May 21, 1957 J. A. SHAFER 2,793,029

SPRING PACKAGE UNIT FOR CAR TRUCKS

Filed June 14, 1953 2 Sheets-Sheet 1

Fig. 1

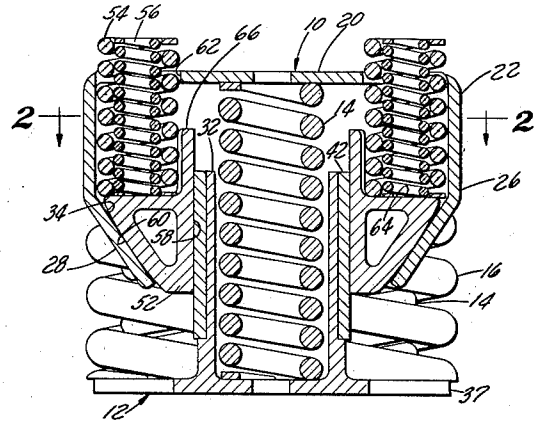

Fig. 2

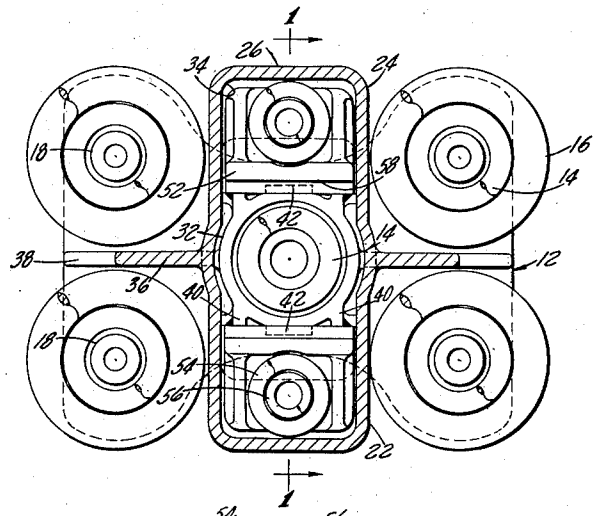

Fig. 3

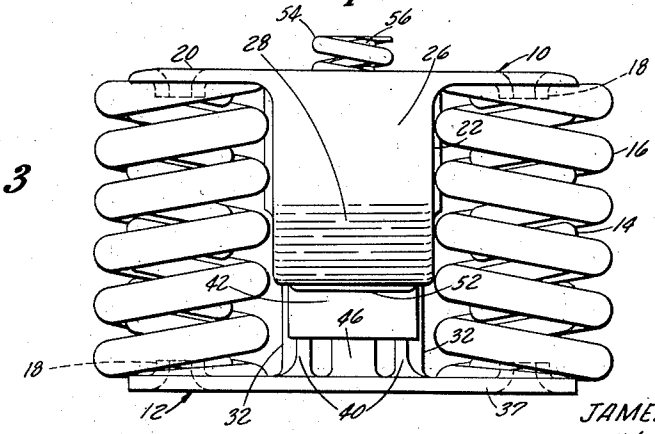

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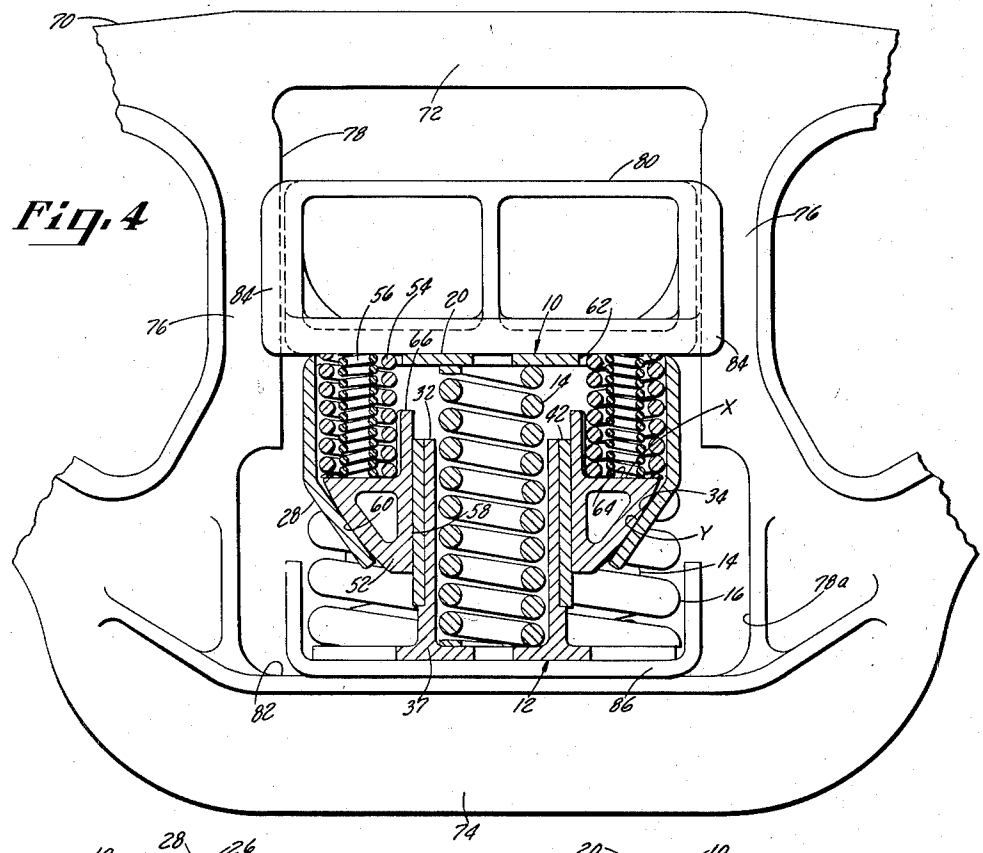
Fig. 4



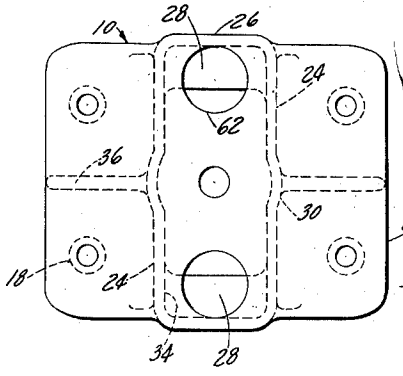


Fig. 5

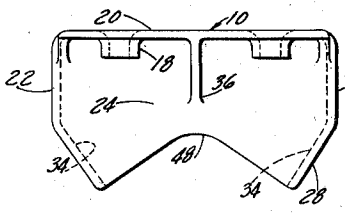


Fig. 6

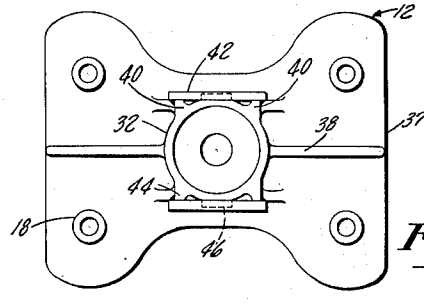


Fig. 7

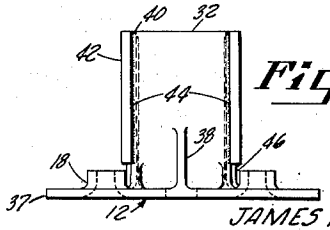


Fig. 8

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SPRING PACKAGE UNIT FOR CAR TRUCKS

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Application December 14, 1953, Serial No. 397,836

14 Claims. (Cl. 267—9)

This invention relates to a package spring group having friction control means, for use in railway car trucks of the type wherein the bolster is spring supported on the truck side frames.

The need for friction means in car trucks to damp oscillations of the bolster supporting springs is well recognized. Although new car trucks are usually provided with built-in friction systems for controlling the oscillations of the bolster supporting springs, there are in service hundreds of thousands of car trucks in which the bolster is entirely supported on unsnubbed springs.

Package type spring groups containing friction control means have appeared in the art in recent years for substitution in place of the entire group of unsnubbed bolster supporting springs in old style trucks. Such package spring groups, however, have contained various shortcomings. Some groups require bolster and side frame structural changes before they can be applied to the car trucks. In others, wherein pre-locking of the spring group is required, the use of special assembly and installation tools is necessitated. Still others require the use of non-standard bolster springs. My invention overcomes these objections through the provision of a simple, compact bolster spring group incorporating friction means capable of being easily assembled, yet requiring no changes in the car truck structure or special equipment for assembly and installation.

My invention contemplates a spring group wherein a friction means is utilized in parallel with the bolster springs which are disposed between spring cap and spring seat members. The spring seat member presents spaced vertical friction surfaces for engagement with friction wedges retained by the spring cap member. The friction wedges are urged into engagement with the friction surfaces by wedge springs which, prior to the application of the unit to a car truck, are uncompressed and extend upwardly through openings in the spring cap member. Upon the application of the unit to a car truck, the weight of the bolster and the car body compresses the wedge springs to the point where the bolster engages the top side of the spring cap. Thus the bolster provides an abutment for the upper end of these springs. Since the compression is applied to the wedge springs only upon the engagement of the bolster with the top of the spring cap member, the need for a prelocking device for maintaining the unit compressed prior to application to a car truck is eliminated.

Therefore, it is an object of my invention to provide a simple and efficient spring package unit having friction control means, wherein prelocking of the unit is not required.

Another object of my invention is to provide a spring package unit, capable of pre-assembly, but which can be easily assembled and installed in the field without the use of locking devices or special equipment and tools.

Still another object of my invention is to provide a spring package in the form of a unit wherein friction wedge springs for actuating the friction wedges of the unit are compressed a predetermined amount by means

of the associated car truck bolster when the unit is applied to a car truck.

An additional object of my invention is to provide a spring package unit, capable of facile pre-assembly, that can be used in any conventional car truck (in which the bolster is spring supported on the side frame) without any change being made to the car truck or its components.

A further object is to provide a spring package unit wherein there is a large area of contact between the friction wedges thereof and associated wear plates under all loading conditions.

A still further object of my invention is to devise a highly effective bolster supporting device providing for controlled movement of the bolster in the form of a spring package unit utilizing standard A. A. R. (Association of American Railroads) bolster springs, which is simple in construction, inexpensive to manufacture and easy to assemble and install.

The foregoing and other objects and advantages will become apparent from the following description taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a vertical sectional view of the spring package unit embodying my invention, taken along line 1—1 of Figure 2.

Figure 2 is a horizontal sectional view of the unit taken along line 2—2 of Figure 1.

Figure 3 is a side elevational view of the spring package unit shown in Figures 1 and 2.

Figure 4 illustrates a spring package unit applied to a railway car truck.

Figure 5 is a top plan view of the spring cap member of the spring package unit.

Figure 6 is an elevational view of the spring cap member shown in Figure 5.

Figure 7 is a top plan view of the spring seat member of the spring package unit.

Figure 8 is an end elevational view of the spring seat member shown in Figure 7.

Referring to the drawings, my spring package unit comprises a spring cap member **10** and a spring seat member **12** between which is positioned a group of inner and outer coil springs **14** and **16**, which may be standard A. A. R. bolster springs. Positioning means for these springs is afforded by spring centering lugs **18** on said cap and seat members. The central spring of the group comprises an inner spring **14** only.

Spring cap member **10** as particularly seen in Figures 5 and 6 comprises a flat top wall **20** for engagement with the upper ends of springs **14** and **16** and a centrally disposed depending box portion **22** which is formed by spaced side and end walls **24** and **26**. Diagonal walls **28** forming continuations of end walls **26** extend downwardly and inwardly toward spring seat member **12**. The middle portion of side walls **24** is made slightly convex as at **30** to accommodate center spring housing **32** on seat member **12** in telescoping relationship with box portion **22**. Top wall **20**, side walls **24**, end walls **26** and diagonal walls **28** define a pair of wedge-receiving pockets **34** which open toward spring seat member **12**. Top ribs **36** serve to reinforce the juncture of side walls **24** and top wall **20**.

Spring seat member **12** (Figures 7 and 8) comprises a base portion **37** on which the lower ends of springs **14** and **16** rest and a centrally disposed upwardly projecting center spring housing **32**. Upstanding ribs **38** reinforce the juncture of spring housing **32** and base portion **37**. Spring housing **32** is substantially circular in horizontal cross-section and contains vertical ribs **40** on opposite sides thereof to which vertically extending friction wear plates **42** are secured by means of welds as at **44**. The lower edges of wear plates **42** are supported by ledges **46** on housing **32**.

It will be noted that side walls 24 of the spring cap member are relieved as at 48 (Figure 6) to avoid interference with ribs 38 on the spring seat member when the spring group is fully compressed.

The friction means comprises a pair of friction wedges 52 which are disposed in pockets 34, each wedge being urged into engagement with wear plate 42 on housing 32 and with the inner side of diagonal wall 28 of spring cap member 10 by outer and inner wedge springs 54 and 56. Each wedge 52 comprises a flat friction face 58 in slidable engagement with vertically disposed wear plate 42 and a vertically crowned wedge face 60 engaging the inner side of diagonal wall 28. Face 60 is crowned vertically so as to permit the wedge to rock relative to diagonal wall 28, thus assuring full surface contact between flat face 58 and wear plate 42. Springs 54 and 56 extend upwardly through openings 62 in spring cap member 10 and engage the underside of the bolster when the latter rests on the member, as may be seen in Figure 4. A spring seat 64 is provided between faces 58 and 60 of the wedge for engagement with the lower end of springs 54 and 56. The upper end of springs 54 and 56 engage the underside of the bolster when it is resting on the unit as previously mentioned. Thus the bolster in effect serves as the top wall of the spring cap to subject springs 54 and 56 to a predetermined initial compression, thereby urging wedges 52 into engagement with wear plates 42 on spring seat member 12 with the force required to effectively damp the oscillations of the bolster support springs 14 and 16 as the latter compress and expand in service.

Face 58 of wedge 52 extends upwardly as at 66, so as to overlap the top edge of wear plate 42 under no-load conditions, as may be seen in Figure 4. In addition, the length of wear plate 42 is such that wedge face 58 extends below the bottom edge of plate 42 under full-load conditions. This construction prevents the formation of grooves and shoulders on the surfaces of plate 42 and wedge 52 by distributing the wear evenly over their entire areas. Even distribution of wear is also assured by the fact that the line of force of outer and inner wedge springs 54 and 56 acts against seat 64 at a point "X" which is inwardly of the point of contact "Y" between crowned wedge face 60 and the inner surface of diagonal wall 28. This tends to rotate wedge 52 in such a manner that there is a reduction in force of the wedge against wear plate 42 at the lower portion of vertical face 58 and a corresponding increase in force at the upper portion of face 58. This construction therefore provides an even distribution of the friction force over the entire area of contact between wedge 52 and wear plate 42.

Figure 4 illustrates a typical application of my invention to a conventional railway car truck of the type in which no friction system had been provided for controlling the oscillations of the bolster supporting springs, wherein side frame 70 comprises a compression member 72 and tension member 74 connected by a pair of spaced columns 76 and forming therebetween a bolster-receiving opening 78. The lower ends of columns 76 are spaced apart a greater amount than the upper portions thereof to form a widened lower opening 78*a* of bolster receiving opening 78. Bolster 80 extends into opening 78 and rests on the spring package unit which is supported on spring seat portion 82 of tension member 74. In this particular embodiment, a spring plank 86 is interposed between the spring group unit and the spring seat portion 82 of member 74. The bolster is provided adjacent both columns with outer guide lugs 84, which overlap the portions of columns 76 that are disposed above widened opening 78*a*, the lugs being of such vertical height as to pass through opening 78*a* to permit the bolster to be withdrawn from the frame. Thus it will be seen that the bolster is slidably interlocked with the side frame in the usual manner by means of guide lugs 84. While only one side frame with its associated bolster end is shown, it will be understood that the other side of the truck has a similar side frame associated with the bolster in like manner. It is to be noted that no change in the car truck has been required in order to apply the spring package unit.

A feature of my invention resides in the provision of openings 62 in the top wall 20 of the spring cap member through which wedge springs 54 and 56 extend a predetermined amount above the top surface of the member when the springs are in free or uncompressed condition (Figures 1 and 3). Springs 54 and 56 are therefore placed under predetermined compression by the bolster when the latter is supported on the spring group, as in Figure 4. It is to be understood that while the weight of the bolster alone may not be sufficient to compress wedge springs 54 and 56 to the extent that the bolster engages the top surface of spring cap member 10, when the car body rests on the bolster, there is more than enough weight to bring the bolster into contact with member 10 and in addition to compress bolster springs 14 and 16 a slight amount. Thereafter, additional loading of the bolster results only in the compression of springs 14 and 16, the compression of wedge springs 54 and 56 being unaffected by the bolster movement. This, in turn, assures a constant friction force generated by the wedges against the wear plates. Once the bolster rests on spring cap member 10 it in effect forms an abutment for the upper end of springs 54 and 56 that is fixed relative to the spring cap member. It will be appreciated that with this arrangement the need for locking devices for the precompression of said wedge springs and the bolster springs is eliminated.

Another feature of the invention is the provision of a construction which utilizes a center spring 14 in housing 32 of the spring seat member. This spring alone has sufficient capacity to overcome the frictional forces generated by wedges 52 against wear plates 42. This action avoids the formation of undesirable bending stresses at the juncture of top wall 20 and side walls 24 of spring cap member 10 and at the juncture of base portion 37 and housing 32 of the spring seat member 12. Without the center spring it will be apparent that upon expansion of the unit following compression thereof, the frictional force acting on wear plates 42 would tend to resist upward movement of box portion 22 of the cap member against the expansive force applied to the four corners of top wall 20 by the bolster springs 14, 16, while the same frictional force would tend to drag housing 32 upwards against the force of the bolster springs acting downwards against the four corners of base 37. Such action might result in failure of the members at the aforementioned junctures. My construction in eliminating such bending forces makes it possible to simplify the structure of the spring cap and spring seat members. Thus, top wall 20 and base portion 37 are in the form of flat plates without the need of any upstanding peripheral flanges to stiffen the members. Also the use of the center spring serves to increase the capacity of the unit.

To assemble my spring packing unit, bolster springs 14 and 16 are placed in their respective positions on spring seat member 12. Friction wedges 52 are then placed in pockets 34. Next, with wedges 52 manually held in place in pocket 34, spring cap member 10 is positioned over spring seat member 12 and then lowered to its final position wherein spring cap member 10 rests on bolster springs 14 and 16 and the wedges are in contact with wear plates 42 on housing 32 of the spring seat member. The assembly is completed by the insertion of wedge springs 54 and 56 through openings 62 in spring cap member 10 onto spring seats 64 of wedges 52.

In applying the assembled spring package unit to a car truck, the bolster is first raised to its highest position in bolster-receiving opening 78 (Fig. 4) of the side frame. Next, the unit is placed on seat 82 (or on spring plank 86, if used) in opening 78 and the bolster is lowered into engagement with the spring cap 10 of the unit, wedge springs being thereby compressed a prede-

termined amount, as illustrated in Fig. 4. It will be understood that the assembled unit is of such a height that with the bolster raised to its uppermost position in opening **78** the unit may be readily applied to the side frame, even though wedge springs **54** and **56** in their uncompressed condition extend above spring cap member **10**. To remove the unit the above procedure is reversed.

In view of the fact that standard A. A. R. bolster springs are stocked by most of the railroads and since my spring package unit utilizes such springs, all that need be shipped to the railroads are the spring cap member, the spring seat member complete with wear plates, the wedges and the wedge springs. These parts, together with standard bolster springs from a railroad's stockroom may then be readily assembled in the field to form the spring package unit. This convenience will result in substantial savings to the railroad and permits ready replacement in the field of any springs broken in service.

The terms and expressions which I have employed are used as terms of description and not of limitation and I have no intention, in the use of such terms and expressions, of excluding any equivalents of the features shown and described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

Having thus described my invention, I claim:

1. A spring package unit comprising a spring seat member, springs on said member, a spring cap member having a flat top resting on said springs, friction means carried by said cap member and being in slidable engagement with said seat member, and spring means engaging said friction means for urging the same into said engagement, the upper end of said spring means extending through openings in said top of said cap member and projecting above said top.

2. A spring package unit for supporting a car truck bolster, said unit comprising a spring cap member, a spring seat member, springs between said cap and seat members, said seat member having an upwardly extending central housing portion, friction means comprising wedge pockets in said spring cap member, friction wedges in said pockets and wear plates secured to the sides of said center spring housing, and wedge springs engaging said wedges for urging said wedges into engagement with said wear plates, said wedge springs extending through openings in said spring cap member and being held under predetermined compression by a bolster when the latter is supported on said unit.

3. In a car truck, a side frame having a bolster-receiving opening, a bolster extending into said opening and a spring package unit in said opening for supporting said bolster on said frame, said unit comprising a spring cap member having a flat top engaging the underside of said bolster, a spring seat member, springs between said cap and seat member, friction means carried by said cap member and frictionally engaging said seat member, and springs associated with said friction means for actuating the latter, said second-named springs extending through openings in said top of said spring cap member and being compressed against the underside of said bolster, said springs extending above said top of said cap member prior to the application of said bolster to said unit.

4. A spring package unit comprising a spring cap member and a spring seat member in telescoping relationship therewith, springs between said members, said spring seat member comprising a base portion and an upright centrally disposed spring housing portion, wear plates secured to opposite sides of said housing, said spring cap member comprising a top wall and a box portion depending from said top wall for receiving said housing portion, said box portion having diagonal walls extending downwardly and inwardly toward said housing, wedge means in said box portion in engagement with said plates and diagonal walls, and springs supported on said wedges for urging said wedges into engagement with said wear plates and diagonal walls, the upper end of said last-named springs extending through openings in said spring cap member a predetermined amount when in uncompressed condition.

5. In a spring package unit, a spring cap member having a flat top, a spring seat member, load carrying springs between said members, vertical wear plates on one of said members, friction wedges carried by the other of said members, said wedges having friction faces in slidable engagement with said plates, and springs engaging said wedges for actuating the latter, said faces overlapping the upper edges of said wear plates when said unit is subjected to substantially no-load condition on said faces overlapping the lower edges of said wear plates when said unit is under substantially loaded condition, said second-named springs when uncompressed extending upwardly through openings in said top of said spring cap member, said second named springs being compressed to the level of said top when said unit is under loaded condition.

6. In a spring package unit, spaced spring cap and seat members, springs between said members, one of said members comprising a vertically disposed center-spring housing, friction surfaces on opposite sides of said spring housing, the other of said members comprising a friction wedge housing portion straddling said spring housing, friction wedges confined in said second-named housing and in slidable engagement with said surfaces, and springs associated with said wedges for urging said wedges into said engagement with said surfaces, said second-named springs when uncompressed extending through openings in said other of said members.

7. A spring package unit comprising a spring seat member, springs on said member, a cap member on said springs, said cap member having a depending wedge pocket portion, said seat member having vertical friction surfaces extending into said pocket portion, wedge members in said pocket portion and being in slidable engagement with said surfaces, and springs in engagement with said wedge members for actuating the same, said cap member having openings in the top thereof through which said wedge springs are applied to said wedge members.

8. A spring package unit comprising spring means, a cap member on said spring means, and friction means, said friction means comprising a wedge-receiving pocket portion on the underside of said member, a friction wedge member in said pocket portion, said wedge member having a spring seat, a spring on said seat, said cap member having an opening directly above said seat through which said spring is inserted for engagement with said seat.

9. A spring package unit for a car truck comprising a spring seat member, springs on said member, a cap member on said springs, said cap member having a depending wedge pocket portion, said seat member having a center spring housing with vertical friction surfaces extending into said pocket portion, wedges in said pocket portion, said portion comprising flat generally diagonally extending wedge supporting surfaces converging inwardly toward the vertical center line of said unit, each of said wedges comprising a convexly curved wedge face engaging the respective one of said supporting surfaces and a generally vertical friction face slidingly engaging an opposing one of said friction surfaces, and a spring engaging each of said wedges for actuating the same, the point of application of the resultant force of each of said wedge springs to its associated wedge being disposed inwardly of the engagement between said wedge face and said supporting surface.

10. A spring package unit for a car truck comprising a spring seat member, springs on said member, a cap member having a flat top and being supported on said

springs, said seat member having generally centrally disposed friction surfaces extending into said cap member, said cap member comprising generally vertical end walls and generally flat diagonal walls extending inwardly from said end walls, said end and diagonal walls defining pockets for receiving friction wedge members, wedge members in said pockets, each of said wedge members comprising a wedge face curved generally convexly in the direction of the slope of the associated one of said diagonal walls and being in engagement therewith and a generally vertical friction face engaging an opposing one of said friction surfaces, and springs disposed between said wedge members and said cap member for actuating the wedges, the point of application to its associated wedge member of the resultant force of each of said wedge springs being disposed inwardly of the engagement between the wedge member and said diagonal wall.

11. In a spring package unit, spaced spring cap and seat members, said seat member comprising generally vertically disposed friction surfaces extending into said cap member, springs between said members, said cap member comprising a top portion engaging the tops of said springs, friction means disposed between and in engagement with said members, said means comprising a pair of wedges carried by said cap member and frictionally engaging said surfaces on said seat member, and other springs for actuating said friction means, said last named springs when uncompressed extending through openings in said top portion of said cap member and projecting above said first-named springs a predetermined amount.

12. A spring package unit comprising a spring cap member having a flat top, a spring seat member comprising vertical friction surfaces extending into said cap member, resilient means between said cap and seat members, friction means disposed between said members, said means being carried by said cap member and slidingly engaging said friction surfaces on said seat member, and springs engaging said friction means for actuating the latter, said second-named springs extending through openings in said

spring cap member and being compressible to the level of said top of said cap member by an object to be supported by said unit.

13. A spring package unit including supporting springs, friction means disposed within the unit and other springs for actuating said friction means, said unit having at its upper extremity a spring cap member with a flat top portion, said portion having openings through which said last-named springs extend when in uncompressed condition, the upper ends of said last-named springs projecting above said top portion when the springs are in said uncompressed condition, said last-named springs engaging said friction means and being compressible to the level of said flat top portion by an object engaging said last-named springs and supported on said unit.

14. A spring package unit comprising a spring seat member, springs on said member, a cap member having a flat top supported on said springs, and friction means carried in at least one pocket in said cap member, said means comprising a wedge member in slidable frictional engagement with said seat member and spring means engaging said wedge member for actuating the latter, said cap member having an opening through which said spring means extends outwardly of said unit when said spring means is in uncompressed condition, said spring means being compressible to the level of said top of said cap member by an object to be supported on said unit.

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