M7157 OR 2,370,107 Examiner

Feb. 20, 1945. D. M. LIGHT ET AL 2,370,107

SPRING GROUP

Filed Dec. 15, 1941 3 Sheets-Sheet 1

Fig. 1.

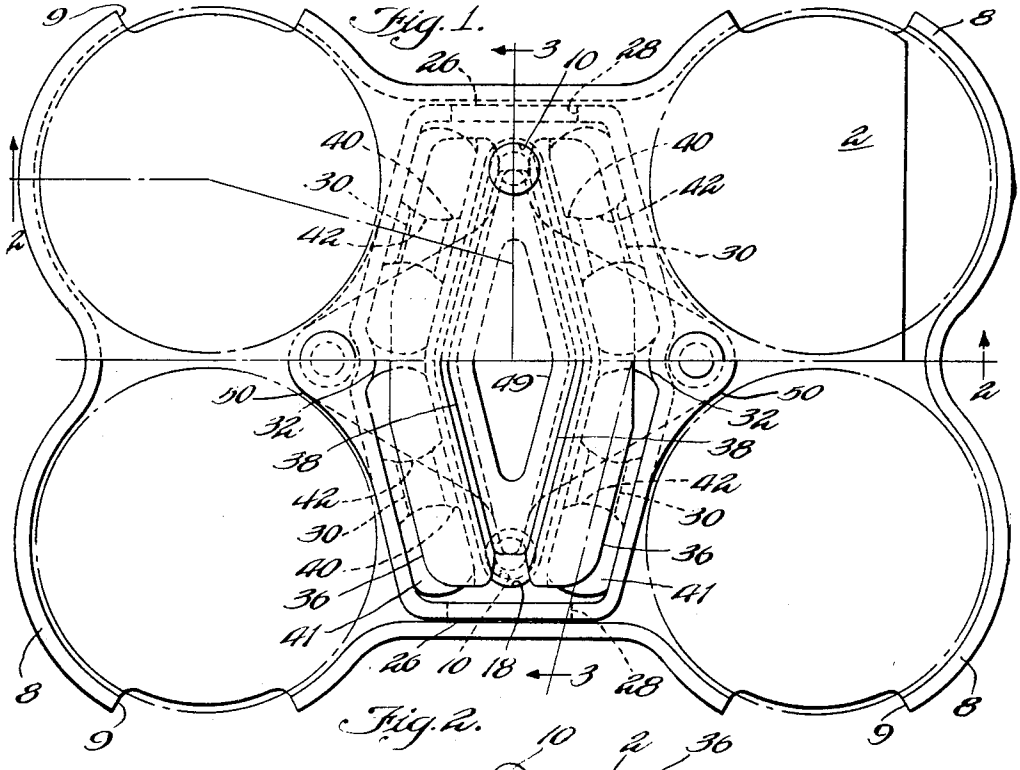
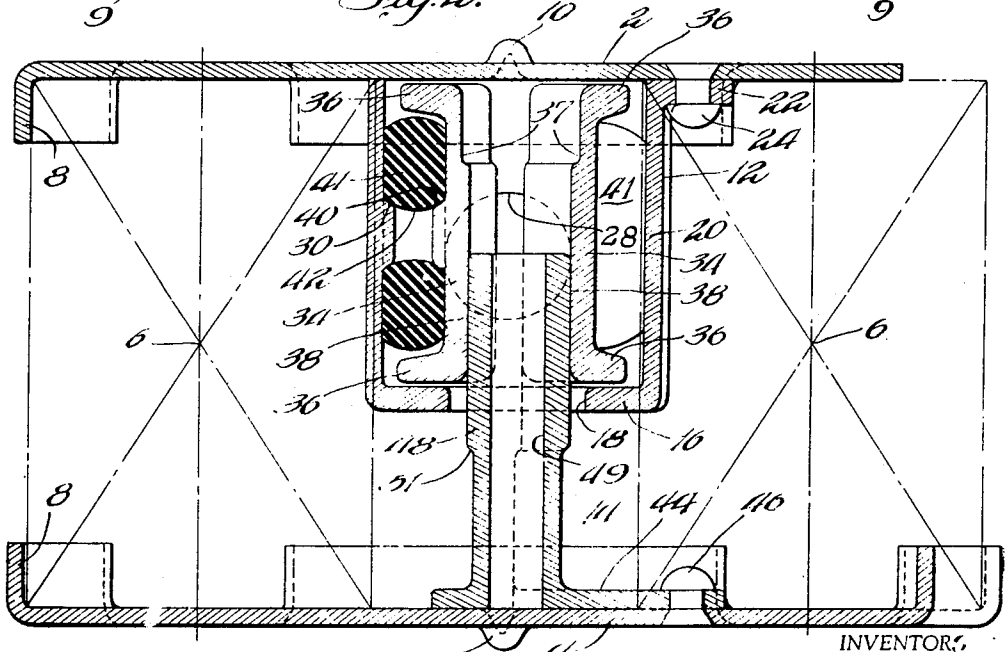


Fig. 2.



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Filed Dec. 15, 1941 3 Sheets-Sheet 2

Fig. 4.

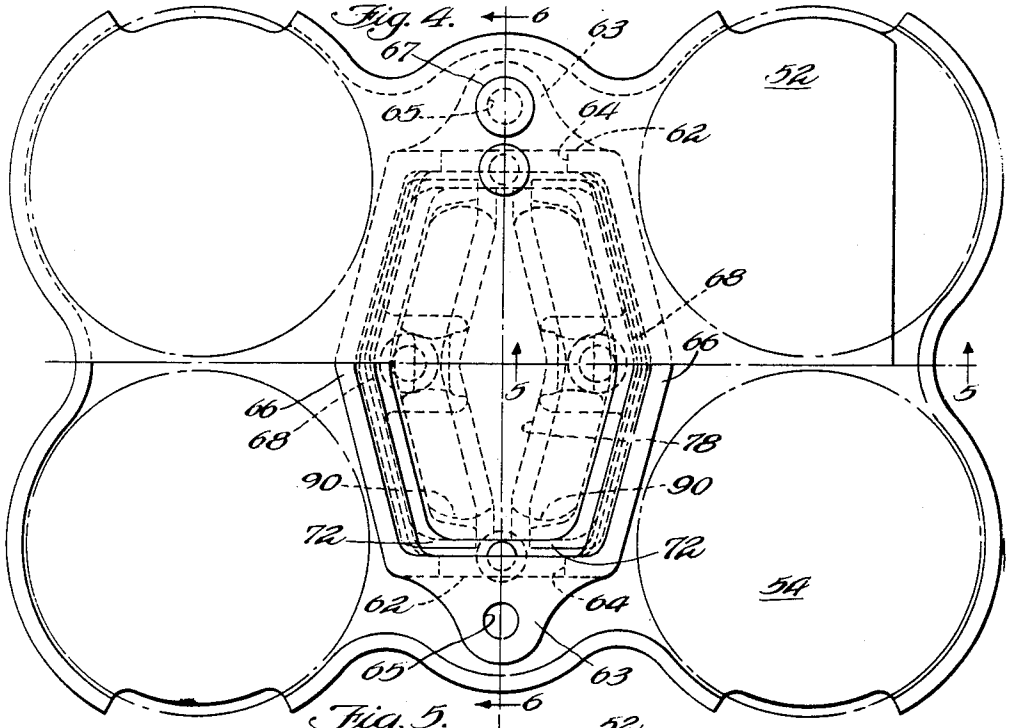
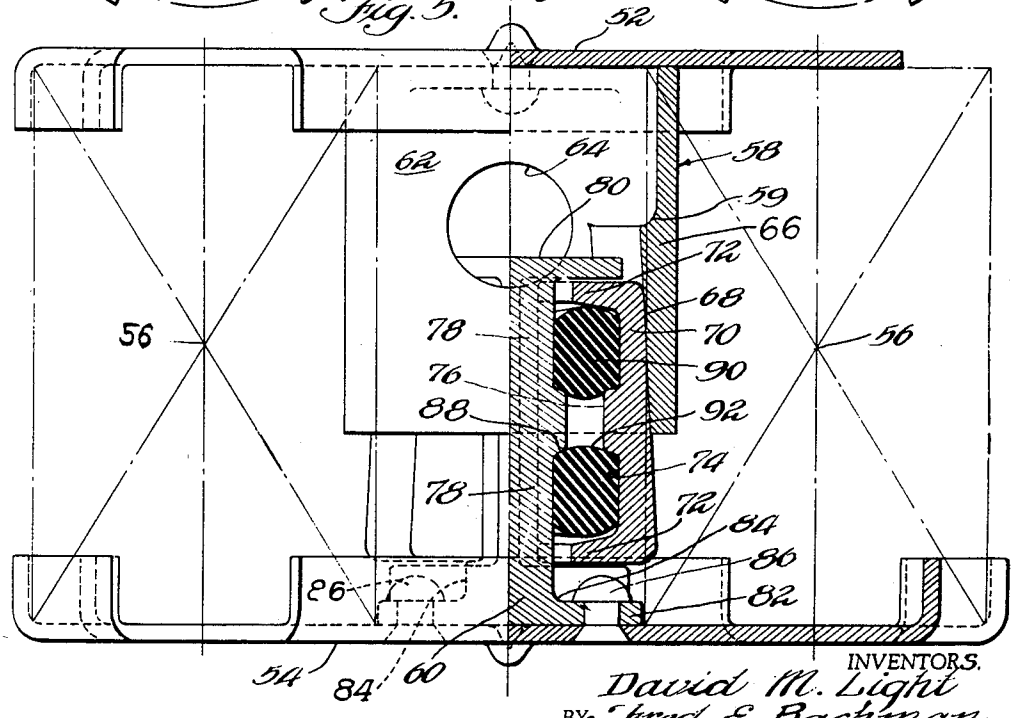


Fig. 5.



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Filed Dec. 15, 1941 3 Sheets-Sheet 3

Fig. 3.

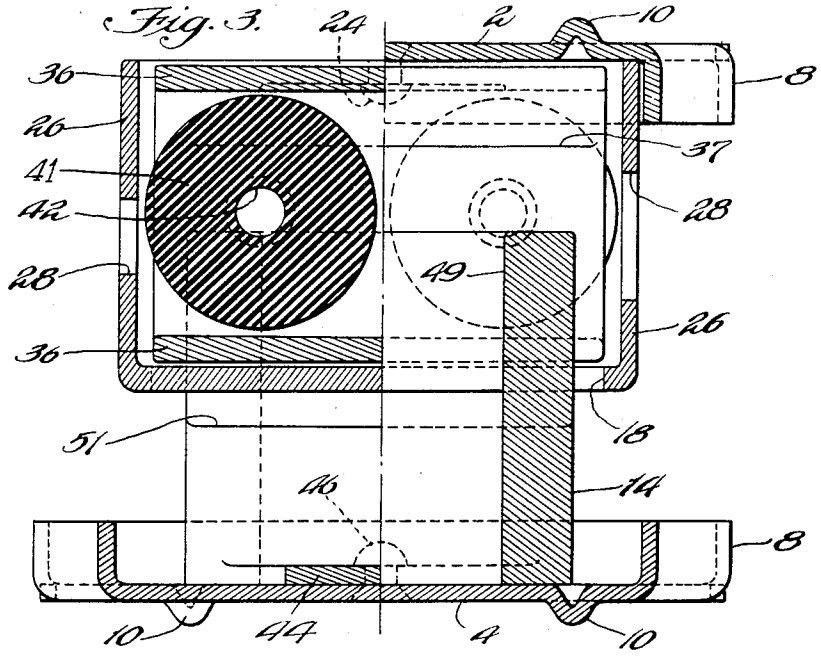
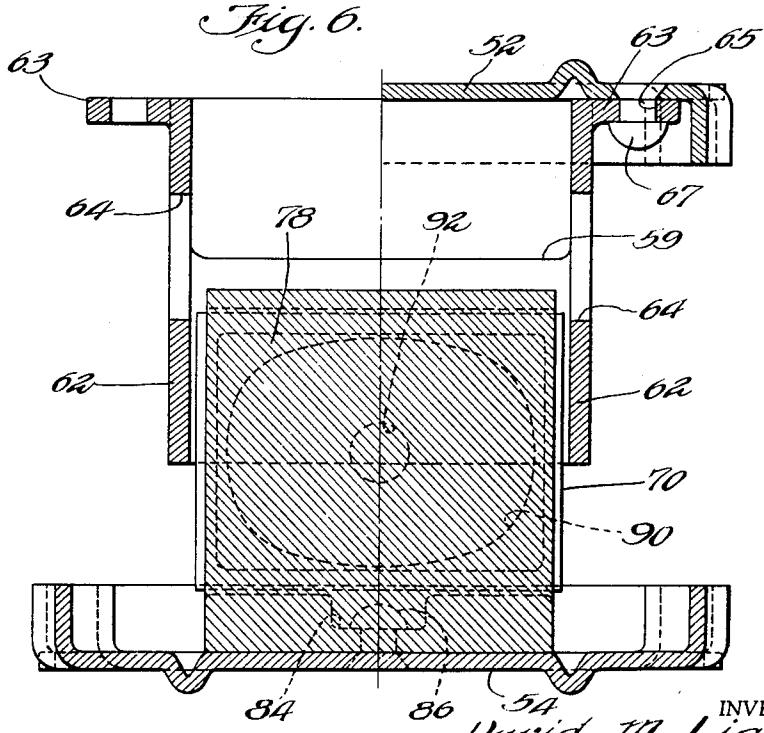


Fig. 6.



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Patented Feb. 20, 1945 2,370,107

UNITED STATES PATENT OFFICE

2,370,107

SPRING GROUP

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Application December 15, 1941, Serial No. 422,944

19 Claims. (Cl. 267—9)

Our invention relates to spring groups as usually utilized in railway car trucks and more particularly to such a structure wherein a plurality of coil springs may be utilized in conjunction with a snubbing means or friction absorbing device, such a combination sometimes being designated a ride control group.

The general object of our invention is to devise such a spring group capable of convenient assembling or dismantling and suitable for ready adaption to various loading devices, while at the same time meeting the normal requirements of the manufacturing practice.

A specific object of our invention is to devise such a spring group comprising top and bottom spring plates between which may be secured coil springs and to which may be fixed the opposite followers of a friction device so constructed as to afford maximum wearing surfaces and long life in service.

Another object of our invention is to devise such a structure as that described wherein in one modification a top follower may house V-shaped friction shoes and resilient means for urging said shoes into engagement with the V-shaped friction walls of a bottom follower, and in another modification a bottom follower may support V-shaped friction shoes and resilient means for urging said shoes into engagement with the V-shaped friction walls of a top follower.

Our novel arrangement comprises in one modification a single rubber-like pad urging each shoe into engagement with the associated follower, and in another modification a pair of such pads urging each shoe into engagement with the associated follower, each of said last-mentioned pads exerting pressure upon said shoe adjacent one end thereof.

Still another object of our invention is to provide a bottom follower for a device such as that described comprising a horizontal base portion secured to a bottom spring plate and a vertical portion in the form of a parallelogram and presenting at each side thereof a V-shaped friction surface for frictional engagement with associated friction shoes.

In the drawings,

Figure 1 is a top plan view of a spring group embodying our invention, one-half of the top spring plate being cut away in order more clearly to illustrate the structure therebeneath.

Figure 2 is a sectional view of the structure shown in Figure 1, taken in the vertical planes indicated by the line 2—2 of Figure 1, and Figure 3 is a further sectional view of said structure, taken in the vertical planes indicated by the line 3—3 of Figure 1.

Figure 4 is a top plan view of a spring group embodying a modified form of our invention, one-half of the top spring plate being cut away in order more clearly to illustrate the structure therebeneath.

Figure 5 is a side view of the structure shown in Figure 4, the left half thereof being a view in elevation, and the right half thereof being a sectional view taken in the vertical plane indicated by the line 5—5 of Figure 4.

Figure 6 is a sectional view of the structure shown in Figures 4 and 5, taken in the transverse vertical plane bisecting said structure and substantially as indicated by the line 6—6 of Figure 4.

Our novel spring group may comprise a top spring plate 2 and a bottom spring plate 4, the end portions of each of which may have a scallop-like contour in order conveniently to conform to the coil springs confined therebetween and diagrammatically indicated at 6, 6. Each of said plates may have flanges inturned as at 8, 8, said flanges being discontinuous as at 9, 9 in order to facilitate drainage or to permit escape of any other included extraneous matter. Each of the plates 2 and 4 may have formed thereon a plurality of outwardly projecting lugs 10, 10 which may conveniently serve as positioning means therefor with respect to the supporting and supported frame members between which the group may normally be positioned. The top plate 2 is cut off at the rear end thereof as at 11 in order to avoid interference with the associated load carrying member or bolster (not shown) normally seated on said top spring plate.

Centrally of the group and between the coils at opposite ends thereof may be positioned our novel form of friction device having the top follower 12 and the bottom follower 14, said top follower being a box-like structure open at the top thereof and comprising the bottom wall 16 with an opening 18 therein for a purpose hereinafter described, V-shaped side walls 20, 20 flanged as at 22, 22 and secured by rivets 24, 24 to the top spring plate, and end walls 26, 26 cored away as at 28, 28. Adjacent each end of each side wall 20 is a lug 30 serving as positioning means for the associated rubber-like pad, and centrally of each side wall 20 is a vertically extending protuberance 32 spacing the associated rubber-like pads and serving as positioning means therefor.

Within the top follower and at each side thereof is a V-shaped friction shoe 34 flanged at the

top and bottom thereof as at 36, 36 and comprising a V-shaped friction surface, relieved as at 37, in complementary engagement as at 38 with a friction surface on the associated bottom follower in a manner hereinafter more fully described. On the side opposite the friction surface 38, each shoe is provided with a lug 40 opposed to the associated lug 30 on the top follower and serving as positioning means for the associated rubber-like pad 41.

Each rubber-like pad 41 is of annular shape with an annular opening 42 therethrough for reception of the lugs 30 and 40 on the associated top follower and friction shoe respectively, said lugs positioning said rubber pad with respect to said follower and said shoe in a manner heretofore described. A pair of said pads is associated with each shoe, and each pad exerts pressure adjacent one end of the associated shoe so that said shoe is urged into engagement with the bottom follower 14 by means of spaced pads exerting pressure adjacent each end of said shoe. It may be noted that each shoe is confined between the top spring plate 2 and the bottom wall 16 of the top follower in such a manner as to restrict relative vertical movement of said shoe.

The bottom follower 14 comprises a horizontal base portion 44 riveted as at 46 to the bottom spring plate 4 and a vertical portion 48 in the form of a parallelogram as viewed in the plan view of Figure 1, said vertical portion 48 extending through the opening 18 in the top follower 12 for frictional engagement with the associated friction shoes 34, 34. Each side of the vertical portion 48 of the bottom follower comprises a V-shaped friction surface, relieved as at 51 and in frictional engagement as at 38 with the V-shaped friction surface on the associated friction shoe 34. The base portion 44 of the bottom follower is of such contour as to afford positioning means as at 50, 50 for the coil springs 6, 6, as may be best seen in the top plan view of Figure 1. A vertical opening 49 extends through the top portion 48 and the base portion 44 of said bottom follower.

In the modification shown in Figures 4 to 6 inclusive, our novel spring group comprises top and bottom spring plates 52 and 54 of similar form to those described for the previous modification and confining therebetween coil springs 56, 56 diagrammatically indicated. Centrally of the spring group and between the coils at opposite ends thereof may be positioned a modification of our novel form of friction device having the top follower generally designated 58 and the bottom follower generally designated 60, said top follower being a box-like structure open at the top and bottom thereof and comprising end walls 62, 62 cored away as at 64, and the side walls 66, 66 with diagonally arranged V-shaped friction surfaces, relieved as at 59, 59, in frictional engagement as at 68 with the associated friction shoes 70, 70. The end walls 62, 62 are provided with horizontal flanges 63, 63 with openings 65, 65 therethrough for the reception of rivets 67, 67 securing said top follower to the top spring plate.

Each friction shoe 70 is a V-shaped member of cup-like form and is flanged over at the top and bottom thereof as at 72, 72 in such a manner as to define a recess 74 for reception of an associated rubber-like pad. Centrally of said recess is a lug 76 serving as positioning means for said pad. The outer surface of said shoe is a diagonal V-shaped friction surface in complementary engagement with the associated friction surface on the side wall of the top follower as at 68.

The bottom follower 60 is of I-section, as best seen in Figure 5, and comprises a vertical portion 78 tapering toward each end of the device, said vertical portion 78 being integrally formed with horizontal webs 80 and 82 at the top and bottom thereof, said webs overlying and underlying respectively the associated friction shoes in such a manner that the top web 80 restricts upward relative motion of said shoes, while the bottom web 82 restricts downward relative motion thereof. The bottom web 82 is provided with recesses 84, 84 within which may be received the heads of rivets 86, 86 securing the bottom follower to the bottom spring plate 54. This arrangement prevents abutment of the friction shoes 70, 70 and the rivets 86, 86 on the closure stroke. The bottom follower 60 is also provided, on each side of the vertical portion 78, with an annular lug 88 serving as positioning means for the associated rubber pad 90 under compression between said bottom follower and the associated friction shoe.

The rubber-like pad 90 is of oval form as best seen in the sectional view of Figure 6 and comprises an annular opening 92 for reception of the positioning lugs 76 and 88 on the associated friction shoe and bottom follower respectively. It may be noted that in the modification shown in Figures 4 to 6 inclusive, each friction shoe is urged into engagement with the friction surface on the top follower by a single resilient pad compressed between said shoe and a side of the bottom follower, whereas in the modifications shown in Figures 1 to 3 inclusive, each friction shoe is urged into frictional engagement with the bottom follower by a plurality of resilient pads under compression between said shoe and a side wall of the top follower, each of said last-mentioned pads bearing against said shoe adjacent one end thereof.

It will be understood that in the modification shown in Figures 1 to 3, by means of the parallel friction surfaces on the bottom follower, a substantially uniform amount of friction will be developed throughout the spring travel, while in the modification shown in Figures 4 to 6 by means of the diagonal friction surfaces on the top follower and the complementary surfaces on the associated friction shoes, a greater amount of friction will be developed on the closure stroke than on the release stroke.

It is to be understood that we 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.

We claim:

1. In a composite spring group, top and bottom spring plates with a plurality of coil springs confined therebetween, top and bottom followers secured respectively to said top and bottom spring plates, said top follower comprising side walls and a bottom wall with an opening therethrough, said bottom follower comprising an upstanding portion projecting through said opening and presenting nonflat friction surfaces at opposite sides thereof, a pair of friction shoes housed in said top follower each in complementary engagement with the friction surface on the

267, SPRING DEVICES.

9

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adjacent side of said upstanding portion, and a plurality of spaced resilient means under compression between each friction shoe and the associated side wall, each of said resilient means bearing against said shoe adjacent one end thereof.

2. In a friction absorbing device, a follower presenting a pair of converging substantially flat friction faces on each side thereof, another follower having side walls substantially parallel with the respective faces, a friction shoe in complementary engagement with the faces on each side of the first-mentioned follower, each shoe presenting abutment surfaces substantially parallel to the adjacent side walls, and resilient members compressed between said abutment surfaces and said walls, each of said members bearing against one of said surfaces only.

3. In a composite spring group, top and bottom spring plates with a plurality of coil springs confined therebetween, top and bottom followers secured respectively to said top and bottom spring plates, said top follower comprising side walls each having a vertically extending protuberance centrally thereof, friction shoes housed in said top follower at opposite sides thereof, said bottom follower extending between said shoes and comprising friction surfaces in complementary engagement therewith, and a plurality of rubber pads under compression between each side wall and each friction shoe and spaced by said protuberance.

4. In a composite spring group, top and bottom spring plates with a plurality of coil springs confined therebetween, top and bottom followers secured respectively to said top and bottom spring plates, said top follower comprising diagonally arranged V-shaped friction surfaces at opposite sides thereof, said bottom follower extending between said surfaces and comprising a recess in each side thereof, a friction shoe received in each of said recesses, said shoe comprising a diagonally arranged friction face in complementary engagement with the associated friction surface, a V-shaped abutment surface on said shoe, and a resilient pad under compression between each abutment surface and said bottom follower.

5. In a composite spring group, top and bottom spring plates with a plurality of coil springs confined therebetween, top and bottom followers secured respectively to said top and bottom spring plates, said top follower comprising V-shaped side walls, friction shoes housed in said top follower and comprising friction faces, said bottom follower comprising friction surfaces in complementary frictional engagement with respective faces on said shoes, a V-shaped abutment surface on each shoe, and a plurality of resilient pads compressed between each of said abutment surfaces and the associated side wall of the top follower.

6. In a composite spring group, top and bottom spring plates with a plurality of coil springs confined therebetween, and a friction absorbing device between said plates, said device comprising top and bottom followers secured respectively to said top and bottom spring plates, said top follower comprising side walls and a bottom wall with an opening therethrough for reception of a vertical portion of said bottom follower, said portion comprising a nonflat friction surface at each side thereof, a friction shoe in complementary frictional engagement with each of said surfaces, and longitudinally spaced resilient pads compressed between each shoe and the adjacent side wall.

7. In a friction absorbing device, a follower presenting a pair of converging substantially flat friction faces on each side thereof, another follower having side walls substantially parallel with the respective faces, friction shoes in complementary frictional engagement with respective faces, said shoes presenting abutment surfaces parallel to the side walls, and resilient means under compression between said abutment surfaces and said walls.

8. In a friction device, a follower presenting friction surfaces at opposite sides thereof converging toward opposite ends of the device, friction shoes in complementary engagement with said surfaces, and a spaced follower carrying resilient means converging toward opposite ends of the device and bearing against the associated shoes, the friction surfaces on respective sides of said first-mentioned follower being disposed in diagonal converging planes.

9. In a friction device, spaced followers, one of said followers presenting friction surfaces at opposite sides thereof converging toward opposite ends of the device, friction shoes in complementary engagement with said surfaces, the other of said followers comprising side walls converging toward opposite ends of the device, and a block of resilient material partially housed within each shoe and extending substantially from end to end thereof under compression between one of said side walls and a complementary abutment surface on said shoe.

10. In a friction device, a follower presenting friction surfaces at opposite sides thereof converging toward opposite ends of the device, friction shoes in complementary engagement with said surfaces, and a spaced follower interlocked with said shoes and carrying rubber-like material converging toward opposite ends of the device, said material bearing against said shoes substantially throughout their entire length.

11. In a friction device, top and bottom followers, one of said followers presenting friction surfaces at opposite sides thereof converging toward opposite ends of the device, friction means in complementary engagement with said surfaces, and the other of said followers supporting resilient rubber-like material converging toward opposite ends of the device and bearing against said friction means.

12. In a friction device, a follower presenting friction surfaces at opposite sides thereof converging toward opposite ends of the device, friction shoes in complementary engagement with said surfaces, and a spaced follower comprising side walls converging toward opposite ends of the device, and resilient means compressed between said side walls and complementary abutment surfaces on said shoes.

13. In a friction device, a follower presenting friction surfaces at opposite sides thereof, said friction surfaces converging toward each other and also converging at opposite ends of the device, friction shoes in complementary engagement with said surfaces, and a spaced follower comprising side walls converging toward opposite ends of the device, and resilient means compressed between said side walls and complementary abutment surfaces on said shoes.

14. In a friction device, a follower presenting friction surfaces at opposite sides thereof converging toward opposite ends of the device, friction shoes in complementary engagement with

said surfaces and movable thereagainst vertically, and horizontally in the direction longitudinally of the device, and a spaced follower carrying resilient means converging toward opposite ends of the device and bearing against the associated shoes.

15. In a friction absorbing device, a top follower comprising V-shaped side walls, a pair of friction shoes housed in said top follower, a bottom follower having a V-shaped friction surface at each side thereof in complementary engagement with one of said shoes, and a pair of rubber pads under compression between each side wall and the associated shoe, each of said pads bearing against said shoe adjacent one side thereof.

16. In a friction absorbing device, a housing follower having spaced side walls, each presenting an internal V-shaped friction face, a friction shoe in engagement with each face, another follower interlocked with said shoes, a V-shaped abutment surface on each shoe, a V-shaped spring seat on each side of the last-mentioned follower, and resilient means compressed between each spring seat and the adjacent abutment surface.

17. In a friction absorbing device, a follower having a V-shaped friction face on each side thereof, a friction shoe in engagement with each face, another follower interlocked with said shoes, a V-shaped abutment surface on each shoe, a V-shaped wall on each side of the last-mentioned follower, and spaced resilient means compressed between each wall and the adjacent abutment surface.

18. In a friction absorbing device, a housing follower presenting an internal diagonal V-shaped friction face at each side thereof, a friction shoe in complementary engagement with each face, another follower interlocked with said shoes, a V-shaped abutment surface on each shoe, a spring seat on each side of the last-mentioned follower, and resilient means compressed between each spring seat and the adjacent abutment surface.

19. In a friction absorbing device, a housing follower having oppositely spaced, V-shaped, substantially vertical side walls, each presenting a pair of converging abutment surfaces, a bottom wall integral with said side walls and having an opening therethrough substantially in the form of a parallelogram, friction shoes housed in said follower, each shoe presenting on one side thereof a pair of spring seats parallel with the respective abutment surfaces on the adjacent side wall, and said shoe presenting on the opposite side thereof a pair of friction faces parallel to the respective spring seats on said shoe, a bottom follower having a friction stem substantially in the form of a parallelogram, said stem projecting upwardly through said opening and presenting on each side thereof a pair of friction faces in complementary frictional engagement with the faces on the associated shoe, a resilient pad under compression between each seat and the adjacent abutment surface, each of said pads resisting relative horizontal twisting movement between said followers in one direction only, and resilient means bearing against abutment means fixed to respective followers for yieldingly resisting movement of said followers toward each other.

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