This invention relates to journal boxes and comprises all of the features of novelty herein disclosed. An object of the invention is to provide a journal box which will utilize to the full all wearing surfaces and have long life. Another object is to provide a journal box capable of reversal end for end and/or inversion up and down. Another object is to provide a journal box with means for holding a seat plate selectively upon top or bottom thus to transmit load to different portions of a bearing surface. Another object is to provide improved lubricating means for journal bearing surfaces operable with the box in different positions. Still another object is to provide improved means for supplying lubricant to end thrust surfaces of a journal box. Yet another object is to provide improved cushioning means for transmitting load to a journal box especially without unduly raising the point of load application.

To these ends and also to improve generally upon devices of this character, the invention consists in the various matters hereinafter described and claimed. In its broader aspects, the invention is not necessarily limited to the specific construction selected for illustrative purposes in the accompanying drawings in which:

Fig. 1 is a vertical longitudinal sectional view.
Fig. 2 is one half an end view and one half a cross section of Fig. 1.
Fig. 3 is one half side view and one half vertical section of the box body.
Fig. 4 is an end view of one half of the box body.
Fig. 5 is one half plan view and one half horizontal section of the box body.
Fig. 6 is a sectional view at a corner on line 6--6 of Figure 4.
Fig. 7 is a sectional plan view.
Fig. 8 is a side view of the end cap.
Fig. 9 is an inside elevation of one half of the end cap.
Fig. 10 is a plan view of a modified form of seat plate and adjacent parts of the box.
Fig. 11 is a longitudinal sectional view of the seat plate and associated parts.
Fig. 12 is one half a cross section and one half an end view of Fig. 11.

The numeral 2 indicates a shaft or axle carrying a raceway sleeve 4 for antifriction bearings having rolling elements 5. The rolling elements are preferably cylindrical with reduced ends 8 entering channels in a cage having end rings 10. The rollers run on a carburized or otherwise hardened surface 12 in the bore of an axle box 14. The box is symmetrical about two intersecting axes so that it can be inverted up and down or reversed end for end. The inversion utilizes the bearing surfaces at both top and bottom where the maximum load will occur and the reversal end for end utilizes both sets of pedestal flanges to take outward thrust shocks. The hardened surface 12 is desirably peripherally continuous but can be considered as comprising a bearing surface at both top and bottom.

As best shown in Figs. 3 and 4, the bearing surface 12 at both its upper and lower portions extends unbroken to flat end walls 16 which form the inner walls of recesses or cavities 18 at the corners of the box. Each upper and each lower pair of corner recesses join at the center as indicated at 20 where the recesses are shallow radially. Each recess widens outwardly to the box corner, as along the line 22, and then narrows again to the point 24, and between such adjacent points 24, the bearing surface is unbroken except at a terminal chamfer. Longitudinal passages 26 through all corners of the box connect the opposite recesses and such passages and recesses (or whichever ones are at the bottom) form connected lubricant receptacles. The passages 26 are widest at the ends but become somewhat narrower medially as at 27 where the corners of the box are slabbed off on an incline.

Both ends of the box have a series of symmetrically located openings 28 which are tapped to receive tightly the threads of fastening bolts for end closures. Such bolts 30 at the rear or inner end of the box are or may be all alike and extend through a gasket 32 and a flange 34 held by lock washers and nuts 36. The flange is part of an end closure or sealing ring 38 which has a generally annular extension 40 projecting into the box where its flat terminal face 42 is hardened and guides the adjacent cage ring 46. Externally the projection 40 has a relief groove 43 to receive surplus oil from the surface 12. Internally the ring 38 has a groove 44 to receive oil thrown from a rib 46 on the axle. As shown more in detail in patent to Brittain, 1,984,822 granted December 18, 1934, the upper part of the internal groove 44 is continuously arch-shaped in cross section but its lower portion has drain walls 48 extending to the upper edges of exit openings 50 which are located at the sides. Oppositely inclined bottom walls 52 lead from a point directly under the axle to the openings 50 and drain oil to the openings. This construction leaves a dam or obstruction 54 which prevents oil being splashed from the box to the low point of the
axle when the box shifts endwise on curves. The sealing ring has grease grooves at 56 and a curved flange 59 forming an external drain groove 60 overhung by a flange 61 on a guard ring 64 which has a second flange 66 pressed on a wheel bush. At the front or outer end of the box, fastening bolts 72 extend through a gasket 74 and a flange 76 on a closure or end cap 78 and receive nuts 80. The lowest bolt indicated at 82 is longer than the others and traverses a circular reinforcing wall or sleeve 84 in an enlargement 86 of the end cap, such enlargement forming a lubricant reservoir 88 filled at the plug 90 and supplementing and open to the box and its reservoir. A wick 92 to lubricate the end of the axle has its lower end bifurcated to form legs 94 straddling the sleeve 84. The wick extends upward through a vertical slot 95 in a projection of the end cap, such cap having also a substantially annular projection 96 which enters the box and has a hardened flat terminal face 98 to guide the adjacent cage ring 10. The projection also has an external relief groove 102 to receive excess oil working through the box. At the top of the projection, there is also an inclined passage 102 to conduct some of such excess lubricant to a polygonal recess 104 containing a thrust block 106. The thrust block has a top recess or passage 108 receiving oil from the passage 102 and draining it to an inclined passage 110 leading to a center recess 112 above the wick and opposite the end of the axle. This oil thus aids the wick in lubricating the thrust faces of the axle and thrust block. The thrust block is backed up by spacing plates 114 engaging a circular face or pad 116 on the end cap. A clamping bolt 118 has a head 120 embedded in the thrust block and a clamping nut 122 outside the end cap to engage a washer 124.

40. The box has pairs of pedestal flanges 130 equally spaced from the center of the box and flaring as indicated at 132. The inner faces of the flanges are hardened for their full height and the sides of the box are also hardened at top and bottom as indicated at 134. The corners of the box are slabbled off on inclines as indicated at 136 to provide clearance for the usual equalizer bars. The top of the box (and also the bottom) is provided with a polygonal recess or seat for an equalizer seat plate. The recess has spaced end walls 138 extending across the box and pairs of side walls 140 extending lengthwise of the box but discontinuous where the box is slabbled off at 136. The confining walls meet at the corners on a short radius and the recess has a finished annular seating face or pad 142 to engage a similar finished face on a seat plate 144. The seat plate is preferably square except for short bevels at the corners and is of a size to readily enter the recess where it is confined by the side walls against any substantial bodily shifting. The seat plate has flanges 146 to straddle an equalizer bar, a central rounded rib 148 to enter the usual recess in such bar, and seating surfaces 150 at the sides of the rib. The seating surfaces 150 are convexly crowned both longitudinally of the box and transversely. The seat plate is symmetrical about intersecting axes and will fit in either recess, either end first. The box body is symmetrical about two intersecting axes. Hence, when the bearing surface 12 becomes worn at the top where most of the load comes, the box can be inverted. The sealing ring 38 and the end cap 78 are then both inverted with respect to the box, and the seat plate 144 is placed in the opposite recess. When the inner pair of pedestal flanges 130 becomes worn, the box can be reversed end for end and since the seat plate and its seating recess are symmetrical with respect to the center of the box, the point of application of the load on the bearings is not changed. The sealing ring and the end cap are then interchanged, together with their fastenings.

In Figs. 10, 11 and 12, a modified form of seat plate is shown. The sealing recesses in the axle box are or may be the same as before. An annular cushion 152 having a center hole 154 is supported on the annular face 142 and enters the axial recess 156 in the bottom of a square seat plate 158, the peripheral wall 160 of the recess tapering or enlarging downwardly. This wall approaches quite closely to the straight sides and ends of the seat plate at the center lines of the seat plate but becomes more and more remote therefrom as the corners are approached. This extra thickness at the corners furnishes desirable rigidity and strength while allowing the cushion to enter the seat plate centrally. Hence the inserted cushion does not unduly elevate the seat plate. The cushion absorbs shock and reduces noise while also facilitating easier alignment or compensatory angular shifting of the seat plate when the load is not exactly central. The cushion, being of circular form, will facilitate rocking or alignment of the box in operation because the cross section in any vertical plane decreases towards the periphery and the cushion will thus deflect or compress more easily at its periphery than near the center.

We claim:

1. In a device of the character indicated, a circumferentially continuous journal box having an internal bearing surface at top and bottom, a shaft journaled in the box, and the box having internal passages for lubricant extending longitudinally through the circumferential continuous portion of the box at top and bottom of the bearing surfaces, and the box having end recesses at top and bottom to afford communication between the lubricant passages and the ends of the bearing surfaces whereby lubricant can be supplied from a lubricant passage to a bearing surface in two opposite or inverted positions of the box selectively; substantially as described.

2. In a device of the character indicated, a circumferentially continuous journal box having an internal bearing surface at top and bottom, a shaft journaled in the box, the box being invertible up and down and having external load transferring means applicable to top or bottom, and the box also having internal passages for lubricant extending longitudinally through the box outside of the bearing surfaces at both top and bottom, and each passage communicating with one of the bearing surfaces to effect lubrication of the box in either of two inverted positions thereof; substantially as described.

3. In a device of the character indicated, a journal box having an internal bearing surface at top and bottom, a shaft journaled in the box, the box having internal recesses for lubricant at top and bottom and extending longitudinally through the corners of the box outside of the bearing surfaces, each corner recess communicating with the end of one of the bearing surfaces whereby lubricant can be supplied to a bearing surface in two opposite or inverted positions of the box, a cap having its lower portion enlarged to provide a lubricant receptacle constructed and
arranged to communicate with the lower one of
the longitudinally extending lubricant recesses,
and means for securing the cap to the box in two
opposite positions selectively; substantially as
described.

4. In a device of the character indicated, a
journal box circumferentially continuous and un-
broken and having an internal bearing surface at
top and bottom, a shaft journalled in the box, the
box having internal recesses for lubricant above
and below the shaft and outside of the bearing
surfaces, said lubricant recesses extending longi-
tudinally throughout the box and communicat-
ing at the ends with the bearing surfaces whereby
lubricant can be supplied to a bearing surface in
two inverted positions of the box, and an end
closure adapted to fit either end of the box in
either of the inverted positions thereof; substan-
tially as described.

5. In a device of the character indicated, a
journal box having an internal bearing surface at
both top and bottom to selectively receive the
load, an axle journalled in the box, and lubricant
passages extending through the box at top and
bottom outside of the bearing surfaces and each
passage communicating with the ends of one
bearing surface whereby lubricant has access
from a lubricant passage to the end of a bearing
surface in two opposite or inverted positions of the
box selectively; substantially as described.

6. In a device of the character indicated, a
journal box having an internal bearing surface at
both top and bottom to selectively receive the
load, an axle journalled in the box, lubricant pas-
sages extending through the box at top and bot-
tom outside of the bearing surfaces and each
passage communicating with the ends of one
bearing surface whereby lubricant has access
from a lubricant passage to the end of a bearing
surface in two opposite or inverted positions of
the box selectively, and detachable means for
closing the ends of the box and adapted to fit the
box in two opposite or inverted positions thereof
selectively, said detachable means having a lubri-
cant receptacle in its lower portion to supplement
the lowest lubricant passage; substantially as
described.

7. In a device of the character indicated, an
invertible journal box having internal bearing
surfaces in its upper and lower portions, an axle
journalled in the box, lubricant holding passages
extending longitudinally through the box outside
of the bearing surfaces, one such passage being
near the top and the other near the bottom of the
box, and recesses in the box at the ends of the
bearing surfaces and extending outwardly there-
from to afford communication between the ends
of the bearing surfaces and said passages in two
opposite or inverted positions of the box; sub-
stantially as described.

8. In a device of the character described, a
journal box adapted for inversion up and down
and comprising a circumferentially continuous
body with a longitudinal bore therein, an axle
extending into the box, antifriction bearings be-
tween the axle and the bore, the box having lu-
bricant holding passages extending lengthwise
through the body thereof outside of the bore and
both above and below the axle for selective use,
the passages having communication with the
bearings to effect lubrication thereof in either of
the inverted positions of the box, an end cap
adapted to be secured to the box in either of the
inverted positions, and the lower portion of the
cap having a lubricant receptacle adapted to
communicate with whichever one of said lubri-
cant passages is selected to lie at the bottom;
substantially as described.

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