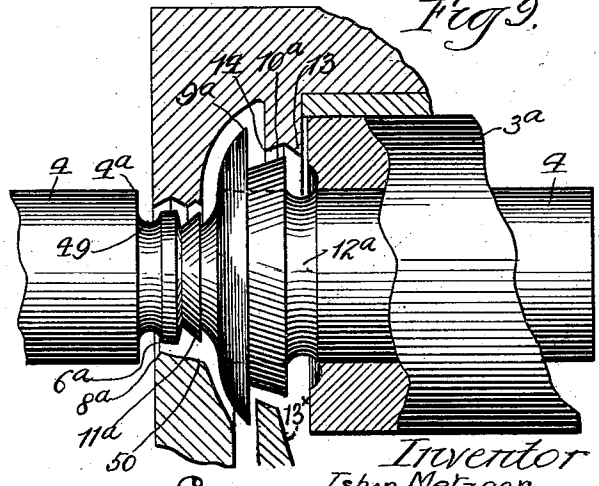


Fig 9.



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UNITED STATES PATENT OFFICE.

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JOURNAL AND BOX.

SPECIFICATION forming part of Letters Patent No. 537,059, dated April 9, 1895.

Application filed May 31, 1894. Serial No. 512,984. (No model.)

To all whom it may concern:

Be it known that I, ISBON METZGER, a citizen of the United States, residing in the county of Louisa, near Winfield, and State of Iowa, have invented certain new and useful Improvements in Journals and Boxes or Bearings Therefor, of which the following is a full, clear, and exact specification.

My invention relates to improvements in journals of axles or shaftings and the boxing or bearings therefor, and it is more particularly designed as an improvement on the invention covered by United States Letters Patent No. 511,445, granted to me December 26, 1893, to which reference may be had for an understanding of features common to both devices not fully described herein.

The primary object of my present invention is to still further reduce the liability of the oil splashing or running out of the journal box around the shaft or axle, and at other places, and to prevent the sand and grit from entering the box.

Another object of my invention is to simplify and improve the means of holding and adjusting the abutment for limiting the end thrust of the axle or journal.

With these ends in view my invention consists in certain features of novelty in the construction, combination and arrangement of parts hereinafter described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a plan view of a car axle box wheel and journal, showing the upper half or section of the box removed. Fig. 2 is a longitudinal section thereof taken lengthwise of the axle, the upper half of the box being in place. Fig. 3 is a view looking at the inner end of the box, showing the opening therein for the passage of the shaft or axle, the latter being removed. Fig. 4 is a plan view of the lower half of the box showing a modified form of means for holding the abutment in place. Fig. 5 is a detail sectional view taken on the line 5—5 Fig. 4. Fig. 6 is a vertical longitudinal sectional view of a part of the box taken through the door therein, showing the preferred form of means for sealing the interstice between such door and the edge of the opening. Fig. 7 is a sectional view thereof taken on the line 7—7 Fig. 6. Fig. 8 is a view similar to Fig. 6 with the door removed, and Fig. 9 is a modified form of a journal or axle hereinafter described, partly in section and partly broken away.

Like signs of reference indicate like parts throughout the several views.

In constructing my axle or journal so as to prevent the oil from working or splashing out through the axle opening in the box, I proceed upon the principle that a liquid while on a rotating body will be driven by the centrifugal force to its largest diameter before entirely leaving it. Hence I provide the axle or shaft at the opening in the box with a number of conical or flaring flanges which have their largest diameters arranged nearest the box or oil well so that any oil which finds its way upon these flanges will be driven by the centrifugal force to the larger edge of the flange before it drips off; and in combination with the axle thus formed I so form the edge of the opening in the box as to catch the oil as it flies from the larger edge of the flange, and convey it back to the oil well, the inner edges of the flanges being formed at an abrupt angle to the shaft so that they will not defeat the purpose of the invention by driving the oil toward the box opening.

Referring now more particularly to Figs. 1, 2 and 3, 1 is the lower half and 2 the upper half of an ordinary car axle box, which halves are provided at their inner ends each with one-half of the opening through which the axle or shaft projects. The lower half of this box constitutes an oil well in which the enlarged journal 3 dips, as shown in Fig. 2.

That portion of the axle 4 which projects into the box from the outer side of the wheel 5 is formed integrally with or otherwise secured to the enlarged journal and between the enlarged journal 3 and the wheel, it is provided next the wheel with an enlarged flange 6 which is inclosed by a hood or groove 7 formed in the upper and lower halves of the box. The purpose of this flange is to arrest the grit and sand that might otherwise find their way into the box, and to the end that the groove at the lower side of the box may not retain such grit and sand as collect upon the upper side of the axle and fall into the groove, the lower half of the groove is cut away as shown at 8 in Figs. 2 and 3, so that

the grit carried around by the axle will be dumped off into the groove and then slide out of the latter. Between the flange 6 and the journal 3 the axle is formed with a conical flange 9 whose larger diameter is located on the side next the journal 3; and on each side of the flange 9 is formed another flange 10, 11, respectively, which also flare in the same direction as the flange 9, that is to say, their larger diameters are arranged on the inner side or side next the journal 3. By this means a catch groove is constituted on each side of the flange 9 and also a groove or reduced portion 12 is formed between the inner edge of the flange 10 and the journal 3.

The upper edge of the box immediately over the edge of the flange 10 is provided with a depending portion whose lower edge is triangular or A-shaped in cross section so as to form a depending or drip point 13 immediately over the reduced portion 12 and another drip point 14 between the flange 9 and the edge of the flange 10. Thus it will be seen that any oil which might splash upward against the under side of the portion 12 will be arrested by the abrupt edge of the flange 10, and that portion of the oil which is carried up by the flange 10 by the centrifugal force will be driven against the under side of the said A-shaped portion whence it will drip from the point 13 back upon the portion 12 and thence run into the oil well. Any excess of oil which gets upon the flange 10 and runs toward the flange 9 will be arrested by the latter, and collecting in the groove constituted by these two flanges will drip off from the under side of the axle onto the incline surface 15 formed in the lower half of the opening in the box, which will lead the oil to a duct 16 extending back into the oil well. The lower inner side of this incline 15 is bordered by an abrupt wall 17 which stands above the lower edge of the flange 9 so as to prevent the oil from splashing directly up onto the incline 15; and the upper edge of the wall 17 is also inclined toward the latter immediately under the larger edge of the flange 10 so as to catch the drippings from such flange and convey the same back into the well.

Any oil which finds its way to the periphery of the flange 9 will either drip off onto the incline 15 and run back into the well, or else it will be thrown by centrifugal force to the larger edge of the flange 9 and if it leaves such edge, will strike upward against the top of a recess 18 which is A-shaped in cross section and arranged immediately over the flange 9 so as to constitute a drip point on either side of such flange, one of such points being the same as the point 14, the other being indicated at 19. The oil however which flies from the edge of the flange 9 will strike against the inner side of the recess 18 and consequently run down to the point 14 and drip off onto the flange 10, whence it will either run down upon the inclines 15 or 17 or else be thrown up and drip off of the drip point 13 back onto the reduced portion 12 and thence into the oil well. The upper edge of the opening in the box is also provided immediately over the larger edge of the flange 11 with a depending portion whose lower edge is A-shaped in cross section so as to constitute on the outer side a drip point 20 and on the inner side an inclined surface leading to the drip point 19 which latter is immediately over the groove constituted by the flangess 9—11. The purpose of the drip point 19 it will be seen is to catch any oil which might be thrown upward by the flange 11 and drip it off into the groove between such flange and the flange 9 whence it will be cast upon the incline 15 which extends out under the flange 11. The purpose of the point 20 is more for arresting the passage of grit which might find its way over the edge of the flange 6 and strike downward toward the groove between the flanges 9—11, it being observed that the point 20 intercepts a straight line between the edge of the flange 6 and the inner edge of the flange 11. By this means the grit which finds its way over the edge of the flange 6 will be cast downward upon the flange 11 and will slip off either through the opening 8 or else onto the incline 15, and if on the latter it will be washed by the oil back into the bottom of the oil well where it will not affect the journal.

Arranged above the enlarged journal 3 is a bushing or bearing block 21 whose upper side is rounded as shown in Fig. 2 in order that the journal may rock in a vertical plane independently of the box without losing perfect contact with the bushing. This bushing or block 21 is held in place by means of a transverse bolt or bar 22 which passes athwart the upper half of the box at the end of the bushing.

23 is the abutment for limiting the end thrust of the journal or axle. This is preferably made revoluble and consists of the enlarged end or head against which the journal abuts, and a tapering end 24 which is arranged in a conical socket formed in a cross head 25, the parts being so proportioned that the enlarged head at the outer end will have a bearing against the side of the cross head while the conical sides of the portion 24 and the inner end of such portion will bear against the side and end respectively of the socket in the cross head; thus equally distributing the friction and reducing the wear. The inner end of the portion 24 is provided with a stem 26 which passes through the cross head and carries a nut 27 whereby the revoluble abutment and cross head are secured together in such a manner that the former may revolve with the journal. The end of the enlarged journal 3 is provided with a projection 28 which is of the same diameter as the opposing end of the abutment 23. The purpose of this is to prevent the abutment from wearing a cavity in the end of the journal, which, when the journal made lateral movements independently of the box, would strain and probably damage

the parts. The ends of the cross head 25 are supported upon two blocks or lugs 29 arranged on opposite sides of the lower half of the box; and such cross head is held up to its work so as to rigidly resist the end thrust of the axle, by means of two screw rods 30 which pass through the inner end of the box and also through the ends of the cross head and carry, on the off-side of the cross head, the nuts 31 by means of which the cross head with its abutment may be adjusted toward the journal. Ordinarily however, the abutment is so adjusted as to be normally out of contact with the journal, but in close proximity to it so that the slightest end thrust will be resisted while the great friction which would result from continuous contact, is avoided. Located on the rods 30 between the inner end of the box and the ends of the cross head are coil springs 32 whose purpose is to hold the abutment normally away from the journal while at the same time permitting the abutment to be adjusted toward the journal by simply manipulating the nuts 31, the latter being provided with projections 33 which engage with pins 34 for locking them.

35 is the door-way of the box through which access to the interior of the box may be had. This door-way is preferably closed by means of the construction shown in Figs. 6, 7 and 8. In this form the edge of the box around the door-way 35 is provided with a rib or feather 36 which extends around its lower edge and also its two side edges. The door 37 is preferably constructed of a piece of sheet metal having a groove complementary in shape to the rib 36, formed in its lower side so that when the door is in position such groove will receive the rib and form a tight joint to prevent the escape of oil and introduction of dust. This door is attached to the box by means of a pivot bolt 38 which passes through its upper edge and upon which bolt, interposed between the head thereof and the under side of the box, is a spring 39 which permits of longitudinal movement of the bolt while holding it normally inward. This provides for the door 37 being raised at its lower edge so as to disengage the groove therein with the rib 36 and thereby permit the door to be turned to one side for uncovering the opening 35. To the end that the rib 36 may not interfere with this movement of the door the portions of such rib which are at the sides are tapered toward their upper ends as shown in Fig. 8.

In Fig. 4, which shows a modified form of means for holding the abutment and cross head, the lower half of the box is provided with a support 40 upon which the reduced ends 41 of the cross head 25 rest and slide. At each end of each of these supports 40 is formed a shoulder 42 and between these shoulders and the ends 41 of the cross head are interposed a number of removable blocks 43, 44, which are preferably of different thicknesses. By this means it will be seen that when it is desired to adjust the cross head, it is only necessary to remove a block from one side and place it on the other side of the end 41. By making the blocks of different thicknesses I am enabled to effect the nice adjustment of the cross head by exchanging the blocks on one side for those on the other.

The ends 41 of the cross head are slightly rounded as shown in Fig. 4, and the blocks 43, 44 are of such thickness as to leave a slight play between them and the ends of the cross head, whereby the cross head may oscillate on a vertical axis so that the abutment will remain squarely against the end of the journal, notwithstanding the lateral movement of the latter with reference to the box when rounding curves.

The blocks 43, 44 and cross head are held against vertical displacement by means of bars 45 placed over them and secured to the shoulders 42; while the blocks are held against lateral displacement by shoulders 46 on the cross head. The attachment of the bars 45 is effected by providing one of the shoulders 42 with a boss 47 having a socket as shown in Fig. 5, for the introduction of the end of the bar 45, while the other end of the bar is secured by means of a bolt 48 passing through it and the other shoulder 42.

In the modified form of axle or shaft shown in Fig. 9 the enlarged journal 3^a and the larger ones 9^a 10^a of the conical flanges are formed separately from the shaft or axle. This may be best done by first shrinking upon the inner end of the axle 4 a sleeve of sufficient length to constitute both the journal 3^a and the flanges 9^a 10^a. After this is done the sleeve is turned down preferably until the axle 4 is cut into so as to form a groove 12^a between the edge of the flange 10^a and the journal; and the flanges 9^a 10^a are also formed by turning down the sleeve as will be understood, the flange 9^a on the outer side being slightly rounded instead of straight like the edge of the flange 9 before described, for the purpose of giving greater body to its outer edge and avoiding breakage. The axle or journal on the outer side of the flange 9^a is then turned down to form the flange 11^a and thus constitute a groove between the latter flange and the flange 9^a as shown. The flange 11^a is conical with its larger edge turned toward the journal, and between the flange 11^a and the exterior of the box is formed an additional flange 6^a whose outer edge borders on a groove 49 into which the sand and grit are caught and tilted out on the under side, the edge of the box immediately under such groove being beveled as at 8^a so as to avoid catching the grit as it falls; and from the upper edge of this bevel 8^a the edge of the box in the lower half of the opening is beveled inward and downward so as to convey the oil back into the oil well. The last mentioned bevel however is provided with a swell 50 which extends above a straight line drawn between the lower edge of the flange 6^a and the

lower edge of the flange 9^a so as to intercept the direct passage of grit and dust into the box. The flange 6^a is of considerable less diameter than the main portion of the axle 4 whereby the shoulder 4^a is constituted which overlaps the edge of the opening in the box and thus intercepts the direct passage of grit into the box over the flange 6^a. The upper edge of the opening over the flange 9^a in this form of the invention may be substantially complementary in shape to the edge of the flange, but in both the forms the drip points 14 and 19 are constituted on both sides of the flange. The edge of the box opening over the flange 6^a in this form is shown as A-shape in cross section the purpose of which is the same as that of the groove or recess 7 in the form first described.

While I have been particular to describe the minute details of construction of the devices shown, it will nevertheless be understood that I do not limit myself to the same as they might be omitted or varied at pleasure without departing from the spirit of the invention.

The particular form of thrust bearing shown herein but not claimed, forms the subject matter of the claims in my application, Serial No. 479,507, filed in the United States Patent Office January 20, 1894.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The combination with a journal box having an oil well, of a shaft having a journal passing into said box and being provided with a conical flange having its largest diameter arranged nearest said well, the upper edge of the opening in said box being extended downwardly and terminating in points forming drips on both sides of said flange and being out of contact with said shaft and flange; the shaft having a catch groove arranged under the outer one of said drips, and the opening in the box below said flange and catch groove being inclined toward the well, substantially as set forth.

2. The combination with a journal box having an oil well, of a shaft or axle having a journal passing into said box and being provided with an enlarged conical flange having its largest diameter arranged on the side next the oil well, a smaller conical flange at each side of said enlarged flange, flaring inwardly, the outer one of said smaller flanges having its smaller or outer edge arranged adjacent to a larger portion of the shaft whereby a catch groove is formed, the upper edge of the opening in the box being extended downwardly on both sides of each of said flanges and forming drip points arranged to direct the oil into the spaces between the flanges, substantially as set forth.

3. The combination with a journal box having an opening therein and being provided with an oil well, of a shaft or axle projecting through said opening and having the enlarged journal dipping into said well and being formed with the enlarged flange 6, a smaller flange 9 having a conical periphery, arranged between the flange 6 and said journal and having its larger edge nearest said journal, the flange 10 having a conical periphery, located at the inner side of the flange 9 and being of smaller diameter, and the flange 11 located between the flange 6 and the flange 9 at a distance from the latter and having a conical periphery, and the larger edges or diameters of all of said flanges being arranged nearer the journal; and the upper edge of the opening in said box being provided with a recess forming a hood over the flange 6, the points 19—20 over the flange 11, and depending portions forming drip points on both sides of the flange 9, substantially as set forth.

4. The combination, with an axle or shaft and a journal box, of a bodily movable cross head having an abutment adapted to limit the end thrust of said shaft or axle, supports in said box for the ends of said cross head having shoulders 42, and removable blocks interposed between said shoulders and the ends of said cross head, substantially as set forth.

5. The combination with a shaft or axle and a journal box, of a bodily movable cross head having an abutment for limiting the end thrust of said shaft or axle and being provided with reduced ends, supports in said box upon which said ends rest provided with shoulders, removable blocks interposed between said shoulders and said reduced ends, the said blocks being held against lateral displacement by the ends of said cross head, and a removable bar secured over said reduced ends and blocks for holding them against vertical displacement, substantially as set forth.

6. The combination with an axle or shaft and a journal box, of a cross head having an abutment for limiting the end thrust of said axle and being provided with rounded ends, supports in said box for said rounded ends, and means for holding said cross head up to its work, substantially as set forth.

7. The combination with a shaft or axle and a journal box, of a cross head having an abutment for limiting the end thrust of said shaft or axle and being provided with reduced ends, supports in said box upon which said reduced ends rest, having shoulders 42 and bosses 47, the latter having sockets, removable blocks interposed between said shoulders and said reduced ends, bars each having one end inserted in one of said sockets and extending across said blocks and reduced ends, and means for securing the other ends of each of said bars in place, substantially as set forth.

8. The combination with a journal box having a door-opening, of a rib arranged at the edges of said opening, and a door pivoted to said box and having a groove complementary to and adapted to receive said rib, said rib being tapered toward the pivot of said door, substantially as set forth.

9. The combination with a journal box having an oil well, of a shaft having a journal

passing into said box and being provided with a conical flange having its largest diameter arranged nearest said well, the upper side of the opening in said box being extended downwardly and terminating in drip points on both sides of and being entirely out of contact with said flange, and the lower side of said opening being inclined inwardly under the outer one of said drip points, substantially as set forth.

10. The combination, with a journal box having an oil well, of a shaft having a journal passing into said box and being provided with a conical flange having its largest diameter arranged nearest the interior of the box and inner edge being formed at an abrupt angle to the shaft, the upper edge of the opening in said box being extended downwardly and terminating in points forming drips on both sides of said flange, and the opening in said box below said flange being inclined toward the well, substantially as set forth.

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