Dec. 26, 1944. A. J. HERSEY ET AL 2,365,875

CUSHIONED JOURNAL BOX

Filed May 10, 1943 2 Sheets-Sheet 1

Fig. 1

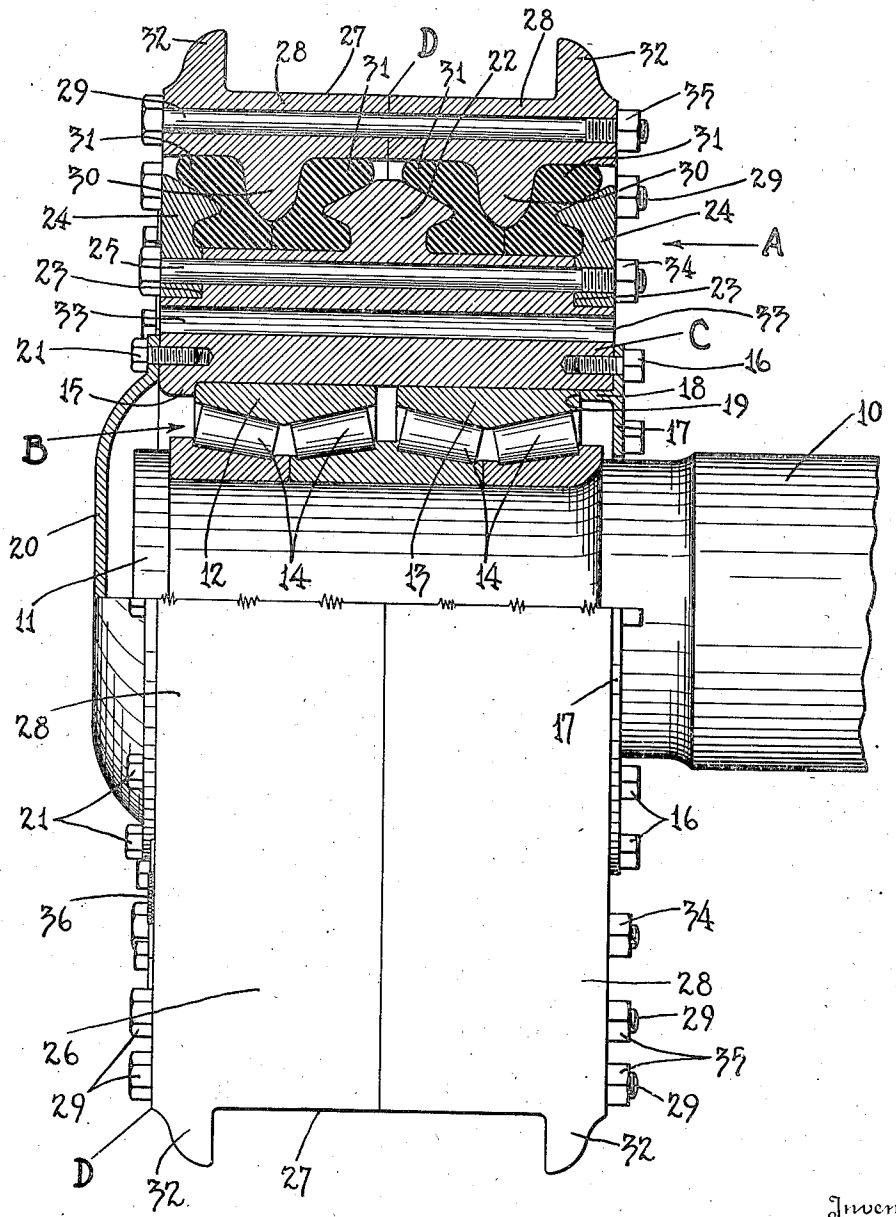

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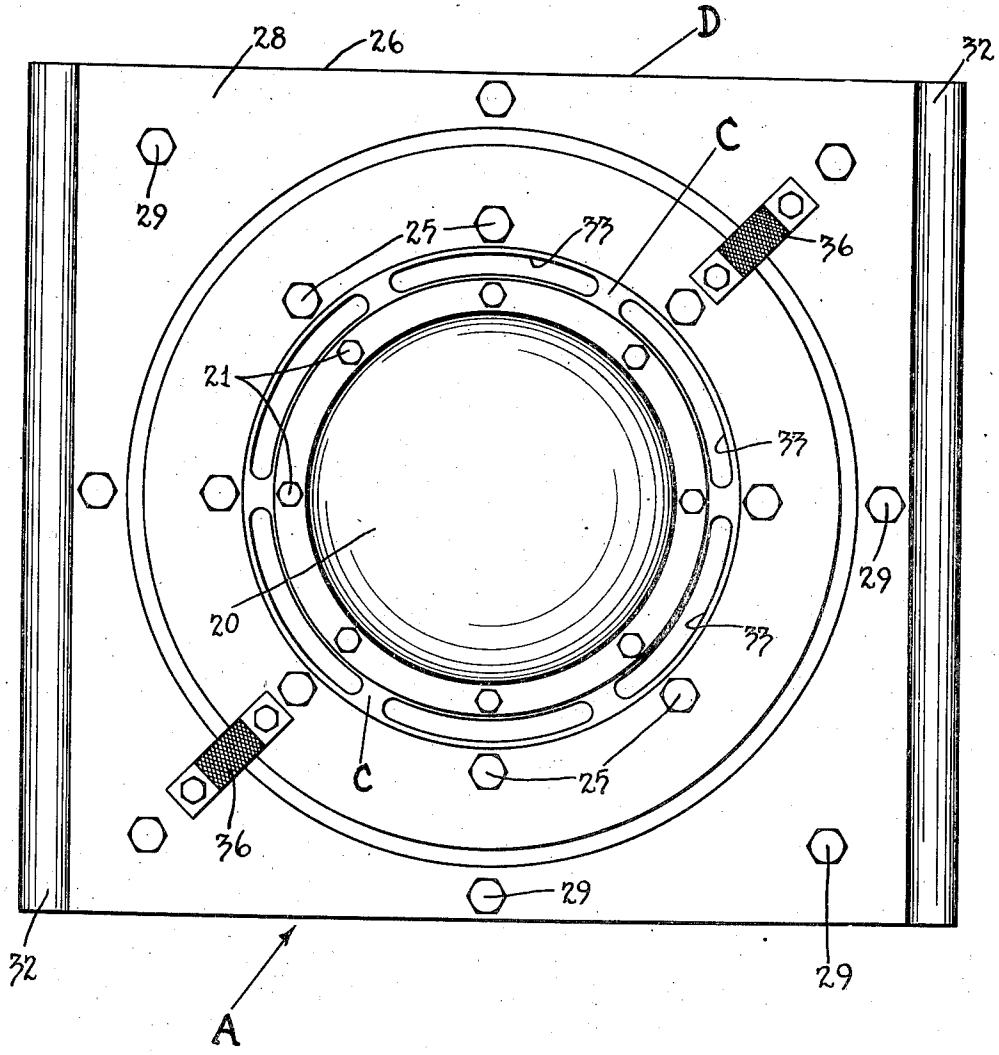
Fig. 2



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CUSHIONED JOURNAL BOX

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Minneapolis, Minn.

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4 Claims. (Cl. 308—184)

Our invention relates to cushioned mountings for bearings and particularly to cushioned journal boxes for the axles of railway trucks.

An object of the invention is to provide an improved cushioned mounting of simple, durable and relatively inexpensive construction, including cushioning means of annular formation interposed between and distributed axially along a center member and an outer encircling member, said means cushioning each member relative to the other against forces imparted thereto.

A further object of the invention is to provide a cushioned mounting, as above, in which the material of the cushioning means occupies position between interdisposed axial abutments occurring in succession on both the center member and the outer encircling member, the structure providing for the axial flowage of the cushioning material between each abutment on each member and the adjacent abutment on the other member.

Another object of the invention is to provide a cushioned mounting, as above, in which one of the concentric members consists of a plurality of mating sections adapted to be conveniently clamped together, thus enabling the structure to be readily assembled and disassembled.

More specifically, it is an object of our invention to provide a cushioned journal box of the foregoing characteristics for railway trucks adapted to be applied to an axle of such a truck and the associated pedestal jaws of the truck for sliding movement in the latter, such journal box having the cushioning material thereof subjected to pre-tensioning adjustment to accord with the loading encountered and such material being effectively protected against bearing lubricants and heat.

Another object of the invention is to provide an improved journal box for railway trucks in which the cushioning means serves to damp the harmonics set up in the conventional load supporting springs in such trucks.

Other objects of the invention reside in the novel combination and arrangement of parts and in the details of construction hereinafter illustrated and/or described.

In the accompanying drawings, Fig. 1 is a view partly in plan and partly in section, the same illustrating a structure in embodiment of our invention and in the form of a journal box for a conventional railway truck. Fig. 2 is an elevational view of the structure shown in Fig. 1.

The familiar construction in railway trucks is not shown, it being well known that a truck of such nature conventionally includes axles, a truck frame having pedestal jaws, and journal boxes journaled on the ends of the axles and slidably guided in the pedestal jaws, the truck frame being supported by helical springs borne by said journal boxes.

Reference being had to the drawings, wherein similar parts are designated in the different figures by similar reference characters, it will be seen that Fig. 1 shows one end of an axle 10 to which is applied a journal box, designated in its entirety by the reference letter A. Mounted on a reduced end portion of said axle 10 and held in place thereon by a nut 11 is a conventional anti-friction bearing B having external races 12, 13 secured by rolling elements 14 against end thrusts.

Our journal box structure A is mounted on said external races 12, 13 of said anti-friction bearing B and includes two concentrically related annularly spaced members, viz., a center member C and an outer member D.

The center member C of the journal box A is a sleeve which slips snugly over the races 12, 13 of the anti-friction bearing B, the bore at the outer end of said sleeve being reduced to form a thrust shoulder 15 for engagement with the race 12. Removably secured by bolts 16 to the inner end of said sleeve C is a sealing ring 17 formed with an annular flange 18 fitting within the bore of the sleeve C and providing at its inner edge a thrust shoulder 19 which engages the race 13. Conventional packing, not shown, will be interposed in a customary manner between the sealing ring 17 and the axle 10 to prevent the escape of bearing lubricants from the inner end of the sleeve C. To prevent the escape of such lubricants from the outer end of said sleeve C, we employ a sealing cap 20 which overreaches the end of the axle 10 and closes the bore of the sleeve at its outer end, said cap 20 being removably secured to said sleeve C by bolts 21.

Formed externally of the sleeve C, midway between the ends thereof, is an annular flange or abutment 22 and externally of said sleeve, at either end thereof, is an annular rabbet 23 in which an end-ring or abutment 24 is slidably seated for movement axially of the sleeve. Clamping bolts 25, extending through said sleeve C from end to end thereof and through both end-rings 24 secure said end-rings to the sleeve and urge them toward each other and said sleeve-flange 22.

The outer member D of our journal box A is

a box-like casing, the thickness of which corresponds with the length of the sleeve C, said casing having a cross-sectionally circular opening therethrough from one face to the other and being rectangular in outline to provide a planiform surface 26 at its upper edge and parallel planiform surfaces 27 at the front and rear edges thereof. The casing D consists of axially inner and outer mating sections 28 which meet at a plane medially of the flange 22 on the sleeve C, said sections 28 being detachably tied together by means of clamping bolts 29 extending therethrough.

In the assembled relationship of casing sections 28 and sleeve C, the inner casing section 28 encompasses the inner end of the sleeve C axially overreaching the inner end-ring 24 and its adjacent half portion of the flange 22 on said sleeve C, while the outer casing section 28 encompasses the outer end of the sleeve C axially overreaching the outer end-ring 24 and its adjacent half-portion of said flange 22. Formed within each of the casing sections 28 is an internal annular rib 30 and these ribs 30 radially overreach the flange 22 and end-rings 24 on the sleeve C, the rib 30 on the inner casing section 28 being disposed between and axially spaced from the inner end-ring 24 and said flange 22, and the rib 30 on the outer casing section 28 being disposed between and axially spaced from the outer end-ring 24 and said flange 22.

Resilient material in annular formation comprising cushioning means occupies the annular space between the sleeve C and casing sections 28, said means, as shown, consisting of cushioning rings 31, there being a pair of such cushioning rings for each casing section 28, one ring of such pair being located at one side of its respective internal rib 30 and the other ring located at the other side of said rib. The cushioning rings 31 for each casing section 28 meet internally of their respective internal rib 30 and are cross-sectionally shaped to fill the annular space between the sleeve C and such casing section, except at the one extreme portion of such space exteriorly of its respective end-ring 24 and the other extreme portion thereof exteriorly of the half-portion of the sleeve-flange 22 adjacent such end-ring. These extreme portions of the annular space within each casing section, normally unoccupied by the resilient material of the cushioning means, provide room for the flowage of such material when it is subjected to forces tending to compress the same.

The upright fore and aft planiform surfaces 27 of the casing D slidably fit between the facing surfaces of pedestal jaws on a railway truck frame and said casing is formed with guide-flanges 32 along the margins of said surfaces 27 for guiding the casing D up and down along said pedestal jaws. Interposed between the casing D and the truck frame will be the usual helical load-supporting spring, not shown, which will have its footing upon the upper surface 26 of said casing.

The cushioning rings 31 cushion radial load shocks and axial thrust shocks imposed upon either sleeve C or casing D and, with respect to such load shocks, said cushioning rings 31 serve to damp the harmonics set up in the load-supporting springs of the truck. With respect to axial thrust shocks, it will be seen that a succession of cooperating abutments come into play in cushioning the same. For example, upon the imposition of an axial thrust against the sleeve C from the inner end thereof, that is, to the left as seen in Fig. 1, the shock of such thrust is met, in part, by the cushioning ring 31 of the outer casing section 28 located between the sleeve-flange 22 and the internal rib 30 of said casing section and, in part, by the cushioning ring 31 of the inner casing section 28 located between the internal rib 30 of that section and the inner end-ring 24 on the sleeve C. Thus, annularly of the structure at spaced localities axially thereof are cooperating pairs of abutments with cushioning material therebetween for absorbing axial shocks. In addition to relative radial and axial cushioned movements between the sleeve C and casing D, it is obvious that said parts are also relatively movable, under the yielding restraint of the cushioning material, to compensate for stresses tending to misalign the same with respect to each other. Although all of the various relative yielding movements between sleeve C and casing D may readily occur in the present construction, it is, nevertheless, a relatively stable structure. This is due to the arrangement wherein a plurality of the axially distributed cushioning rings are simultaneously put under compression, each cushioning ring having room for the axial flowage of the resilient material thereof.

Preferably, the sleeve-flange 22 and the end-rings 24 on the sleeve C and the internal ribs 30 on the casing sections 28 will be cross-sectionally formed so that the resilient material of the radially inner and radially outer portions of each cushioning ring 31, upon flowage under compression, will meet with progressively increasing resistance to such flowage in each such ring portion. To this end, each portion of the annular space, between the sleeve C and casing D occupied by a cushioning ring 31, has an annular throat and is progressively annularly constricted at either side of said throat in the direction provided for the flowage of the cushioning ring material.

Openings 33 are formed in the sleeve C from end to end thereof concentrically about the axis of said sleeve externally of the sealing ring 17 and sealing cap 20. Air within and passing through said openings 33 substantially dissipates the heat generated in the anti-friction bearing B, thereby preventing the conduction of such heat to the cushioning rings 31.

The end-rings 24 are identical and so also are the casing sections 28. This construction promotes the ready assembly of the parts. Nuts 34 on the clamping bolts 25, which tie the end-rings 24 together and secure them to the sleeve C, are tightened along with nuts 35 on the clamping bolts 29, which tie the casing sections 28 together. This tightening of said nuts 34, 35 causes the two relatively remote cushioning rings 31 to be initially compressed between the end-rings 24 and casing-ribs 30 and the two relatively adjacent cushioning rings 31 to be compressed between said ribs 30 and the sleeve-flange 22. Thus, the resilient material of the cushioning rings 31 is pre-tensioned as desired, the degree thereof depending upon the extent to which the nuts 34, 35 on the clamping bolts 25, 29 are tightened. Under many circumstances, it will be desirable to proportion the parts so that the desired pre-tensioning of the cushioning rings 31 will be attained when the casing sections 28 are drawn snugly together and the end-rings 24 are drawn snugly against the end-walls of their respective rabbets 23 in the sleeve C.

Ground straps 36, bolted to the sleeve C and one of the casing sections 28, electrically connect sleeve and casing. This is a desirable expedient in the journal boxes of railway trucks used on railways employing electrical signaling systems and, especially, since the resilient material of the cushioning rings 31 will be of rubber or the like having electrical insulating properties.

Changes in the specific form of our invention, as herein disclosed, may be made within the scope of what is claimed without departing from the spirit of our invention.

Having described our invention, what we claim as new and desire to protect by Letters Patent is:

1. A cushioned journal box for a railway truck having a frame, an axle and a bearing mounted against end movement on said axle, said journal box comprising a sleeve mounted against end movement on said bearing, said sleeve having a fixed external annular flange between its ends and axially adjustable end-rings at the extremities thereof projecting radially beyond said sleeve, a sectional casing encompassing and providing an annular space between the same and said sleeve, said casing being slidably guided vertically in said truck frame, each end portion of said casing encircling one of the end-rings and the adjacent annular portion of the annular flange on said sleeve, each end portion of said casing having an internal annular rib thereon axially spaced from said annular flange and its respective end-ring and radially overreaching the same, each end portion of said casing having annularly formed cushioning means of resilient material filling the annular space between such casing portion and said sleeve except at the extreme portions of such space terminating externally of said annular flange and the corresponding end-ring, the cushioning material for each casing portion being flowable along said extreme portions of the annular space within such casing portion under compression induced by its respective end-ring or by relative radial movement between sleeve and casing, such cushioning material for each casing portion serving under all degrees of such compression thereof yieldingly to maintain a normal relation axially between casing and sleeve.

2. A cushioned journal box for a railway truck having a frame and an axle, said journal box including annularly spaced concentric members, the inner member constituting a journal for said axle and the outer member being slidably guided vertically in said frame, one of said members being formed intermediately thereof with an annular flange and having axially adjustable end-rings, each end portion of the other member axially overreaching one of the end-rings and the adjacent annular portion of the flange on said first member, each end portion of said second member having an annular rib thereon axially spaced from said annular flange and its respective end-ring and radially overreaching the same, each end portion of said second member having annularly formed cushioning means of resilient material filling the annular space between the same and said first member except at the extreme portions of such space terminally overreaching said annular flange and the corresponding end-ring, the cushioning material for each end portion of said second member being flowable along said extreme portions of the annular space between such end portion of said second member and said first member under compression set up by its respective end-ring or resulting from relative radial movement between said members, such cushioning material for each end portion of said second member serving under all degrees of such compression thereof yieldingly to maintain a normal relation axially between said members.

3. In a cushioned bearing mounting for a shaft, one thereof being revoluble relative to the other, said mounting comprising a bearing sleeve applied to said shaft, said sleeve having an external annular flange between its ends and axially adjustable end-rings at the ends thereof projecting radially beyond said sleeve, a casing encompassing and providing an annular space between the same and said sleeve, each end portion of said casing encircling one of the end-rings and the adjacent annular portion of the flange on said sleeve, each end portion of said casing having an internal annular rib thereon axially spaced from said annular flange and its respective end-ring and radially overreaching the same, each end portion of said casing having annularly formed cushioning means of resilient material filling the annular space between such casing portion and sleeve except at the extreme portions of such space terminating externally of said annular flange and the corresponding end-ring, the cushioning material for each casing portion being flowable along said extreme portions of the annular space within such casing portion under compression induced by its respective end-ring or by relative radial movement between sleeve and casing, such cushioning material for each casing portion serving under all degrees of such compression thereof to maintain a normal relation axially between casing and sleeve.

4. In a cushioned bearing mounting for a shaft, one thereof being revoluble relative to the other, said mounting including annularly spaced concentric members, the inner member constituting a bearing applied to said shaft, one of said members being formed intermediately thereof with an annular flange and having axially adjustable end-rings, each end portion of the other member axially overreaching one of the end-rings and the adjacent annular portion of the flange on said first member, each end portion of said second member having an annular rib thereon axially spaced from said annular flange and its respective end-ring and radially overreaching the same, each end portion of said second member having annularly formed cushioning means of resilient material filling the annular space between the same and said first member except at the extreme portions of such space terminally overreaching said annular flange and the corresponding end-ring, the cushioning material for each end portion of said second member being flowable along said extreme portions of the annular space between such end portion of said second member and said first member under compression set up by its respective end-ring or resulting from relative radial movement between said members, such cushioning material for each end portion of said second member serving under all degrees of such compression thereof yieldingly to maintain a normal relation axially between said members.

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