Jan. 9, 1940. R. W. LOTZ 2,186,548

SPRING ASSEMBLY FOR UPHOLSTERY

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Fig. 1.

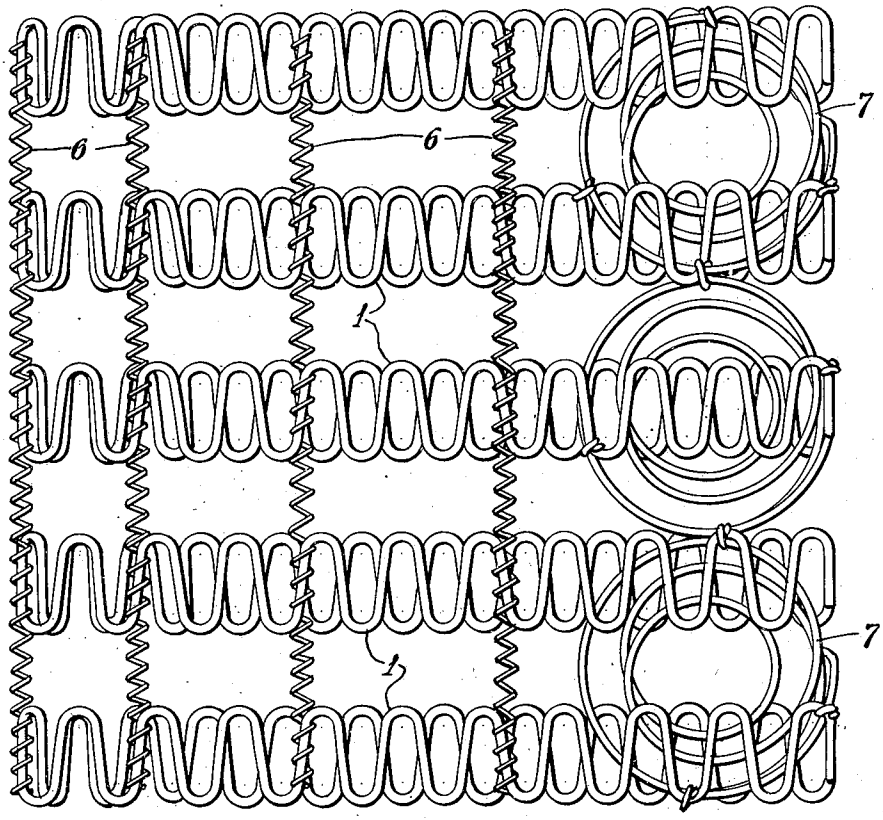
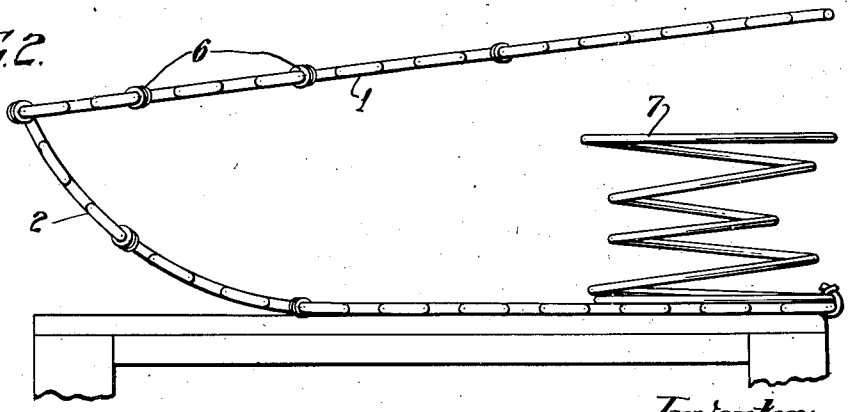


Fig. 2.



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Fig. 3

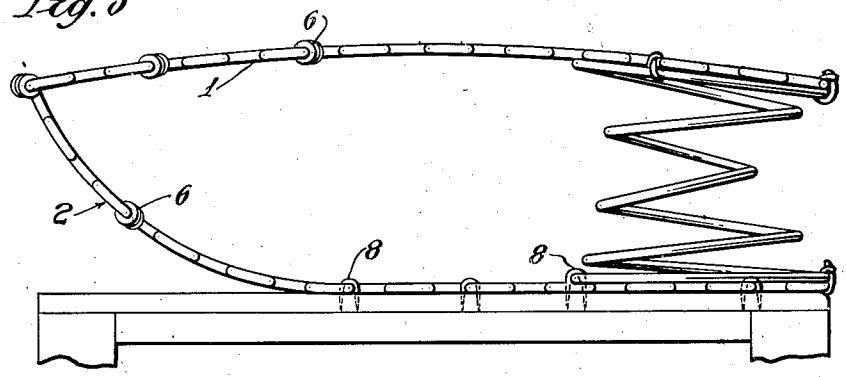


Fig. 4

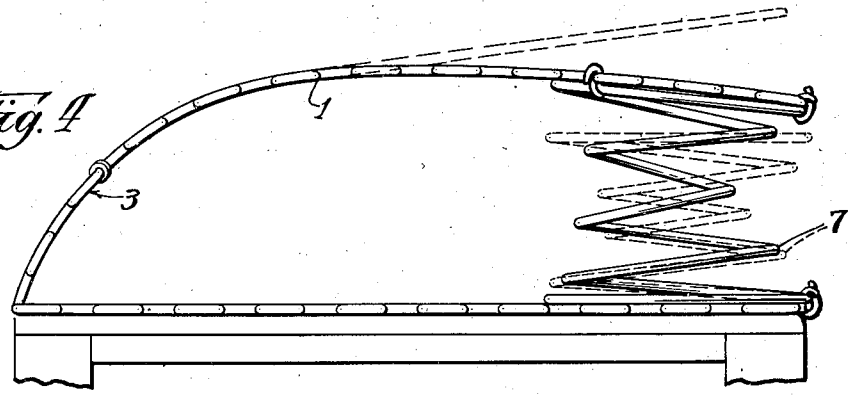
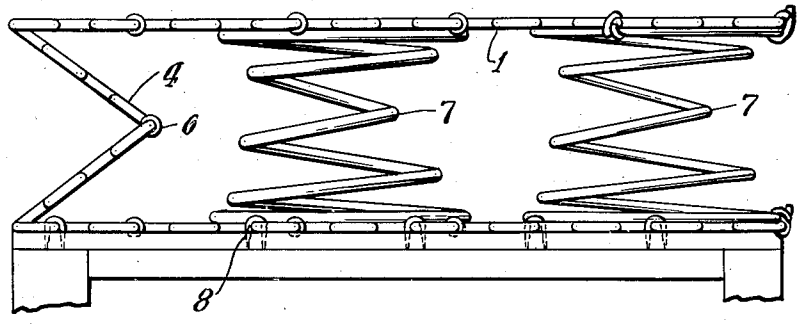


Fig. 5.



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UNITED STATES PATENT OFFICE

2,186,548

SPRING ASSEMBLY FOR UPHOLSTERY

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Application June 18, 1936, Serial No. 85,899

5 Claims. (Cl. 155—179)

The main object of the present invention is to provide a spring assembly adapted for seat cushions, generally, and automobile seat cushions in particular, wherein two sets of opposed and counteracting spring elements are employed, one of said sets of spring elements constituting a pad support and being normally very elastic so as to yield easily to load and to the variations in load due to the jolting of the vehicle in travel; the other set of spring elements acting normally to exert a constant yielding force on said pad supporting set to effect the equivalent of a partial compression thereof to decrease to some extent the normal range of action of the same both downwardly and upwardly and produce a shock absorbing action in the completed structure which serves to effect a very material progressive increase in resistance to downward movement of said pad supporting elements to avoid the well-known "hitting bottom" of automobile seats and the like, progressively increasing resistance to the rebound of the structure following extreme compression under the influence of shock.

Suitable embodiments of the invention are illustrated in the accompanying drawings, wherein—

Fig. 1 is a fragmentary top plan view of a spring assembly constructed in accordance with the invention.

Fig. 2 is a side elevation of the complete assembly.

Fig. 3 is a view similar to Fig. 2 showing the structure after complete assembly thereof.

Fig. 4 is a view similar to Fig. 3 showing the structure in inverted position.

Fig. 5 is a view similar to Fig. 3 showing another form of embodiment of the invention.

The structure, as illustrated, comprises a series of spring members 1 which, preferably, are composed of a resilient wire bent to zig-zag form to constitute the substantial equivalents of flat springs. Each of the spring members 1 is bent between its ends to any one of a plurality of contours such as are shown in 2, 3 and 4, respectively of Figs. 2, 3, 4 and 5 to constitute substantially V-shaped members having divergent arms. These are normally spaced apart along their outer or free end portions as shown in Fig. 2, a distance appreciably greater than the desired spacing apart thereof in the completed structure.

The said members 1 are disposed parallel with each other and in desired spaced relation to each other as shown in Fig. 1. Preferably the bent portions 2, 3 and 4 of the members 1 of the respective Figs. 1, 2, 3, 4 and 5 are suitably coupled with each other as by means of the helicals 6.

Springs 7, which in the instances illustrated, are upholstery or hour-glass springs of a height normally appreciably less than the predetermined height or depth of the completed spring assembly, are interposed between and secured to the outer end portions of the arms of the springs 1, thus drawing and maintaining the same flexed to occupy the desired ultimate relative positions shown in Figs. 3, 4 and 5, respectively, the said spring 7 being partly distended by the counteraction of the springs 1. The springs 7 thus act to produce in the springs 1 the equivalent of a partial compression which renders them stiffer than normal and, therefore, less responsive to load thereon than would be true in the absence of the springs 7. The arms of the springs 1 are thus also bowed appreciably to provide what may be termed a skeleton convex top supporting surface for the customary layer of padding which overlies the springs 1 in a completed cushion.

In the structures of Figs. 1 to 4, inclusive, there is shown only one row of springs 7 at one end of the structure which may be either the front or rear end of the same. In Fig. 5 the structure is illustrated with two rows of springs 7 disposed between the arms of the springs 1 and said number of rows and relative positions of springs 7 may be changed and varied to suit the conditions of use of the structure.

The structures of the several figures of the drawings may also be taken to be only one-half or other fractional part of a complete structure, wherein the springs 1 have the bends 2, 3 and 4 at both ends with springs 7 interposed between said ends, thus to adapt the several structures for incorporation into loose cushions.

As shown in Figs. 3, 4 and 5, the bottom arms of the springs 1 and the lower ends of the springs 7 are secured by means of suitable fastening devices, such as staples 8, to seat frames or other supports as in the case of chairs of certain types wherein the seat cushions are permanently and not removably attached. In instances, the lower terminal coils of the springs 7 may be secured directly to the seat frames or other supports and the portions of the lower arms of the springs 1 to which the springs 7 are secured may be omitted.

The type of bends 2, 3 or 4 selected may be varied to render the edge portions of the completed structure as yielding as desired and to impart to the corresponding edges of the pad and cover whatever contour may be desired. The several modifications of the structures illustrated

to which reference is made hereinabove are believed to be easily comprehensible to persons skilled in the art without resort to illustration thereof.

The action of the spring assembly illustrated and described, when installed in vehicles, is such as to allow for limited down and up movement of the upper arms of the springs 1 without appreciable influence of the springs 7. When the vehicle passes over an appreciable obstruction, however, the said upper arms of the springs 1 will move downwardly to an extent to compress the springs 7 which act then to resist said movement increasingly to an extent which will save the occupant of the cushion from the annoying shock of "hitting bottom." Upon the counteraction or upward movement following sudden compression, the springs 7 will act to reduce and limit upward throw of the occupant of the cushion, the said springs 7 acting then as shock absorbers in both directions.

One of the main advantages of the structure lies in the fact that the springs 7 may be made of appreciably greater load carrying capacity than ordinary without rendering the cushion relatively hard and uncomfortable since they come into action to an apreciable degree under the influence of shock only.

In instances where the bends 2, 3 and 4 of the springs 1 occur at both ends of the structure, the meeting ends of the springs 1 at any selected point or points, will be suitably coupled or joined and in such structures the pad supporting portions of the said springs, at top and bottom will be bowed to a far smaller normal radius than the ultimate shape or contour desired and said bowed portions will be maintained flexed to the desired contour by the interposed springs 7.

I claim as my invention:

1. A spring assembly composed of a plurality of spaced apart resilient approximately V-shaped metal members, and springs connected with and coupling the divergent arms of said strips, said springs being of appreciably less length than the normal width of space between divergent portions of said arms with which they are connected thereby yieldingly maintaining said arms flexed to decrease the normal divergence thereof.

2. A spring assembly composed of a plurality of spaced apart resilient metal members bent between their ends to present outer end portions diverging from each other to a predetermined angle, and upholstery springs of appreciably less length than the spacing apart of the parts of said outer end portions of said members between which said springs are interposed, secured to and coupling said last-named parts and maintaining said end portions of said strips flexed yieldingly to another relative position.

3. A spring assembly composed of a plurality of spaced apart resilient metal members bent between their ends to present outer end portions diverging from each other to a predetermined angle and resilient spring elements of less length than the normal space separating the parts of the end portions of said members between which said spring elements are disposed connected with and coupling said parts and maintaining the same yieldingly flexed to another relative position.

4. A resilient seat unit comprising a rigid seat frame, a strip of resilient metal secured at one end portion to said seat frame, a resilient spring element secured to the seat frame, a portion of said metal strip disposed normally to overhang said element in spaced relation thereto and flexed and secured to said element and yieldingly maintained flexed by the latter while yieldingly distending the same.

5. A resilient metallic cushion construction comprising a series of equal substantially parallel and spaced apart resilient metal members each presenting a bowed middle portion and divergent arms, and resilient elements interposed between and coupling said divergent arms with each other, said elements being of appreciably less normal length than the normal divergence of said arms, whereby the latter are maintained yieldingly flexed to a lesser divergence and, in turn, maintain said elements yieldingly distended.

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