Sept. 22, 1942. J. L. MOHUN 2,296,726

RAILWAY JOURNAL MOUNTING

Filed Oct. 21, 1938 3 Sheets-Sheet 1

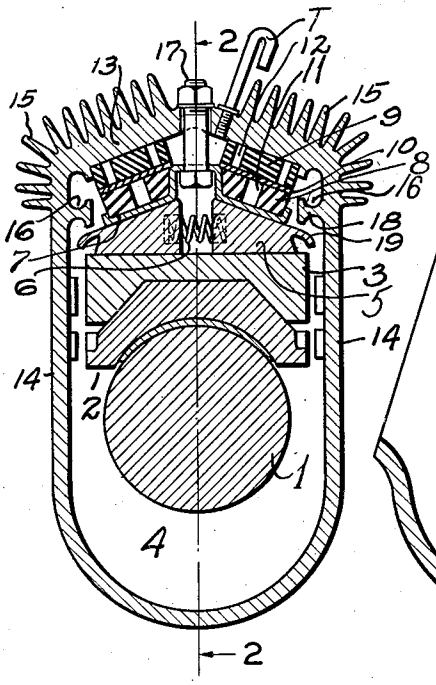


FIG. 1.

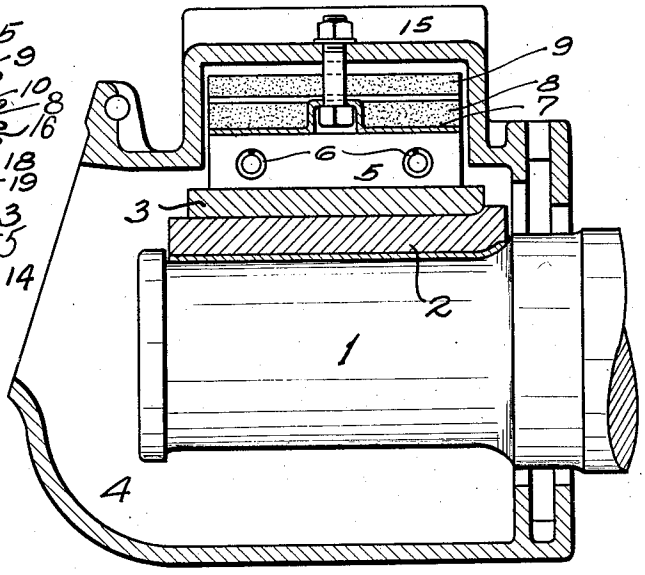


FIG. 2.

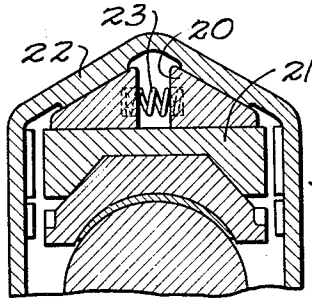


FIG. 3.

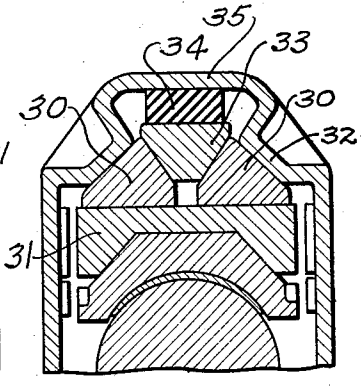


FIG. 4.

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RAILWAY JOURNAL MOUNTING

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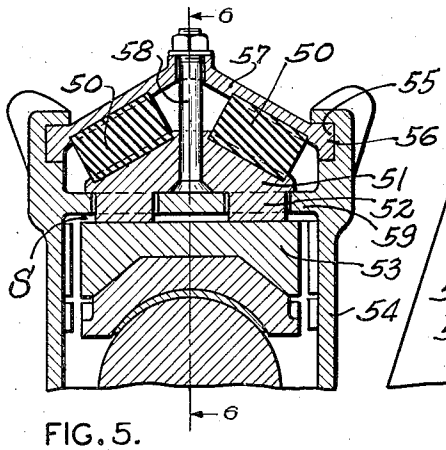


FIG. 5.

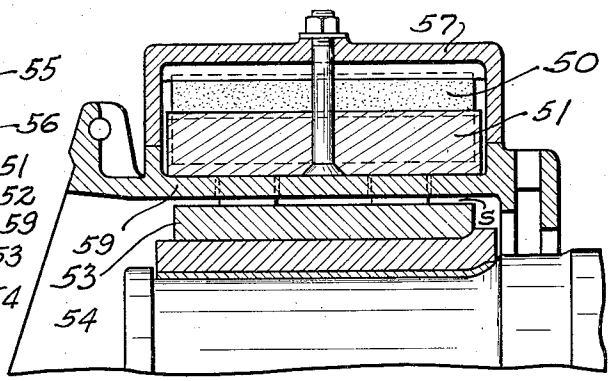


FIG. 6.

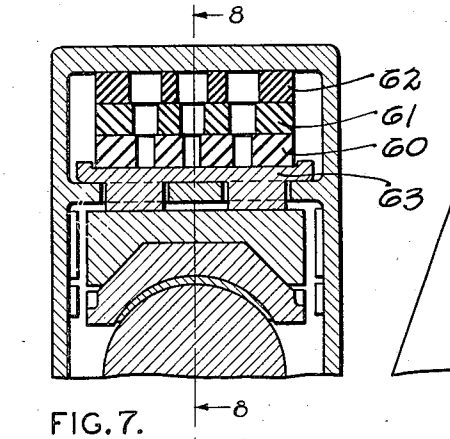


FIG. 7.

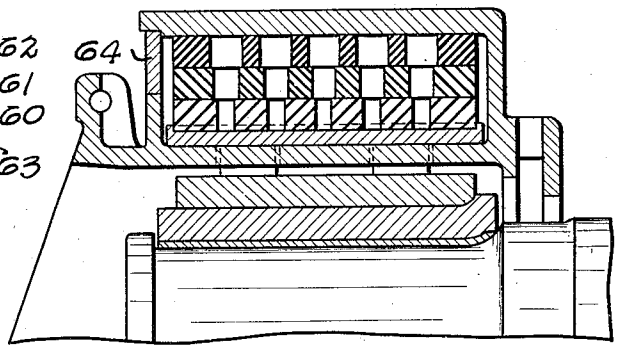


FIG. 8.

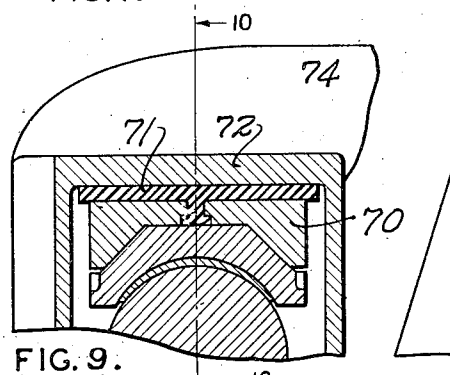


FIG. 9.

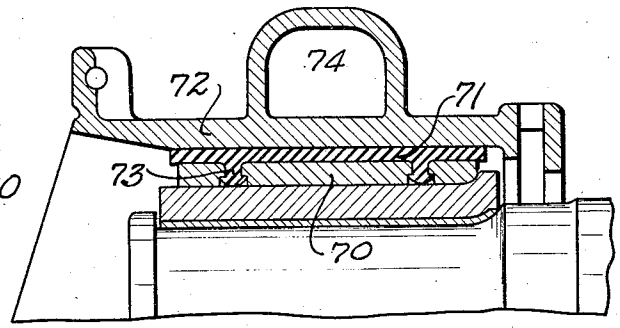


FIG. 10.

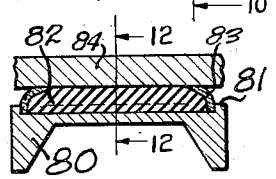


FIG. 11.

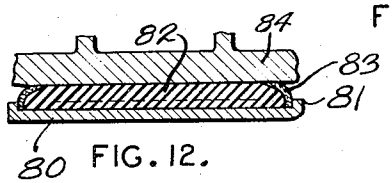


FIG. 12.

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RAILWAY JOURNAL MOUNTING

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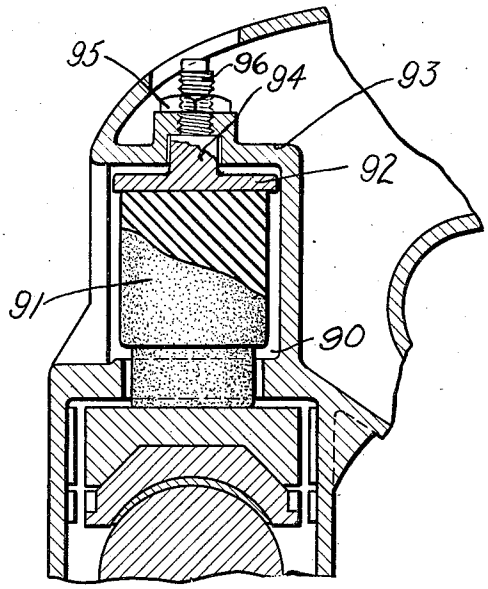


FIG. 13.

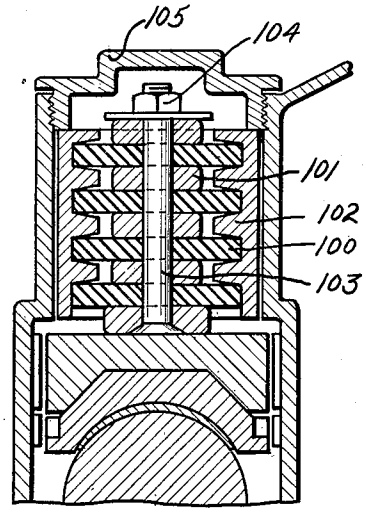


FIG. 14.

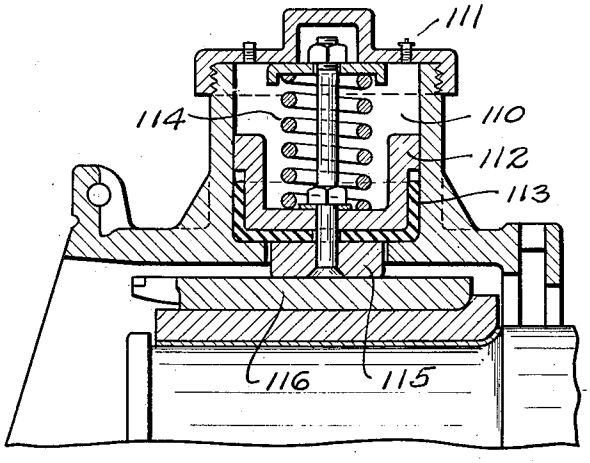


FIG. 15.

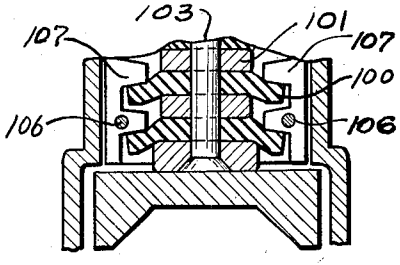


FIG. 14a

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UNITED STATES PATENT OFFICE

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RAILWAY JOURNAL MOUNTING

John L. Mohun, Chicago, Ill.

Application October 21, 1938, Serial No. 236,153

8 Claims. (Cl. 308—38)

The invention relates to railway trucks and more particularly to the axle box and associated parts, it being understood that the box may form a part of the truck frame or may be made separately from the frame and may be rigid with the frame or may be movable vertically therein. The invention consists in all of the novel structure described herein and illustrated in the accompanying drawings.

The main objects of the invention are to improve the riding qualities of railway trucks by cushioning and reducing vibration, as near as possible to the source arising from the relatively small but incessant shocks set up by the action of the wheel on the rail, due to track irregularities and transverse play of the axles and journals relative to the boxes; to reduce the wear on the journal bearing, box lids, dust guards, brake beams, truck levers, wheel flanges, etc.; to reduce the stresses in the truck side frame and to assist in the better alignment of the journal bearings and the side frame. The larger shocks will be passed onto and taken up by the truck springs, bolster springs, etc., as has been done heretofore.

These general objectives are attained by placing a shock absorber between the axle journal and the side frame of the truck. While I propose to utilize rubber pads in compression and shear for this purpose, my invention contemplates the use of shock absorbing structures involving other types of spring and friction devices either with the rubber pads or independently of them. Also I contemplate the use of fluid pressure shock absorbing devices.

Another object of the invention is to provide initial adjustment of a flexible support for the frame in the axle box by which the height of the frame, truck center plate and vehicle coupler may be maintained in accordance with the rigid standards specified in railway rolling stock.

Another object of the invention is to adapt a shock absorber for use in the standard axle box already installed, preferably without requiring any change in the box structure.

Another object is to obtain uniform distribution of pressure between the journal and its load by an interposed element which compensates for any irregularities in the bearing, wedge or box structure, and a dependent object is to eliminate overheating due to uneven loading of the bearing.

Another object of the invention is to maintain close contact between the journal and its bearing by avoiding jumping of the bearing off the journal under sereve shocks. This reduces or eliminates the likelihood of injury to the bearing and avoids the grabbing of the lubricant distributing waste between the journal and bearing with resulting overheating.

Another object of the invention is to counteract harmonic action frequently set up in the truck springs by cumulative shocks, thereby reducing the necessity for friction springs, or other dampening or shock absorbing devices in the truck structure.

Another object of the invention is to reduce to a minimum the unsprung weight of a truck on the wheels and axles.

These and other detailed objects of the invention as will appear from the following description are obtained from the structure illustrated in the accompanying drawings, in which—

Figure 1 is a transverse section through a railway journal and box equipped with the present invention.

Figure 2 is a longitudinal section through the same structure and is taken on the line 2—2 of Figure 1.

Figures 3, 4, 5, 7, and 9 correspond generally to the upper portion of Figure 1 but illustrate, respectively, different forms of the invention.

Figures 6, 8, and 10 are longitudinal sections taken on the corresponding section lines of Figures 5, 7, and 9.

Figure 11 is a detail transverse section through another form of the shock absorbing unit.

Figure 12 is a longitudinal section taken on the line 12—12 of Figure 11.

Figures 13 and 14 are transverse sections through journal boxes and associated structure illustrating other forms of the invention.

Figure 14*a* shows the structure of Figure 14 with the shock absorber compressed and includes a modified feature.

Figure 15 is a longitudinal section through a journal box and associated structure illustrating another form of the invention.

The journal 1, bearing 2, and wedge 3, and the lower part of journal box 4 shown in Figures 1 and 2, correspond to the usual construction of such parts. Mounted on wedge 3 is a pair of blocks 5 with their top faces inclined downwardly and outwardly from the vertical plane containing the axis of the journal. Coiled springs 6 seated in recesses in blocks 5 tend to thrust the latter outwardly towards the sides of the journal box. A saddle 7 rests upon the inclined top faces of blocks 5 and seats spaced units of rubber or other yielding material each comprising a lower pad 8, an upper pad 9, and a plate 10 between said pads

and vulcanized or otherwise bonded to each of them. Preferably, but not necessarily, pads 8 and 9 are of different degrees of hardness to reduce vibrations due to harmonic action set up by the synchronization of successive shocks. The same result may be obtained by providing apertures 11 and 12 in pads 8 and 9, respectively, the apertures in one pad being of greater extent than the apertures in the other pad.

The top wall 13 of journal box 4 is inclined upwardly and inwardly from the side walls 14 to rest upon pads 9 and the exterior face of the wall may be ribbed, as indicated at 15, to dissipate heat from the box whereby the useful life of the rubber is prolonged. The adjacent faces of walls 14 and blocks 5 are provided with cooperating overlapping elements 18 and 19, respectively, for baffling lubricant tending to creep up the side wall or to splash upwardly into the top portion of the box which contains the shock absorbing structure. Element 18 also includes an upwardly facing groove 16 for collecting condensate from oil vapors and discharging it at the end of the compartment where it may return to the waste (not shown). These features are advantageous in protecting the rubber from contact with the oil and avoiding deterioration of the rubber which attends such contact.

The construction described provides a combination of spring, friction and rubber structure for absorbing the shocks received by the running gear before they can be transmitted to the truck frame whether the same is integral with the box or is carried on the box either directly or by means of equalizer bars. Obviously the structure is particularly advantageous where the frames and box are integral with each other and it would be impracticable to provide springs or other shock absorbers between the frame and the box.

The yielding structure interposed between the bearing and the box holds the bearing against the journal, under severe shocks as well as light shocks, thereby avoiding pounding of the bearing and admission of waste to the crevices temporarily created when the relative movement of the wheel and frame tends to move the journal from the bearing. Relatively small shocks applied in a vertical direction may be absorbed by the rubber pads and, since these pads are supported by inclined surfaces, the forces applied to the journal in a vertical direction will be met by the resistance of the pads to shear as well as by the resistance of the pads to compression. Hence the forces will not only be absorbed but will be dissipated due to the distortion of the pads. Heavier shocks will be absorbed by the movement of blocks 5 towards each other and compression of springs 6, and these forces will be dissipated by the friction between blocks 5 and wedge 3 and saddle 7. Transverse shocks between the box and axle will be absorbed and dissipated by the shear value of the rubber pads.

A bolt 17 will hold the rubber pads and their saddle as a unit in assembled relation with the journal box, and this bolt affords means for determining the initial distance between the journal bearing wedge and the top of the box whereby the height of the box, and frame carried thereby, above the journal (and rail) may be adjusted and also the compression, and resistance of the rubber pads, may be adjusted. Preferably a tubular element T is inserted in the box and forms an air vent to reduce temperature in the box to avoid deterioration of the rubber pads.

Figure 3 illustrates a simpler structure utilizing a friction device only. The blocks 20, resting on wedge 21, directly engage the box top wall 22 and the absorption and dissipation of shocks is effected by the compression of springs 23 and by the friction between blocks 20 and the elements engaged thereby.

Figure 4 illustrates another combination of rubber and friction shock absorbing elements. Friction blocks 30 are slidably mounted on the journal wedge 31 and support the box through the inclined elements 32 of the top wall of the box. A wedge-like element 33 rests on blocks 30 and supports the box through a rubber pad 34 engaging the portion 35 of the top wall of the box. With this construction any relative vertical movement of the box and journal will be resisted by simultaneous compression of the rubber pad and sliding movement of elements 30, 31, 32, and 33 on each other. Obviously this degree of resistance will increase rapidly with the pressure on the blocks and the resulting friction between the sliding surfaces.

Figures 5 and 6 illustrate another arrangement whereby the shocks are absorbed wholly by rubber pads 50 compressed between a saddle 51 with depending bosses 52 projecting through the top wall 59 of the box proper and resting upon the usual journal bearing wedge 53. The side walls 54 of the box are extended upwardly and grooved longitudinally at 55 to slidably receive the edges 56 of a top member 57 to which pads 50 and saddle 51 are adjustably secured by bolt 58. In this construction the truck frame would be cast integral with the box and light shocks would be absorbed by the resistance of pads 50 to compression and shear, the space "S" between wedge 53 and the box top wall 59 providing for play of the box and frame relative to the journal and wheels. In this structure the rubber pads are housed in a substantially closed chamber separate from the body of the box proper which contains the journal bearing and lubricant and waste packing whereby the likelihood of the rubber contacting with oil is decreased.

Figures 7 and 8 illustrate a form of the invention in which a plurality of pads 60, 61 and 62 are superimposed upon each other and are carried by a saddle 63 with depending bosses resting upon the journal bearing wedge as illustrated in Figures 5 and 6. Pads 60, 61 and 62 are of different densities and, furthermore, are provided with apertures of increasing extent from the lower pad to the upper pad whereby the tendency towards harmonic vibration is counteracted by the different periods of vibrations in the pads. This structure also contemplates the formation of the pad receiving housing integral with the remainder of the box as distinguished from a separate top member indicated in Figures 5 and 6. The front of the pad receiving housing has a restricted opening provided with a closure 64. By making the pad structure of superimposed layers, their insertion through the opening in the housing is facilitated.

Figures 9 and 10 illustrate a very simple form of the invention which requires no change in the standard box structure although the journal bearing wedge 70 is reduced in thickness to accommodate the rubber pad 71 placed between the wedge and the box top wall 72. Preferably the wedge is apertured to receive projections 73 on the pad serving to hold the pad in place on the wedge. The box is shown as being formed integrally with the truck frame, the end portion 74

of which merges with the box top wall 72 to form a box-shaped section.

Figures 11 and 12 illustrate a modification of the structure shown in Figures 9 and 10 in which the journal bearing wedge 80 is provided with lips 81 engaging the periphery of pad 82 to prevent its movement transversely of wedge 80. Also this structure includes a shield or packing 83 of chrome leather, or other suitable material, surrounding the periphery of pad 82 and extending above the upper corner of the pad in such manner that the distortion of the pad presses strip 83 tightly against lip 81 and the top wall 84 of the box to form an oil seal and prevent the oil in the box having access to the rubber pad, thus preventing deterioration of the rubber by the oil, although the seal would not be required with pads made of the rubber compositions now being produced which are resistant to attack by oil.

Figure 13 illustrates a form of the invention in which the combined journal box and frame casting includes a recess or chamber 90 adapted to contain a shock absorber unit 91 which may comprise a single block of rubber, as shown, or other shock absorbing structure. One side of the chamber is open for the admission of the unit and the unit may be replaced when desired without disassembling the box and the bearing structure. Preferably, but not necessarily, the assembly includes a cap 92 between shock absorber 91 and the chamber top wall 93. A central boss 94 on cap 92 is received in a recess in wall 93 and is seated on a set screw 96 whereby the height of the box and frame relative to the journal may be adjusted and the compression of the shock absorber may be changed. Nut 95 locks the screw in adjusted position. This provides simple, accessible means permitting arranging for continued flexibility in case of a loaded car as against an empty car.

Figure 14 illustrates a form of the invention in which the shock absorber comprises a series of alternate elements of rubber 100 and steel 101, the rubber elements being seated in grooves in the wall 102 of a housing. When distorted under load, as indicated in Figure 14*a*, the rubber elements are not only compressed but flexed and placed in shear thereby increasing the range of the shock absorber action. The assembly is maintained by the bolt 103 which may be adjusted by nut 104 to vary the compression of the rubber elements and also the height of the frame above the journal and rail. A detachable cap 105 provides for insertion and removal of the device and also for adjustment of the unit vertically of the box. If the rubber discs are too stiff to be thrust into position between the grooves in a rigid housing, as shown in Figure 14, the housing may be split longitudinally to accommodate assembly and the parts 107 bolted together as indicated at 106 in Figure 14*a*.

Figure 15 illustrates another embodiment of the invention in which the shock absorber includes a dash pot yielding device, as distinguished from the rubber, or friction, or combination of rubber and friction devices previously described. A chamber 110 is substantially sealed against the free expulsion of air but includes a control valve 111. The plunger 112 includes a flexible cup packing 113. A spring 114 tends to return the plunger and cup packing to the bottom of chamber 110. The end 115 in contact with the bearing wedge 116 may be of metal or rubber as desired. This arrangement provides a fluid cushion designed to function similarly to the rubber and friction devices previously described.

Each of the devices described provides a shock absorbing cushion between the journal bearing and the load thereon which will absorb and tend to dissipate many of the shocks heretofore transmitted to the truck frame and the body carried thereby. Metal to metal contact between the journal and the box and its load is interrupted, thereby tending to reduce noise. Any irregularities in the contour between the bearing and wedge and between the wedge and the box top wall will be compensated for through the adjustment provided by the yielding structure and this tends to reduce the likelihood of overheating due to concentration of the load on a restricted portion of the journal bearing.

The cushion between the bearing and the box tends to maintain the bearing in constant contact with the journal and to avoid the opening up of crevices between the edge of the bearing and the journal in which waste may enter and be picked up by the rotating journal and carried between the bearing surfaces with resulting uneven bearing and overheating.

The cushion between the journal and the box tends to dampen the action of the main truck springs and prevent harmonic action of the latter, thereby resulting in more even riding of the truck and the body mounted thereon.

While there are a number of embodiments of the invention illustrated and described herein, it will be understood that the structure may be varied in ways other than those illustrated and some of the features may be omitted without departing from the spirit of the invention broadly and the exclusive use of such modifications as come within the scope of the claims is contemplated.

What is claimed is:

1. In combination, a railway axle journal box, a journal, a journal bearing, a journal bearing wedge, a device supporting said box on said wedge and absorbing shocks between them, the structure including rubber pads, there being elements extending laterally beneath said pads and terminating in down-turned flanges to baffle the passage of oil upwardly from the lower portion of said box to said rubber pads.

2. In combination, a railway axle journal, a journal bearing, a journal bearing wedge, blocks resting on and slidable transversely of said wedge with their top surfaces inclined upwardly and inwardly from the sides of said wedge, a journal box inclosing said journal, bearing, wedge and blocks and having a top wall inclined upwardly and inwardly from the box sides, rubber pads between said blocks and top wall and supporting said box and its load on said journal, and yielding means thrusting said blocks towards the sides of said box.

3. In combination, a railway axle journal, a journal bearing, a journal box inclosing said journal and bearing, a rubber structure transmitting the load on said box to said bearing, there being adjustable means for adjusting the extent of distortion of said rubber structure to limit its yieldability and determine the relative height of said journal and box.

4. A construction as described in claim 3 in which the support for the rubber structure is inclined to the vertical and the load is so applied to the rubber structure that the latter is placed under shear by the load.

5. A construction as described in claim 3 in

which the rubber structure has its load-supporting upper portion projecting laterally beyond its supported lower portion whereby the structure supports its load partly through the resistance of rubber to shear.

6. In combination, a railway axle journal box, structure therein comprising a journal and a journal bearing mounted thereon and a journal bearing wedge, rubber pads carried by said structure, there being elements one above the other on the upright walls of the box and on said structure above the level of said journal and journal bearing and overlapping horizontally to baffle the passage of oil upwardly from the lower portion of said box to said rubber pads.

7. In combination, a railway axle journal, a journal bearing, a journal bearing wedge member, a block supported by and movable transversely of said wedge member with its top surface inclined to the horizontal, a journal box enclosing said journal and wedge member and block and having a top wall member with its downwardly facing surface similarly supported by said block top surface to carry the journal load, and a rubber pad between said block and one of said members for absorbing load shocks between the box and the journal.

8. In combination, a railway axle journal, a box mounted thereon, and structure yieldingly resisting relative vertical movements of said box and journal and comprising a rubber pad and elements supporting and carried by said pad, said pad having element contacting faces inclined to the horizontal and being movable transversely relative to each other as said journal and box move vertically relative to each other whereby the pad is placed in compression and in shear by the vertical forces transmitted through the structure.

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