Sept. 15, 1953

G. J. CHRISTENSON

2,652,244

SPRING PACKAGE

Filed Aug. 6, 1949

2 Sheets-Sheet 1

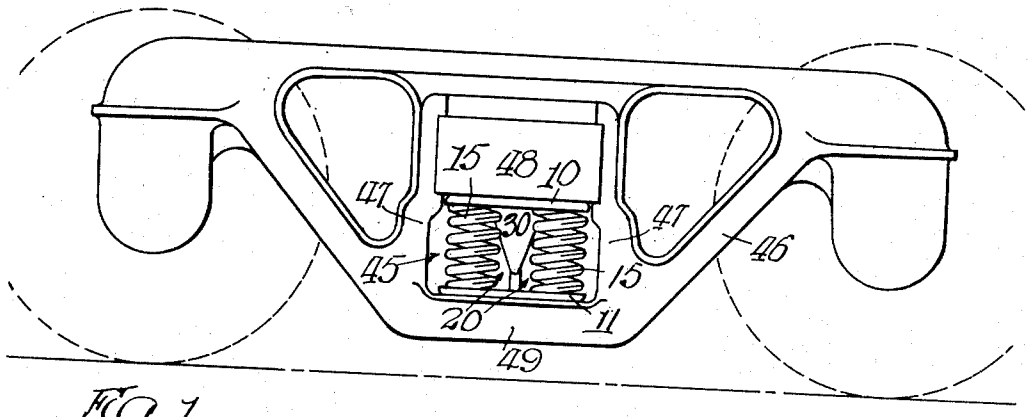


FIG. 1.

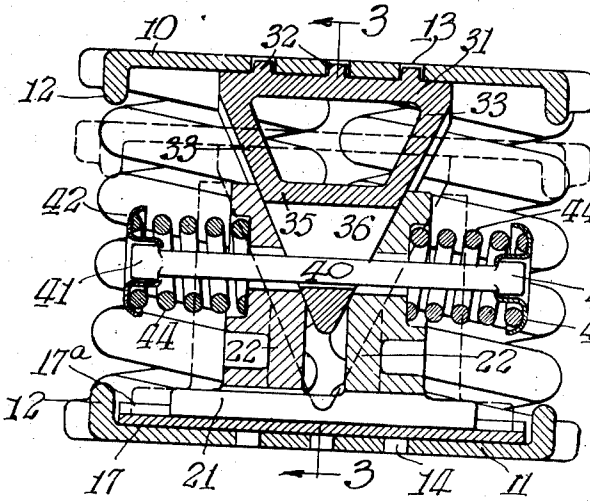
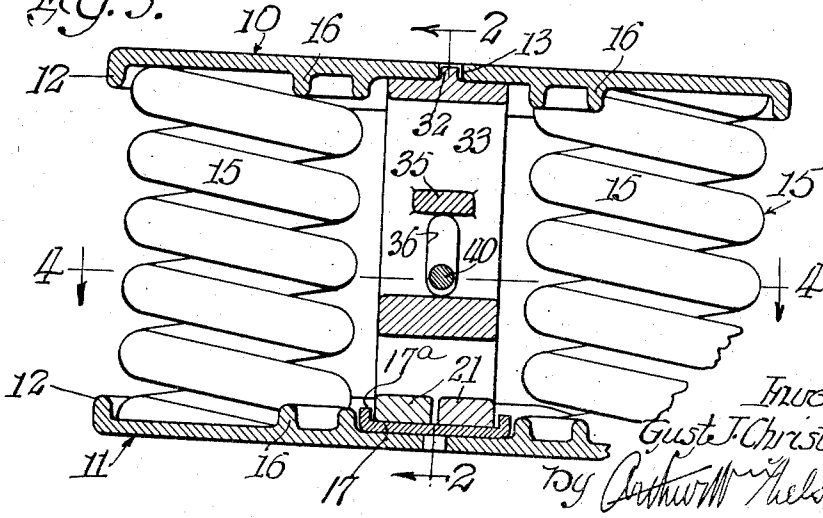


FIG. 2.

FIG. 3.



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2 Sheets-Sheet 2

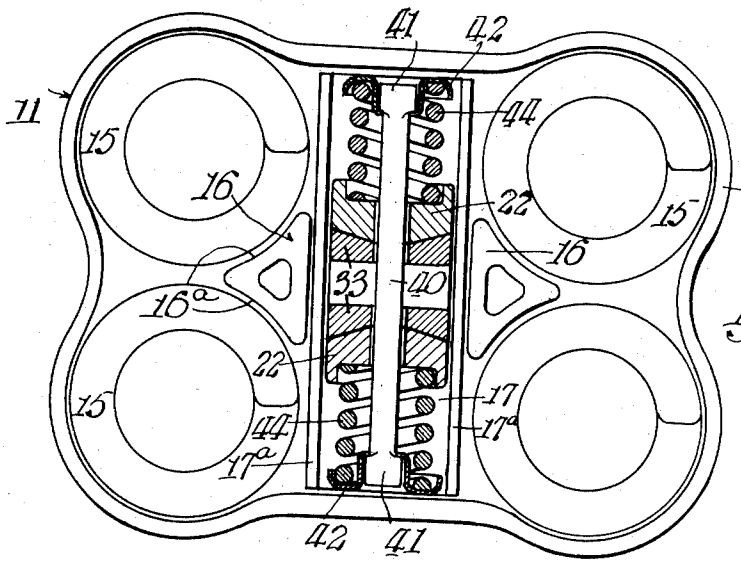


FIG. 4.

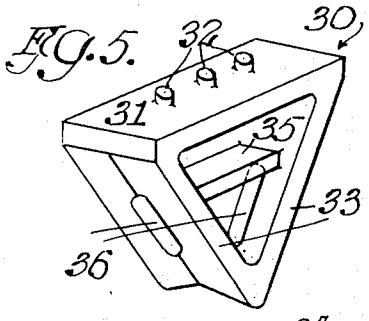


FIG. 5.

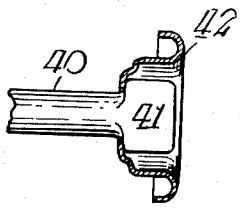


FIG. 7.

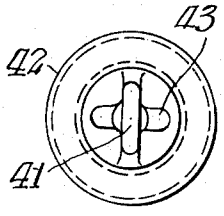


FIG. 8.

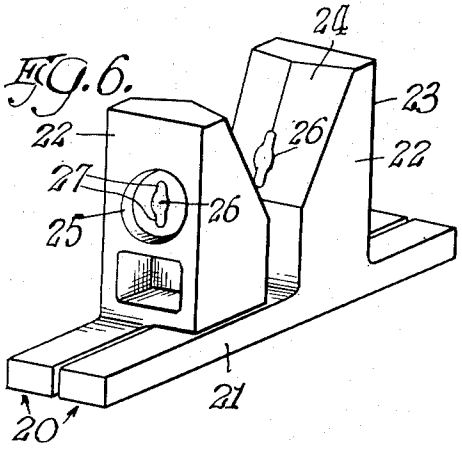


FIG. 6.

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UNITED STATES PATENT OFFICE

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SPRING PACKAGE

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Application August 6, 1949, Serial No. 108,874

7 Claims. (Cl. 267—9)

1

This invention relates to improvements in spring packages for use in connection with the ends of a car bolster and associated side frames and it consists of the matters hereinafter described and more particularly pointed out in the appended claims.

One of the objects of the invention is to provide a simple, efficient, low cost spring package for controlling the harmonic action of railroad car springs so harmful to lading and equipment.

Another object of the invention is to provide a package of this kind in the form of a unitary assembly for substitution for the cushioning means employed in cars already in service or for use in new cars as they are being built.

A further object of the invention is to provide a package of this kind, which is of the variable friction type, and wherein the amount or magnitude of the friction applied is in direct ratio to the load and to the shocks applied to the car by reason of the irregularities in the rails over which the car travels.

The above mentioned objects of the invention, as well as others, along with the advantages thereof, will more fully appear as the specification proceeds.

In the drawings:

Fig. 1 is a view in elevation of the side frame of a railway truck, showing the improved spring package in place in the bolster opening thereof, between the associated bolster end and the bottom arch bar of the side frame.

Fig. 2 is a transverse vertical sectional view through the package, on a scale enlarged over that of Fig. 1, and as taken on the line 2—2 of Fig. 3.

Fig. 3 is another transverse vertical sectional view through the package, on the scale of Fig. 2 and as taken on the line 3—3 thereof.

Fig. 4 is a horizontal sectional view through the package on the scale of and as taken on the line 4—4 of Fig. 3.

Fig. 5 is a perspective view of a certain wedge member embodied in the improved package and which will be more fully referred to later.

Fig. 6 is a perspective view of a pair of friction shoes embodied in the improved package and which will be more fully referred to later.

Fig. 7 is a detail sectional view through one end of a shoe retaining member and associated spring end abutment member embodied in the improved package.

Fig. 8 is a view in end elevation of the members appearing in Fig. 7.

The improved spring package is a unitary assembly for use in the bolster opening of a railway car truck side frame and its purpose is to yieldingly support the associated bolster end from the bottom arch bar of said frame, in a manner controlling the vertical movement of said bolster end under the changing action of the supported load in the travel of the car. In general, the package includes upper and lower plates for engagement by and with the bolster end and bottom arch bar of the side frame respectively, and between said plates is a resilient cushioning means, usually in the form of four load supporting springs, one disposed at each of the four corners of the plates. Also between said plates is a mechanism for controlling the flexing action of said springs, in a manner evening out the relative movement of said plates upon application of and release of load imposed upon the package through the bolster.

2

Referring now to that embodiment of the invention illustrated in the drawings, the improved package includes a pair of upper and lower counterpart plates 10 and 11 respectively, each of which is of an elongated rectangular shape and of a width permitting its insertion into the bottom part of the bolster opening of the side frame of a railway car truck. Each plate, which is made of metal, has rounded corners and includes a marginal flange 12 that extends about the sides, the ends and the rounded corners of each plate. These plates are so arranged that the marginal flange of one plate faces the marginal flange of the other plate.

In the center line of each plate, in one direction thereof is a row of spaced openings. In the drawings the openings are numbered 13 in the plate in the upper position, and 14 in the plate below. The purpose of the openings will appear later. Between each of the four similar corners of said plates is located a resilient load supporting and cushioning means, preferably in the form of a helically coiled spring 15, the four springs being matched ones. On the center line of the inner face of each plate 10 and 11 are three sided bosses 16, each of which has a pair of curved surfaces 16a constituting arcs of the same radius as the inside of the rounded corners of the plate. These bosses, which best appear in Fig. 4, form stops for parts of the ends of the springs 15 and prevent them from shifting out of position from the corners of the plates 10 and 11 respectively.

Extending transversely of the upper face of the lower plate 11 is a wear plate 17, of such length that its ends substantially engage with portions of the flange 12 at opposite sides of the plate, in

the direction of the row of openings 14 therein and which said plate covers. The wear plate is provided along each side with an upstanding longitudinal flange 17a and said plate (including the flanges 17) is of such width as to fit within the space between the pair of bosses 16 of the plate, as best appears in Fig. 4.

20—20 indicates a pair of oppositely disposed, counterpart friction shoes forming part of the package and these shoes best appear in Fig. 6. Each shoe includes a flat and somewhat elongated base 21 and toward one end thereof is an upstanding body 22 having a width that approximates twice the width of the base. Thus, one-half of the body projects laterally from one side of the base, a distance approximating the width of the base. One face 23 of the body is flat and is disposed perpendicular to the base and the upper half 24 of the other face of said body is angled off to extend downwardly and outwardly from the top, toward the other end of the base. The upper half 24 of said other face is of a convexed formation, one-half of each face extending at a lateral obtuse angle from the center line thereof. In the face 23 of the body is a spring end receiving opening 25 and concentric therewith is a passageway 26 of smaller diameter that opens through the upper half 24 of the other face about midway between its top and bottom ends. Each passageway 26 includes oppositely arranged recesses 27—27 of a width less than the diameter of the associated passageway 26. The base of each shoe is of such width that when placed side by side, they will fit between the two side flanges 17a of the wear plate 17 so as to be guided in a relative straight line movement thereby.

In positioning the shoes in operative relation upon said wear plate, those faces thereof including the upper halves 24 are arranged to face each other and at this time the bases are disposed between the side flanges of the wear plate and one-half of the body of each shoe then overhangs the base of the other shoe. At this time the bottom faces of the bases of said shoes, which are flat, have a rubbing frictional engagement with the upper face of the wear plate, between the flanges 17a thereof.

Associated with the upper plate 10 is a wedge member 30 of substantially inverted triangular shape with its base 31 engaged with the under face of the top plate. The base of said wedge member is provided with a row of upstanding lugs 32 so spaced apart as to be engaged in the openings 13 of the top plate. This prevents shifting of the wedge member. Opposite sides 33 of the wedge are inclined downwardly and inwardly toward each other and are angularly complemental to the opposed face portions 24 of the shoes and with which they are constantly engaged. The faces of the sides 23 of the wedge are concaved cross sections to match the convexed cross sections of the shoe faces 24. With this arrangement of faces, they are enlarged in area without enlarging the width of the wedge or the shoe body and, at the same time, these faces hold the shoes and the wedge against lateral relative shifting.

The opposite sides of the wedge are connected together at a point below the base by a strut 35 and below said strut said sides have vertically disposed slots 36, which when the wedge is operatively disposed relatively to the shoes 20, line up with the passageways 26 and recess extensions thereof.

A bolt-like member 40 extends through the wedge slots 36 and passageways 26 in the shoes and has T-shaped end heads 41 thereon, produced by flattening the ends thereof and on each end of this member is a cup-like spring end receiving washer 42. Each washer has an opening 43 therein which matches the passageways 26 and recesses 27 in the shoe bodies 22. A helical spring 44 surrounds each end portion of the member 40 and each spring abuts at one end with a washer 42 and engages at its other end within a recess 25 in the associated shoe. The springs 44 normally act to yieldingly push or move the shoes toward each other. In the assembly package, the T-shaped heads of the member 40, stand crosswise of the openings 43 in the washers 42.

In Fig. 1 the improved package is shown in its operative position within the bolster opening 45 in the side frame 46 of a car truck. In this position, the package is disposed in the plane of the columns 47 of the side frame and the associated bolster end 48 is engaged upon the top plate 10 and the bottom plate 11 is engaged upon the bottom arch bar 49 of the side frame.

Assuming that the parts of the package, when it is disposed in the bolster opening, are in the position appearing in full lines in Fig. 2. At this time the load supporting springs are normal and not in compression, and the springs 44 though not in compression, are acting to urge the shoes 20—20 toward each other so that the angular surfaces 24 thereof are engaged with the angular surfaces on the sides 33 of the wedge 30. By reason of the angularity of said surfaces, the inward pressure of the springs also functions to urge the shoes downwardly so that the bottom surfaces of bases 21 of the shoes 20 have a good flat even frictional engagement with the top surface of the wear plate 17.

In the travel of the associated car, the bolster end 48 moves downwardly under load in the bolster opening. As said bolster end rests upon the top plate 10 of the package, the load imposed upon the top plate causes the plate to compress the load bearing springs 15 as said top plate moves toward the bottom plate 11.

In the downward movement of said top plate the wedge member 30 moves downwardly therewith and will push the shoes 20—20 relatively outwardly against the action of the springs 44. By reason of said springs, in connection with the action of the angled faces of the wedge and the bodies of the shoes, the bases of the shoes are pressed into a good firm frictional engagement with the coacting top surface of the wear plate. The relative position of the parts when the load bearing springs are in compression appears in dotted lines in Fig. 2.

Thus, the downward movement of the top plate in the compression of the load bearing springs is resisted not only by the frictional resistances of the bases of the shoes upon the wear plate but also by the frictional resistance offered by the engagement of the angular surfaces of the shoe bodies and the wedge respectively, and the resistance of the springs against compression.

Upon release of load, the load bearing springs will tend to expand and move the top plate upwardly toward its normal position. As the top plate moves upwardly, the wedge 30 moves with it, and at this time the springs 44 being released from load, expand and force the bodies of the shoes 20—20 toward each other. At this time, because of the angularity of the engaged surfaces

of the wedge and shoe bodies respectively, the shoes are held in good frictional engagement with the wear plate and the relative sliding between said angled surfaces of the wedge and shoe bodies is opposed by said springs to increase the frictional engagement therebetween. Thus, a good positive frictional snubbing action is afforded, whereby the harmonic action of the load bearing springs is evenly controlled in either direction of movement of the top plate, when being placed under load and when released from load.

By reason of the engaged angular, concavo-convexed surfaces of the shoe bodies **22** and the wedge **30**, the shoe may float as may be necessary, relatively to the wedge, but not to move laterally to such an extent as to become skewed. Also the bases of the shoes, being disposed between the flanges *17a* of the wear plate **17** are held for a guided straight line movement.

By reason of the structure described, the same will function equally as well in a position reversed from that appearing in Fig. 2. Thus should the package be inadvertently disposed in an upside-down position in the bolster opening of a car truck side frame, it will function just as well as if properly disposed with said opening as intended and that is with the plate **10** forming the top plate thereof.

Also, it is to be noted that the amount of friction applied for snubbing the action of the load bearing springs is in direct proportion to the load applied and in direct proportion to the release of load. In other words, the package acts to snub spring action in both directions.

While in describing the invention I have referred in detail to the form, arrangement and construction of the various parts thereof, the same is to be considered only in the illustrative sense and therefore I do not wish to be limited thereto except as may be specifically set forth in the appended claims.

I claim as my invention:

1. A spring package of the kind described and embodying therein upper and lower plate members, resilient cushioning members between said members, a horizontal wear plate carried by one of said members, shoes, each having an elongated horizontal base for frictional engagement with said wear plate and a portion perpendicular to said base, said bases being arranged with their inner surfaces facing each other, means on said wear plate providing guides for the outer sides of said bases, means carried by the other of said members and providing oppositely angled surfaces for frictional engagement with complemental surfaces on said perpendicular portions of said shoes and operative in the movement of said members toward each other, in the compression of said cushioning means under load for moving said shoes relatively in one direction upon and with their bases in frictional engagement with said wear plate, and resilient means opposing the movement of said shoes in said one direction, said resilient means operating in the movement of said plate members away from each other, upon release of load upon said cushioning means, for moving said shoes relatively in the other direction upon and with their bases in frictional engagement upon said wear plate.

2. A spring package of the kind described and embodying therein upper and lower plate members, resilient cushioning means between said members, a horizontal surface portion on one of said members, shoes, each having a horizontal surface for frictional engagement with said horizontal surface portion, said shoes also having angular faces arranged in opposition to each other, means carried by the other of said members and providing angularly disposed faces, opposed to and normally engaged with the angular faces of said shoes, and operative in the movement of said upper and lower plate members toward each other, in the compression of said cushioning means under load, for moving said shoes in one direction upon and in frictional engagement with said horizontal surface portion, resilient means located outside of and opposing the movement of said shoes in said one direction, and a member extending through parts of said shoes and a part of said means carried by the other of said members and through parts of said resilient means and operatively connecting them together as an assembly, said resilient means operating in the movement of said plate members away from each other, upon release of load upon said cushioning means, for moving said shoes relatively in the other direction upon and in frictional engagement with said horizontal surface portion.

3. A spring package of the kind described and embodying therein upper and lower plate members, resilient cushioning means between said members, a horizontal surface portion on one of said members, shoes, each having a horizontal surface for frictional engagement with said horizontal surface portion, each shoe having a downwardly and inwardly angled face and which faces are opposed to each other, a wedge member carried by the other of said plate members midway between said shoes and formed with angular faces complemental to and normally frictionally engaged with the angled faces of said shoes and operative in the movement of said plate members toward each other, in the compression of said cushioning means under load, for moving said shoes outwardly from each other upon and in frictional engagement with said horizontal surface portion, and resilient means opposing the outward movement of said shoes, said resilient means including a member extending through said shoes and said wedge and springs mounted on said member outside of but engaging said shoes, said resilient means operating in the movement of said plate members away from each other, upon release of load upon said cushioning means, for moving said shoes inwardly toward each other, upon and in frictional engagement with said horizontal surface portion.

4. A spring package of the kind described and embodying therein upper and lower plate members, resilient cushioning means between said members, a horizontal surface portion on one of said members, shoes, each having an elongated horizontal base for frictional engagement with said horizontal surface portion and a portion perpendicular to said base, with a part of said portion of each shoe overhanging the base of the other shoe, means carried by the other of said members and providing oppositely angled surfaces for frictional engagement with complemental surfaces on said perpendicular portions of said shoes and operative in the movement of said members toward each other, in the compression of said cushioning means under load, for moving said shoes relatively in one direction upon and with their bases in frictional engagement with said surface portion, and resilient means opposing the movement of said shoes in said one direction and which resilient means includes a rod-like element

passing through said perpendicular portions of said shoes and springs supported on said element and engaged with said portions of said shoes, said resilient means operating in the movement of said plate members away from each other upon release of load upon said cushioning means for moving said shoes relatively in the other direction upon and with their bases in frictional engagement with said surface portion.

5. A spring package of the kind described and embodying therein upper and lower plate members, resilient cushioning means between said members, a horizontal surface portion on one of said members, shoes, each having an elongated horizontal base for frictional engagement with said horizontal surface portion and a portion perpendicular to said base, with a part of said portion of each shoe overhanging the base of the other shoe, means carried by the other of said members and providing oppositely angled surfaces for frictional engagement with complemental surfaces on said perpendicular portions of said shoes and operative in the movement of said members toward each other, in the compression of said cushioning means under load, for moving said shoes relatively in one direction upon and with their bases in frictional engagement with said surface portion, and resilient means opposing the movement of said shoes in said one direction and which resilient means includes a rod-like element passing through said perpendicular portions of said shoes and springs supported on said element and engaged with said shoes, said resilient means operating in the movement of said plate members away from each other upon release of load upon said cushioning means, for moving said shoes relatively in the other direction upon and with their bases in frictional engagement with said surface portion, said means carried by said other of said plates having a slot-like opening therein for the passage therethrough of said rod-like element.

6. A spring package of the kind described and embodying therein upper and lower plate members, resilient cushioning means between said members, a horizontal surface portion on one of said members, shoes, each having a horizontal base and a perpendicular part, with the bases of said shoes arranged side by side and upon and in frictional engagement upon said horizontal surface portion, the perpendicular parts of said shoes, each overhanging the base of the other shoe, said shoes having oppositely facing angular surfaces, means carried by the other of said plate members and providing oppositely angled surfaces complemental to and having frictional engagement with said angular faces of the shoes and operative in the movement of said members toward each other in the compression of said cushioning means under load, for moving said shoes relatively in one direction upon their bases in frictional engagement with said surface portion, and resilient means opposing the movement of said shoes in said one direction and operating in the movement of said plate members away from each other, upon release of load upon said cushioning means, for moving said shoes relatively in the other direction upon and in frictional engagement with said horizontal surface portion.

7. A spring package of the kind described and embodying therein upper and lower generally rectangular plate members having four corners, cushioning springs disposed between the opposed four corners of said plate members, a horizontal surface portion on one of said plate members between said cushioning springs, a pair of shoes between said springs and each having an elongated base with a horizontal surface for frictional engagement with said surface portion and an upstanding portion which overhangs the base of the other shoe, means carried by the other of said plate members between said springs and providing oppositely angled surfaces for frictional engagement with complemental surfaces on the upstanding portion of said shoes and operative in the movement of said members toward each other in the compression of said cushioning springs under load for moving said shoes relatively in one direction upon and in frictional engagement with said horizontal surface portion, and resilient means opposing the movement of said shoes in said direction, said resilient means operating in the movement of said plate members away from each other upon release of load upon said springs for moving said shoes relatively in the other direction upon and in frictional engagement with said surface portion.

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