June 22, 1937. E. G. GOODWIN 2,084,637

RAILWAY SNUBBING DEVICE

Filed April 2, 1934 2 Sheets-Sheet 1

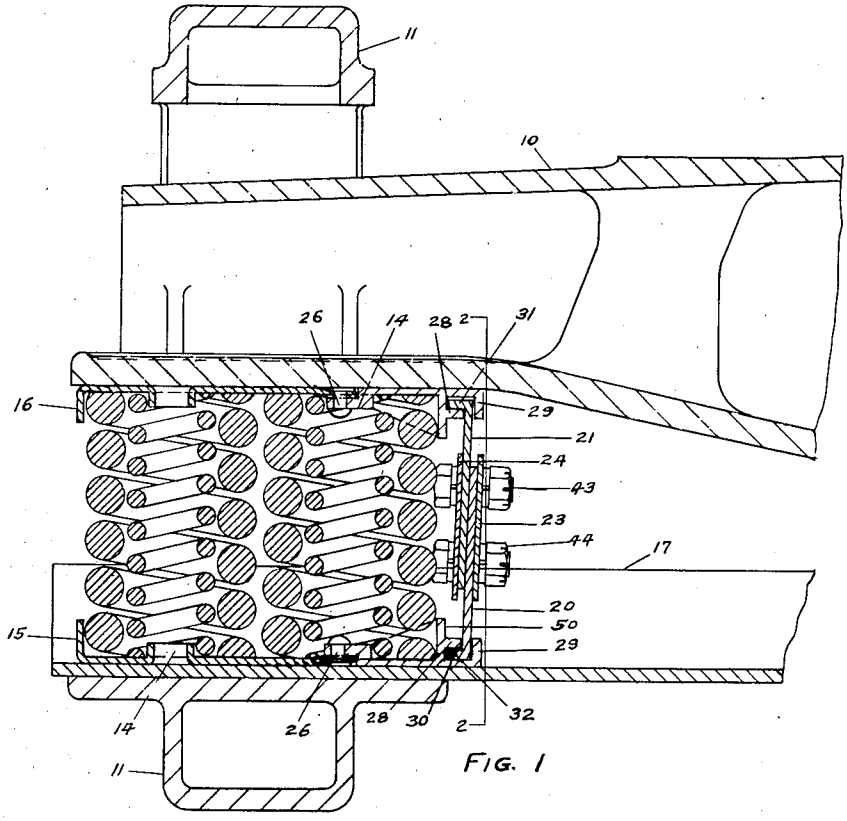


FIG. 1

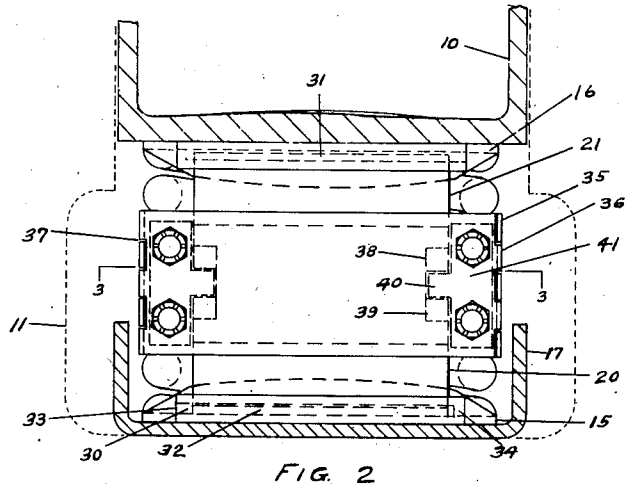


FIG. 2

INVENTOR.
E. G. GOODWIN
BY H. H. Snelling
ATTORNEY.

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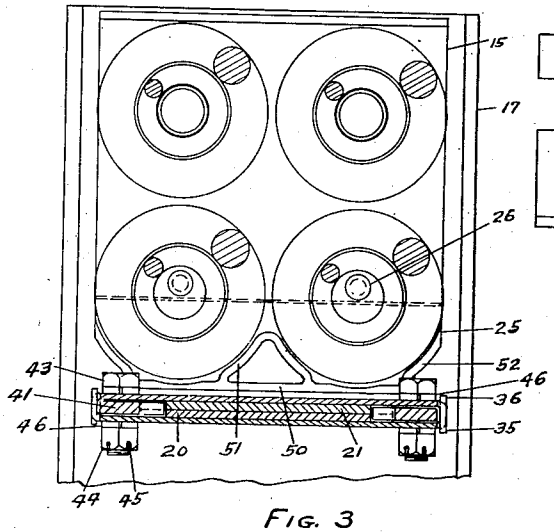


FIG. 3

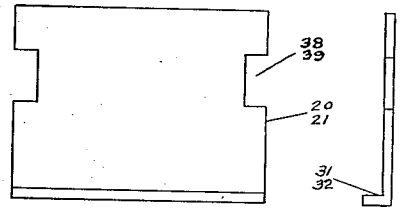


FIG. 4

FIG. 4a

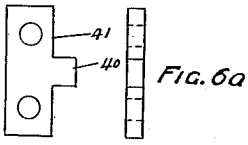


FIG. 6a

FIG. 6

FIG 5a

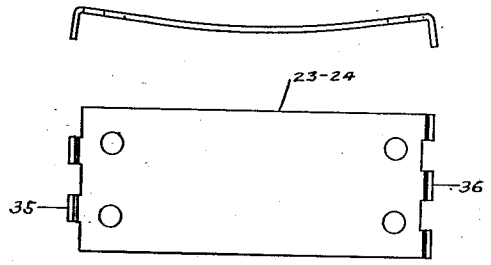


FIG. 5

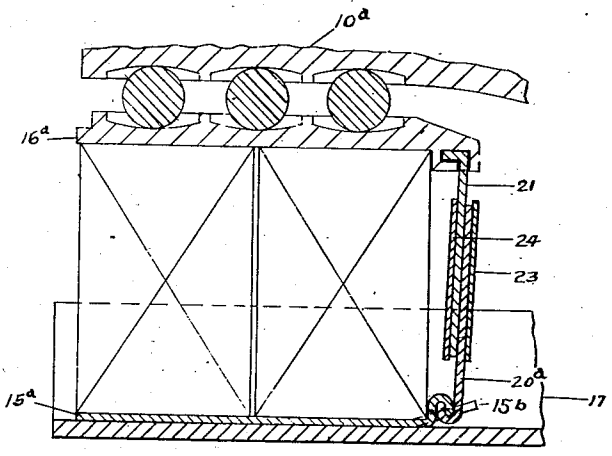


FIG. 8

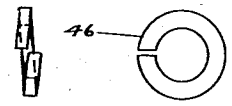


FIG. 7

FIG. 7a

INVENTOR
E. G. GOODWIN
BY H. H. Snelling
ATTORNEY

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2,084,637

RAILWAY SNUBBING DEVICE

Ernest G. Goodwin, Pelham, N. Y., assignor to Graham-White Sander Corporation, Roanoke, Va., a corporation of Virginia

Application April 2, 1934, Serial No. 718,700

27 Claims. (Cl. 267—9)

This invention relates to railway snubbers and has for its primary purpose the provision of a simple and efficient snubber that can be applied to present day equipment or car trucks without alteration of either the bolster, frame, or the spring plank.

A further object of the invention is to provide a railway snubber having large friction areas with low unit pressure. A still further and important feature of the present invention is the provision of a stabilizer or snubbing device in which there is no wear on the snubber until the bolster and side frame have moved with respect to each other to such an extent that snubbing is desirable. In this manner the life of the snubber is materially lengthened and its riding qualities improved since there is no frictional wear on the snubber during normal vibrations of the springs.

A further object of the invention is the provision of a snubber having two degrees of snubbing action, creating friction between two surfaces during the first period of travel of the snubber units and doubling the friction after a predetermined movement.

A still further object of the invention is to provide a snubber permitting lateral and torsional movement of the bolster with reference to the side frames and spring plank.

The railways are appreciating fully the desirability of snubbing car spring action and a number of efficient stabilizing devices are available to the market except for the fact that some of these devices require replacing of equipment or are in one way or another very expensive which in the present depression makes their use almost prohibitive. The problem at the present time is to provide snubbing without sacrifice of existing equipment in perfect condition. To this end is the present invention directed although it is also readily applicable to new cars with standard parts. The simplicity of the present device lends itself readily to use in substantially any existing car and the pieces of the present device may be obtained at low cost of high grade material since no machining is required and the friction surfaces of the four major elements are used exactly as purchased.

In the drawings:—

Figure 1 is a sectional elevation of the stabilizer looking longitudinally of the car and showing the spring plank, bolster and the two near springs in cross section.

Figure 2 is a vertical section on the lines 2—2 of Figure 1.

Figure 3 is a horizontal section on line 3—3 of Figure 2.

Figures 4 and 4ª are views of a friction plate.

Figures 5 and 5ª are views of a spring friction plate.

Figures 6 and 6ª are views of a plate retainer.

Figures 7 and 7ª are views of a spring washer.

Figure 8 shows a modified form of the snubbing device in combination with a common lateral motion device.

The bolster 10 is supported on the side frame 11 by a nest of springs centered about bosses such as 14 projecting upwardly or downwardly from the spring plates 15 and 16, the latter engaging the bolster while the former rests upon the usual spring plank 17. In the present invention the bolster 10, the side frame 11 and the spring plank 17 are not altered but I prefer to modify the spring plates 15 and 16 as will later be described.

Positioned inward of the nest of springs on each truck, but not necessarily so, is a lower friction plate 20 engaging identical upper friction plate 21. These two friction plates are held resiliently in contact with each other by means of spring friction plates 23 and 24 preferably identical and exerting pressure against the two friction plates thruout their entire area of contact.

The connection between the friction plates 20 and 21 and the retaining devices on the bolster and the spring plank respectively, is a loose one in order that either or preferably both of these members can move an appreciable distance without causing the two friction plates to rub against each other. In this manner the springs may expand and compress thru small distances without any snubbing effect whatsoever and consequently without any rubbing or wear on the two friction plates. The connection is preferably sufficiently loose to permit the bolster to have as much freedom of motion for small disturbances as if the snubber were absent, that is, the bolster not only may have freedom of motion in a horizontal plane but also may freely turn a certain amount about its own longitudinal axis without operatively disturbing the friction plates or it may turn a certain amount about its transverse axis without bringing the snubber into play. The torsional movement will be termed an angling movement when referring to such movement of the bolster with respect to the plates and the same term will be used to indicate the slight rotating movement of the plates in their own planes about either the bolster or spring plank. The connection is hinge-like in that it permits limited pivotal movement of the plates about the axis of the

grooves. While I could form an entirely new spring plate either cast or wrought it is my preference to use a two-piece plate part cast and part wrought, by using a casting **25** secured to a pressed steel portion as by the bolts **26** positioned within, but not necessarily centrally of, the spring boss, such construction interfering in no manner with the positioning of the springs of the nest. The casting **25** has an inside inturned flange **28** and an inwardly positioned proximate angular flange **29** providing a lengthwise slot **30** in which is received the outwardly turned lip **31** of the upper friction plate **21** or the outwardly turned similar lip **32** of the lower friction plate **20**.

Referring now to Figure 2, it will be noted that the slot **30** is open at one end such as **33** and is closed at the other end as at **34**, the open ends of the two spring plates being on opposite sides, for example, in this figure the open end in the top spring plate is at the right while the open end in the bottom spring plate is at the left, thus insuring against excess lateral displacement of the snubbing assembly.

The spring friction plates **23** and **24** each have a plurality of right angularly bent fingers such as **35** and **36** here indicated as three on one end of each plate and two on the other, these fingers being spaced with respect to each other when assembled as indicated by the numeral **37** as to allow an appreciable amount of relative movement in an up and down direction.

Each of the two side plates has a rectangular opening in each side numbered **38** and **39** respectively, which are not in registry but are offset with each other providing a bay into which projects the lug **40** of the retaining plate **41** which is considerably thicker than either of the friction plates but is thinner than both together as can best be seen in Figure 3. The two spring friction plates are secured together with the retaining member **41** between them by means of a bolt **43**, its castle nut **44** held in place by the pin **45** and by spring washers **46** preferably of considerable strength but the connection is a yielding one and in addition the diameter of the bolt stem is appreciably less than the holes thru which it passes so as to provide clearance in order that the two spring friction plates may move with respect to each other. The lug **40** passing into the bay formed by the two recesses **38** and **39** limits relative movement of the friction plates with respect to the encasing spring friction plates which, as will be noted from Figure 7, are of bowed form when free in order that the pressure exerted by bolting the two plates together shall be exerted over the entire frictional area, the nuts **44** being turned to such a degree as best to accomplish this purpose.

In practice I find it advisable to build the rib **51** in the form shown in Figure 3 following close to the lines of the outer springs and I also provide marginal ribs **52** to cooperate with the central rib **51** to strengthen and support the upstanding portion **50** of the angular flange **29** so as to avoid danger of breaking this flange.

In operation the bolster moves up and down without causing any movement of the snubbing assembly until such time as the free movement reaches the chosen limit. At such time the inturned ends engage the car spring plate and the two plates **20** and **21** engage each other with frictional sliding contact but without sliding against the spring friction plates **23** and **24**, friction plate **20** and spring friction plate **23** also friction plate **21** and spring friction plate **24** moving as two units. When however, the amount of movement of the bolster is greater than necessary to take up the clearance between the spring friction plates the interlocking fingers **35** and **36** are engaged and any further movement of the bolster causes friction not only between the two friction plates but also between one or the other or both of the friction plates and the proximate spring friction plate. As the bolster moves in the opposite direction the snubbing action is first between the friction plates and then all the plates as before. Since an active snubber is not only unnecessary but actually harmful at non-critical car speeds it is desirable to provide a snubber that functions only during critical speeds or where the passing of rail joints and the period of vertical spring oscillation are the same time intervals. This form of snubber thus has two advantages over the continuous type, better riding at non-critical speeds and the elimination of snubber wear, the latter of considerable importance for dry friction surfaces especially since a high percentage of unnecessary movement is prevented.

In Figure 8 I show a modified form of means for connecting the friction plates to the spring seats or plates **15a** and **16a**. The plate **20a** is provided with hook-like members for engaging similar members on the spring seat **15a** which are raised from the plank **17** appreciably to provide for the vertical play of the plate **20a**; one or two lugs **15b** may be provided on the spring plate **15a** to prevent lateral relative displacement of the plates **15a** and **20a**. The spring seat **16a** is in the form of a common type used to provide lateral motion for the bolster.

It is apparent that means other than the spring seats may be used to connect the friction plates to the bolster and to the plank and the claims are intended to cover broadly any expedient for making this connection.

In some of the claims I refer to the snubber as consisting of telescopic links which terminology is believed to be quite apt since each plate in effect consists of a link which telescopes into the link composed of the opposite friction plate and the spring plates.

What I claim is:

1. An assembly for use in a snubber, comprising a pair of friction plates having surface contact and a pair of spring holding plates connected to move together and receiving between them the two friction plates, retaining means loosely interlocking the four plates so that as the two friction plates are moved, with respect to each other, the frictional sliding engagement will be between the friction plates only for a chosen amount and this will be followed, upon additional movement of the friction plates, by frictional sliding engagement between the two plates and one or both of the spring steel plates.

2. A one-piece spring plate with flanges characterized by having an undercut groove along one edge for non-rigidity attaching a spring snubber.

3. An article of manufacture comprising a spring plate for snubbers and lateral motion devices and having grooves on one surface for accommodating anti-friction members, the other surface being flat for engaging supporting springs and having in the latter surface an undercut groove for loosely receiving the flanged edge of the plate of a snubbing member said undercut groove being parallel to said bearing grooves.

4. A spring cap for a nest of springs in a car

truck comprising a plate having a plurality of ribs and flanges on one side for engaging a plurality of springs and a thickened portion extending substantially across the plate, said portion having an undercut groove therein for receiving a snubbing device.

5. A spring cap for a nest of springs in a car truck comprising a plate having on one side retaining means for coil springs, an upright flange extending substantially across the plate and a second flange T-shaped in cross section adjacent said flange and cooperating therewith to form an undercut groove for receiving a connecting device, said spring retaining means including a plurality of spring engaging ribs integral with one of said flanges to strengthen the plate at the grooved portion.

6. The device of claim 4 in which said groove is open at one end and means are provided on the plate for preventing the snubbing device from slipping thru the groove and out the other end.

7. The device of claim 5 in which said groove is closed at one end.

8. In a railway car truck having a spring plank and a spring supported bolster thereon, means engaging the bolster for retaining the upper portion of the springs, similar means engaging the plank for retaining the lower portion of said springs, and flanged telescopic links connecting said means, both of said means having undercut grooves for loosely receiving and retaining the flanged ends of said links.

9. The device of claim 8 in which said grooves are closed on one end and the closed end of the groove in the first mentioned means is above the open end of the groove in the second mentioned means whereby the flanged ends of the links are prevented from working out of the grooves.

10. A non-load-carrying snubbing device for railway cars having sprung and unsprung parts, said device comprising a pair of friction plate members having engaging vertical surfaces, one of said members having a loose connection with the sprung part and the other member having a similar connection with the unsprung part and spring means for holding said members in frictional engagement, said connections having play between the engaging parts whereby to permit a hinging action and to permit free angling movement of the sprung part with respect to the snubbing device and to permit further free movement of the sprung part and the snubbing device with respect to the unsprung part.

11. A non-load-carrying snubbing unit for railway cars adapted to be inserted between the bolster and spring plank, said unit comprising a pair of identical interchangeable spring cap members to be substituted for the upper and lower spring caps found on the usual coil spring nest in car trucks, a pair of identical interchangeable friction members removably connected to the respective spring cap members to be supported thereby and means for resiliently holding said friction members in friction engagement, said holding means being carried by the friction members and said connection being loose to permit a certain amount of free non-snubbed universal movement of the bolster with respect to the truck, said cap members and friction members being freely disconnectable when disassociated from a truck.

12. The device of claim 11 in which said connecting means includes undercut grooves in certain of said members, and includes means on the cooperating members for loosely engaging in said grooves.

13. The device of claim 11 in which said connecting means includes grooves in said cap members and beaded or flanged edges on said friction members loosely engaging in said grooves.

14. A spring cap comprising two overlapping parts one of cast metal and one of pressed metal, bosses on said cap for engaging and retaining springs and means within certain of the bosses for securing the cast portion to the pressed portion, one of said portions having a groove therein of substantially L-shape in cross section for loosely receiving the flanged edge of a snubbing plate.

15. A one-piece spring seat for car trucks comprising a plate having spring retaining means on one side and having on the same side an undercut groove for non-rigidly attaching a spring snubbing plate.

16. A spring cap for a nest of springs in a car truck comprising a plate having means on one side for centering and retaining a plurality of springs and having on the same side an elongated undercut groove for receiving the flanged edge of a snubbing plate, said groove adapted to be parallel with the planes of the car truck wheels when the cap is in operative position.

17. An assembly for use in a snubber for railway car trucks having a bolster member and a spring plank member comprising an even number of friction plates adapted to be loosely suspended vertically between said members, means including an even number of spring plates for holding said friction plates in snubbing engagement with each other, each of said spring plates engaging one of said friction plates, said spring plates in their normal disassembled condition having a surface curvature different from that of the friction plates, and said means including a bolt for drawing the spring plates into substantially the same shape as the friction plates whereby the area of contact is a maximum, half of said friction plates adapted to be connected with one of said members and the other half of said friction plates adapted to be connected to the other member, said holding means connecting said spring plates to move together whereby relative movement of the friction plates causes movement of the spring plates with respect to the friction plates.

18. The combination with a side frame and a bolster resiliently supported thereon by spring means, of a spring seat on the side frame, a friction link member loosely carried by said seat and having an interlocking tongue and groove connection therewith, a spring seat on the bolster and a friction link member carried by said bolster spring seat and having a loose interlocking tongue and groove connection therewith, said link members having a frictional telescopic engagement.

19. In a car truck having a side frame and a bolster resiliently supported thereon by spring means, the combination of a snubber retaining device carried by the side frame and held in place by said spring means, a second snubber retaining device held in engagement with the bolster by said spring means, two frictionally engaged friction plates respectively connected to said retaining devices, means for resiliently maintaining said frictional engagement, said connections between the retaining devices and friction plates being loose to permit angling and delayed movement of the snubber plates with respect to the retaining devices and means on the side

frame preventing disconnection of the snubbing plates from the retaining devices.

20. In a car truck having a side frame and a bolster resiliently supported thereon by spring means, the combination of a snubber retaining device carried by the side frame, a second snubber retaining device adapted to move with the bolster as the spring means contract and expand, two frictionally engaged friction plates respectively connected to said retaining devices, and means including a plate of spring steel for resiliently maintaining said frictional engagement, said connections between the retaining devices and friction plates being loose to permit angling and delayed movement of the snubber plates with respect to the retaining devices, and said steel plate being frictionally engaged by one of said friction plates.

21. In a car truck having a side frame and a bolster resiliently supported thereon by spring means, the combination of a snubber retaining device carried by the side frame, a second snubber retaining device adapted to move with the bolster as the spring means contract and expand, two frictionally engaged friction plates respectively connected to said retaining devices and means including a plate of spring steel for resiliently maintaining said frictional engagement, said connections between the retaining devices and friction plates being loose to permit angling and delayed movement of the snubber plates with respect to the retaining devices, and said steel plate before assembly with the friction plates being normally bowed.

22. In a car truck having a side frame and a bolster resiliently supported thereon by spring means, the combination of a snubber retaining device carried by the side frame, a second snubber retaining device adapted to move with the bolster as the spring means contract and expand, two frictionally engaged friction plates respectively connected to said retaining devices and means including two loosely interlocked plates of spring steel held sprung out of their normal shape and into frictional contact with the respective friction plates for resiliently maintaining said frictional engagement.

23. In a car truck having a side frame and a bolster resiliently supported thereon by spring means, the combination of a snubber retaining device carried by the side frame, a second snubber retaining device adapted to move with the bolster as the spring means contract and expand, two frictionally engaged friction plates respectively connected to said retaining devices, two interlocked plates of spring steel respectively engaging said friction plates, the disassembled shape of said steel plates being different from that of the friction plates, and resilient means for drawing the steel plates into substantially the same shape as the friction plates for maintaining said friction plates in contact and to bring the steel plates into maximum frictional engagement with the friction plates.

24. An assembly for use in a snubber, comprising a pair of friction plates having surface contact and a pair of spring holding plates connected to move together and receiving between them the two friction plates, the connection being loose thereby providing play so that the two spring holding plates may move a limited amount with respect to each other.

25. The combination with a car truck having sprung and unsprung parts and springs supporting the sprung part on the unsprung part, of friction snubbing means for damping the movement of the sprung part only after the springs have been compressed or expanded a chosen distance while permitting free undamped movement of the sprung part in a horizontal plane, said means consisting of a pair of frictionally engaging telescopic links loosely connected to said parts whereby having limited freedom of motion horizontally and vertically with respect to the parts, and means on the unsprung part acting to maintain said connections.

26. A snubber assembly comprising a pair of relatively movable cooperating friction plates, a pair of spaced spring plates receiving between them said friction plates and each having a friction surface which when the snubber is disassembled is different from that of the surface on the proximate friction plate, and means springing said spring plates to bring the unlike surfaces into contact substantially over their entire proximate surfaces, said means causing said spring plates to move as a unit and with respect to either of said friction plates during the relative movement of the friction plates, and means on each friction plate for supporting the assembly.

27. The device of claim 26 in which said spring plates in their disassembled state are substantially cylindrical, said friction plates are substantially flat and said means comprise bolts for drawing said spring plates against the friction plates thruout their proximate areas whereby the pressure between the friction plates is approximately the same over all the contact area.

ERNEST G. GOODWIN.