April 12, 1966 F. W. SINCLAIR 3,245,357

BOGIE TRUCKS FOR RAIL VEHICLES

Filed Oct. 15, 1962

4 Sheets-Sheet 1

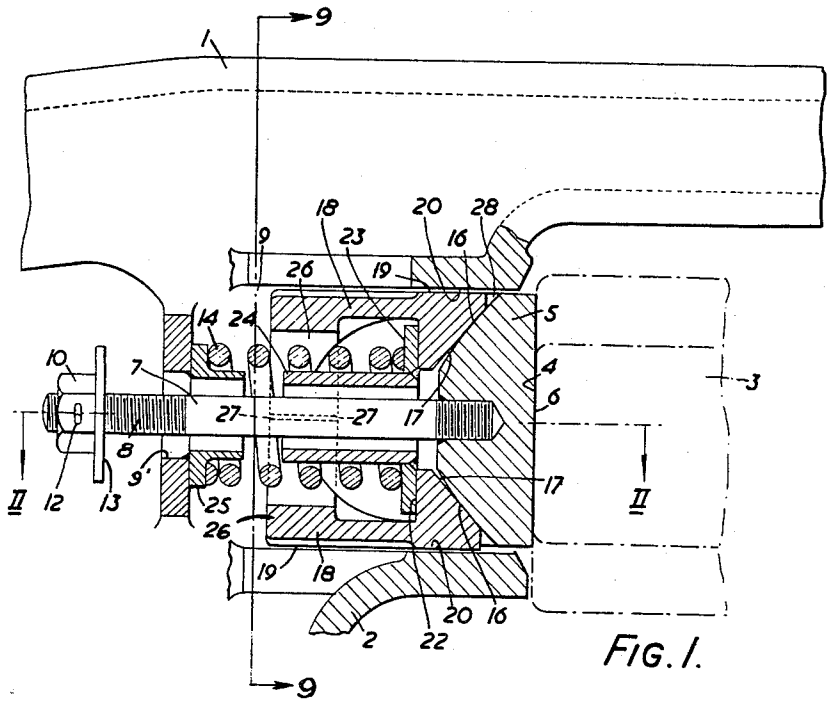



FIG. 1.

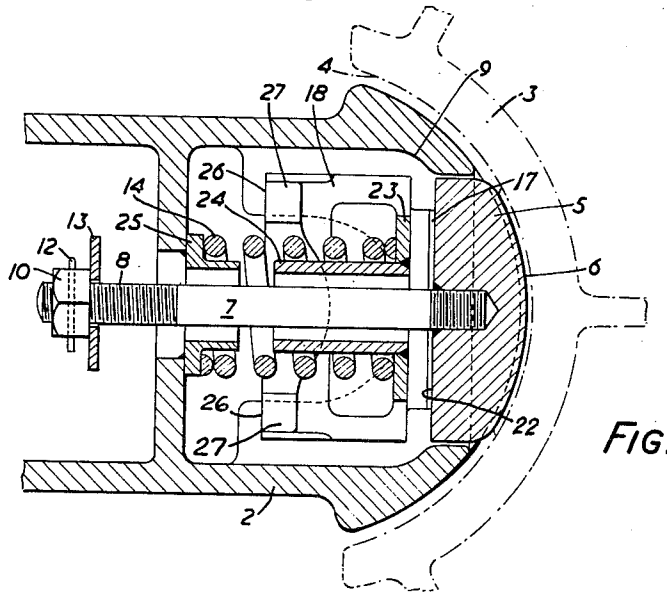



FIG. 2.

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BOGIE TRUCKS FOR RAIL VEHICLES

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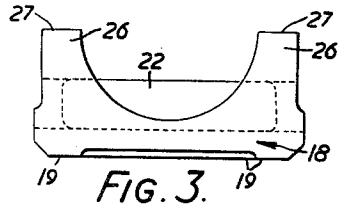



FIG. 3.

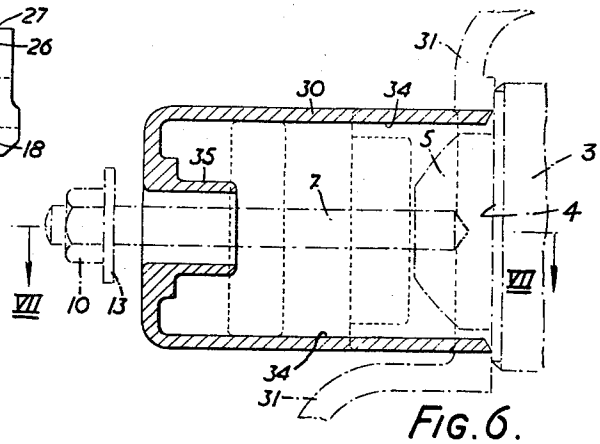



FIG. 6.

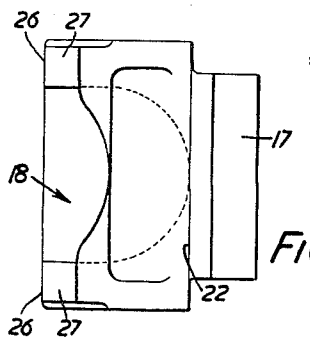



FIG. 4.

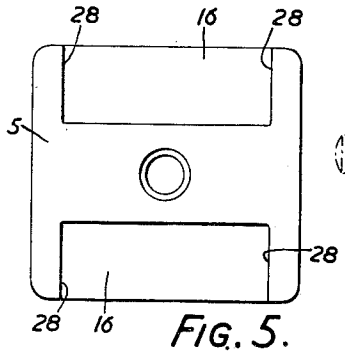



FIG. 5.

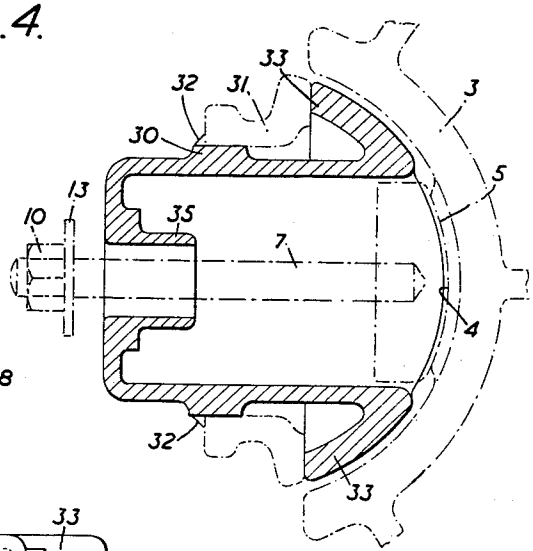



FIG. 7.

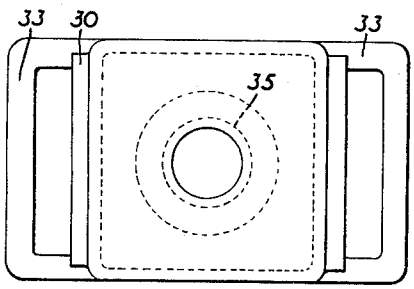



FIG. 8.

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BOGIE TRUCKS FOR RAIL VEHICLES

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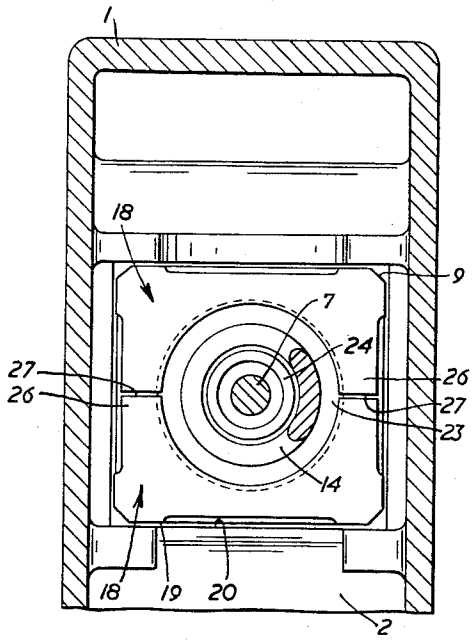



FIG. 9.

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BOGIE TRUCKS FOR RAIL VEHICLES

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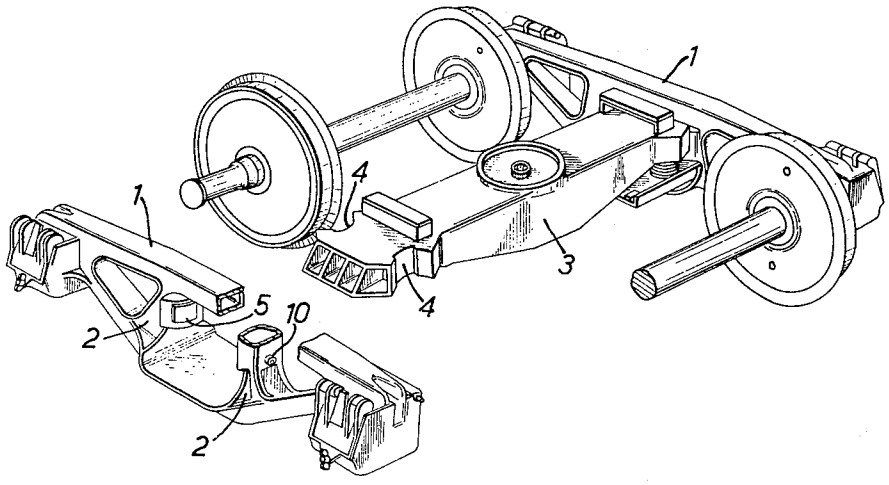



FIG. 10

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3,245,357

# BOGIE TRUCKS FOR RAIL VEHICLES

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Claims priority, application Great Britain, Oct. 13, 1961, 36,807/61
13 Claims. (Cl. 105—197)

This invention relates to bogie trucks for rail vehicles and is concerned with the provision of improved frictional damping means for the bogie bolster springs. Such damping means control the build up of objectionable periodicities or resonance in the springing systems of the bolsters and enables the use of soft, long-travel springs in the systems.

In previous forms of frictional bogie damping means separate shoes mounted in or forming the bolster guide surfaces of the side frames of the bogie truck have been spring loaded into frictional contact with wearing surfaces on the bolster in order to provide a frictional drag on the latter. With such arrangements the shoes have been slidably mounted in bolster columns of the side frames, and in use wear of the shoes and the columns results in vertical play with objectionable noise and hammering during travel. The object of the invention is to provide an improved arrangement in which wear is taken up so that vertical play of the frictional damping shoes does not occur.

To this end, the frictional shoes which contact the wearing surfaces on the bolster are each mounted between upper and lower collets or the like which are slidably mounted in a housing with upper and lower bearing surfaces and are formed at the outer ends with oppositely inclined pressure surfaces which engage the corresponding shoe, the spring loading acting on the shoe through the collets so that the shoe tends to be centred between the collets which are respectively urged apart into contact with said upper and lower bearing surfaces.

The wedging reaction between each two collets and the corresponding shoe maintains contact of the collets with the bearing surfaces, so that wear of the latter and of the collets which occurs in service is automatically taken up. Preferably the two collets are urged toward the bolster by a common compression spring located centrally between them, and the arrangement may be such that the spring pressure on the bolster can be relieved to facilitate fitting of the bolster between the bolster columns. This can be achieved by providing each shoe with a stem portion which extends inwardly of the bolster column and at its free end has screw and nut means to retract the shoe into the corresponding column against the spring pressure.

The invention will now be further described with reference to the accompanying drawings which illustrate, by way of example, frictional damping means of a bogie truck for a rail vehicle and a modification thereof in accordance with the invention. In the drawings:

FIGURE 1 is a vertical sectional view of one form of damping means showing the immediately adjacent structure of the bogie truck, that is, the bolster, the bolster columns and side frames,

FIGURE 2 is a sectional view on the line II—II of FIGURE 1 showing the damping means and a bolster column,

FIGURE 3 is a detailed plan view of a lower collet-like member,

FIGURE 4 is a detailed plan view of the collet-like member of FIGURE 3, turned through 90°,



FIGURE 5 is a detailed front view from the left of the frictional shoe of the damping means shown in FIGURE 1, without the central bolt,

FIGURE 6 is a view generally similar to that of FIGURE 1 but of the modified damping means,

FIGURE 7 is a sectional view of the line VII—VII in FIGURE 6 generally similar to that of FIGURE 2, and

FIGURE 8 is an end view from the left of FIGURE 7, turned through 90°.

FIGURE 9 is a cross-sectional view taken on the line 9—9 of FIGURE 1.

FIGURE 10 is a fragmentary perspective view of a bogie truck in which the present invention is embodied.

Describing first the arrangement of FIGURES 1 to 5, each side frame **1** of the truck has the usual spaced bolster columns such as **2** between which the corresponding end of the bolster **3** is suspended on the bolster springing system which forms no part of the invention and hence is not described herein. Two concave front and rear guide surfaces **4** (see FIGURE 2) on the bolster **3** of opposite curvature are frictionally engaged by damping shoes such as **5** mounted in the bolster columns **2** and formed with complementary convex guide surfaces such as **6**.

Only one set of the damping means is shown in the drawings which thus only illustrate one damping shoe **5**; the two sets of damping means engaging the guide surfaces **4** at one end of the bolster **3** are identical with each other and also with the damping means at the other end of the bolster **3** which are mounted in he opposite side frame **1**. Thus the following description refers to the single damping means illustrated.

The shoe **5** has a central stem **7** which is screw-threaded at **8** at its free end which projects through an aperture **9'** in the corresponding bolster column **2** and through a housing **9** in the column **2** in which the elements of the damping means are accommodated. A nut **10** on the stem **7** is normally fixed in an inoperative end position shown in FIGURE 2 by means of a split pin **12** passing through the nut **10** and stem **7**, and withdrawal of the pin **12** enables the nut **10** and an attached washer **13** to be screwed up against the adjacent face of the bolster column **2**. This enables the shoe **5** to be retracted into the column **2** away from the bolster surface **4** against the loading of a helical compression spring **14** which acts in a manner described hereinafter to urge the shoe **5** into frictional engagement with the surface **4**.

As can be seen from FIGURE 1 and the detail view of FIGURE 5, the upper and lower rear or inner edges of the shoe **5** are cut away centrally to provide pressure surfaces **16** which are slightly convexly radiused in side view as seen in FIGURE 1. The surfaces **16** engage oppositely inclined plane pressure surfaces **17** formed on similar upper and lower collets **18** detail views of which are shown in FIGURES 3 and 4. The collets **18** have bearing surfaces **19** which slide on and bear against bearing surfaces **20** formed at the top and bottom of the aperture **9** in the bolster column **2**.

An inwardly facing step **22** on each collet **18** adjacent the outer end thereof forms an abutment for a spring plate **23** which transmits to both collets **18** the loading of the compression spring **14**. The spring **14** surrounds the stem **7** of the damping shoe **5** and is located by engagement around a tubular stem **24** projecting inwardly from and attached to the spring plate **23**. A stepped rear spring abutment **25** is welded in position within the column **2**.

Thus the spring **14** urges the shoe **5** into frictional engagement with the corresponding bolster surface **4**, the spring force being transmitted through the spring plate

25 and the collets 18. The resultant wedging reaction between the pressure surfaces 16 of the shoe 5 and the pressure surfaces 17 of the collets 18 urges the latter apart and firmly into engagement with the respective bearing surfaces 20 on the column 2; thus wear of the collets 18 and the column surfaces 20 is automatically taken up and vertical play eliminated, and the shoe 5 is accurately centered between the collets 18. The convex radius of the pressure surfaces 16 allows self-aligning movement of the shoe 5 between the collets 18.

Two limbs 26 projecting from the inner end of each collet 18 remote from the pressure surface 17 thereof extend towards the other collet 18, being respectively disposed on opposite sides of the spring 14 which they straddle. Corresponding limbs 26 of the two collets 18 are closely spaced, and the limbs have end surfaces 27 which engage on any tendency for the collets 18 to tilt or twist within the column 2 and thus prevent undue tilting or twisting movement. As the corresponding inner edges of the shoe 5 are only partly cut away to provide the surfaces 16 the latter are each arranged between two opposed shoulders 28 on the shoe 5. Each collet 18 is thus received between the corresponding pair of opposed shoulders 28, and the latter engage the collets 18 to prevent undue twisting movement of the shoe 5.

The modification illustrated in FIGURES 6 to 8 utilise a shoe 5 shown in broken outline in FIGURES 6 and 7 generally similar to the shoe already described and cooperating with collets urged into engagement with the shoe 5 by a compression spring as before; the collets and spring are also substantially identical to the collets 18 and spring 14 previously described and hence they are not shown in the drawings.

The modification mainly resides in housing the moving elements of the damping means within a separate housing member 30 which is fitted into the corresponding bolster column 31 and tack welded thereto at points such as 32. The housing 30 has at the outer end sidewardly projecting flanges 33 which seat against the column 31, as shown in FIGURE 7, to locate the housing relatively to the column. Internal upper and lower wearing surfaces 34 in the housing 30 perform the same function as the surfaces 20 previously described, the collets being respectively urged against the surfaces 34 by the already described wedging reaction between the collets and the shoe 5. The rear spring abutment 35 is now formed integrally with the housing member 30.

Thus the modified means operate in exactly the same manner as the means of the earlier figures, the shoe 5 being spring urged into frictional engagement with the corresponding concave guide surface 4 on the bolster casting 3. The advantages of the modification are that the damping means can be pre-assembled and fitted as a "package" unit in the corresponding column 31, and that when the surfaces 34 are unduly worn the welds 32 can be cut away to enable a replacement unit, complete with housing element 30, to be fitted.

I claim:

1. Frictional damping means for the bolster of a bogie truck, comprising a frictional shoe for contact with a side wearing surface on the bolster, collet-like members between which said shoe is mounted, each of said collet-like members being formed with an inclined pressure surface, said pressure surfaces being oppositely inclined with respect to one another and engaging pressure surfaces on said shoe, a housing for said shoe and collet-like members, bearing surfaces in said housing on which said collet-like members are slidably mounted, spring means acting on said collet-like members to urge the pressure surfaces thereon into engagement with the pressure surfaces on said shoe and to urge said shoe into frictional contact with said bolster side wearing surface, the collet-like members having further surfaces which engage each other to prevent said members twisting in the housing or tilting therein to any marked extent in a longitudinal plane.

2. Frictional damping means for the bolster of a bogie truck, comprising a frictional shoe for contact with a side wearing surface on the bolster, collet-like members between which said shoe is mounted, each of said collet-like members being formed with an inclined pressure surface, said pressure surfaces being oppositely inclined with respect to one another and engaging relatively inclined pressure surfaces on said shoe, a housing for said shoe and collet-like members, bearing surfaces in said housing on which said collet-like members are slidably mounted, spring means acting on said collet-like members to urge the pressure surfaces thereon into engagement with the pressure surfaces on said shoe and to urge said shoe into frictional contact with said bolster side wearing surface, the collet-like members having further surfaces which engage each other to prevent said members twisting in the housing or tilting therein to any marked extent in a longitudinal plane.

3. Frictional damping means according to claim 2 wherein said further surfaces are formed on the collet-like members at the inner ends of the latter remote from the pressure surfaces, and are facing and closely spaced.

4. Frictional damping means according to claim 3, wherein said spring means comprise a common spring acting on said collet-like members, said members being formed with limbs on which said further surfaces are formed and which respectively extend on opposite sides of the spring beyond spring abutment surfaces formed on the members.

5. Damping means according to claim 2, wherein the two collet-like members are urged toward the shoe by a common compression spring arranged between them and forming said spring means.

6. Damping means according to claim 2, wherein the shoe has a stem portion which extends inwardly and at its free end has screw and nut means to retract the shoe into the housing against the spring pressure, whereby that pressure can be relieved to facilitate fitting of the damping means.

7. Damping means according to claim 2, wherein the shoe has a wearing surface which is arcuate in plan view for engagement with a complementary surface on the bolster.

8. In a bogie truck for a rail vehicle having side frames each formed with two spaced bolster columns, a bolster vertically movable between the spaced columns of each side frame, each column providing a housing facing the bolster for bolster damping means, and suspension springs supporting said bolster, frictional damping means for said bolster comprising in each housing a frictional shoe contacting a corresponding side wearing surface on the bolster, an upper collet-like member and a lower collet-like member respectively in sliding engagement with upper and lower bearing surfaces within said housing, each of said upper and lower collet-like members having an inclined pressure surface, said pressure surfaces being oppositely and symmetrically inclined with respect to one another and arranged to receive said frictional shoe between them, spring means acting through said collet-like members to urge said pressure surfaces into engagement with said shoe and in turn urge said shoe into frictional damping contact with said side wearing surface, the collet-like members having further surfaces which engage each other to prevent said members twisting in the housing or tilting therein to any marked extent in a longitudinal vertical plane.

9. Damping means according to claim 8 wherein each housing is provided by a separate housing member formed for mounting the means in the corresponding bolster column as a package unit.

10. Damping means according to claim 9, wherein the housing member has a locating flange at the outer end for engagement with the bolster column and is formed so

that it can be detachably secured to the latter, for example by welding.

**11.** Damping means according to claim **8**, wherein each housing is formed by an aperture in the corresponding bolster column on which said upper and lower bearing surfaces are formed.

**12.** Frictional damping means for the bolster of a bogie truck, comprising a frictional shoe for contact with a side wearing surface on the bolster, said shoe presenting relatively inclined and convexly radiused pressure surfaces on the side facing away from the bolster, collet-like members between which said shoe is mounted and each presenting an inclined pressure surface generally complementary to and facing towards said shoe, each of said pressure surfaces on the collet-like members engaging a corresponding one of said shoe pressure surfaces, a housing for said shoe and said collet-like members, bearing surfaces in said housing on which said collet-like members are slidably mounted, spring means acting on said collet-like members to urge the pressure surfaces thereon into engagement with the pressure surfaces on said shoe and to urge said shoe into frictional contact with said bolster side wearing surface, the collet-like members having further surfaces which engage each other to prevent said members twisting in the housing or tilting therein to any marked extent in a longitudinal plane.



**13.** Damping means according to claim **12**, wherein the collets have plane pressure surfaces.


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