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W. C. VAN DRESSER ET AL

2,049,550

CUSHION CONSTRUCTION

Filed Feb. 10, 1932

3 Sheets-Sheet 1

Fig. 1.

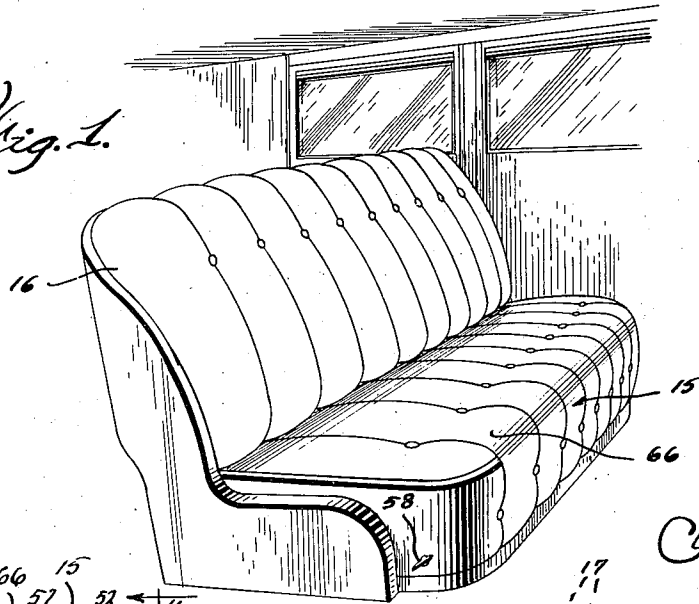


Fig. 2.

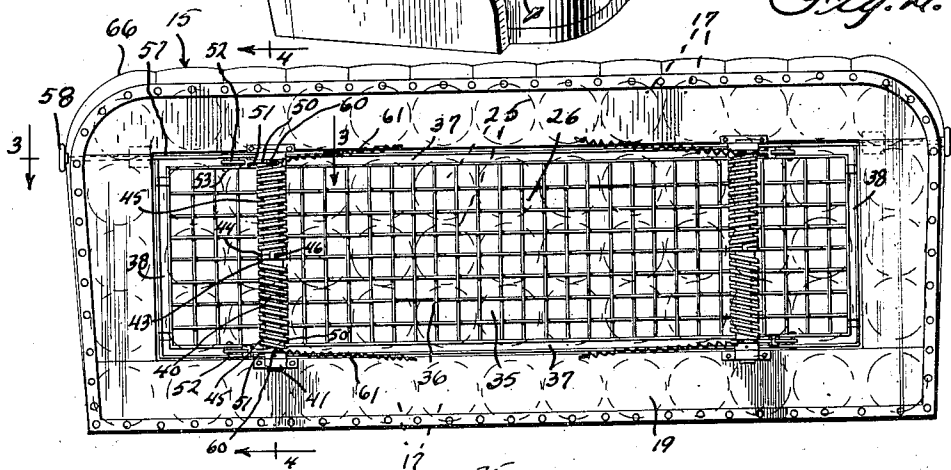
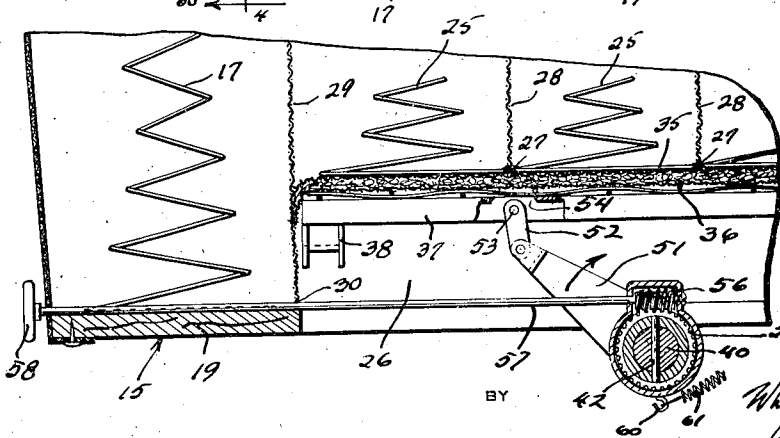


Fig. 3.



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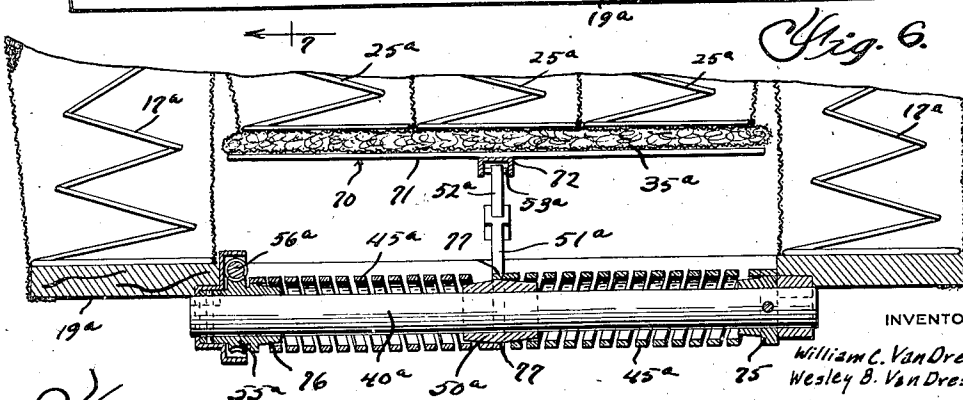
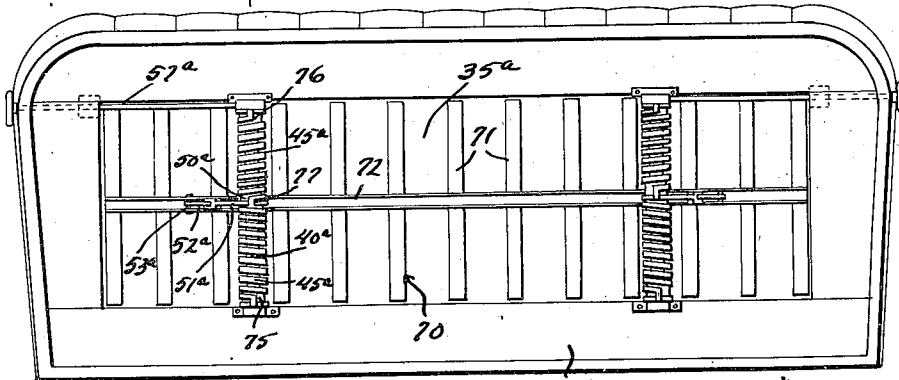
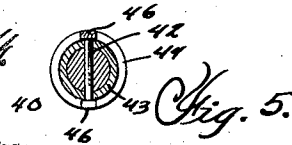
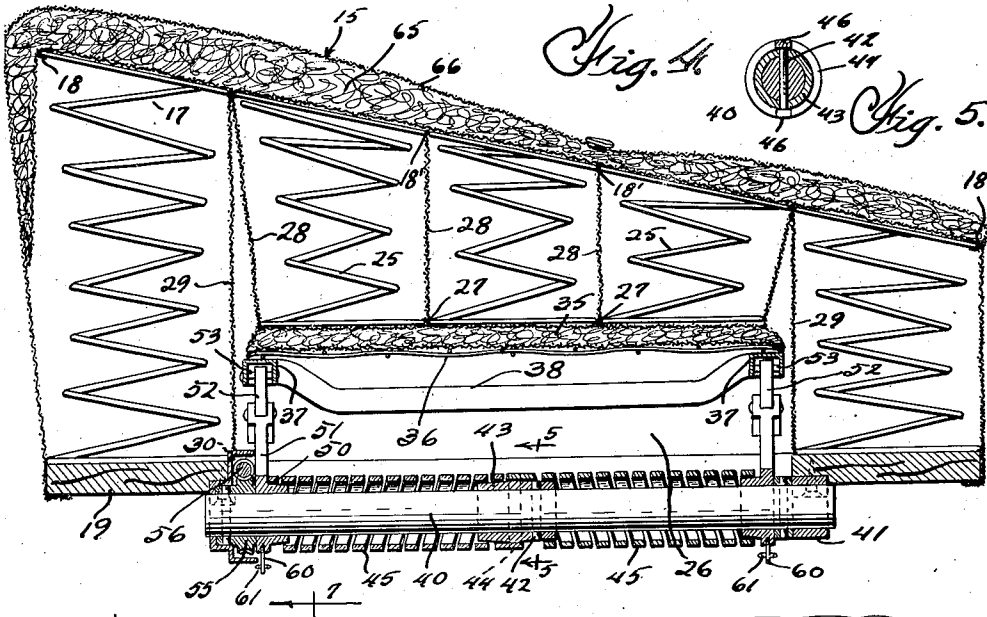
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3 Sheets-Sheet 2



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CUSHION CONSTRUCTION

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8 Claims. (Cl. 155—179)

This invention relates to a cushion construction of the character used in upholstered seats and the like.

One of the primary objects of this invention is to provide a cushion construction having means for adjusting the firmness thereof whereby for a relatively light person the cushion may be made relatively soft while for a heavier person the cushion may be made much firmer.

More particularly the invention contemplates the provision of a cushion which will include a plurality of springs grouped to form a unit, means for yieldably supporting certain of these springs and means for adjusting the yieldability of this support.

Numerous other objects and advantages of this invention will become more apparent as the following description proceeds, particularly when reference is had to the accompanying drawings, wherein:

Fig. 1 is a perspective view of a cushion construction in position in a vehicle seat;

Fig. 2 is a bottom plan view of a cushion constructed in accordance with the teachings of this invention;

Fig. 3 is a fragmentary sectional view taken substantially on the line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken substantially on the line 4—4 of Fig. 2;

Fig. 5 is a sectional view taken substantially on the line 5—5 of Fig. 4;

Fig. 6 is a view similar to Fig. 2 showing a slightly modified form of construction;

Fig. 7 is a sectional view taken substantially on the line 7—7 of Fig. 6;

Fig. 8 is a view similar to Fig. 2 showing a further modified form of construction;

Fig. 9 is a sectional view taken substantially on the line 9—9 of Fig. 8;

Fig. 10 is a fragmentary sectional view taken substantially on the line 10—10 of Fig. 8; and

Fig. 11 is a fragmentary perspective view of a slightly modified form of supporting base forming one of the elements of the construction.

A cushion constructed in accordance with the teachings of this invention will find utility in any seat construction whatever. The cushion may be utilized as the seat cushion of the construction or as the back cushion thereof. The invention will find particular utility, however, when incorporated in a seat construction of a motor vehicle and accordingly the invention will be described as being incorporated in a seat construction of this character.

Vehicle seat constructions, as generally made

comprise a plurality of coil springs grouped to form a spring unit and an upholstery covering for this unit. As generally made these spring units are of medium firmness and are therefore adapted for persons of average weight. Such a cushion construction, however, is usually too soft for an extremely heavy person and too firm for a person of light weight, and the present invention therefore contemplates the provision of means for readily adjusting the firmness of such a cushion so that the same may be adapted to persons of different weights.

Referring then particularly to the drawings wherein like reference characters designate corresponding parts throughout all views, there is shown in Fig. 1 of the drawings a vehicle seat comprising a seat cushion 15 and a back cushion 16. While the vehicle seat disclosed is illustrated as being the front seat in the vehicle, it will be readily apparent that the invention will be equally applicable to the rear seat of the vehicle.

One of the cushions forming a part of the vehicle seat such, for example, as the seat cushion 15, is illustrated in Figs. 2 to 4, inclusive, of the drawings. By reference to these figures, it will be noted that the cushion comprises a plurality of coil springs 17 arranged in transverse and longitudinal rows to form a spring unit. A border frame 18 is preferably provided around the upper edge of the spring unit, the border springs of the unit having their top convolutions secured to this border frame. A wooden base frame 19 is also provided in accordance with the usual practice, the border springs of the unit resting on this base frame.

The springs of the unit may be secured together in any desired manner, it being important, however, that these springs be secured together for relatively free vertical movement with respect to each other. Thus if desired, the tops of the springs in adjacent longitudinal rows may be secured to each other by longitudinally extending coil spring cables 18', the springs being clipped to these cables whereby the springs are held in position within the spring unit, but may move vertically slightly relative to each other.

According to the teachings of this invention certain of the springs forming the spring unit are supported on a yieldable support arranged to float within the spring unit. Any number of these springs may be thus supported, but as illustrated it is preferable to select a group of springs disposed centrally of the spring unit and to mount this group of springs on the yieldable support.

These springs may, if desired, be of lighter gauge than the other springs of the spring unit in accordance with the usual practice.

As illustrated, the springs disposed in the three longitudinal rows arranged centrally of the spring unit, with the exception of the border springs at the ends of these rows, are mounted as a group on a yieldable support. These springs are designated by the reference character 25, and it will be noted that these springs are of shorter length than the border springs 17 to provide a chamber 26 below these springs and centrally of the spring unit.

The springs 25 are preferably secured at their lower ends to longitudinally extending coil spring cables 27, which are similar to and extend parallel with the cables 18'. Thus the lower ends of the springs 25 are yieldably secured together, and if desired each cable 18' may be connected to the cable 27 extending parallel therewith by means of a listing strip or the like 28. Listing strips 29 may also be provided connecting the cables 18' secured to the border springs 17 to similar cables 30 secured to the lower ends of these border springs.

The springs 25 are supported on a felt pad or the like 35, this pad being preferably of a size sufficient to extend under all of the springs 25. This felt pad is in turn supported on a screen 36 which is secured in any desired manner at its edges to a frame comprising longitudinally extending channel bars 37 and transversely extending end channel bars 38. It will be noted particularly by reference to Fig. 4 of the drawings that the center portions of the end cross bars 38 are preferably offset downwardly so as not to unnecessarily limit downward movement of the end springs of the group of springs 25.

It will be understood that the frame, the wire screen and the pad together constitute a floating or yieldable support for the springs 25, and the present invention contemplates the provision of means for adjusting the yieldability of this support. For this purpose shafts 40 are provided, there being preferably two of these shafts, one disposed adjacent each end of the floating support above referred to. Since these shafts and their associated mechanisms are identical in construction, only one of the shafts will be described, and while only two of the shafts are shown, it is to be understood that if desired more of these shafts may be associated with the cushion construction.

Each shaft is journaled at its ends in suitable supporting brackets 41, these brackets being suitably fixed to the border base frame 19. Fixed to the shaft 40 substantially centrally thereof as by a pin 42, is a collar 43 provided with a radial flange 44. Coiled about the shaft 40 on opposite sides of the collar 43 are springs 45, these springs having their adjacent ends anchored in slots 46 formed in the flange 44.

These springs are torsion springs, and the free end of each spring is secured to the hub 50 of an arm 51, it being understood that there are two arms 51 and that the hub of each of these arms is rotatably mounted on shaft 40. These hubs are disposed adjacent opposite ends of the shaft 40 and the torsion springs 45 work in opposite directions so as to urge these arms 51 upwardly or in the direction of the arrow in Fig. 3 of the drawings.

Pivotally secured to the end of each arm 51 is a link 52, and each link is pivotally connected as by a pin 53 to the adjacent portion of one of the

side frame members 37. It will be noted that the web of each frame member is preferably cut away as at 54 adjacent each point of attachment of a link 52 to the frame member to provide for free pivotal movement of the links 52.

With the structure as thus far described, it will be understood that the springs 45 will urge the arms 51 and the links 52 upwardly, and since the links 52 constitute the sole support for the floating frame, the springs 45 constitute a means to yieldably support this frame. It will be further apparent that if the shaft 40 is rotated, the force of the springs 45 may be adjusted to either increase or decrease their yieldability as a support for the frame.

For the purpose of accomplishing this adjustment, there is preferably fixed to one end of the shaft a worm wheel 55, and arranged for engagement with this worm wheel is a worm 56 formed on the end of a shaft 57. This shaft is extended to project through one end of the cushion construction and is provided on its end with a knob or the like 58 by which the shaft may be rotated.

To increase the yieldability or flexibility of the supporting means, there is preferably provided a counterbalancing spring which acts mainly when the levers 51 are in their uppermost position. Thus there is secured to each hub 50 a hook or the like 60, and secured to each of these hooks is a tension spring or the like 61 which tends to rotate the hub 50 against the action of its respective spring 45. Thus it will be understood that when the cushion is only lightly loaded, the force of the springs 45 will be partially counterbalanced by the springs 61 so that the support for the springs 25 will be quite yieldable. As, however, the springs 25 are forced downwardly, the force exerted by the counterbalancing springs will be relieved, and the supporting frame will be supported only by the springs 45.

In use it will be understood that the spring unit including the border springs 17 and the springs 25 will be suitably covered by padding or the like 65 and an upholstery cover 66. With the seat cushion installed in a vehicle seat, if a heavy person desires to use the seat, he may adjust the shafts 40 to increase the force exerted by the springs 45 and to thus decrease the yieldability of the support for the springs 25. The cushion will thus be made relatively firm and more comfortable for the heavy person. If, however, a lighter person desires to use the seat, he may rotate the shafts 40 to reduce the force exerted by the springs 45, with the result that the cushion will be made softer and more comfortable for the lighter person. The initial compression of the springs 25 will be absorbed by the springs themselves, but as these springs are forced downwardly the yieldable support moves downwardly against the force exerted by the springs 45. Further, during the initial downward movement of the support the force of the springs 45 is partially balanced by the springs 61, these latter springs, however, becoming inoperative upon a predetermined downward movement of the support. Even when the springs 45 are under compression, that is, when they are carrying the weight of a heavy person, they are not near the limits of their yieldability, thus giving the person a soft flexible ride even over a very rough road.

As illustrated, two of the shafts 40 are provided, and these shafts may be separately adjusted to separately adjust the springs 45 carried thereby. Thus one end of the seat cushion may be made relatively firm or soft as compared to the

other end of the cushion by adjustment of one only of the shafts 40. It will be understood that if one of the shafts only is adjusted the entire floating support will be slightly tilted, pivoting on the unadjusted supporting links 52 as a fulcrum.

In Figs. 6 and 7 a slightly modified form of construction is disclosed in which the center springs 25^a are surrounded by the border springs 17^a, these latter springs resting as in the first instance on a border frame 19^a. The center springs 25^a are relatively short in length and are supported on a floating support designated generally by the reference character 70. This support comprises a pad or the like 35^a which is supported on cross bars 71. These bars are in turn integrally connected by a longitudinally extending channel member 72 which is secured to the cross members in any desired manner as, for example, by welding or the like.

Rotatably supported below the support 70 are shafts 40^a, and fixed to each shaft is a worm wheel 55^a adapted to be rotated by a worm 56^a fixed on the end of an actuating rod 57^a.

In this instance, however, there is rotatably supported on each shaft a lever 51^a, this lever being disposed centrally of the shaft and there being only one of these levers rather than two of the same disposed at the ends of the shaft. Torsion springs 45^a coiled on the shaft 40^a are secured at their opposite ends to collars 75 and 76 fixed to the shaft, the latter collar being preferably integral with the worm wheel 55^a. The hub 50^a of the lever 51^a is provided with slots 77 in which the adjacent ends of the springs 45^a are anchored. Pivotaly secured to the end of the lever 51^a is a link 52^a which is pivotaly connected as by a pin 53^a to the channel member 72.

It will be understood that the levers 51^a and the springs 45^a constitute means for yieldably supporting the support 70. The force exerted by the springs 45^a may be adjusted by rotating the shaft 40^a, rotation of the shaft in one direction tending to wind the springs and rotation of the shaft in the other direction acting to unwind the springs. As in the first described form of construction, counterbalancing springs of any desired type may be associated with the levers 51^a for counterbalancing the springs 45^a.

In Figs. 8 to 10, inclusive, a further modification of the inventive idea is disclosed as comprising a floating support 90 for supporting the springs 25^b. In this case the support 90 comprises a suitable pad or the like 91 which in turn is supported on cross channel members 92. Fixed to the under faces of these channel members are longitudinally extending rods 93, there being preferably two of these rods and these rods being circular in cross sectional shape.

The cushion is provided with a border base frame 19^b, and fixed to this base frame and extending transversely of the cushion are rods 94. Two of these rods are provided, one being disposed adjacent either end of the cushion, and rotatably mounted on each rod is the hub 95 of a lever 96. Each lever is prevented from movement longitudinally of its respective supporting rod by collars 97 fixed to the rod on opposite sides of the hub of the lever.

Each lever carries at its upper end a cross arm 98, and rotatably journaled on each cross arm are rollers 99 arranged to roll on the rods or tracks 93.

Spanning the chamber 26^b and disposed between the rods 94 are supports 100, there being

two of these supports. Fixed at its ends to these supports and spanning the space between the same is a plate-like supporting member 101. This supporting member is provided with a central body portion 102 offset upwardly from the supports 100, the plate-like member being provided with inclined portions 103 connecting the supporting flanges 104 thereof to the body portion 102. This body portion is provided on one side with a downwardly extending flange 105.

Rotatably journaled in each inclined portion 103 of the plate 101 is a stem or stud 110 which is fixedly secured against rotation to one end of a spring 111. The opposite end of the spring is secured to an ear 112 formed on the side of its adjacent lever 96.

Threaded on the stem 110 is a pinion 113 having a beveled portion arranged to engage a beveled pinion 114 secured to the end of a rod 115. The rod extends forwardly through the front of the cushion and is provided with a suitable actuating knob or the like 116.

It will be understood that as the rods 115 are rotated, the pinions 113 will be threadedly adjusted on the studs 110 to move these studs longitudinally and to thus adjust the tension of their respective springs 111. It will be understood that the springs 111 constitute the yieldable means supporting the support 90 so that adjustment of these springs will vary the yieldability of the support. As in the first described form of construction, either one or both of the springs 111 may be adjusted, the entire support fulcruming about one set of rollers 99 if one spring only is adjusted.

In use it will be apparent that the yieldability of the support may be adjusted to vary the firmness of the cushion. When the center springs 25^b are forced downwardly, the downward movement of the support will be resiliently resisted by the springs 111, the rollers 99 rolling on the rods 93 during downward movement of the support. As in the first described form of construction, suitable counterbalancing springs may be associated with the levers 96 if desired.

In Fig. 11 a slightly modified form of supporting frame is disclosed, which frame may be substituted for the frame disclosed in the previously described forms of construction. This frame is designated generally by the reference character 121 and comprises longitudinally extending side members 122 and transversely extending end members 117, these members being preferably integral and being U-shaped in cross section with the open part of the U facing upwardly. Imbedded in the U-shaped frame is a packing of fibrous material 118 to which the screen 119 on which the springs are supported may be readily secured as by staples or the like 120.

In this form of construction it is preferable to provide the longitudinally extending side frame members with upwardly offset portions 125 to which ears 126 are secured for supporting the pivot pin (not shown) to which the supporting links for the frame are connected.

It will be understood that this last described supporting frame may be associated with any of the constructions previously described, being adapted more particularly for incorporation in the construction disclosed in Figs. 1 to 4, inclusive, of the drawings. The last described frame member possesses the advantage that by exposing the packing of fibrous material in the manner described, a supporting screen may be easily secured to this frame member.

From the above it will be apparent that the invention provides a spring unit formed of a plurality of coil springs or the like and having means providing a yieldable support for certain of these springs. The yieldability of the support may be readily adjusted so that the firmness of the cushion may be varied. The adjustment is such that it is readily accessible and may therefore be made during use of the seat.

While the invention has been described with some detail, it is to be understood that the description is for the purposes of illustration only and is not definitive of the limits of the inventive idea. The right is reserved to make such changes in the details of construction and arrangement of parts as will fall within the purview of the attached claims.

What we claim as our invention is:

1. In a cushion construction, a plurality of coil springs grouped to form a unit, means including a shaft and a pair of torsional springs on said shaft providing a yieldable support for said springs, and means projecting beyond one edge of said cushion for rotating said shaft to adjust said torsional springs to vary the yieldability of the support for said coil springs.

2. In a cushion construction, a plurality of coil springs grouped to form a unit, a frame disposed below said group of coil springs, a screen secured to said frame and constituting a support for said coil springs, the cross members of said frame at the ends thereof being downwardly offset, and means for supporting said frame including a shaft disposed below said frame, a pair of levers rotatably mounted on said shaft, links connecting said levers to said frame for supporting the latter from the former, torsional springs on said shaft, each of said springs having one end secured to one of said levers, a collar fixed to said shaft, each of said springs having its other end fixed to said collar, and means for rotating said shaft to adjust the torsional springs on said shaft to vary the force with which they act on said levers.

3. In a cushion construction, a plurality of springs grouped to form a unit, a series of border springs surrounding said group of springs, a rigid support for the lower ends of said border springs, an upholstery cover secured to said rigid support and enclosing said border springs and said group of springs, a yieldable support for the lower ends of said group of springs, and means for adjusting the yieldability of said support.

4. In a cushion construction, a plurality of springs grouped to form a unit, an upholstery cover engaging the tops of said springs for restraining the springs against vertical movement, a rigid support for the bases of certain of the springs of the unit, the said upholstery cover being secured at its edges to said rigid support, a yieldable support for the bases of the remaining springs of the unit, and resilient means act-

ing on said yieldable support and being operable to vary the yieldability of said support and to adjust said support to vary the initial compression of the springs supported thereby.

5. In a cushion construction, a base frame, border springs supported on the base frame, a group of springs of less height than the border springs disposed within the border springs, the upper ends of said last mentioned springs being disposed in substantially the plane of said border springs whereby a space is provided within said border springs and below said group of springs of less height, a platform on which the lower ends of said group of springs of less height are supported, pivoted levers disposed in the space below said group of springs for supporting said platform, resilient means acting on said levers to urge the same to their supporting positions, and means for adjusting said resilient means to vary the force exerted by said levers on said platform.

6. In a cushion construction, a base frame, border springs supported on the base frame, a group of springs disposed within the border springs, the upper ends of said last mentioned springs being disposed in substantially the plane of the upper ends of said border springs, yieldable means constituting the sole support for the lower ends of said group of springs, and means for adjusting the yieldability of said yieldable means.

7. In a cushion construction, a base frame, border springs supported on said base frame, a group of springs of less height than the border springs disposed within the border springs, the upper ends of said last mentioned springs being disposed in substantially the plane of the upper ends of said border springs whereby a space is provided within said border springs and below said group of springs of less height, a platform on which the lower ends of said group of springs of less height are supported, yieldable means constituting the sole support for said platform, and means for adjusting the yieldability of said yieldable means.

8. In a cushion construction, a base frame, border springs supported on the base frame, a group of springs of less height than the border springs disposed within the border springs, the upper ends of said last mentioned springs being disposed in substantially the plane of the upper ends of said border springs whereby a space is provided within said border springs and below said group of springs of less height, a platform on which the lower ends of said group of springs of less height are supported, resilient means disposed in the space below said group of springs for supporting said platform, and means for adjusting said resilient means to vary the force exerted thereby on said platform.

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