May 20, 1941. F. W. HANKINS 2,242,212

SPRINGING FOR RAILWAY TRUCKS

Filed July 26, 1940

FIG. 1.

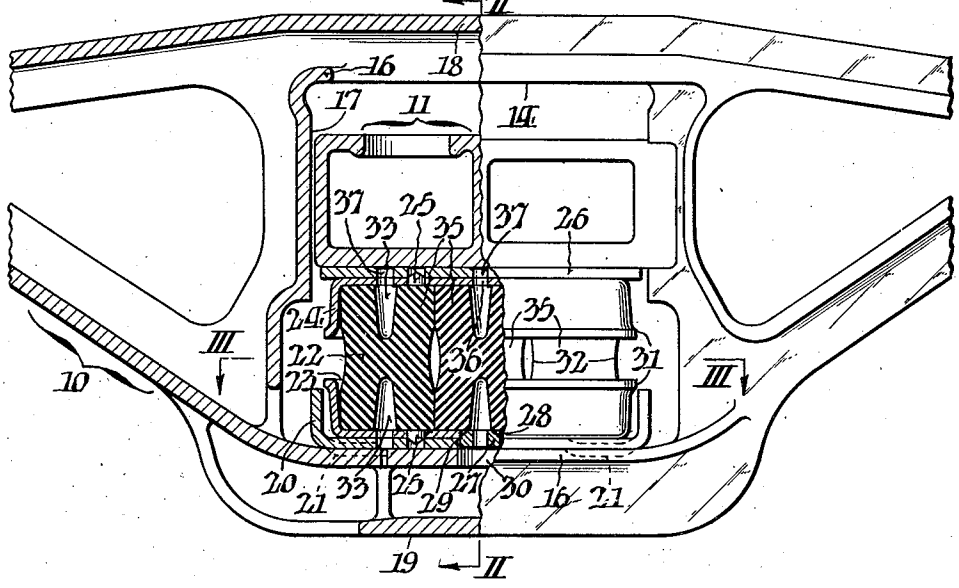


FIG. 2.

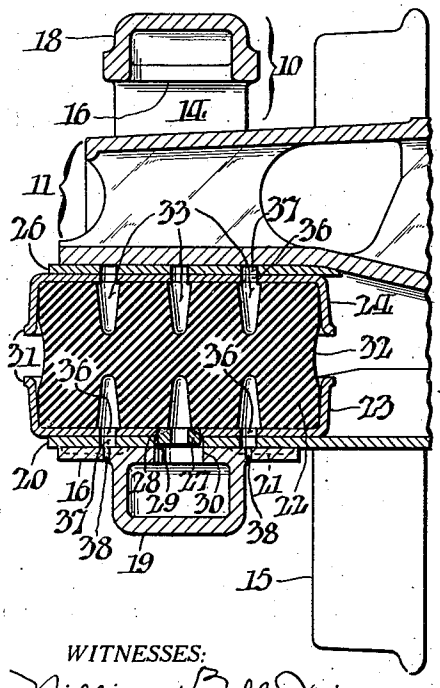
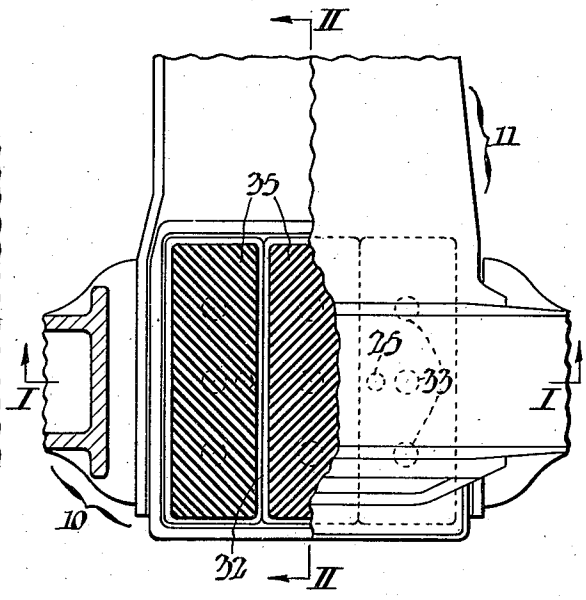


FIG. 3.



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SPRINGING FOR RAILWAY TRUCKS

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2 Claims. (Cl. 267—63)

This invention relates to railway trucks and the like, and especially to springing suitable for bolster type trucks. An important aim of the invention is to provide a wide range of elasticity without necessity for making trucks larger than usual. The invention permits of a soft, yielding spring action for light loads, combined with a stiffer action for heavy loads. In suitable forms of embodiment, the invention allows of easy adjustment or replacement to take care of wear, and relatively low maintenance cost. The action of the springing can be made comparatively very quiet, and the transmission of vibration and shock to the lading minimized. The invention is especially adaptable and advantageous for freight-cars, and can be directly substituted for the usual helical spring assemblies of such cars with great improvement in their riding qualities: in particular, objectionable "going dead" by closing together of coils under severe shocks, which is generally characteristic of helical springs, can be altogether avoided.

Other features and advantages of the invention will appear from the following description of a species or form of embodiment, and from the drawing. All the features and combinations illustrated or described are of my invention, so far as novel.

In the drawing, Fig. 1 is a fragmentary side view of the mid-portion of a bolster type railway freight truck, with the left-hand portion in vertical section as indicated by the line and arrows I—I in Fig. 3; Fig. 2 shows a vertical section through the truck side-frame, bolster, and associated parts, taken as indicated by the line and arrows II—II in Figs. 1 and 3; and Fig. 3 is a fragmentary plan view of the side frame, partly in horizontal section as indicated by the line and arrows III—III in Fig. 1.

The drawing shows only side of the truck, since the other side may be just like that illustrated. Accordingly, there is shown in Figs. 1 and 2 a side frame 10, resembling those of present standard freight car trucks in general design and construction, with one end of a transverse bolster 11 that carries the load of the car body, as usual. Besides the usual axle-box jaws or housings (not shown), the side frame 10 has the window opening 14 into which the bolster 11 extends. This is well illustrated in Fig. 2, which also shows one of the truck wheels 15. The bolster end 11 may be guided for up and down movement relative to the frame 10 in any suitable manner, as by engagement of stop flanges 16, 16 on the bolster with the usual guideways 17, 17 at opposite sides of the window opening. Above and below the window 14 are the usual top and bottom side frame members 18, 19. A support for the spring cushion means to be presently described may be provided in any suitable manner, as by widening the bottom side frame member 19, beneath the window 14, Fig. 2. In the present instance, the truck has a spring plank channel 20 interconnecting its side frames, and resting at each end on the bottom support portion 19 of the corresponding frame 10. As shown in dotted lines in Figs. 1 and 2, the frame support 19 has socket recesses in which are engaged the corresponding dowel projections 21 on the spring plank 20.

The cushion spring 22 here shown comprises a mass or block of highly elastic material, preferably suitably vulcanized "live" rubber, interposed between the frame support 19 and the bolster end 11. The lower and upper portions of the rubber cushion are engaged in corresponding frames or housings 23, 24 associated with the support 19 and with the bolster 11, respectively, and here shown as stout sheet metal pans of generally rectangular outline. These housings 23, 24 may be held in position by any suitable means of engagement, such as conical dowel projections 25 on the housings which engage in corresponding socket openings in the spring plank 20 and in the lower side of the bolster 11,—or, as shown in Fig. 1, in a spacer or liner plate 26 interposed between the housing 24 and the bolster, and itself preferably secured to the bolster. As shown in Figs. 1 and 2, the housing 23 also has a central hollow boss 27 welded to its bottom at its central opening 28, and engaged in a socket hole 29 in the spring plank, which coincides with a like hole 30 in the frame member 19.

As shown in Figs. 1 and 2, the walls of the sheet metal housings 23, 24 have a slight outward flare, which facilitates die-pressing the housings to shape, as well as the installation of the rubber cushion 22 in them. They also have outturned or beaded lips 31, which stiffen them and obviate cutting of the rubber against their edges when it spreads outward under compression. As shown, the vertical dimension of the elastic cushion 22 is such that it holds the housings 23, 24 apart a distance exceeding the range of (vertical) compressive deflection of the cushion in service.

While the lower and upper portions of the rectangular cushion 22 are shown flat-sided or "wall-sided," and as fitting snugly in the bottoms of the pan-like housings 23, 24, the inter-

mediate portion has its sides reduced or grooved all around, as in a concave such as shown at **32**, to allow outward lateral expansion of the rubber within the housings under compression. Also, the upper and lower portions of the cushion **22** are (one or both) internally hollowed or cored to allow inward lateral expansion of the rubber within the housings **23**, **24**, where compressed: e. g., the cushion **22** may have a number of regularly distributed conical cavities or holes **33** in each end. As shown in Figs. 1 and 3, internal lateral expansion of the rubber under compression is additionally allowed for by making the cushion **22** in a plurality of rectangular sections or units **35** (extending transversely of the truck, or lengthwise of the bolster **11**), each with concave groove recesses **32** on its side(s) adjacent the others, as well as on its outward exposed sides. In Figs. 1 and 3, there are three of the cushion sections or units **35**, each with a longitudinal series or row of three evenly spaced holes **33** in its lower and upper ends.

Suitable air passage may be provided for the escape and return of air from and to the cavities **33** when the spring cushion **22** undergoes compression and reexpands, such as vent openings **36** through the bottoms of the housings **23**, **24**, in registry with the cavities **33**, and (preferably) corresponding openings **37** in the web of the spring plank **20** and in the spacer **26**. The roughness of the cast surfaces of the frame support **19** and of the bolster **11** adjacent the parts **20** and **26** allows free passage of air from and to the openings **36** and **37**, though air holes **38** may be drilled through these parts in registry with the holes **36**, **37**, if desired. The change of the air in the cavities **33** that is provided in the manner described is beneficial as a means of getting rid of the heat of internal friction in the rubber **22**, so as to keep it from overheating injuriously.

Irrespective of the advantages above mentioned, the sectional construction of the cushion **22** facilitates manufacture and allows of better curing of the rubber, so that the elastic properties of the cushion can be made much superior to those usually realized in a like cushion made in one piece. Preferably, each section **35** is made of one integral piece of extruded material, compounded of very pure rubber. The holes **33** also facilitate the curing of the rubber. The sections **35** can be individually tested under pressures greatly exceeding in intensity the maximum to which they are ever liable in actual service.

In service, the absence of enclosure about its midportion and its external reduction at **32** combine with the internal hollowing of its enclosed lower and upper portions at **33** to give substantially uniform elastic compressive deflection of the cushion **22** under increasing loads or stresses, and this range of uniform deflection may considerably exceed that due to maximum loading of the car. Under greater compressive deflections (due to track conditions), the lateral expansion of the rubber may take up all the room for expansion provided by the grooving **31** and the holes **33**. When this happens, the ratio of stress to deflection will become higher for further deflection; but the cushion will not go dead, but continue to yield and absorb excessive shocks. It is perfectly practicable to proportion the parts so that the housings **23**, **24**, cannot come together under even the greatest shocks ever met with, so that the cushion **22** cannot go dead like a nest of helical springs. The cushion **22** and its sections **35** will not break in service, and can not only be installed in new trucks, or in substitution for an entire set of helical metal springs, but can even (when suitably designed and constructed) be substituted piecemeal for one or more transverse rows of helical springs when one of the helical springs in a row breaks. The cushion **22** requires no more room than the equivalent metal springs, and gives greatly superior riding. By changing the thickness of the spacer or liner plate **26**, the unloaded position of the bolster **11** relative to the truck frame can be adjusted to compensate for wear of the truck wheels **15**, or of the axle bearings, etc., not shown.

Having thus described my invention, I claim:

1. Springing for a railway car comprising, in combination, lower and upper hollow housings facing toward one another, and a series of live rubber cushion sections fitted side-to-side into said housings and thus substantially fixed in position in the housings, and holding the latter apart, said cushion sections being separated along lateral zones at their mid-height by lateral reduction or recessing between their juxtaposed faces, and also having their upper and lower portions within the housings internally hollowed and empty, whereby lateral expansion is afforded the rubber inside the cushion substantially throughout the cushion height, partly between the cushion sections and partly within each section.

2. Springing for a railway car comprising, in combination, substantially rectangular lower and upper hollow housings facing toward one another, and a series of substantially rectangular live rubber cushion bars fitted side-to-side into said housings and thus substantially fixed in position in the housings, and holding the latter apart, said cushion bars being separated along lateral zones at their mid-height by lateral reduction or recessing between their juxtaposed faces, and also having longitudinal series of empty cavities in their upper and lower portions within the housings, whereby lateral expansion is afforded the rubber inside the cushion substantially throughout the cushion height, partly between the cushion bars and partly within each bar.

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