April 16, 1946. D. M. LIGHT 2,398,751

SPRING GROUP

Filed April 24, 1942 2 Sheets-Sheet 1

Fig. 1.

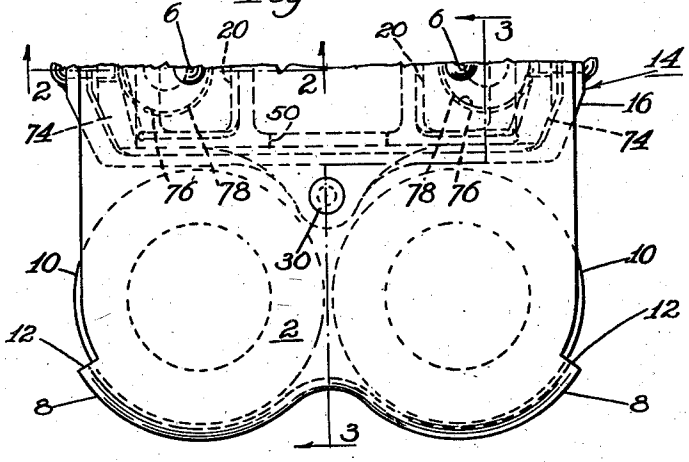


Fig. 2.

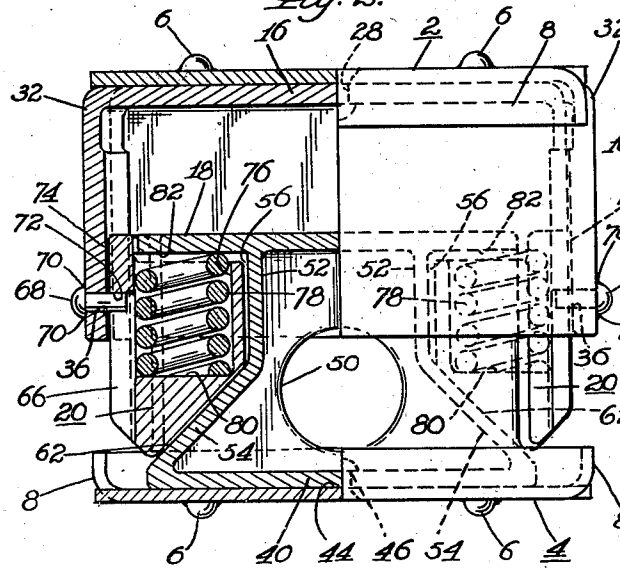
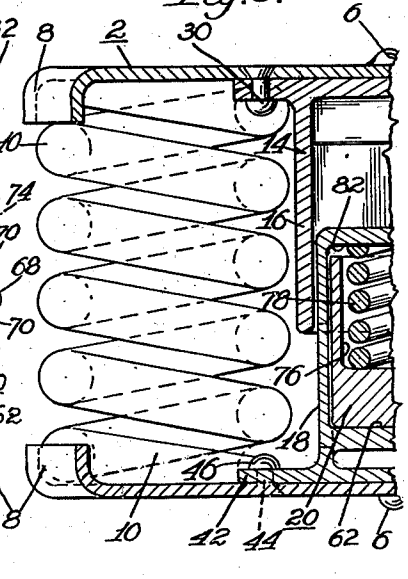


Fig. 3.



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Fig. 4.

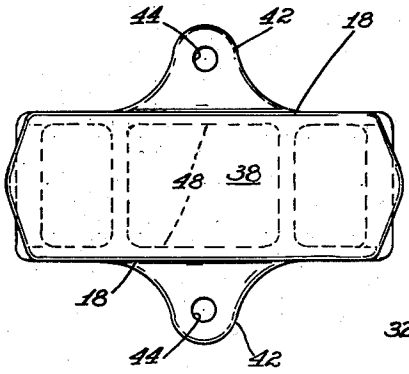


Fig. 6.

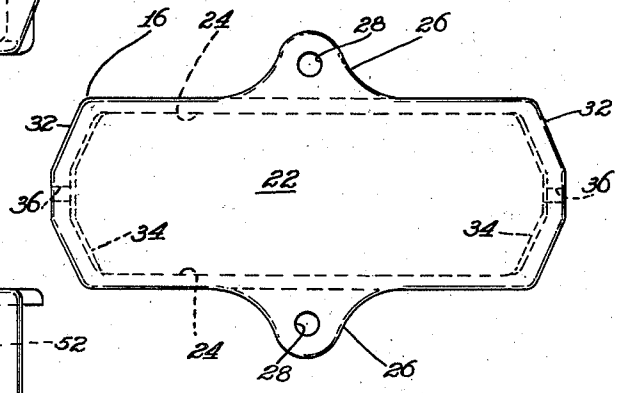


Fig. 5.

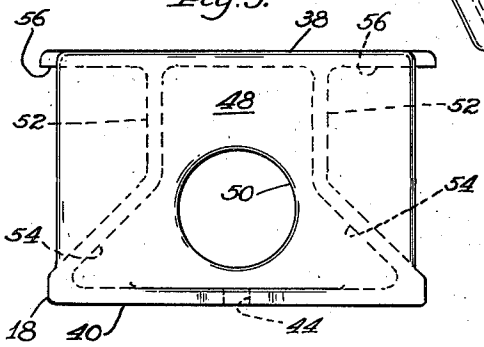


Fig. 7

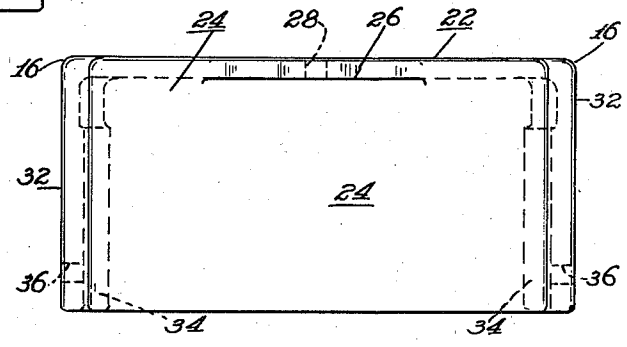
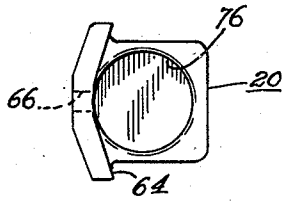


Fig. 8.



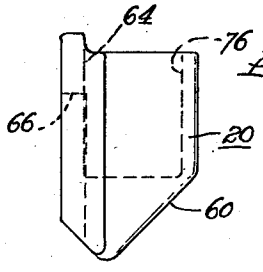


Fig. 9.

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Patented Apr. 16, 1946 2,398,751

UNITED STATES PATENT OFFICE

2,398,751

SPRING GROUP

David M. Light, Chicago, Ill., assignor to American Steel Foundries, Chicago, Ill., a corporation of New Jersey

Application April 24, 1942, Serial No. 440,305

30 Claims. (Cl. 267—9)

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

A specific object of my invention is to devise such a structure as that described wherein top and bottom followers are each engaged with each of a pair of friction shoes, each of said shoes being urged into engagement with both of said followers by means of a resilient member housed in said shoe and under compression between said shoe and one of said followers.

A further object of my invention is to devise such an arrangement as that above described wherein a top follower may be formed as an outer housing and may receive therewithin a bottom follower formed as an inner housing, said inner housing comprising a pocket in each end thereof, each of said pockets having a friction surface therein tapering downwardly and outwardly toward a friction surface on the outer housing whereby a friction shoe received within said pocket may be urged downwardly and outwardly against both of said surfaces by a single resilient member.

Still another object of my invention is to devise a novel inner housing for a ride control unit such as above described, said inner housing comprising at each end thereof a diagonally arranged seat for an associated friction shoe, and said housing also comprising a spring seat above and in vertical alignment with each of said friction shoe seats.

A different object of my invention is to devise a friction shoe of novel form, said shoe comprising a cavity formed and arranged for the reception of an associated resilient member, and said shoe also comprising friction surfaces lying in a plane parallel with the axis of said cavity and another friction surface lying in a plane diagonal to and bisecting said axis.

In the drawings,

Figure 1 is a fragmentary top plan view of a spring group embodying my invention.

Figure 2 is an end view of the structure shown in Figure 1, the right half thereof being a view in elevation, and the left half thereof being a sectional view taken substantially in the vertical plane indicated by the line 2—2 of Figure 1.

Figure 3 is a further sectional view taken in the vertical planes indicated by the line 3—3 of Figure 1.

Figures 4 and 5 are respectively a top plan view and a side elevation of the novel inner housing or bottom follower shown in Figures 1 to 3 inclusive.

Figures 6 and 7 are respectively a top plan view and a side elevation of the outer housing or top follower utilized in the device.

Figures 8 and 9 are respectively a top plan view and a side elevation of one of the pair of identical friction shoes utilized in the arrangement shown in Figures 1 to 3 inclusive.

Describing my invention in detail, the spring group may comprise top and bottom spring plates 2 and 4 respectively, each of said top and bottom plates comprising protuberances 6, 6 affording positioning means for an associated truck frame member, said top plate affording a seat for an associated bolster member (not shown) as will be apparent to those skilled in the art, and said bottom plate being seated upon an associated side frame of a railway car truck (not shown) as will also be clearly apparent. It may be noted that while my novel spring group is particularly designed for use in connection with a railway car truck, it may be equally applicable wherever it is desired to interpose a spring group between a supporting and a supported member.

Each of the spring plates 2 and 4 are flanged as at 8, 8 in order to conveniently confine a plurality of coil springs 10, 10 positioned therebetween, the flanges 8, 8 being discontinuous as at 12, 12, as best seen in Figure 1, in order to lighten the plates and to permit the escape of extraneous material from the bottom plate. It may be noted (Figure 2, left) that the rear flange 8 of the top plate is eliminated in order to avoid interference with the supported bolster member. The springs 10, 10 are arranged in pairs and between the front and rear pairs is disposed a friction device generally designated 14 and comprising an outer housing or top follower 16, an inner housing or bottom follower 18, and a pair of friction shoes 20, 20.

The top follower or outer housing 16, as shown in detail in Figures 6 and 7, comprises a top wall 22, side walls 24, 24 extended centrally thereof at 26, 26 and perforated at 28, 28 for the reception of rivets 30, 30 securing the top follower to the top spring plate 2, and the top

follower or outer housing also comprises the V-shaped end walls 32, 32 each presenting a V-shaped internal friction surface 34 and an opening 36 for a purpose hereinafter described.

Received within the top follower or outer housing 16 is the bottom follower or inner housing 18, shown in detail in Figures 4 and 5, said bottom follower comprising a top wall 38, and a bottom wall 40 extended centrally thereof at 42, 42 and perforated at 44, 44 for the reception of rivets 46, 46 securing said bottom follower or inner housing to the bottom spring plate 4. The bottom follower 18 also comprises side walls 48, 48 cored away as at 50, 50 in order to lighten the device, and spaced vertical walls 52, 52 extending downwardly from the top wall 38, each of said vertical walls 52 merging at the bottom thereof with a diagonal wall 54 extending downwardly and outwardly toward the associated end of the bottom follower to merge with the bottom wall 40, said vertical and diagonal walls 52 and 54 defining with the top and bottom walls 38 and 40 and the side walls 48, 48 a pocket 56 at each end of the bottom follower or inner housing. Within each pocket 56 is seated one of the identical friction shoes 20, 20.

Each friction shoe 20 is a compact metallic object comprising a diagonal friction surface 60 on the bottom thereof, said surface being formed and arranged for frictional engagement as at 62 with the associated diagonal wall 54 on the bottom follower or inner housing, and said shoe also comprises a front wall 64 slotted as at 66 for the reception of a bolt 68 positioned in the opening 36 in the adjacent end wall 32 of the top follower or outer housing and welded therein as at 70, 70. It will be apparent that the bolt 68 will abut the top of the slot 66 as at 72 (Figure 2, left) on the release or expansion stroke in order to prevent disassembly of the device. The front wall 64 of each shoe 20, as may best be seen in Figure 8, is V-shaped and presents a V-shaped outer surface formed and arranged for frictional engagement as at 74 with the associated V-shaped friction surface 34 on the adjacent end wall 32 of the top follower or outer housing. Each shoe 20 also comprises a cavity or pocket 76 adapted for reception of a vertically disposed coil spring 78, said spring being seated at its lower end as at 80 against the bottom of the pocket or cavity 76 and seated at its upper end as at 82 against the top wall 38 of the inner housing or bottom follower. It may be noted that the friction surfaces on the front wall 64 of each friction shoe 20 are disposed in a plane parallel to the longitudinal axis of the cylindrical cavity 76 in said shoe, and it will also be noted that the friction surface 60 on said shoe is disposed in a plane diagonal to and bisecting said axis. It will be clearly apparent to those skilled in the art that the location of the friction surfaces on each friction shoe with respect to the spring housing or spring cavity therein is of considerable significance in permitting the use of a single resilient member acting in a vertical plane to urge said shoe into frictional engagement with a plurality of followers, the engagement with one of said followers being in vertical planes and the engagement with the other of said followers being in a diagonal plane.

It is to be understood that I do not wish to be limited by the exact embodiment of the device shown which is 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, top and bottom spring plates, coil springs therebetween and a friction absorbing device comprising top and bottom followers secured to respective plates, a vertical friction surface at each end of said top follower, a friction surface on said bottom follower tapering downwardly toward the adjacent vertical surface, friction shoes housed in said bottom follower, and vertically disposed coil springs housed in respective shoes in abutment with said bottom follower, each being operative to urge the associated shoe into engagement with a friction surface on the bottom follower and a friction surface on the top follower.

2. In a spring group, top and bottom spring plates, a plurality of coil springs therebetween and a friction absorbing device comprising top and bottom followers in telescoping relationship and secured to respective plates, a vertical V-shaped friction surface at each end of said top follower, a friction surface on said bottom follower tapering downwardly toward the adjacent vertical surface, friction shoes housed in said bottom follower, and resilient members supported by said bottom follower, each of said members being operative to urge the associated shoe into engagement with a friction surface on the bottom follower and a friction surface on the top follower.

3. In a spring group, top and bottom spring plates, a plurality of coil springs therebetween, an outer housing secured to said top plate, an inner housing within said outer housing and secured to said bottom plate, vertical friction surfaces on said outer housing, diagonal friction surfaces on said inner housing, friction shoes recessed in said inner housing, each of said shoes being engaged with one of said diagonal surfaces and one of said vertical surfaces, and vertically disposed coil springs supported in engagement with respective shoes and operative to urge said shoes into engagement with both of the associated surfaces.

4. In a spring group, top and bottom spring plates, a plurality of coil springs therebetween, an outer housing secured to said top plate, an inner housing secured to said bottom plate, vertical friction surfaces on said outer housing, diagonal friction surfaces on said inner housing, friction shoes received within said inner housing, each of said shoes being engaged with one of said diagonal surfaces and one of said vertical surfaces, resilient members engaged with respective shoes and operative to urge said shoes into engagement with the associated surfaces, and projecting means on said outer housing recessed in respective shoes.

5. In a spring group, top and bottom spring plates, a plurality of coil springs therebetween, an outer housing secured to said top plate, an inner housing secured to said bottom plate, V-shaped vertical friction surfaces on said outer housing, tapering friction surfaces on said inner housing, friction shoes recessed in opposite ends of said inner housing, each of said friction shoes being engaged with one of said V-shaped surfaces and one of said tapering surfaces, and resilient members engaged with respective shoes for urging said shoes into engagement with the associated friction surfaces.

6. In a spring group, top and bottom spring plates, a plurality of coil springs therebetween, an outer housing secured to said top plate, an in-

ner housing secured to said bottom plate, vertical friction surfaces on said outer housing, diagonal friction surfaces on said inner housing, friction shoes recessed in said inner housing, each of said friction shoes being engaged with one of said diagonal surfaces and one of said vertical surfaces, and resilient means housed within respective shoes and operative to urge said shoes into engagement with both of the associated surfaces.

7. In a spring group, top and bottom spring plates, a coil spring therebetween and a friction absorbing device comprising top and bottom followers secured to respective plates, a vertical friction surface at each end of said top follower, a friction surface on said bottom follower tapering downwardly toward the adjacent vertical surface, friction shoes housed in said bottom follower, and resilient members supported by said bottom follower, each of said resilient members being operative to urge an associated shoe into engagement with a friction surface on the bottom follower and a friction surface on the top follower.

8. In a spring group, top and bottom spring plates, a plurality of coil springs therebetween, an outer housing secured to said top plate, an inner housing within said outer housing and secured to said bottom plate, vertical friction surfaces on said outer housing, diagonal friction surfaces on said inner housing, friction shoes housed in said inner housing, each of said shoes being engaged with one of said diagonal surfaces and one of said vertical surfaces, and resilient means urging each shoe into engagement with both of the associated surfaces.

9. In a friction absorbing device, an outer housing, an inner housing, friction shoes in said inner housing, friction surfaces on each of said housings, the surfaces on one housing tapering toward respective surfaces on the other housing, and a vertically disposed coil spring housed in each shoe in abutment with one of said housings and operable to urge said shoe into engagement with a surface on each housing.

10. In a composite spring group, top and bottom spring plates with a plurality of coil springs therebetween, and a friction device comprising a pair of telescoped inner and outer followers, each fixed to one of said plates, a vertical friction surface on one of said followers, a friction surface on the other follower sloping toward said first-mentioned surface, resilient means supported by said other follower, a friction shoe in engagement with said means and urged thereby into frictional engagement with both of said surfaces, said resilient means being housed for a substantial portion of its length within said shoe, and said device comprising means for limiting the expansion stroke of said group.

11. In a composite spring group, spaced spring plates, a plurality of coil springs therebetween, and a friction device comprising a pair of telescoped inner and outer followers fixed to respective plates, a friction surface on the outer follower, a friction surface on the inner follower sloping toward said first-mentioned surface, a vertically disposed coil spring seated against a wall of said inner follower, a friction shoe housing said spring and urged thereby into frictional engagement with both of said surfaces, and means on the outer follower reciprocal within a slot in said shoe and adapted for abutment therewith to limit the expansion stroke of the device.

12. In a spring group, top and bottom spring plates, a coil spring therebetween, and a friction device comprising a pair of telescoped inner and outer followers, each being fixed to one of said plates, a V-shaped vertical friction surface on the outer follower, a friction surface on the inner follower sloping toward said first-mentioned surface, resilient means supported by said inner follower, a friction shoe in engagement with said means and urged thereby into frictional engagement with both of said surfaces, said resilient means being housed for the major portion of its length within said shoe, and means on the outer follower interrupting the friction surface thereon and reciprocal within a slot in said shoe for abutment therewith to limit the expansion stroke of the device.

13. In a friction absorbing device, an outer housing, an inner housing therein, friction shoes housed in said inner housing, friction surfaces on each of said housings, and resilient means housed in each shoe in abutment with one of said housings and acting in a vertical plane for operatively urging said shoe into engagement with one surface on each housing.

14. In a friction absorbing device, an outer housing, an inner housing, friction shoes housed in said inner housing, friction surfaces on each of said housings, and a vertically disposed coil spring housed in each shoe in abutment with one of said housings and operable to urge said shoe into engagement with a surface on each housing.

15. In a follower for a friction absorbing device, top and bottom and spaced side walls and a diagonal wall at each end of the follower extending downwardly and outwardly between the side walls, said top wall affording a spring abutment in vertical alignment with each diagonal wall.

16. In a friction absorbing device, telescoped inner and outer housings each having spaced friction surfaces at opposite ends thereof, spaced friction shoes at opposite ends of the device, said shoes being housed within said inner housing and each of said shoes being frictionally engaged with a surface on each housing, and a plurality of vertically disposed coil springs at opposite ends of the device, each of said springs bearing against one of said shoes to urge the same into said engagement.

17. In a follower for a friction absorbing device, a box-like member with a pocket in each side thereof, each pocket being partially defined by a diagonally arranged friction surface and by a substantially horizontal wall affording a spring seat in vertical alignment with said surface.

18. In a friction absorbing device, telescoped inner and outer housings each having spaced friction surfaces at opposite ends thereof, spaced friction shoes at opposite ends of the device, said shoes being housed within said inner housing, and each of said shoes being frictionally engaged with a surface on each housing, and a plurality of vertically disposed coil springs at opposite ends of the device, each of said springs bearing against a wall of the inner housing and one of said shoes to urge the same into said engagement.

19. In a friction absorbing device, telescoped inner and outer housings, a vertical friction surface at each end of one of said housings, a friction surface on the other of said housings sloping toward the adjacent vertical surface, spaced friction shoes at opposite ends of the device, said

shoes being housed within said inner housing, and each of said shoes being frictionally engaged with a surface on each housing, and a plurality of resilient members at opposite ends of the device, each of said members bearing against a wall of one of said housings and one of said shoes to urge the same into said engagement.

20. In a composite spring group, spaced spring plates, a coil spring and a friction device confined in parallel therebetween, said device comprising inner and outer housings fixed to respective plates, each of said housings comprising a friction surface, a friction shoe housed in the inner housing in frictional engagement with a surface of each housing, and a vertically disposed coil spring housed within said inner housing in abutment with said shoe for urging the latter into said engagement, said spring being housed for the major portion of its length within said shoe, and means on the outer housing engageable with complementary means on said shoe for limiting the expansion stroke of the group.

21. In a spring group, spaced spring plates with a spring therebetween, spaced inner and outer housings arranged in telescopic relationship and fixed to respective plates, a pocket in each end of the inner housing, a friction element in each pocket, and a vertically disposed coil spring housed in each element and bearing against a wall of one of said housings for urging said element into engagement with a friction surface on each housing.

22. In a follower for a friction absorbing device, spaced substantially horizontal walls and spaced side walls extending therebetween, and a diagonal wall at each end of the follower extending between said side walls, one of said horizontal walls affording a spring abutment surface in vertical alignment with a friction surface on each of said diagonal walls.

23. In a composite spring group, spaced spring plates, a coil spring therebetween, and a friction device comprising a pair of telescoped inner and outer followers, each being fixed to one of said plates, a pocket within the inner follower at each end thereof, a friction shoe in said pocket in frictional engagement with a vertical surface on one of said followers and a diagonal surface on the other of said followers, a spring seat within said pocket, a resilient member compressed between said seat and said shoe, and means on the outer follower engageable with means on said shoe for limiting the expansion stroke of the group.

24. In a spring group, a pair of spring plates, a plurality of coil springs therebetween, and a friction device comprising telescoped inner and outer followers secured to respective plates, an interior vertical friction surface on the outer follower, a friction face on the inner follower sloping toward said surface, a friction shoe in engagement with said surface and said face, and resilient means compressed between said shoe and one of said followers for urging said shoe into said engagement, said resilient means being housed for its entire length within said inner follower and being housed for a substantial portion of its length within said shoe, said device comprising means for limiting the expansion stroke of the group.

25. In a spring group, spaced spring plates, coil springs positioned therebetween at opposite ends of said group and a friction device between said plates intermediate said springs with top and bottom followers secured respectively to said plates, said device comprising a housing follower presenting internal vertical friction faces at opposite ends thereof, a telescoping follower presenting diagonal walls affording friction shoe seats, shoes on said seats having friction surfaces in complementary engagement with said faces, resilient means compressed between each shoe and one of said followers, and spaced parallel positioning means on each shoe having guiding engagement with spaced walls of said telescoping follower.

26. In a spring group, spaced spring plates, coil springs positioned therebetween at opposite ends of said group and a friction device between said plates intermediate said springs with top and bottom followers secured respectively to said plates, said device comprising a housing follower presenting internal vertical friction faces at opposite ends thereof, a telescoping follower presenting diagonal walls affording friction shoe seats, shoes on said seats having friction surfaces in complementary engagement with said faces, resilient means compressed between each shoe and one of said followers and operative to urge said shoe into engagement with both of said followers, and spaced parallel positioning means on each shoe having guiding engagement with other walls of said telescoping follower.

27. In a spring group, top and bottom spring plates, a coil spring and a friction device therebetween, said device having opposed followers secured respectively to said plates, one of said followers presenting at opposite ends thereof vertical V-shaped friction faces, the other of said followers comprising spaced side walls having at opposite ends thereof inclined walls extending therebetween and affording seats for friction shoes, hollow shoes on said seats with friction surfaces in engagement with said faces respectively, and resilient means partially housed in each shoe and seated adjacent the base thereof and compressed between said shoe and one of said followers and operative to urge said shoe into engagement with both of said followers, and spaced parallel means on each of said shoes in guiding engagement with said side walls.

28. A friction device comprising opposed followers, one of said followers presenting at opposite ends thereof vertical friction faces, the other of said followers comprising spaced side walls having at opposite ends thereof inclined walls extending therebetween and affording seats for friction shoes, shoes on said seats with friction surfaces in engagement with said faces respectively, resilient means compressed between each of said shoes and one of said followers and operative to urge said shoes into engagement with both of said followers, and spaced parallel means on each of said shoes in guiding engagement with said side walls.

29. In a spring group, spaced spring plates, coil springs positioned therebetween at opposite ends of said group and a friction device between said plates intermediate said springs with top and bottom followers secured respectively to said plates, said device comprising a housing follower presenting internal vertical friction faces at opposite ends thereof, a telescoping follower presenting diagonal walls affording friction shoe seats, shoes on said seats having friction surfaces in complementary engagement with said faces, spaced parallel positioning means on each shoe having guiding engagement with other walls of said telescoping follower, and resilient means

compressed between each shoe and one of said followers and operative to urge said shoe into engagement with both of said followers, each of said resilient means having a substantial portion of its length housed within the adjacent shoe and being seated against said adjacent shoe along a horizontal wall intermediate the ends thereof.

30. In a spring group, spaced spring plates, coil springs positioned therebetween at opposite ends of said group and a friction device between said plates intermediate said springs with top and bottom followers secured respectively to said plates, said device comprising a housing follower presenting internal vertical V-shaped friction faces at opposite ends thereof, a telescoping follower presenting diagonal walls affording friction shoe seats, hollow shoes on said seats having friction surfaces in complementary engagement with said faces, guide means on each shoe spaced from the friction surfaces thereof and having engagement with said telescoping follower, and resilient means extending within each shoe and seated adjacent the bottom thereof and operative to urge said shoe into engagement with both of said followers.

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