

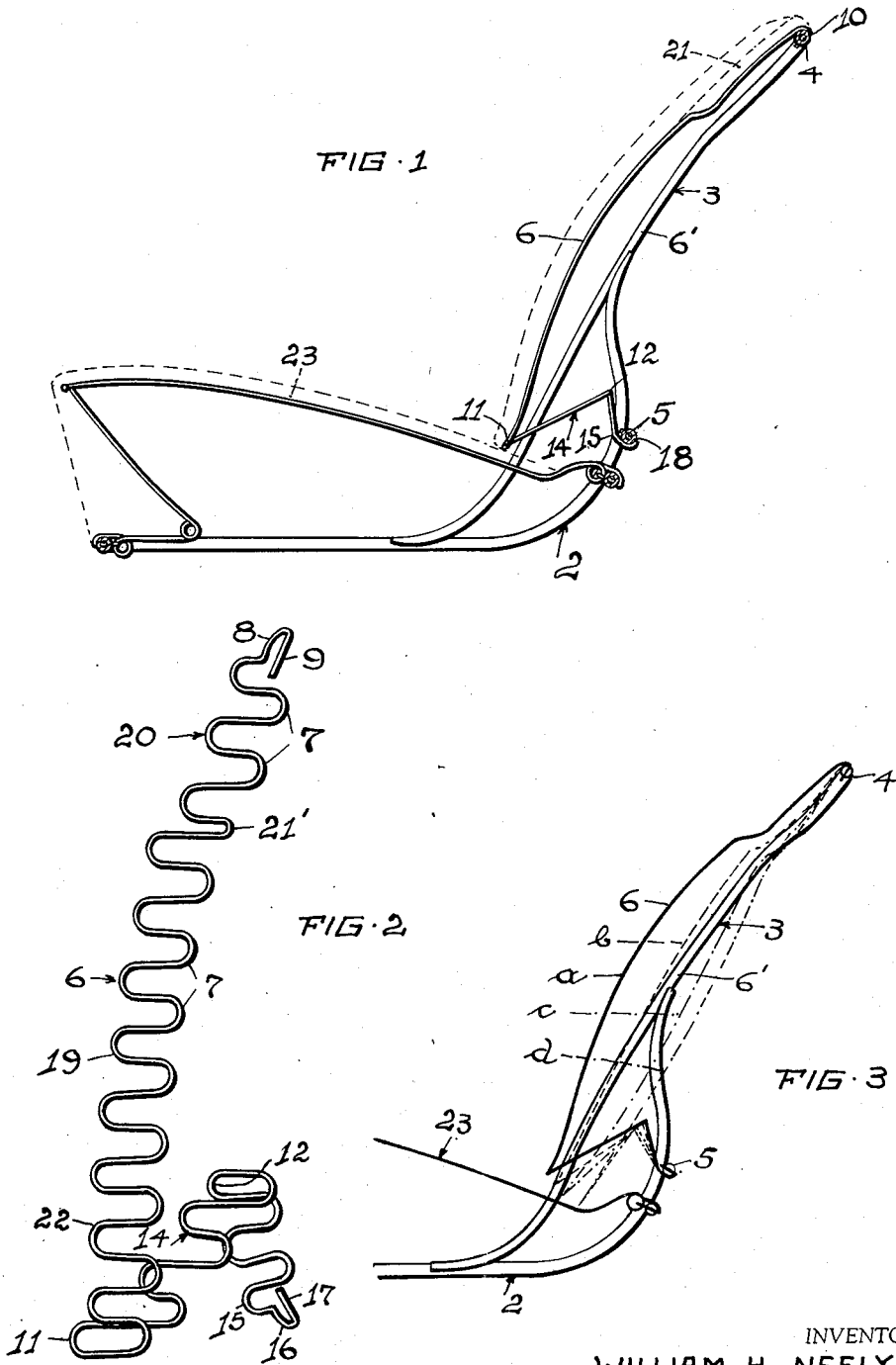
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WIRE SPRING FOR CUSHIONED BACKS OF UPHOLSTERED FURNITURE

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WIRE SPRING FOR CUSHIONED BACKS OF
UPHOLSTERED FURNITURE

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7 Claims. (Cl. 155—179)

This invention relates to flat springs of sinuous or similar shape adapted to be used for backs of upholstered furniture, automobile seats, etc. Flat springs of this type, when secured at their opposite ends to a back frame structure in such a fashion as to follow substantially the desired outline of the finished back, embody areas of undesirable stiffness close to the ends of the springs and an area of insufficient stiffness intermediate said first areas. These areas of excessive and of insufficient stiffness make it quite impossible to obtain proper resting comfort in spring back structures embodying springs of the type referred to above. To overcome these deficiencies in the use of flat springs for back seat structures it has been proposed in Patent No. 2,124,655 dated July 26, 1938, to attach flat springs to a back frame structure in such a fashion as to effect longitudinal stretching of their central areas while hardly increasing the stiffness of other areas. However, this arrangement does not solve the problem to be encountered with in the stiffened end areas of the springs so that proper resting comfort is not obtained in spring back structures assembled from flat springs in the manner disclosed in the said patent.

It is the primary object of the present invention to provide an elongated spring embodying a sinuously corrugated substantially straight resting or supporting portion having attachment means at its opposite ends and means in its resting or supporting portion for inwardly offsetting the upper end zone of said resting portion, all for the purpose of eliminating direct support or rest of a person's back on the undesirably stiffened upper end zone of the resting portion of the spring.

Another object of the invention is the provision of an elongated spring having a sinuously corrugated straight resting or supporting portion including attachment means at its upper end and V-shaped corrugated supporting and attachment means at its lower end, and means in the upper part of the resting or supporting portion for inwardly offsetting the upper end zone of said resting portion, all for the purpose of eliminating direct support or rest of a person's back on the undesirably stiffened upper end zone of the supporting portion of the spring.

A further object of the invention is the provision of an elongated spring, having a sinuously corrugated straight resting or supporting portion, attachment means at its upper end for rigidly securing said end to a frame and V-shaped supporting and attachment means at its lower end

for supporting and attaching said lower end and permitting of axial elongation of the said resting portion when the spring is loaded, with forwardly extended means at the lower end of said supporting or resting portion for effecting rearward offsetting of the lower zone of said supporting or resting portion, all for the purpose of straightening the lower zone of said resting portion and avoiding outwardly curved areas in said zone when the spring is under load.

In addition, the invention has other marked improvements and superiorities which radically distinguish it from presently known structures. These improvements or superior characteristics embodying certain novel features of construction are clearly set forth in the appended claims, and a preferred embodiment of the invention is hereinafter shown with reference to the accompanying drawing forming part of the specification.

In the drawing:

Fig. 1 is a cross sectional view through a seat structure for an automobile having flat, corrugated springs according to the invention secured to its back frame.

Fig. 2 is a perspective view of one of the springs used in the spring assembly of the previously shown seat structure; and

Fig. 3 is a diagrammatical showing of the shapes and forms of a back spring secured to a frame when loaded and when loaded excessively.

Referring now more particularly to the drawing reference numeral 2 represents a sectionally shown tubular frame structure of an automobile, the back frame 3 of which has a substantially rectangularly shaped open form. Back frame 3 which preferably is made of steel tubing includes a top rail 4, a bottom rail 5 and side rails 6'. Top and bottom rails 4 and 5 support a plurality of elongated, corrugated wire springs 6 which bridge back frame 3 and are securely attached to the said rails in a manner hereinafter to be described.

Each of the elongated, corrugated wire springs 6 is made of steel wire bent to sinuous shape so that their loops 7 extend substantially parallel to each other and permit of longitudinal and vertical yielding and stretching of the spring under load. The upper end of each spring 6 is formed with an upwardly extended short integral extension 8, slightly curved in a plane substantially rectangular to the axis of the spring, and has at its end a downwardly extended straight portion 9 which is substantially parallel to the axis of the spring and forms with the curved extension 8 a hook-shaped attachment means adapted to be

sleeved into openings 10 in the top rail 4 for rigid attachment to said top rail 4. The lower end of spring 6 is sharply bent at 11 rearwardly and upwardly and then at 12 downwardly to form a V-shaped corrugated supporting arm 14. This arm has its free end 15 slightly offset and formed with a curved integral extension 16 in a plane rectangular to the axis of the spring and this extension 16 has at its end a doubled back straight portion 17 forming with extension 16 a hook-shaped attachment means adapted to be sleeved into openings 18 in bottom rail 5 for rigid attachment thereto. Springs 6 which thus are securely fastened at their end portions to the top and bottom rails 4 and 5 of the frame structure 3 include in their supporting and resting portion 19 means effecting elimination of excessively stiffened areas from supporting the back of a person resting in the seat structure. For such purpose supporting and resting portion 19 has its upper area 20 inwardly offset by extending one of its loops 7 to wit loops 21 substantially rearwardly and extending the following loops 7 in a plane substantially parallel to but rearwardly offset with respect to the lower portion of supporting and resting portion 19. This arrangement fully eliminates outwardly extended bulged areas in the upper portion of the resting portion 19 and furthermore permits of the use of additional padding 21 for the upper portion of the spring, which portion has increased stiffness due to its closeness to the upper point of attachment of the spring.

In addition, to the just described inward offset in the supporting and resting portion 19, the lowest loop 7 of said portion is slightly forwardly inclined, so as to effect a slight set back of the lower area 22 of the supporting and resting portion 19. This arrangement effects slight straightening of the said lower area when the spring is loaded and furthermore prohibits the building up of an outwardly extended bulge in this lower area.

A back supporting structure embodying springs of the type described provides a perfect comfortable rest for the back of a person under all conditions and this will best be understood from an inspection of the diagrammatical showing in Fig. 3 of the drawing, which figure discloses shape and deformation of a back spring structure with springs according to the invention when differently loaded. The full line showing *a* of the spring outline in this Figure 3 gives the shape of the spring when assembled in a frame, but not under load. It will be noted that the resting portion 19 of spring 6 is slightly curved in a curvature closely following the outside contour of a finished back structure and that the rearwardly offset upper portion of the spring permits of a soft filler pad being secured and supported between the spring and the proper padding.

The next diagrammatically shown shape of the spring, the dotted line position *b*, is effected when a light load is resting against the spring. It will be noted that resting portion 19 of spring 6 is now slightly inwardly bulged, that said portion has been downwardly extended and taken up the greater length of the previously outwardly curved resting portion, thus following the movement of the seat 23 which under load has been moved downwardly, and, finally, that the offset in the upper portion of resting portion 19 has been slightly decreased without effecting an outward bulge in that part of the resting portion which

contacts with the back of a person leaning against the resting portion.

The following diagrammatically shown shape of spring 6, the dash-dotted line position *c*, is effected when a heavier load is resting against the spring. It will clearly be seen that now the inward bulge of the spring has been increased substantially, that at the same time the spring has been substantially elongated which, of course, has increased the stiffness of the spring, the loops of which are set under substantial tension, and that the V-shaped supporting arm, together with the rigid attachment of the upper end of the spring, effect substantial resistance in the spring against further inward bulging of the spring. Special attention is called to the fact that the upper offset portion of the resting portion of the spring is still sufficiently offset to prohibit the now materially stiffened offset portion from interfering with comfortable rest on said resting portion.

The springs in back seat structures, though normally not further deformed, as shown in the dash-dotted line position *c*, will under excessive unfavorable conditions be deformed to the dash-dotted-dash position *d*, a position caused by shocks, as for example, when an automobile is driven over an utmost bumpy road. In that case there will take place nothing but a further inward bulge of the spring and therewith a further elongation and tensioning of the spring.

At the lower end of the resting portion of the spring, there is provided, as previously stated, an outwardly inclined offset of the last loop of said resting portion, and this offset tends to facilitate straightening and inward bulging of the assembled spring seat structure without formation of bulged areas at this particular area of a back seat structure. The effect of this inclined offset can readily be followed from inspection of position *a*, *b* and *c* of the diagrammatical showing in Fig. 3.

The described springs, when assembled in a back seat structure and assembled to a yielding back by an edge wire and interconnecting means, provide a soft comfortable back without excessive hard or soft spots, giving utmost resting and riding comfort under adverse conditions.

Having thus described my invention,

What I claim is:

1. An elongated wire spring for cushioned backs of automobile and furniture seats comprising a substantially straight, corrugated resting and supporting portion including an upper portion rearwardly offset with respect to said straight portion, and attachment and supporting means at the lower end of said resting and supporting portion and the upper end of its rearwardly offset upper portion.

2. An elongated wire spring for cushioned backs of automobile and furniture seats comprising a substantially straight, corrugated resting and supporting portion including an upper rearwardly offset portion arranged substantially parallel to said resting portion, and attachment and supporting means at the lower end of said resting and supporting portion and at the upper end of said rearwardly offset upper portion.

3. An elongated wire spring for cushioned backs of automobile and furniture seats comprising a substantially straight, sinuously corrugated resting and supporting portion having the lower end bend of its sinuous corrugations forwardly inclined and including an upper portion rearwardly offset with respect to said straight portion, and attachment and supporting means

at the end of said forwardly inclined end bend and at the upper end of said rearwardly offset upper portion.

4. A wire spring for cushioned seat structures including a corrugated portion, and means integrally arranged in said corrugated portion rearwardly offsetting one part of said corrugated portion with respect to the other part thereof for controlling amount and location of bulging of said corrugated portion when the spring is secured to a frame and a load is placed on said corrugated portion.

5. A wire spring for cushioned seat structures comprising a single wire shaped to form an extended resting portion and provided with means integrally extended from said resting position for securing the ends of said resting portion to a frame, and means integrally arranged in said resting portion rearwardly offsetting one part of said resting portion with respect to the other part thereof for eliminating bulged and stiffened areas in said one part of said resting portion from contact with a load placed on the other part of said resting portion and controlling amount and location of bulging in the other part of said resting portion when the wire spring is secured to a frame.

6. An elongated wire spring for cushioned backs of automobile and furniture seats comprising a substantially straight, sinuously corrugated resting and supporting portion having its upper portion rearwardly offset by rearwardly inclining a single bend of its sinuous corrugations and having its lower portion forwardly extended by forwardly inclining the lower end bend of its sinuous corrugations, and attachment and supporting means at the end of said lower end bend and at the upper end of said rearwardly offset upper portion.

7. In a wire spring for cushioned backs of seat structures a corrugated portion integral means for rigidly securing the upper end of said corrugated portion to a frame, integral, yielding means at the lower end of said corrugated portion, integral attachment means at the end of said yielding means for securing same to a frame, and integral means in the upper portion of said corrugated portion rearwardly offsetting one part of the upper portion to prevent contact of said one part of the upper portion of said corrugated portion with a load placed against the lower and central portions of said corrugated portion.

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