Oct. 30, 1962 O. J. HORGER ETAL 3,061,385

RAILWAY JOURNAL BOX STOP MEANS

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FIG. 1

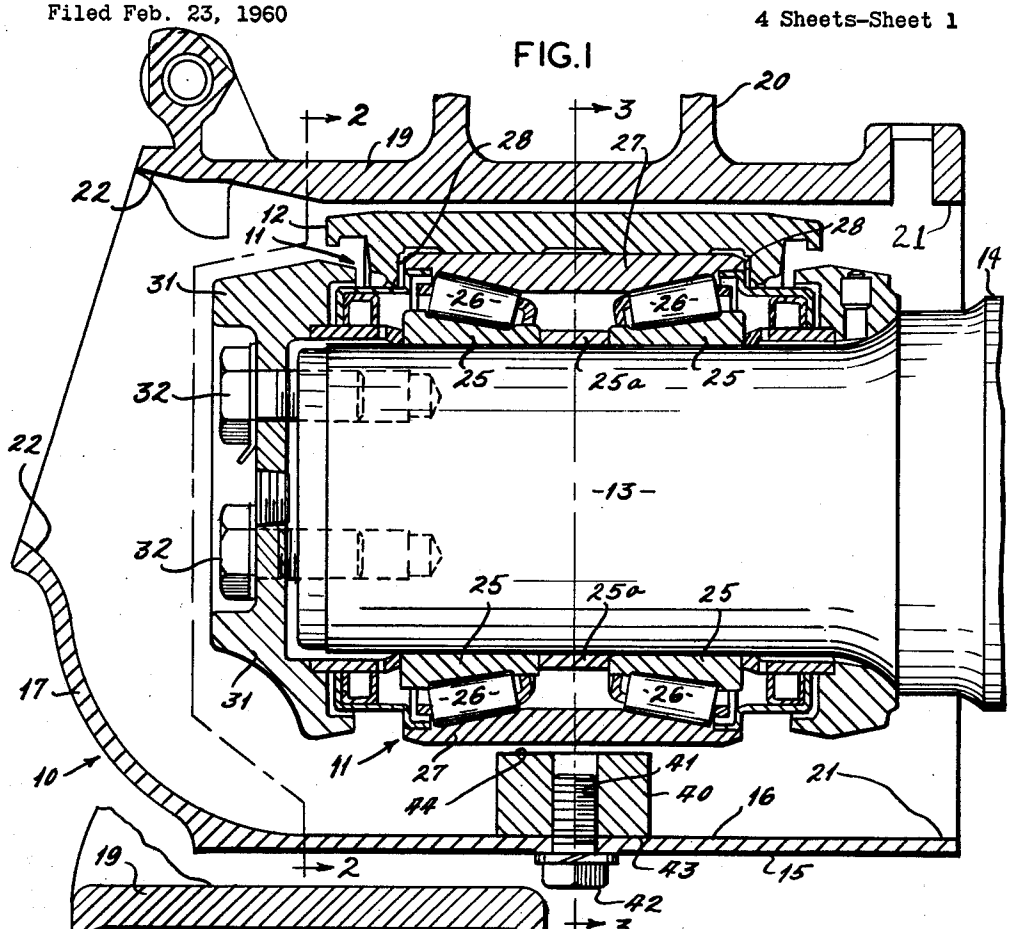


FIG. 5

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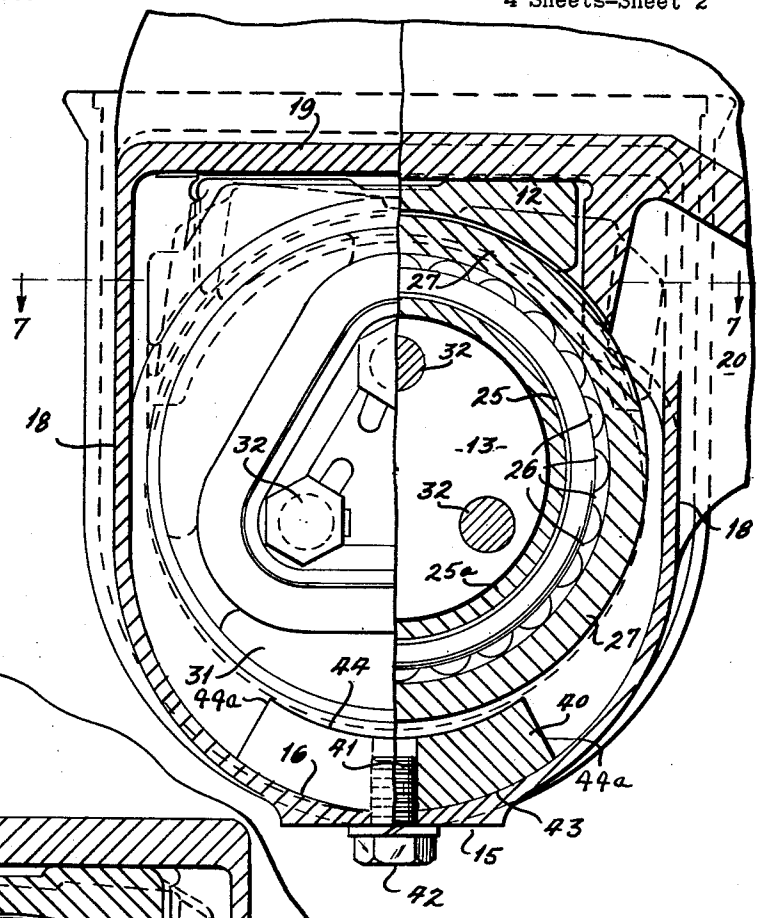
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FIG. 2



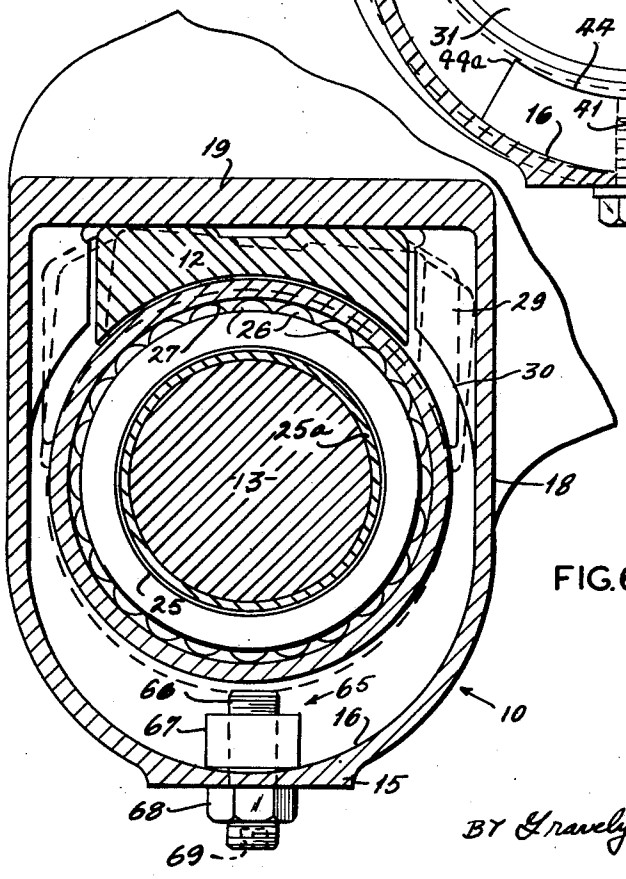


FIG. 6

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RAILWAY JOURNAL BOX STOP MEANS

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FIG. 3

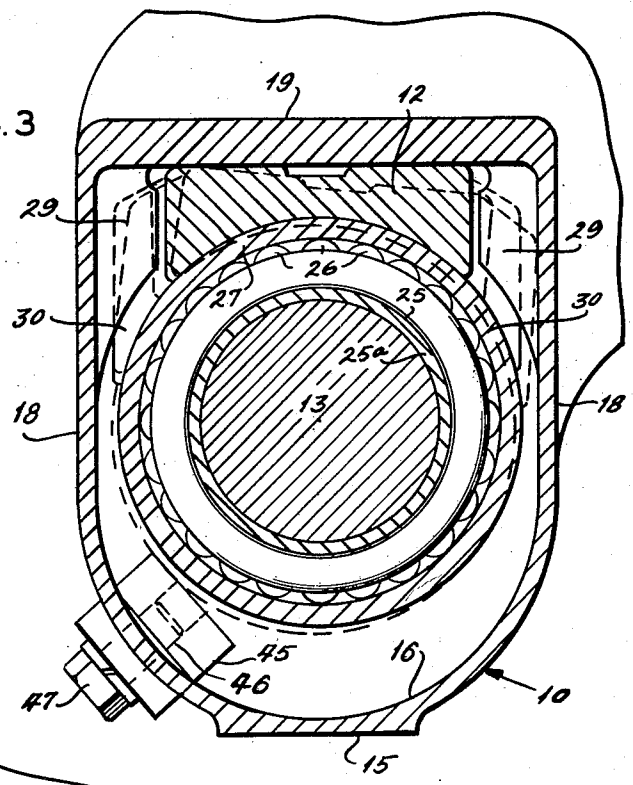
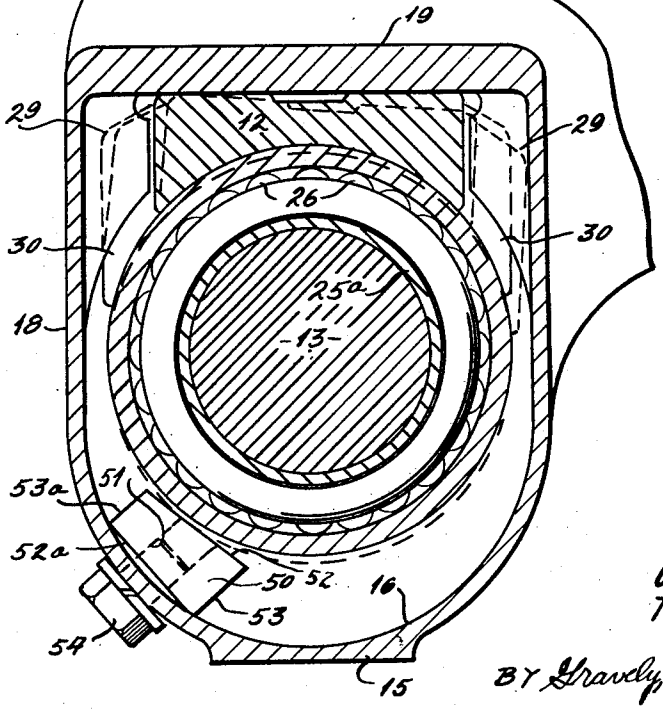


FIG. 4



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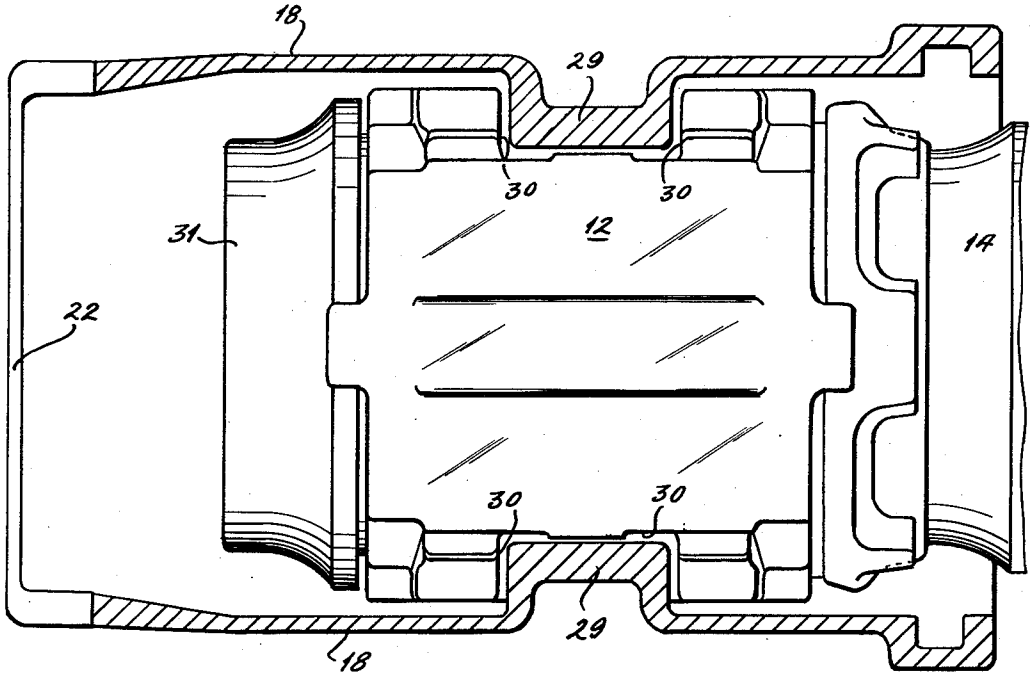
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RAILWAY JOURNAL BOX STOP MEANS

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FIG.7



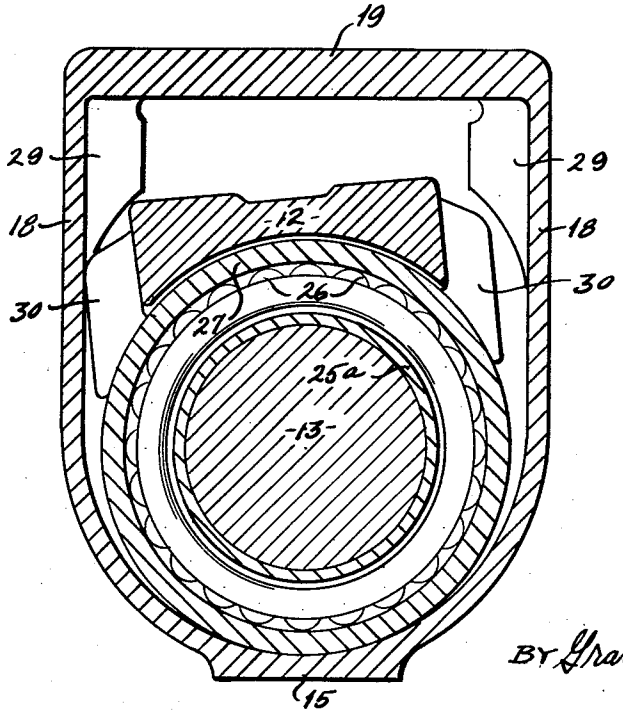


FIG.8

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United States Patent Office

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RAILWAY JOURNAL BOX STOP MEANS

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Filed Feb. 23, 1960, Ser. No. 10,285
9 Claims. (Cl. 308—180)

This invention relates to Association of American Railroads (A.A.R.) journal boxes and particularly to improved railway journal boxes having stop blocks to prevent disengagement of the bearing assembly from the thrust lugs of the integral journal box and to prevent bulging of the integral box from car impacts in road service and yard operations.

At the present time, under certain adverse operating conditions where freight cars are impacted together at relatively high speeds, it is possible for the truck frames to lift off the bearing assembly to an extent which allows the bearing outer race to strike the bottom of the journal box. When this happens, the adapter between the bearing race and the roof of the journal box can become disengaged from the thrust lugs of the journal box. Further, when the load comes back down on the bearing, the adapter sometimes becomes lodged under the thrust lug of the box and does not assume its normal operating position. Also, the side of the journal box tends to become bulged out from the force of the journal striking it.

It is an object of the present invention to provide means for preventing the disengagement of the adapter from the thrust lugs of the journal box and also means for preventing the bulging of the sides of the journal box. A further object is to provide a method of preventing the distortion of the journal box. Still another object is to provide an easily installed adjustable stop block in combination with a journal box to prevent distortion of the sides of the box.

These and other objects and advantages will become apparent hereinafter.

The present invention comprises a stop block for a railway journal box which prevents disengagement of the journal assembly and distortion of the journal box upon impact. The invention further consists in the method of preventing disengaging of a journal assembly hereinafter described and claimed.

In the drawings:

FIG. 1 is a verical longitudinal section through an integral journal box having the preferred stop means of the present invention positioned therein,

FIG. 2 is in part a vertical transverse section of the structure shown in FIG. 1 taken along the line 2—2, and in part a vertical transverse section taken along the line 3—3 of FIG. 1,

FIG. 3 is a vertical transverse view of an integral journal box showing the adapter, the journal box and the journal and bearing assembly in section and a modification of the present invention in detail,

FIG. 4 is similar to FIG. 3 and shows another modification of the present invention,

FIG. 5 is similar to FIG. 3 and shows another modification of the present invention,

FIG. 6 is similar to FIG. 3 and shows still another modification of the present invention,

FIG. 7 is an enlarged horizontal sectional view taken along line 7—7 of FIG. 2 and shows the thrust lug and channel assembly between the journal box and the adapter in more detail, and

FIG. 8 is similar to FIG. 3 but without the stop means of the present invention and shows the disengagement of the adapter and thrust lugs resulting from car impacts.

FIG. 1 shows a railway car journal box 10 housing a

bearing assembly 11, an adapter 12 and the journal portion 13 of a railway car axle 14. The journal box 10 includes a bottom wall 15 having an arcuate inner surface 16 and an upwardly curved lip 17, side walls 18, and a roof 19. The walls 15 and 18 and the roof 19 define a journal box inner surface. The box 10 is adapted to engage the car side frame 20 and has an opening 21 at the innermost end thereof to admit the journal 13, and an opening 22 at the outermost end thereof providing access to the box interior. Clearance between the journal box inner surface 16 and the outer surface of the bearing assembly 11 is needed to install the bearing assembly 11 and the adapter 12.

The bearing assembly 11 includes inner races or cones 25 spaced apart by a spacer 25a, tapered rollers or bearings 26, and a common outer race or cup 27 for the two series of rollers 25. The upper portion of the outer race 27 is received in a recess 28 provided in the bottom surface of the adapter 12. The top surface of the adapter 12 bears against the inner surface of the journal box roof 19. FIG. 7 shows thrust lugs 29 which protrude from the inner surface of the journal box roof 19 and side walls 18 to engage channels or notches 30 provided in the adapter 12. The lug and notch engagement retains the adapter 12 in engagement with the journal box 10.

A cap 31 is fastened to the end of the journal 13 by retaining screws 32 and fits around the outermost end of the bearing assembly 11 to assist in holding the bearing assembly 11 in assembled relation with the journal 13.

When railroad cars which are not equipped with the stop means of the present invention are impacted at high speeds, the truck side frames may lift off the bearing assembly to an extent which causes the bearing outer race 27 to strike the journal box bottom wall 16. When this happens, the adapter 12 between the bearing outer race 27 and the journal box roof 19 becomes disengaged from the journal box thrust lugs 29. Thus, when the load comes back down on the bearing assembly 11, the adapter 12 may become lodged under the journal box thrust lugs 29 rather than resume its proper position with the lugs 29 received in the channels 30 provided for them on the adapter 12. This is shown in FIG. 8. The impact which causes the hereinbefore described unseating, also may cause the bearing assembly 11 to strike the box side wall 18 with sufficient force to bulge it outwardly. If the adapter 12 fails to assume its intended operating position, then the bearing must operate under a load bearing attitude not intended, which may result in distress within the bearing.

To obviate these difficulties, a journal stop means such as a stop block 40 having a threaded opening 41 is attached to the inside of the journal box 10 adjacent the arcuate inner surface 16 of the bottom wall 15 by fastening means such as a screw 42 having threads mating with threads 41. The fastening means 42 is accessible from the exterior of the journal box 10 and thus the stop block 40 can be installed in journal boxes which are in operation without having to disassemble the railway car trucks which would require a considerable labor expenditure and taking the car out of service for an extended period of time. This is important since bulging of the journal box side walls is often not apparent until a series of cars has been in operation for some time. As soon as bulging is noticed, on any car of the series, the stop block can be installed on the whole series without inactivating the cars for an extended period. The tendency toward disengaged adapters and bulged boxes does not exist on all cars using integral box type side frames of the type described. Unfortunately, the design or operating conditions or combination of these which causes the difficulty described remain undiscovered

despite considerable testing and research. Therefore, it is not necessarily known at the outset what cars require the stop blocks to prevent disengagement and/or bulging.

The stop block **40** includes a bottom surface **43** shaped to fit the journal box inner surface **16** and an arcuate top surface **44** positioned beneath and along side of the bearing outer race **27** to restrain the vertical and horizontal displacement of the bearing assembly **11** and the journal **13**. The broken lines in FIG. 2 show how the stop means **40** restrains vertical and horizontal movement of the bearing assembly **11** and the journal **13**. When freight cars were tested at impact speeds of up to 13 miles per hour, the curved stop block **40** performed satisfactorily to prevent disengagement of the thrust lugs **29** from the adapter channels **30** and to prevent journal box distortion or limit it to a negligible amount acceptable for ordinary operation. When railroad cars not equipped with this stop block were tested in the same manner, disengagement occurred with attendant bulging of the journal box side walls in an amount unacceptable for operation. The arcuate face **44** extends outwardly and upwardly of the box inner surface **16** to underlie the vertical centerline of the journal **13**.

Under normal operating conditions, there is a clearance between the journal **13** and the stop block top surface **44** which is necessary for operating purposes, since ordinary freight car truck design requires some freedom of movement of the bearing assembly **11** in the journal box **10** to prevent binding. Too much freedom of movement may result in the hereinbefore discussed disengagement of adapter and thrust lugs and also bulging of the box sides. The preferred stop block means **40** shown in FIGS. 1 and 2, needs no adjustment means to compensate for casting tolerances of the journal box **10**. The outer edges of the block **44***a* are located far enough off the vertical plane to stop horizontal movement of outer race **27** before it strikes the side wall **18**.

FIG. 3 shows a modification of the present invention wherein a rectangular block **45** having a threaded opening **46** is provided adjacent the inner surface of one journal box side wall **18** at an angle of about 30° with the vertical centerline of the journal **13** to partially underlie the journal **13** and bearing assembly **11**. Fastening means such as a screw **47** having threads mating with the threads **46** attach the block **45** to the box **10**.

FIG. 4 shows another modification wherein a stop means **50** having a threaded opening **51** and having a non-rectangular cross section, preferably trapezoidal, is fastened adjacent the inner surface of one journal box side wall **18** to partially underlie the bearing assembly **11** and journal **13**. The stop means **50** is positioned adjacent the inner surface of the box about 30° from the vertical center line, and includes non-parallel planar sides **52** and **52***a* of which side **52** underlies the bearing assembly **11** and the journal **13**, and side **52***a* is adjacent the box inner wall. The stop means **50** also includes parallel sides **53** and **53***a* of which the longer side **53** is positioned nearer the vertical center line of the journal **13**. Fastening means such as a screw **54** having threads mating with the threads **51** attach the block **50** to the journal box **10**. The broken lines in FIGS. 3 and 4 show how the stop means restrain vertical and horizontal displacement of the journal **13** and the bearing assembly **11**.

The modifications shown in FIGS. 3 and 4 have a portion of the stop means underlying the journal and bearing assembly to restrain vertical movement of the journal and bearing assembly and thus prevent disengagement of thrust lugs and adapter grooves. The stop means is on one side of the vertical center line of the journal and bearing assembly and limits lateral motion thereof to prevent the bearing outer race from striking a journal box wall with sufficient force to bulge it outwardly.

The stop means shown in FIGS. 3 and 4 need be applied only to the outside wall of the journal box because when the railway car is impacted, the truck tends to rotate around the center pin in a vertical direction, thereby pushing one end downward and the other end upward, permitting the described displacement on the end that rises and pushing the bearing assembly against the outside wall. The downward force on the other end of the truck is taken mostly through the bearing adapter, although the inside walls of the journal boxes are well reinforced by the frame stress members to prevent bulging if the bearing assembly should contact this wall.

FIG. 5 shows another modification wherein an adjustable stop block assembly **55** is provided on the journal box bottom wall **15**. The adjustable stop block assembly **55** includes a rectangular block **56**, a shim **57**, a threaded screw **58**, and a lock washer **59**. The height of the block **56** is determined by the thickness of the shim **57**. The rectangular block **56** is adequate to prevent excessive vertical displacement of the journal **13** and bearing assembly **11**, but the adjustable shim **57** is necessary to prevent excessive horizontal displacement. It is not possible to utilize a single thickness of shim **57** because the cast journal boxes **10** have a large tolerance and different size shims are needed to compensate for this.

FIG. 6 shows another modification of the present invention including an adjustable stud and nut assembly **65** fitted to the journal box bottom wall **15**. The assembly **65** consists of a threaded stud **66**, a threaded nut **67**, and a threaded jam nut **68**. The nuts **67** and **68** have mating threads with the stud **66**. The height of the stud **66** in the journal box **10** is adjusted by backing off the jam nut **68** and turning the stud **66** by means of a key fitted to a socket **69** in the outer end of the stud **66**. When the stud **66** protrudes into the interior of the journal box **10** the desired height, the jam nut **68** is turned on the stud **66** until it locks against the outer surface of the journal box bottom wall **15**. If desired, the stud **66** can be threaded into the journal box opening and the nut **67** can be eliminated. As with the adjustable stop block assembly shown in FIG. 5, the stud **66** must be adjustable in height to compensate for difference in journal box sizes resulting from casting tolerances. The stud **66** projects toward and underlies a portion of the journal **13** and the bearing assembly **11** and is adjustable toward or away from same from outside the box **10**. The broken lines in FIGS. 5 and 6 show how the stop means restrain vertical and horizontal displacement of the journal **13** and the bearing assembly **11**.

The adapted **12** is applied to the inside of the journal box **10** through the opening **21** in the innermost end thereof. After the bearing assembly **11** is fitted to the journal **13**, the side frame **20** with its integral box **10** and adapter **12** is applied to the journal and bearing assembly through the opening **21**. The stop block is then inserted into the journal box **10** through the opening **22** in the outermost end thereof, applied to the journal box inner surface **16**, and fastened or adjusted from outside the journal box by the hereinbefore described fastening and adjusting means.

Thus, it is seen that the present invention provides a stop means for a railway journal box which provides all of the objects and advantages sought therefor.

While the present invention has been illustrated with tapered roller bearings, it is understood that the invention is also applicable with other types of anti-friction bearings and with plain or friction type bearings. Furthermore, the present invention is applicable to a type of construction known as a "cartridge journal box." This construction is used in much the same manner as the described and shown roller bearing assembly. It is applied to an integral journal box in the same manner as the described roller bearing assembly using an adapter or bearing housing with a thrust lug and channel arrangement. The cartridge has a bottom wall corresponding to the bearing outer race with which the stop means cooperates to limit vertical and horizontal displacement.

This invention is further intended to cover all changes

and modifications of the examples of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. In a railway car journal box having a roof, an obstruction free bottom wall, and side walls which define a journal box inner surface, said box having an unobstructed opening at one end to freely receive a railway car journal and an opening at the other end allowing access to the box interior, the improvement which comprises a single adjustable stop means positioned adjacent to the box inner surface and underlying and spaced from a bearing assembly fixed to the journal, said bearing assembly normally riding on the box roof spaced from the stop means, the single stop means constructed and arranged to limit horizontal and vertical movement of the journal and bearing assembly only when the railway car is impacted, adjustment means projecting through the journal box bottom wall and accessible from beneath the box, said adjustment means moving said stop means toward and away from the journal, and lock means cooperating with the adjustment means to lock the stop means in a fixed position relative to the journal and the journal box.

2. In a railway car journal box having a roof, an obstruction free bottom wall, and side walls which define a journal box inner surface, said box having an unobstructed opening at one end to freely receive a railway car journal and an opening at the other end allowing access to the box interior, the improvement which comprises a single adjustable stop structure positioned adjacent to the box inner surface and underlying and spaced from a roller bearing assembly fixed to the journal, said roller bearing assembly normally riding on the box roof spaced from the stop means, the stop structure constructed and arranged to limit horizontal and vertical movement of the journal and roller bearing assembly only when the railway car is impacted, said stop structure comprising a stud fitted through the bottom wall into said box to project toward and underlie the journal and roller bearing assembly, said stud being normally spaced from the outer periphery of the journal and roller bearing assembly and being movable toward and away from the journal and roller bearing assembly from beneath the outside of the journal box, and lock means cooperating with the stud to lock the stud in a fixed position relative to the journal and roller bearing assembly and the journal box.

3. In a railway car journal box having a roof, an obstruction free bottom wall, and side walls which define a journal box inner surface, said box having an unobstructed opening at one end to freely receive a railway car journal and an opening at the other end allowing access to the box interior, the improvement which comprises a single adjustable stop means positioned adjacent to the box inner surface and underlying and normally spaced from a roller bearing assembly fixed to the journal, said roller bearing assembly normally riding in the box spaced from the stop means, the stop means constructed and arranged to limit horizontal and vertical movement of the journal and roller bearing assembly only when the railway car is impacted, said stop means comprising a stop block, a shim interposed between the stop block and the inner surface of the journal box, and screw means threadedly engaged with the stop block, the shim and the bottom wall of the journal box, said screw means extending through the journal box bottom wall and adjustable exteriorly of the box, said screw means holding the stop block and the shim in assembled relation with the journal box, the stop block being adjustable toward and away from the journal and roller bearing assembly by varying the thickness of the shim.

4. An integral journal box for a railway car adapted to house a journal and roller bearing assembly including a bearing adapter having thrust lug channels therein, said box having an obstruction free bottom wall, a roof, and side walls which define an inner surface, said roof and side walls having thrust lugs thereon, the journal and bearing assembly riding on the box roof and being spaced from the bottom of the box providing vertical lift space permitting engagement of the bearing adapter channels with the box thrust lugs, and a single journal stop structure comprising removable stop means seated against the inner surface of the journal box below the horizontal centerline thereof, said stop means including a face portion underlying and spaced from a small segment of the outer periphery of the journal and bearing assembly to limit vertical and horizontal movement thereof only when the railway car is impacted, and means accessible from outside the journal box removably securing said stop means to the inside surface of the journal box, permitting said stop means to be positioned within said box after the bearing adapter is engaged with the box thrust lugs.

5. The structure defined in claim 4 wherein said stop means is a single block secured to the journal box bottom wall beneath the vertical centerline of the journal and has an arcuate face underlying the journal centerline and extending upwardly and outwardly around a portion of the outer periphery of the journal and bearing assembly in spaced relation thereto.

6. The structure defined in claim 4 wherein said stop means is positioned adjacent to the inner surface of the journal box at about 30° from the vertical centerline of the journal box and has a non-rectangular cross-section with a flattened planar portion underlying a portion of the journal housed in the box.

7. In an integral railway car journal box provided with thrust lugs, an obstruction free bottom wall, and side walls which define a journal box inner surface, said box having an unobstructed opening at one end to freely receive a railway car journal and an opening at the other end allowing access to the box interior, the improvement which comprises a single stop block positioned adjacent to the bottom of the box at the vertical centerline thereof, said block having an arcuate face underlying and spaced from a journal and bearing assembly fixed to the journal, said bearing assembly normally riding on an adapter engaged with the box thrust lugs, said single stop block constructed and arranged to limit both horizontal and vertical movement of the journal and bearing assembly and prevent disengagement of the adapter from the box thrust lugs only when the railway car is impacted, and fastening means accessible from outside said box securing said block to the inside bottom wall of said box, said block being positioned in said box after the journal and bearing assembly and said adapter are engaged with said box thrust lugs.

8. A method of restraining vertical and horizontal movement of a journal and bearing assembly in an integral car journal box including the steps of applying a bearing adapter to the inside roof of an integral journal box, applying a bearing assembly to a railway car axle journal, positioning the journal and bearing assembly within the journal box, engaging the bearing adapter with the bearing assembly, and thereafter positioning a single stop means within the journal box on the bottom surface thereof underlying and spaced from the outer periphery of the journal and bearing assembly to restrain vertical and horizontal movement only when the railway car is impacted, and fastening the stop means to the inner surface of the journal box from outside said box.

9. A method of restraining vertical and horizontal movement of a journal and bearing assembly in an integral car journal box including the steps of applying a bearing adapter to the inside roof of an integral journal box, applying a bearing assembly to a railway car axle journal, positioning the journal and bearing assembly within the journal box, engaging the bearing adapter with the bearing assembly, thereafter positioning a single

stop means within the journal box on the bottom surface thereof underlying and spaced from the outer periphery of the journal and bearing assembly to restrain vertical and horizontal movement only when the railway car is impacted, adjusting said stop means toward or away from the journal and bearing assembly, and fastening the stop means to the inner surface of the journal box from outside said box.

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