Aug. 29, 1944. F. E. BACHMAN 2,356,742

SPRING GROUP

Filed Aug. 21, 1941 4 Sheets-Sheet 1

Fig. 1.

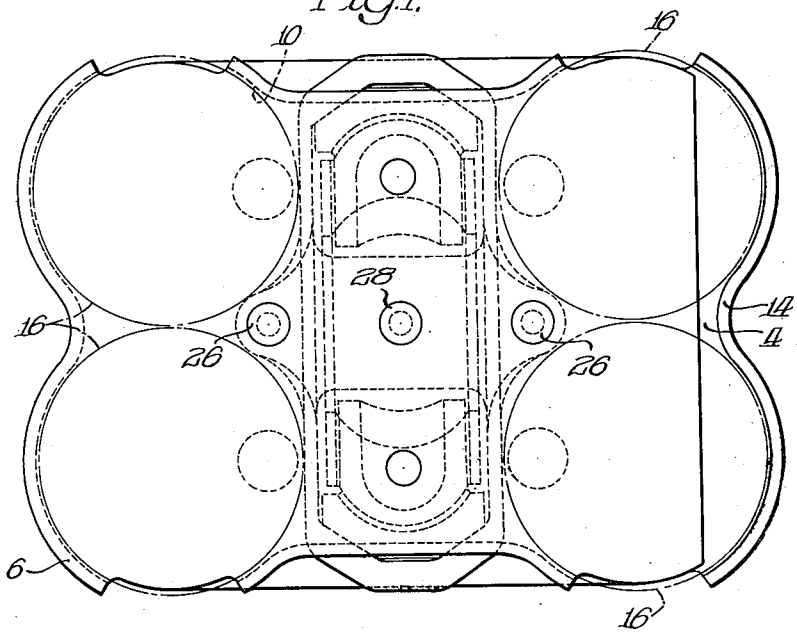
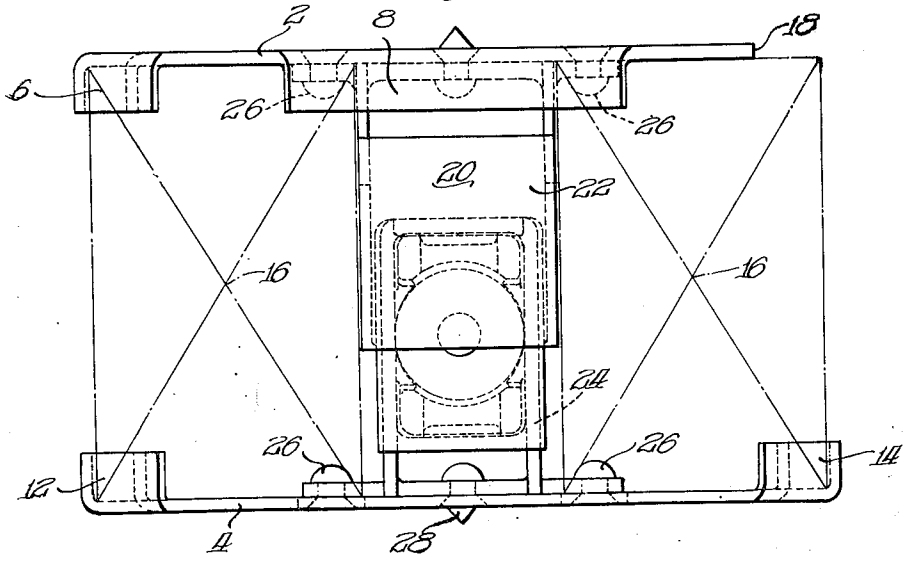


Fig. 2.



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Aug. 29, 1944. F. E. BACHMAN 2,356,742

SPRING GROUP

Filed Aug. 21, 1941 4 Sheets-Sheet 2

Fig. 3

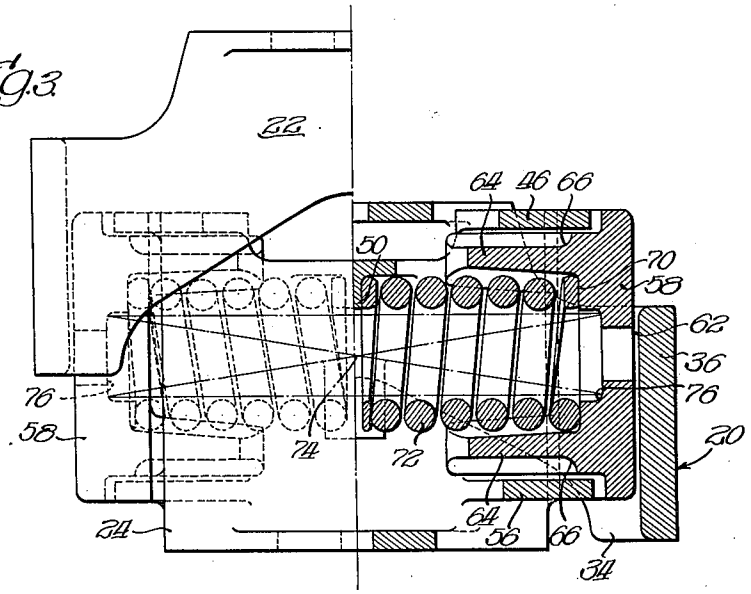


Fig. 4.

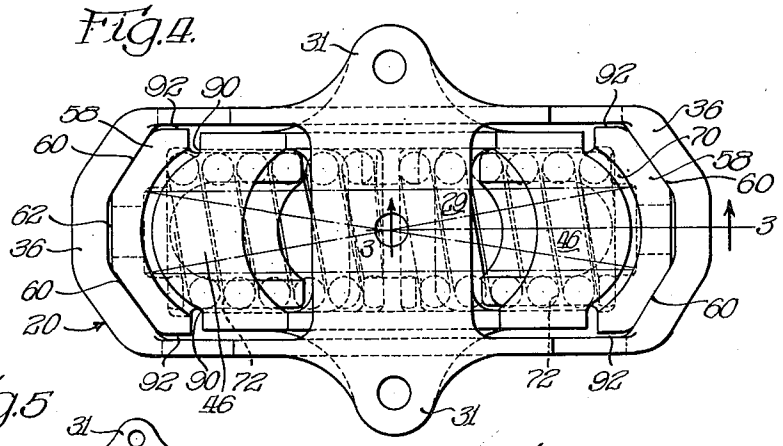


Fig. 5

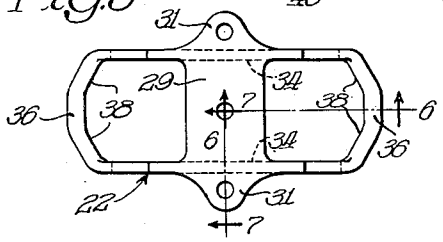


Fig. 6.

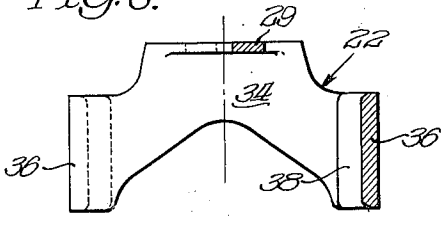
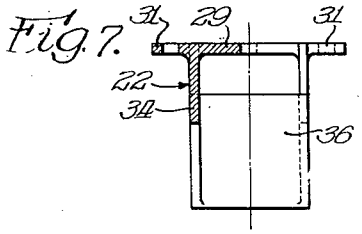


Fig. 7.



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Aug. 29, 1944. F. E. BACHMAN 2,356,742

SPRING GROUP

Filed Aug. 21, 1941 4 Sheets-Sheet 3

Fig. 8.

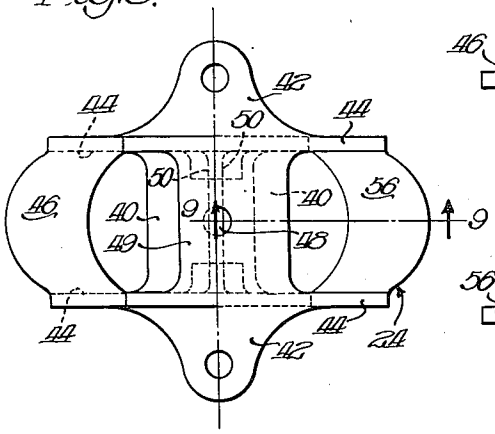


Fig. 9.

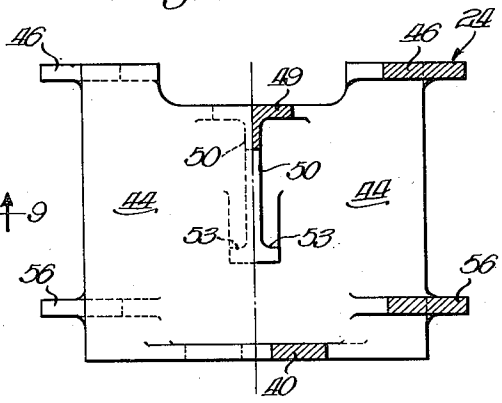


Fig. 10.

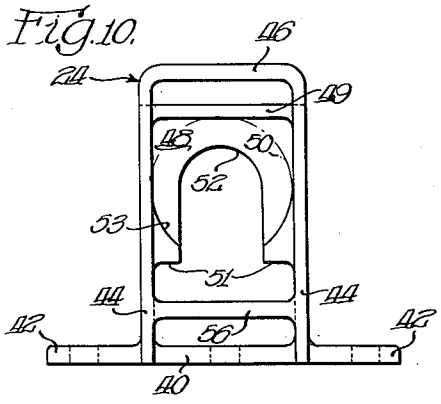


Fig. 11.

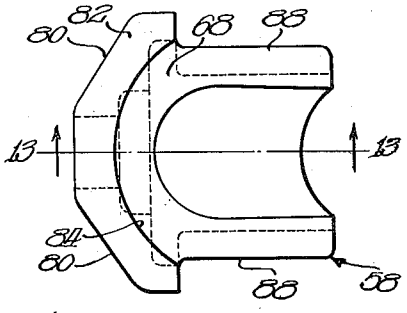


Fig. 12.

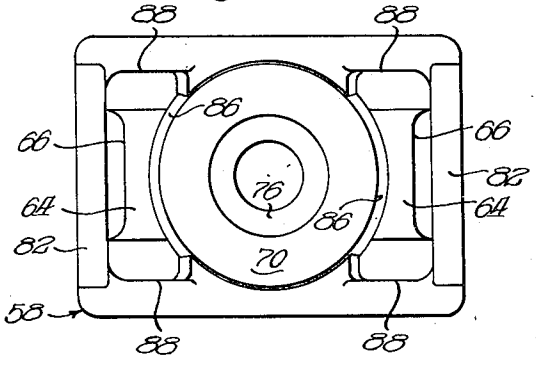
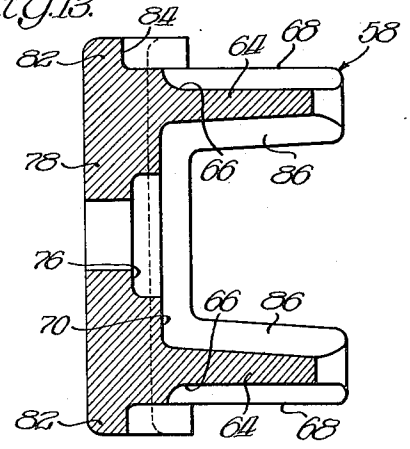


Fig. 13.



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Aug. 29, 1944. F. E. BACHMAN 2,356,742

SPRING GROUP

Filed Aug. 21, 1941 4 Sheets-Sheet 4

Fig. 14.

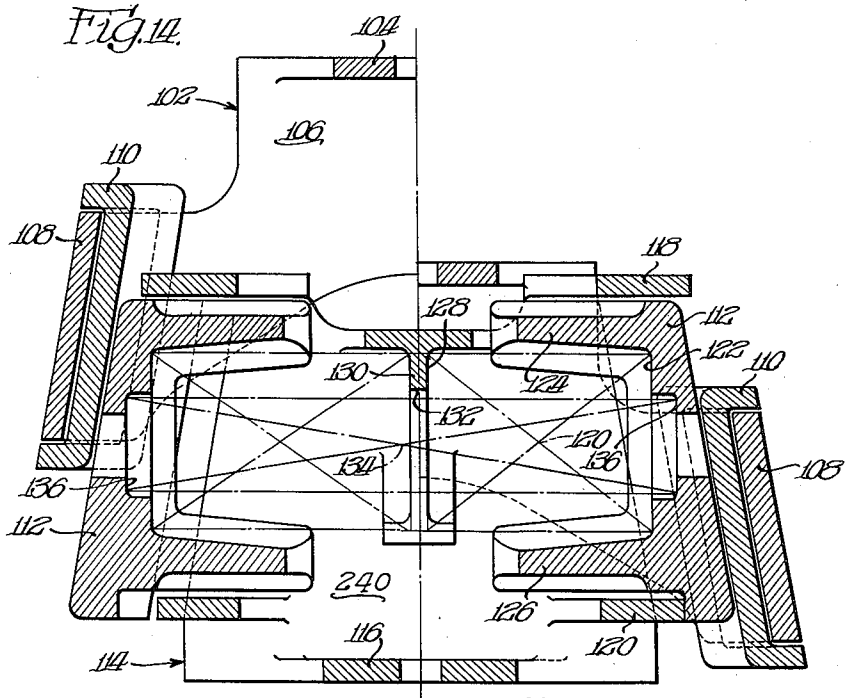
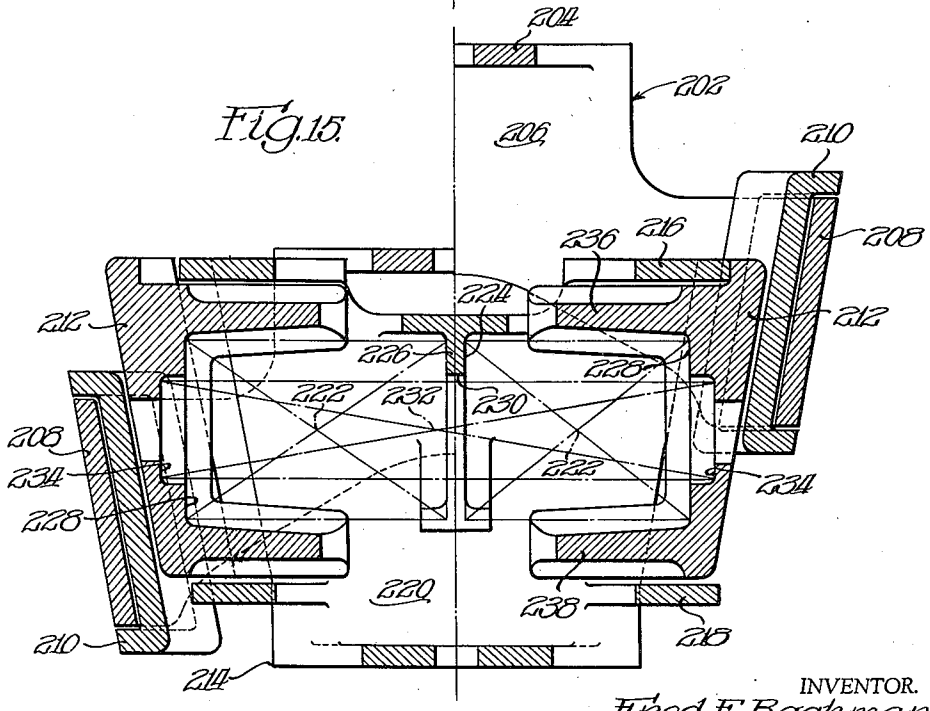


Fig. 15.



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Patented Aug. 29, 1944 2,356,742

UNITED STATES PATENT OFFICE

2,356,742

SPRING GROUP

Fred E. Bachman, Chicago, Ill., assignor to American Steel Foundries, Chicago, Ill., a corporation of New Jersey

Application August 21, 1941, Serial No. 407,704

24 Claims. (Cl. 267—9)

My invention relates to a spring group or ride control assembly for use in a railway car truck and more particularly to a type which utilizes a plurality of coil springs in conjunction with a friction absorbing device sometimes designated a snubber.

The general object of my invention is to devise an eminently practicable form of such spring group wherein the respective followers of the friction device may be secured to the top and bottom spring plates with the friction device in parallel relationship with a plurality of coil springs used therewith, and said device having such a form as to permit the smooth development of friction on both the compression stroke and the release stroke or if desired to permit a greater friction on either.

In one modification I have set forth an arrangement wherein the friction increases throughout the entire compression stroke; in another modification I have set forth an arrangement wherein a greater amount of friction may be developed on the release stroke; and in the principal modification I have shown an arrangement wherein equal friction will be developed on both the compression and release strokes.

A specific object of my device is to form a spring group comprising a friction device with a top follower of box-like form having friction faces at opposite ends thereof, each friction face comprising a plurality of spaced surfaces diagonally arranged with respect to each other; said device also comprising a bottom follower in telescopic arrangement with said top follower together with friction shoes interposed between said followers at opposite ends thereof, with said followers and shoes being so constructed as to permit the association therewith of a plurality of compression springs, certain of which may operate independently with respective shoes and certain of which may have engagement with both shoes.

A different object of my invention is to devise such an arrangement as that just described wherein all or a portion of said compression springs may be utilized depending upon the character and amount of friction desired to be developed.

My invention also contemplates such a spring group as that described wherein a compression spring may be independently associated with a friction shoe at each end of the friction device and another compression spring may be telescoped with said first-mentioned springs and have engagement with the friction shoes at both ends of the device.

My invention also comprehends an arrangement wherein all the compression springs will be under substantially constant stress throughout the stroke and therefore may readily be adapted to the development of a particular amount of friction depending upon the application desired to be made.

At the same time, my device readily adapts itself to modifications wherein varying amounts of friction may be developed on the up and down strokes as may be desired and as shown in certain modifications herewith.

In the drawings, Figure 1 is a top plan view of a spring group incorporating my invention and Figure 2 is a side elevation thereof taken from the right as seen in Figure 1.

Figure 3 is a detailed showing of my novel form of friction absorbing device utilized in the spring group shown in Figures 1 and 2, the left half of Figure 3 being shown in elevation and the right half thereof in section with the section taken substantially in the vertical plane bisecting the device longitudinally and as indicated by the line 3, 3 of Figure 4, the section being taken through the device as closed and the elevation at the left of Figure 3 being shown with the device opened.

Figure 4 is a top plan view of the form of friction device shown in Figure 3.

Figure 5 is a plan view of my novel form of outer housing.

Figure 6 is a side elevation thereof half in section, the section being taken in the vertical plane bisecting the housing longitudinally and substantially in the plane indicated by the line 6, 6 of Figure 5; and Figure 7 is an end view half in section, the section being taken substantially in the vertical plane bisecting the housing transversely and as indicated by the line 7, 7 of Figure 5.

Figures 8, 9, and 10 show in detail my novel form of inner housing, Figure 8 being a plan view thereof, the left half showing the top plan and the right half the bottom plan, Figure 9 being a side elevation half in section, the section being taken substantially in the longitudinal vertical plane bisecting the device and as indicated by the line 9, 9 of Figure 8, and Figure 10 being an end view thereof.

Figures 11, 12, and 13 show the detail of my novel form of friction shoe, Figure 11 being a top plan thereof, Figure 12 being an end view thereof, the view being taken from the right as

seen in Figure 11, and Figure 13 a section through the vertical plane bisecting the shoe at its middle and substantially as indicated by the line 13, 13 of Figure 11.

Figure 14 shows a modified form of my novel friction device wherein a greater amount of friction is developed on the down stroke or compression stroke, and Figure 15 shows a further modification wherein the amount of friction developed decreases from a maximum at the beginning of the downward stroke to a minimum at the finish of the downward stroke. The structures shown in Figures 14 and 15 are substantially the converse of each other as may be readily understood by those skilled in the art.

Describing the structure in detail and referring first to the modification illustrated in Figures 1 and 2, my novel spring group or control unit comprises the top spring plate 2 and the bottom plate 4, said top spring plate having at the outboard end thereof, the downturned end flange 6 and at opposite sides thereof, the downturned flanges 8 and 10, and said bottom plate having the upturned end flanges 12 and 14, said end flanges likewise having scallop form to accommodate positioning of the coil springs diagrammatically indicated at 16, 16. The inboard end of the spring plate is cut away as at 18 to accommodate the tapering portion of the bolster commonly used in freight car trucks in which the spring group is particularly adapted for use. Centrally positioned between the coil springs 16, 16 at opposite ends of the spring group is the friction device or snubber generally designated 20, said snubber 20 comprising the top follower 22 and the bottom follower 24 riveted as at 26, 26 to the top and bottom spring plates respectively. The centrally positioned rivets may be formed with outwardly projecting lugs 28, 28 serving as auxiliary positioning means for the spring group.

My novel form of friction device or snubber is shown in the assembly views of Figures 3 and 4, and various details thereof are illustrated in Figures 5 to 13 inclusive. As aforesaid the friction device generally designated 20 comprises the top follower or outer housing 22 and the bottom follower or inner housing 24 in telescoping relationship with each other, said top follower having a generally box-like form with the central base plate 29 (Figures 5 to 7) with the lateral ears 31, 31 for the securing rivets already referred to, said base plate being integrally formed with the side walls 34, 34 and the end walls 36, 36. The side walls 34, 34 have a general V-shape form in order to give depth and accommodate play between the top and the bottom followers while at the same time reducing weight by eliminating the top corner and permitting more ready inspection. The opposite sides of each wall 36 are formed with the diagonally arranged flat spaced friction surfaces 38, 38, said surfaces being vertically arranged in this modification in order that constant friction may be developed on both the up and down or compression and release strokes.

The bottom follower or inner housing generally designated 24 is shown in detail in Figures 8, 9, and 10 and takes the form of a skeletal framework of box-like shape comprising the bottom wall 40 with the laterally projecting lugs or ears 42, 42 serving as means for securing said follower to the associated spring plate. The spaced side walls 44, 44 at the upper portion of the casting are formed with the transversely arranged top webs 46, 46 at opposite ends of the structure and downwardly offset therefrom the transverse central wall 48 with the top web 49, said wall terminating at 51, 51 (Figure 10) and being relieved as at 53 to define the spring seat 50 partially surrounding the central slot 52 of inverted U-shape. The structure comprises also the intermediately positioned transverse walls 56, 56 at opposite ends thereof, and each of the walls 46 and 56 are of arcuate form in plan as best seen in the view of Figure 8, the converse outer edges thereof conveniently accommodating the friction shoes 58, 58 (Figure 4) which are carried by the bottom follower for reciprocal motion with respect to the top follower.

In the assembly views of Figures 3 and 4, it will be noted that the top follower 22 and the bottom follower 24 are in telescoping relationship with each other and that the bottom follower 24 serves as a carrier for the friction shoes 58, 58 at opposite ends of the device, said friction shoes being hereafter described in detail and comprising spaced vertically arranged flat friction surfaces having engagement as at 60, 60 (Figure 4) with the before-mentioned friction surfaces 38, 38 which are complementary thereto. The friction shoes 58, 58 have sufficient clearance as at 62 (Figure 4), from the end wall 36 of the top follower to accommodate wear of the shoe, and to permit definite alignment of the spaced friction surfaces. Each friction shoe 58 is formed with spaced top and bottom walls 64, 64 relieved as at 66, 66 and having at their outer surfaces U-shaped bearing areas 68, 68 for abutment with the transverse webs 46 and 56 of the bottom follower, said webs thus affording carrier means for said shoes. The inner face of each friction shoe 58 affords a seat as at 70 for a main spring 72, the opposite end of which may seat as at 50 against the central transverse wall 48 of the bottom follower, said spring 72 thus urging the friction shoe 58 outwardly against the before-mentioned friction surfaces 38, 38 of the top follower or housing. Under certain conditions, it may be desirable to utilize an auxiliary coil spring diagrammatically designated 74 (Figure 3), said auxiliary spring 74 extending through the before-mentioned slot 52 in the wall 48 and having its opposite ends seated as at 76, 76 against the respective friction shoes at opposite ends of the device.

It may be noted that the springs 72 and 74 are in this modification compressed an equal amount throughout the stroke of the snubber as will be apparent from a consideration of the right and left portions of Figure 3 wherein the device is respectively shown open and compressed.

The detail of each friction shoe 58 is shown in Figures 11, 12, and 13. Each shoe 58 is somewhat U-shape in section and comprises the heavy vertical end wall 78 with diagonally arranged friction surfaces 80, 80 at opposite sides thereof, said friction surfaces being formed on angles complementary to the angles of the before-mentioned friction surfaces 38, 38 formed on the outer housing against which they abut. The wall 78 is made relatively thick and heavy in order to accommodate wear thereof in use. The top and bottom walls 64, 64 are relieved as at 66, 66 as already indicated to reduce weight, and the end wall 78 is formed with top and bottom flanges 82, 82 the inner edges of which are arcuate in form as indicated at 84 for convenient association with the edges of the trans-

verse webs 46 and 56 on the bottom housing or follower, said web serving as carrier means for the friction shoe. The top and bottom walls 64, 64 have arcuate inner faces 86, 86 to accommodate the associated spring 72, and the inner face of the wall 78 affords a seat as at 70 for the spring 72 and a seat as at 76 for the auxiliary spring 74. The lateral edges of the walls 64, 64 may be formed flat and smooth as at 88, 88 for bearing against the enclosing side walls 44, 44 of the bottom follower, the relative position of said side walls and the edges of said shoes being most clearly seen at 90, 90 in the plan view of Figure 4. In Figure 4 it may also be noted how clearance is afforded at 92, 92 between the lateral edges of the friction shoes and the side walls of the top follower in order to permit a degree of accommodation of the shoes to the friction surfaces against which they seat.

The modification shown in Figure 14 is generally similar to that just described with a difference that the friction surfaces on the top follower are formed as removable shoes and the friction surfaces thereon are diagonally arranged for engagement with complementary surfaces formed on the friction shoes carried by the bottom follower. In this modification of Figure 14, the top follower 102 comprises the top wall 104, the side wall 106, and the end walls 108, 108, said end walls being diagonally arranged and forming with the side walls a yoke-like structure on which may be carried friction shoes 110, 110 for frictional engagement along diagonally arranged flat faces formed at opposite sides of the shoes 110 with complementary surfaces formed at opposite sides of the friction shoes 112, 112, the connection of the engaging surfaces being similar to those described for the previous modification except that they are diagonally arranged. Each of the friction shoes 112 is carried by the bottom follower generally designated 114, said bottom follower comprising the base or bottom wall 116 serving as a seat for the device, being generally similar to the bottom follower described for the previous modification and comprising the spaced transverse walls 118 and 120 adjacent the top and bottom thereof and serving together with the side walls 240, 240 as positioning means for the shoes 112. Associated with each friction shoe 112 is a main compression spring diagrammatically indicated at 120, one end of said spring having abutment as at 122 with the back wall of the friction shoe between the top and bottom walls 124 and 126 thereof, the opposite end of the spring 120 being seated as at 128 against the central transverse wall 130 of the bottom follower. The wall 130 is slotted at 132 as in previous modifications to accommodate the auxiliary spring diagrammatically indicated at 134, the opposite ends of which may seat as at 136, 136 against the friction shoes at opposite ends of the device.

The modification shown in Figure 15 is similar to that of Figure 14 except that the friction surfaces are reversely arranged so that maximum resistance occurs at the top of the stroke instead of at the bottom thereof. This will be apparent from a comparison of the views of Figures 14 and 15. It may be noted in Figure 14 the compression spring 120 at the right of the figure is under full compression where the device is shown closed, whereas in Figure 15 the corresponding compression spring is shown under maximum compression when the device is open.

In the modification of Figure 15, the top follower 202 has the transverse top wall 204, and the side walls 206, 206 forming with the diagonally arranged transverse end walls 208, 208 a yoke-like structure on which may be removably supported friction shoes 210, 210 in an arrangement similar to that of the arrangement in the modification of Figure 14. Flat friction surfaces are formed at opposite sides of each friction shoe 210 for engagement with complementary surfaces on the adjacent shoe 212, said shoe 212 being actuated by the bottom follower generally designated 214 and positioned with respect to said bottom follower by means of upper and lower transverse webs 216 and 218 and the side walls 220, 220 of said follower. Associated with each friction shoe 212 is a compression spring diagrammatically indicated at 222, the inner end of said spring being seated as at 224 against the central transverse wall or web 226 of the bottom follower and the opposite end of the spring 222 being seated as at 228 against the back wall of the shoe 212. The central transverse wall 226 may be cut away as at 230 as in the previous modifications to accommodate an auxiliary spring diagrammatically indicated at 232, opposite ends of which may seat as at 234, 234 against the friction shoes at opposite ends of the device. In this modification as in previous modifications, the compression springs may be positioned between the top and bottom walls 236 and 238 of each friction shoe 212, said walls being arcuately formed to accommodate said springs.

It will thus be apparent that in the modifications illustrated, I have shown my novel friction device as arranged to develop a substantially constant friction through a normal stroke or to develop a maximum friction at the bottom on the top of each stroke, as shown under varying conditions. Each modification also will accommodate a single compression spring associated with each friction shoe as well as an auxiliary compression spring which may be associated with both shoes or a plurality thereof.

It is to be understood that I do not wish to be limited by the exact embodiments of the device shown which are merely by way of illustration and not limitation as various and other forms of the device will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a spring group for a railway car truck, top and bottom spring plates, coil springs between said plates at opposite ends thereof, and a friction device between said coil springs with spaced followers secured respectively to said plates, one of said followers having a yoke-like portion with spaced friction surfaces at opposite ends thereof, and the other of said followers being telescoped within said yoke portion and supporting therein friction shoes for engagement with the friction surfaces at opposite ends of said yoke portion, and resilient means urging said shoes into engagement with said surfaces, the friction surfaces at opposite ends of said device being tapered to afford a maximum development of friction at one end of the stroke and a minimum at the opposite end thereof.

2. In a spring group for a railway car truck, top and bottom spring plates, coil springs between said plates at opposite ends thereof, and a friction device between said coil springs with spaced followers secured respectively to said plates, one of said followers having a yoke-like portion with spaced friction surfaces at opposite ends there-

of, and the other of said followers being telescoped within said yoke portion and supporting therein friction shoes for engagement with the friction surfaces at opposite ends of said yoke portion, and resilient means urging said shoes into engagement with said surfaces, said resilient means comprising a coil spring associated with each friction shoe and another coil spring associated with both of said shoes.

3. In a spring group for a railway car truck, top and bottom spring plates, coil springs between said plates at opposite ends thereof, and a friction device between said coil springs with spaced followers secured respectively to said plates, one of said followers having a yoke-like portion with spaced friction surfaces at opposite ends thereof, and the other of said followers being telescoped within said yoke portion and supporting therein friction shoes for engagement with the friction surfaces at opposite ends of said yoke portion, and resilient means urging said shoes into engagement with said surfaces.

4. In a spring group, spaced spring plates, a coil spring therebetween and a friction device in parallel with said coil spring with spaced followers secured respectively to said plates, one of said followers having spaced diagonally arranged friction panels at opposite ends thereof, and the other of said followers supporting friction shoes for slidable engagement with said panels, and resilient means within said last-mentioned follower urging said shoes into engagement with said panels respectively, certain of said resilient means independently actuating respective shoes, and the other of said resilient means being operative against both of said shoes.

5. In a ride control device comprising top and bottom follower plates, a coil spring, and a friction device having spaced followers fixed to said plates respectively, one of said followers having spaced diagonally arranged friction surfaces at opposite ends thereof, the other of said followers supporting friction shoes for engagement therewith, and spring means housed in said last-mentioned follower urging said shoes into engagement with said surfaces, certain of said spring means independently actuating respective shoes and other of said spring means being compressed between said shoes.

6. In a ride control group having a coil spring, a friction device comprising telescoped followers, securing means for said followers, the inner of said followers forming a carrier for spaced friction shoes having engagement with friction surfaces on the outer of said followers, coil springs housed within said inner follower and associated with said shoes respectively urging them into engagement with said surfaces, and another coil spring extending through said first-mentioned coil springs for engagement with both of said shoes.

7. In a spring assembly, top and bottom follower plates, a coil spring therebetween, and a friction device with spaced followers secured to said plates respectively, one of said followers having a yoke-like member partially housing the other of said followers, friction shoes mounted on said other follower for engagement with opposite ends of said yoke member, and resilient means urging said shoes into engagement therewith, certain of said resilient means independently actuating respective shoes and another thereof actuating both of said shoes.

8. In a spring group, a friction device comprising telescoped followers, one of said followers having a yoke-like portion with friction surfaces supported at opposite ends thereof, the other of said followers carrying friction shoes for engagement with said surfaces, and resilient means within said last-mentioned follower urging said shoes into engagement with said surfaces, certain of said resilient means independently actuating respective shoes and the other of said resilient means actuating both of said shoes.

9. In a spring group, a snubber having spaced telescoped followers, one of said followers supporting friction shoes for engagement with spaced friction surfaces on the other of said followers, and resilient means urging said shoes into engagement with said surfaces, said surfaces at opposite ends of the device being reversely tapered to afford maximum compression of said resilient means at one end of the stroke and minimum compression at the opposite end, certain of said resilient means independently actuating respective shoes and other of said resilient means actuating both of said shoes.

10. In a spring group, spaced spring plates, a coil spring therebetween and a friction device in parallel with said coil spring with spaced followers secured respectively to said plates, one of said followers having spaced diagonally arranged friction panels at opposite ends thereof, and the other of said followers supporting friction shoes for slidable engagement with said panels, and resilient means within said last-mentioned follower urging said shoes into engagement with said panels respectively.

11. In a ride control device comprising top and bottom follower plates, a coil spring therebetween and a friction device having spaced followers of yoke-like form fixed to said plates respectively, one of said followers having spaced diagonally arranged friction surfaces at opposite ends thereof, the other of said followers supporting friction shoes for engagement therewith, and spring means housed in said last-mentioned follower urging said shoes into engagement with said surfaces, certain of said spring means being compressed between said shoes and other of said spring means being compressed between respective shoes and a wall of one of said followers.

12. In a ride control group having a coil spring, a friction device comprising telescoped followers of yoke-like form, securing means for said followers, the inner of said followers forming a carrier for spaced friction shoes having engagement with friction surfaces on the outer of said followers, and a coil spring extending between said shoes urging them into engagement with said friction surfaces, said inner follower having a vertical wall affording seats for other springs independently actuating respective shoes.

13. In a ride control group having a coil spring, a friction device comprising telescoped followers of yoke-like form, securing means for said followers, the inner of said followers forming a carrier for spaced friction shoes having engagement with friction surfaces on the outer of said followers, and coil springs housed within said inner follower and independently actuating respective shoes.

14. In a spring assembly, top and bottom follower plates, a coil spring therebetween, a friction device having top and bottom followers of yoke-like form in telescoping relationship, one of said followers supporting friction shoes for engagement with friction surfaces at respective ends of said other follower, and resilient means housed within said followers and actuating said

shoes, said top follower having a top wall affording a seat for said device and being spaced from said end walls with openings therebetween to accommodate reciprocal movement of said bottom follower.

15. In a friction device follower, a box-like structure having spaced horizontal walls at opposite ends thereof for support of associated friction shoes, and a central transverse vertical wall affording spring seats for springs associated with said shoes respectively, said vertical wall having a slot therein for an associated spring having engagement with both of said shoes.

16. In a friction device follower, a box-like structure having spaced horizontal walls at opposite ends thereof for support of associated friction shoes, and a central transverse vertical wall affording spring seats for springs associated with said shoes respectively, said last-mentioned wall having an opening therethrough for a spring associated with both of said shoes.

17. In a friction device follower, an elongated box-like structure having at opposite ends thereof spaced walls affording support for friction shoes and a transverse wall forming seats for springs associated with said shoes respectively, said transverse wall having an opening for a supplemental spring telescoped within said first-mentioned springs for engagement with both of said shoes.

18. In a spring group, a snubber having spaced telescoped followers, one of said followers supporting friction shoes for engagement with spaced friction surfaces on the other of said followers, and resilient means urging said shoes into engagement with said surfaces, said surfaces at opposite ends of the device being reversely tapered to afford maximum compression of said resilient means at one end of the stroke and minimum compression at the opposite end, certain of said resilient means independently actuating respective shoes and other of said resilient means actuating both of said shoes, said last-mentioned resilient means extending through said other resilient means.

19. In a ride control group having a coil spring, a friction device comprising telescoped followers of yoke-like form, securing means for said followers, the inner of said followers forming a carrier for spaced friction shoes having engagement with friction surfaces on the outer of said followers, spaced coil springs housed within said inner follower and independently actuating respective shoes, and another coil spring actuating both of said shoes.

20. In a ride control group having a coil spring, a friction device comprising telescoped followers of yoke-like form, securing means for said followers, the inner of said followers forming a carrier for spaced friction shoes having engagement with friction surfaces on the outer of said followers, spaced coil springs housed within said inner follower and independently actuating respective shoes, and another coil spring actuating both of said shoes, said last-mentioned coil spring being centrally disposed with respect to said first-mentioned coil springs.

21. In a spring assembly, top and bottom follower plates, a coil spring therebetween, a friction device having spaced followers of yoke-like form in telescoping relationship, one of said followers supporting friction shoes for engagement with friction surfaces at respective ends of said other follower, and resilient means housed within said followers and actuating said shoes, certain of said resilient means independently actuating respective shoes and other of said resilient means actuating both of said shoes.

22. A friction device comprising telescoping rigid followers, diagonally arranged friction surfaces at opposite ends of one of said followers, a friction shoe supported at each end of the other of said followers in engagement with respective surfaces, certain resilient means directly compressed between said shoes and in engagement therewith, and other resilient means compressed between each shoe and a wall of one of said followers.

23. In a spring group, top and bottom plates, a coil spring and a friction device in parallel therebetween, said device having top and bottom followers secured to said plates respectively, one of said followers presenting V-shaped tapering internal friction surfaces, and the other of said followers housing friction shoes for engagement with said surfaces respectively, and resilient means asociated with each shoe operative to urge it into engagement with the adjacent friction surface.

24. In a spring group, top and bottom plates, a coil spring and a friction device confined therebetween, said friction device comprising a top follower, with V-shaped tapering internal friction faces on the end walls thereof, a bottom follower housing friction shoes for engagement with said walls, and resilient means compressed between each shoe and said bottom follower urging said shoe into engagement with the adjacent friction wall.

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