

Nov. 26, 1929.

W. W. DOTY

1,737,112

CUSHION SPRING

Filed Aug. 28, 1926

2 Sheets-Sheet 1

**Fig. 1**

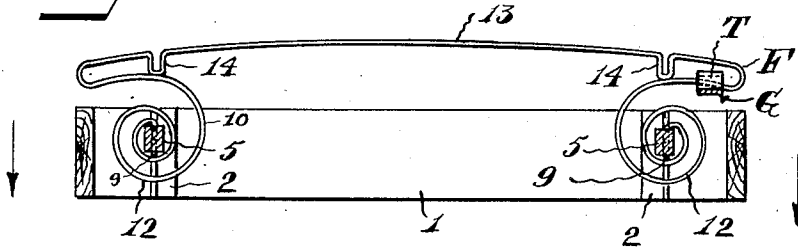


**Fig. 2**

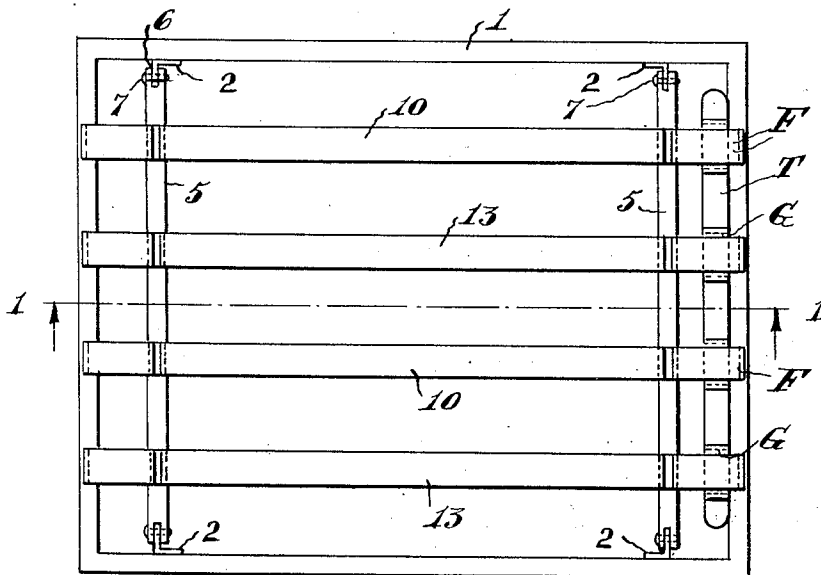


**Fig. 3**

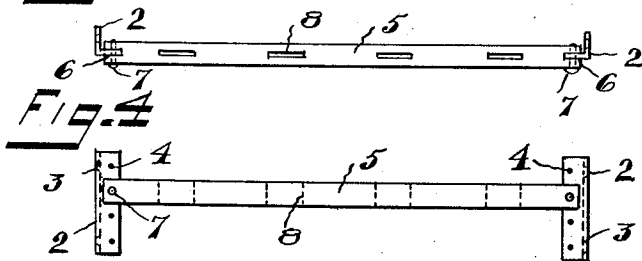


**Fig. 4**

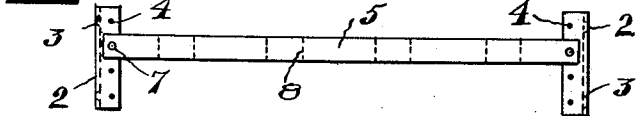


**Fig. 2<sup>a</sup>**



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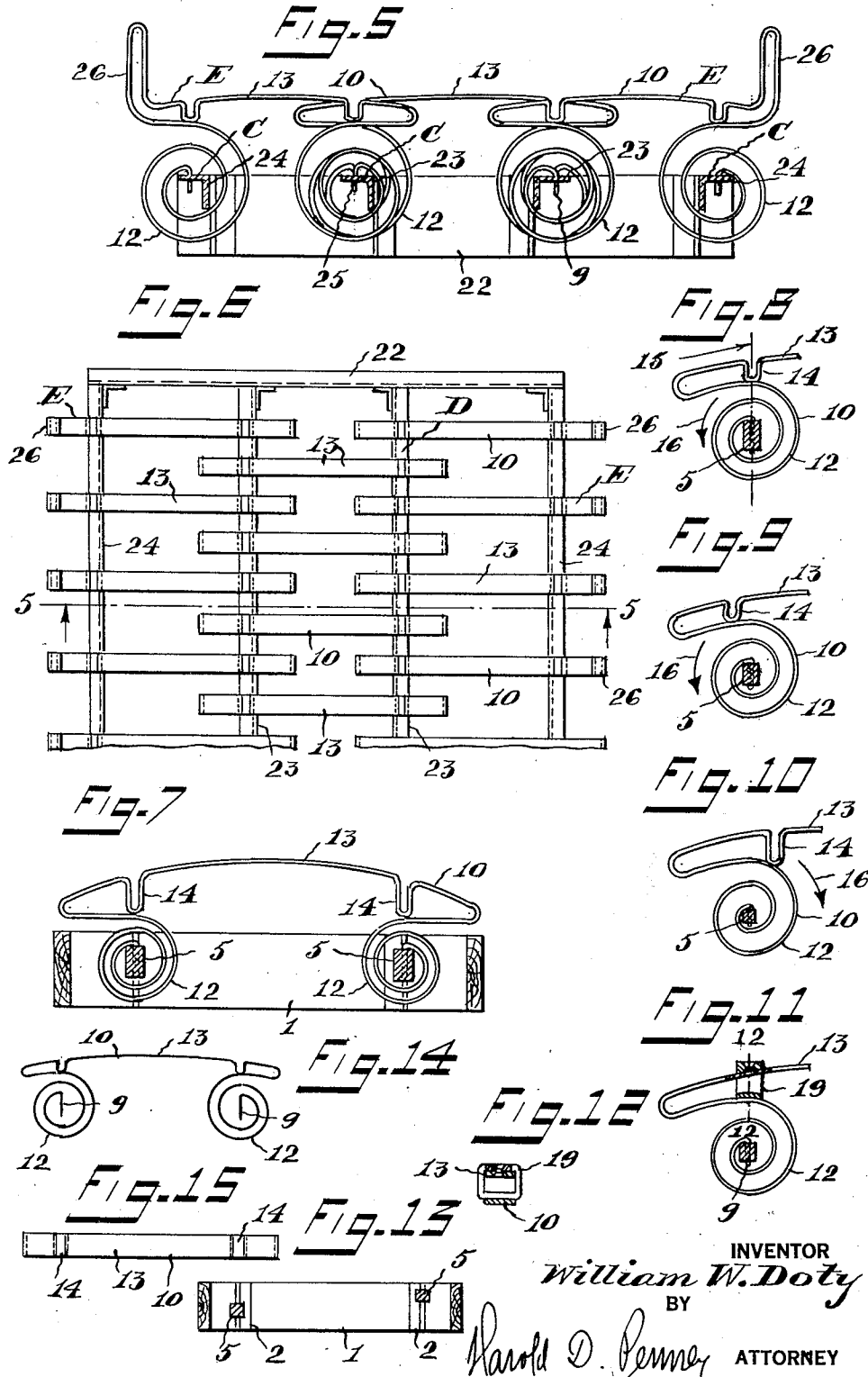
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## UNITED STATES PATENT OFFICE

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## CUSHION SPRING

Application filed August 28, 1926. Serial No. 132,230.

My present invention relates to an improvement in cushion springs for general use but more especially I find them extremely useful for cushions for road vehicles, generally, and automobiles, in particular. It is to be pointed out, however, that my invention is adaptable to a large number of uses to which cushion or shock absorption springs may be put.

10 In some respects my spring and its aggregation as a seat cushion is somewhat similar to that shown in my copending application Serial #598,721 filed November 3rd, 1922.

15 One of the outstanding advantages of my cushion, as assembled, is that, when arranged as a back support, it is so resilient and contoured as to fit well into the back of the user and thereby support the same in a comfortable manner, and at the same time act as a  
20 so-called "kidney back" wherein this organ is protected against undue jar.

When used as a seat cushion, in conjunction with the back, the assembly forms a perfect protection against jolts of whatever  
25 severity, or direction, and protects the under part of the legs from becoming tired or cramped, due to the large amount of overhang over the front of the seat frame, something which has been difficult of accomplishment heretofore.

Another advantage is the manner in which the spring elements are tied together in assembly to cause them to co-ordinate in function as a cushion.

35 Another advantage is the simple manner by which such assembly may be accomplished, and the rapidity of the same, which, further, permits economical manufacture, and easy repair and replacement should this  
40 be necessary.

A further advantage will be noted in the provision of means whereby adjustment may be made during assembly, to cause the spring elements to react under load and shock differently, under varied conditions of use and requirement.

50 Owing to all of the foregoing features and the structural simplicity of my complete cushion a greater economy of labor and material is effected in manufacture, and with-

out materially altering the present standard methods of upholstering and finishing, now in vogue.

In some of the modified uses, such as a spring mattress support for couches, beds  
55 and the like, a rigid mattress frame is provided unlike the standards now in use, and it will be noted that the rigid frame thereof is guarded by the spring overhang, and that, in addition, these spring elements provide  
60 means for supporting an independently mounted, stuffed mattress, which may be easily turned, as in a bed, and which mattress will be protected against sagging all about its exposed outer edges, and prevented from  
65 sliding out of place, thereby acting as a mattress retaining means, as well as a support.

Another advantage of my construction is the manner in which the seat plane of the  
70 springs may be varied in tension and inclination of plane, thereby to adjust to any desired load or bodily comfort and contour.

A further advantage lies in the fact that my springs are preferably, though not  
75 necessarily, made of wide flat spring metal, which gives a comparatively wide area of contact with the upholstery and padding, thereby eliminating a tendency of the springs to cut or wear through the cushioning fabrics.

80 A further advantage lies in the dual shock absorbing means provided, inasmuch as the spring has component major and minor load and shock absorbing elements, combined.

In the drawings accompanying

85 Fig. 1 is a sectional view of one complete form of assembly taken on line 1—1 of Fig. 2;

Fig. 2 is a plan view thereof, looking in the direction of the arrows of Fig. 1; Fig.  
90 2<sup>a</sup> is a perspective view of the spring tie;

Fig. 3 is a plan view of one of the spring supports;

Fig. 4 is a side view thereof;

Fig. 5 is a sectional view of my device, as  
95 a compound cushion member applicable to bed structures, taken on the line 5—5, Fig. 6, looking in the direction of the arrows;

Fig. 6 is a fragmentary plan view thereof;

Fig. 7 is a sectional view, similar to Fig. 1, 100

showing spring support adjustment, for tension variation;

Figs. 8 to 11 are fragmentary views showing means for varying the winding direction and tension of the springs;

Fig. 12 is a sectional view of a spring clip, taken on the line 12—12 Fig. 11;

Fig. 13 is a sectional view similar to Fig. 1, showing certain adjustment of the spring supports to cause inclination of the seat plane;

Fig. 14 is a side elevation of a characteristic form of my spring and

Fig. 15 is a plan view thereof showing the wide flat area presented to the seat.

My device comprises an outer frame 1, preferably of wood, of any desired rectangular form, and has oppositely located spring support brackets 2, screwed or otherwise affixed thereto, see Figs. 1 to 4.

These brackets are of drilled angle iron, or equivalents, and are provided with screw holes 3, and a series of support adjusting holes 4.

The spring supports 5 are in the form of metal rods 5, which are bifurcated at their ends as at 6, Figs. 3 and 4, to embrace one web of the angle brackets or both sides, and these ends 6 are drilled to receive therein a pin 7, which when introduced therein holds the support bars 5 in opposite alinement with the angle brackets 2, substantially flush or in plane with the top of the seat frame 1. In some instances it may be desirable to set one of the supports 5 at a lower plane than the other, and the plurality of holes 4, permits of this, see Fig. 13, so as to cause the seat plane to be inclined, or to permit of raising and lowering of the seat plane relative to the top of the frame 1, as desired.

The supports 5 are also provided with a series of slots 8, Fig. 3, through their vertical sections, these slots acting as a seat and registering means for the reception therein and to operatively hold the interior tang 9 of the spiral springs 10. The purpose of the tang and slot is, obviously, to form a connecting seat means between the two members which will allow of a quick, rigid and adjustable assembly of the same.

The spring elements, 10 comprise a single unit of preferably wide, flat, tempered metal, having its ends wound into opposed spirals 12, 12, the interior ends of the spirals terminating in a straight tang, pointed in opposite direction to the load. The spirals are preferably joined by an integral lateral band 13 which joins an extension of the outer largest coil of the spirals. This outer band is resilient of itself, due to its length, and while it is capable of absorbing, initially, light shocks, heavier shocks cause it to transfer its overload to the spiral end members 12—12 causing them to deflect also, and to

wind or unwind, as will be later described, to

absorb the load. Thus it will be seen that the cumulative shock is distributed by two elements of the spring in three ways, (1) by the lateral member 13 absorbing the light shocks, (2) by the deflection or distortion of the spirals and (3) by the rolling or unrolling of the spirals against each other, or in opposition.

The foregoing action is not only cumulative, but the recovery of the springs is easy, without jar or shock, and the spring readily adapts itself to a given load and maintains the same with a minimum of unpleasant vibration action.

The wide flat lateral 13, and its long resilient length, under tension, in operative position as a seat back adjusts itself perfectly to the "small" of the back of the user, and gives conformable, comfortable support to the region of the kidneys. In conjunction with the seat cushion, the combination of the two give a maximum of comfort with a minimum of jar, whatever the direction of vibration.

In the assembly of the preferred form shown in Figs. 1, 2, 7 and 13, the angle brackets 2 are affixed to the frame 1, as shown, by screws or otherwise, and the spring support bars 5 are positioned at a desired level to the upper face of the frame 1, pins are inserted through the holes in the bars 5 and the brackets 2, thereby locking these in operative position. This assembly is then ready for the setting of the springs 10, which are set on the supports or bars 5 by inserting the tangs 9 in slots 7 until the inner coil of the spiral rests thereon.

The structure is then ready for the usual padding and finishing. It may be desirable in some instances to cause the front end of the seat or back to be inclined to the frame thereof, and this may be done as exemplified in Fig. 13 in which view the one support 5 is shown lower or higher than the other by the expedient of using an upper or lower hole 4 in the bracket 2.

It is also, sometimes, desirable to increase the crown and consequently the tension or resistance of the spring to its load, using a standard type of spring, and this is accomplished by setting the brackets 2 closer together, as in Fig. 1, bringing the supports 5 closer to each other and thereby causing the lateral 13 to be bowed upwardly, increasing its resistance to a given load.

It will be noted that these and various following modifications of load resistance may be all accomplished with one standard type of spring element.

As another means, and the preferred form, of varying the resistance to load, reference may be had to Figs. 8 to 11 inclusive, wherein there is disclosed a means whereby to modify the action of the spirals 12. Fig. 8 shows a contacting indent 14 in the lateral element

13, which bears downwardly and contacts with the outer loop of the spiral, in the present instance at the vertical axis 15, which is directly over the tang 9 in the slotted support. This causes the spiral to wind up in the direction of the arrow 16, and makes a soft resistance to load.

Fig. 9 shows the contact 14 shifted to the left of the axis 15, as at 17, which quickens the action of winding the spiral in the direction of the arrow 16, for the same purpose as above described.

Fig. 10 shows the same kind of indented contact 14, shifted to the right of the axis 15, as at 18, causing the spiral to unwind under load, and giving a stiffer resistance to load, inasmuch as it tends to bow the lateral 13 upwardly when the opposite spirals oppose one another in action.

In Figs. 11 and 12 there are shown a modified equivalent 19 of the indents 14, comprising a rectangular thimble or sleeve which may adjustably engage the lateral 13 and the outer loop of the spiral 12, and by placing this at the desired positions indicated in Figs. 8 to 10 inclusive, modified action of the spirals is accomplished as described for the latter figures. To disclose another adaptation of my spring there is shown in Fig. 5 a bed spring comprising an outer metal frame 22 of the usual angle iron construction, having a plurality of longitudinal supports 23 of angle iron, these all being riveted or welded together to form a rigid interiorly reinforced frame.

The uppermost web C of the four longitudinal members, including the side frame members 24 are slotted at equidistant points as at 25. These slots, as described for Fig. 3 receive the tang 9 of the spirals 12—12, in order to mount the springs, as previously described.

The springs 10 it will be noted, are alternated in their setting upon the supports 23 and sides 24, causing the ends thereof to pass one another at the points of mounting as at D, Fig. 6, leaving the springs in somewhat staggered relation to one another, but in general, forming a wide resilient mattress surface, whereby to receive and support thereon a stuffed mattress, not shown.

In addition to the foregoing, the outer rows E of the springs 10, at the point of joining of the lateral 13 and the outer coil of the spiral 12, is developed into an integral upstanding return bend 26, and as these are only arranged on the outside coil of each of the outside springs, the effect is to create a series of upstanding guards which hold the stuffed mattress in position upon the complete spring structure and prevent it from sliding off.

The action of the springs, as above utilized, is the same as described for the previous disclosures.

As a means for tying the upstanding

springs together, when in assembly as in Fig. 2, to prevent side movement under load, and at the same time permit free, independent movement of each spring, I have found it desirable to place a transverse spring tie, generally denoted by T, Fig. 2<sup>a</sup>, at the outer ends of the springs as at F, Fig. 2, and preferably at only one end thereof, to serve this purpose.

This tie may be made of stock similar to the springs themselves and is provided with a series of indented seats G, Fig. 2<sup>a</sup>, which register with and engage the spring ends, as shown in Figs. 1 and 2. Thus the springs are all tied together for the prevention of ducking under load, with freedom for individual movement. These ties, in some instances, may be riveted to some of the springs, to maintain operative association therewith, although this is not shown.

Obvious modifications may be made or equivalents substituted, in the structure herein set forth without departing from the spirit of the invention or the scope of the appended claims.

Having thus described my invention what I claim is:

1. A resilient cushion support of the class described, comprising a rigid frame, supports in said frame, spiral ended springs located in said supports, said spiral ends having upstanding guards thereon whereby to resiliently and locatably support a cushion mattress.

2. A resilient cushion support of the class described, comprising an outer frame, notched supports in said frame, spiral ended springs located in the notches of said supports, said spiral ends having upstanding overhanging extension guards thereon whereby to resiliently and locatably support a cushion mattress.

3. In a cushioning support, in combination, a frame, spring supports, means associated with said supports to adjustably position said support relative to said frames, springs, and means for securing the springs to said supports, said springs including coiled spring portions disposed in aligned spaced relation, the coils of said spring portions being wound reversely, the outer ends of the outermost coils of the spring portions extending outwardly and having connected extensions of said ends forming a load receiving portion of the springs, said securing means securing the inner ends of the innermost coils of the spring portions to said supports, pressure on said load receiving portion causing the coils of the spring portions to wind up in opposite directions, and means associated with said load receiving portions to resiliently and locatably support a cushion mattress on said springs.

4. In a cushioning support, in combination, a frame, springs, and means for securing the springs to said frame, said springs including

coiled spring portions disposed in alined spaced relation, the coils of the spring portions being wound in opposite directions, the outer ends of the outermost coils of the spring portions extending outwardly for a distance  
 5 in a plane substantially at right angles to the line of the vertical axis of the coils and bent reversely and extending inwardly in a plane above and substantially parallel to the plane  
 10 of said outward extensions and connected and forming a load receiving portion of the springs, said securing means securing the inner ends of the innermost coils of the spring portions to said frame, pressure on said load  
 15 receiving portion causing winding up of the coils of the spring portions in opposite directions.

5. In a cushioning support, springs having alined spring portions spaced apart and including coils wound in opposite directions, the outer ends of the outermost coils of the spring portions being located in a plane above the outer ends of the innermost coils of the spring portions, the outer ends of said outermost coils extending outwardly and having  
 20 connected extensions thereof forming a load receiving portion of the springs whereby pressure on said load receiving portion winds up the coils of the spring portions in opposite directions and away from the direction  
 25 of the application of the load on said load receiving portion.

6. In a cushioning support, springs having alined spring portions spaced apart and including coils wound in opposite directions, the outermost coil of each spring portion having a substantially straight outer end extending outwardly relative to the line of the vertical axis of the coils, said extended  
 30 outer ends of the spring portions being bent reversely and having connected inward extensions thereof forming a load receiving portion of the springs whereby pressure on said load receiving portion winds up the coils  
 35 of said spring portion in opposite directions.

7. In a cushioning support, in combination, springs including coiled spring portions disposed in alined spaced relation, the coils of said spring portions being wound reversely, the outer ends of the outermost coils of the spring portions being extended and connected  
 40 for providing a load receiving portion of the springs whereby pressure on said load receiving portion winds up the coils of said spring portions in opposite directions, and means cooperating between said load receiving portion and the outer ends of the outermost coils of the spring portions for varying the resistance of the coils to the pressure on  
 45 said load receiving portion.

8. In a cushioning support, in combination, springs including coiled spring portions disposed in alined spaced relation, the coils of the spring portions being wound reversely, the outer ends of the outermost coils of the

spring portions being extended and connected and forming a load receiving portion of the springs whereby pressure on said load receiving portion winds up the coils of the spring portions in opposite directions, and means associated with said load receiving portion and contacting the outer ends of the outermost coils of the spring portions for varying the resistance of the coils to the pressure on said load receiving portion.  
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9. In a cushioning support, in combination, springs including coiled spring portions disposed in alined spaced relation, the coils of the spring portions being wound reversely, the outer ends of the outermost coils of the spring portions being extended and connected and forming a load receiving portion of the springs whereby pressure on said load receiving portion winds up the coils of the spring portions in opposite directions, and means cooperating between said load receiving portion and the outer ends of the outermost coils of the spring portions at points on said outermost ends located substantially in the line of the vertical axis of the coils  
 75 for varying the resistance of the coils to the pressure on said load receiving portion.  
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10. In a cushion support, in combination, a frame, supporting brackets on the frame, spring supports secured at their ends to said brackets, and spring elements disposed on said spring supports transversely thereof in parallel spaced relation, each of said spring elements embodying coiled spring portions disposed in alined spaced relation, the coils of said portions being wound reversely and the inner ends of the innermost coils being secured to said spring supports, the outer ends of the outermost coils of the spring portions extending outwardly relative to the line of the vertical axis of the coils and bent reversely and extending inwardly and connected and forming a load receiving portion of the spring element whereby pressure on said load receiving portion winds up the coils of the spring portions in opposite directions.  
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11. In a cushion support, in combination, a frame, supporting brackets on the frame, spring supports secured at their ends to said brackets, and spring elements disposed on said spring supports transversely thereof in parallel spaced relation, each of said spring elements embodying coiled spring portions disposed in alined spaced relations, the coils of said portions being wound reversely and the inner ends of the innermost coils being secured to said spring supports, the outer ends of the outermost coils of the spring portions extending outwardly relative to the line of the vertical axis of the coils and bent reversely and extending inwardly and connected and forming a load receiving portion of the spring element whereby pressure on said load receiving portion winds up the coils of the spring portions in opposite directions, said  
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load receiving portion having appurtenant thereto means cooperating with the outer ends of the outermost coils of the spring portions for varying the resistance of the coils to the pressure on said load receiving portion.

12. In a cushion support in combination, a frame, supporting brackets on the frame, spring supports secured at their ends to said brackets, and spring elements disposed on said spring supports transversely thereof in parallel spaced relation, each of said spring elements embodying coiled spring portions disposed in alined spaced relation, the coils of said portions being wound reversely and the inner ends of the innermost coils being secured to said spring supports, the outer ends of the outermost coils of the spring portions extending outwardly relative to the line of the vertical axis of the coils and bent reversely and extending inwardly and connected and forming a load receiving portion of the spring element whereby pressure on said load receiving portion winds up the coils of the spring portions in opposite directions, and means engaging the extended outer ends of the outermost coils of the spring portions transversely of said ends for preventing lateral movement of the spring portions under pressure.

13. In a cushioning support spring elements including coiled spring portions having outer ends of the coils thereof extended and connected and forming primary shock absorbing portions of the spring elements and means associated with said primary shock absorbing portions and contacting with said outer ends of said coils for varying the resistance of the coils to shock transmitted thereto.

14. In a cushioning support, in combination, spring elements including coiled spring portions having outer ends of the coils thereof extended and connected and forming primary shock absorbing portions of the spring elements that transmit the shock from said absorbing portions to said coils, and means cooperating between said shock absorbing portions and said outer ends of the coils for varying the resistance of the coils to the shock transmitted to the coils by the shock absorbing portions.

Signed at New York, in the county of New York and State of New York, this 27th day of August, A. D. 1926.

WILLIAM W. DOTY.