Aug. 3, 1948. D. H. VAN HOVE 2,446,500

UPHOLSTERY SPRING STRUCTURE

Filed Jan. 28, 1944 2 Sheets-Sheet 1

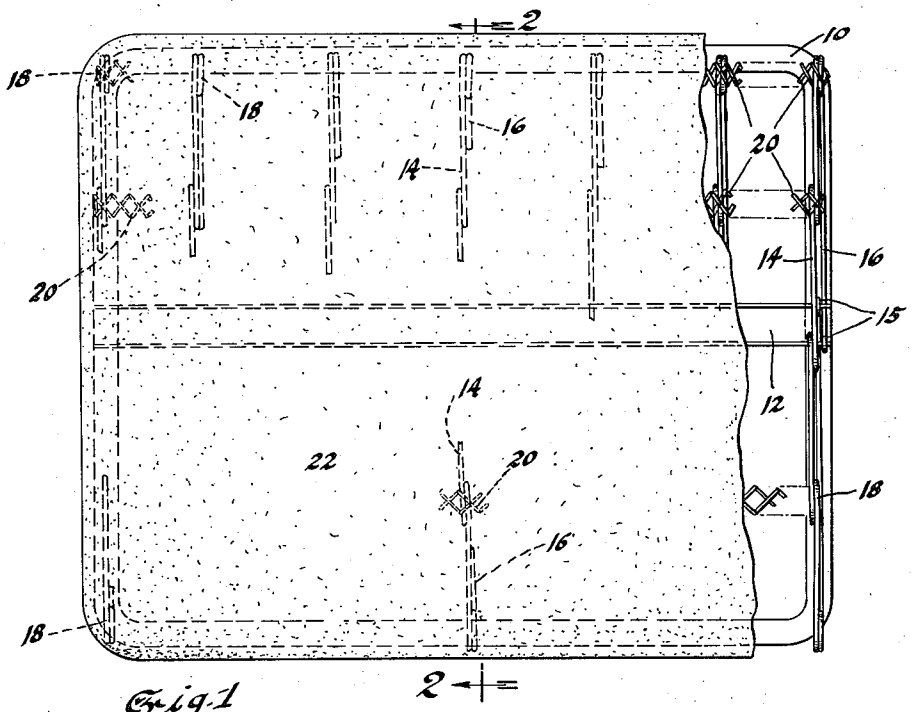


Fig. 1

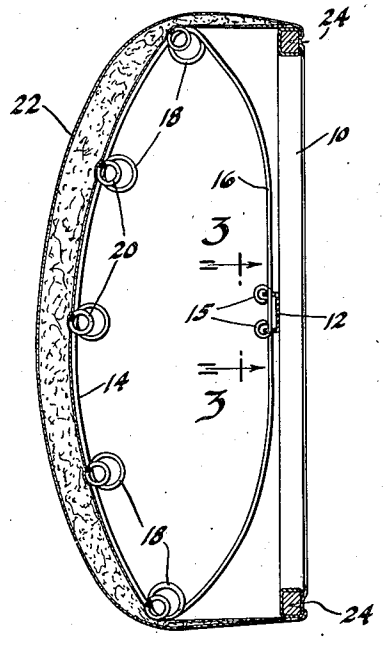


Fig. 2

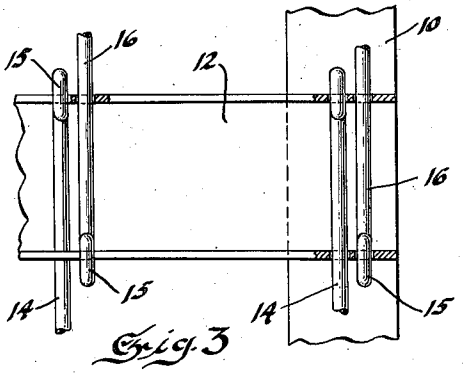


Fig. 3

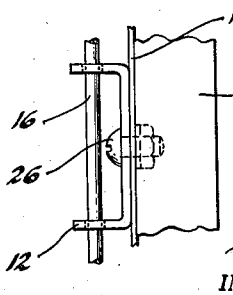


Fig. 8

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Aug. 3, 1948. D. H. VAN HOVE 2,446,500

UPHOLSTERY SPRING STRUCTURE

Filed Jan. 28, 1944 2 Sheets-Sheet 2

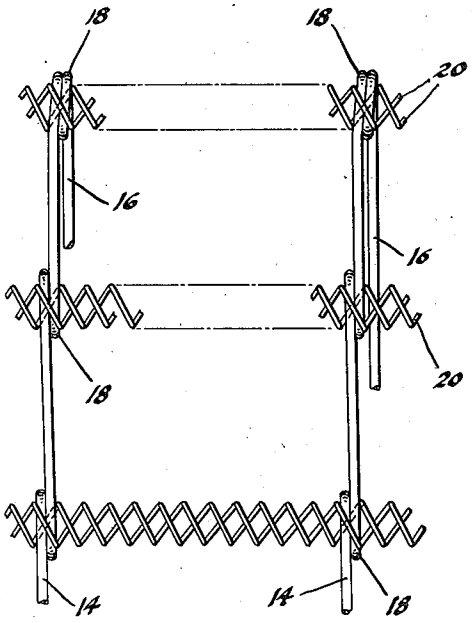


Fig. 4

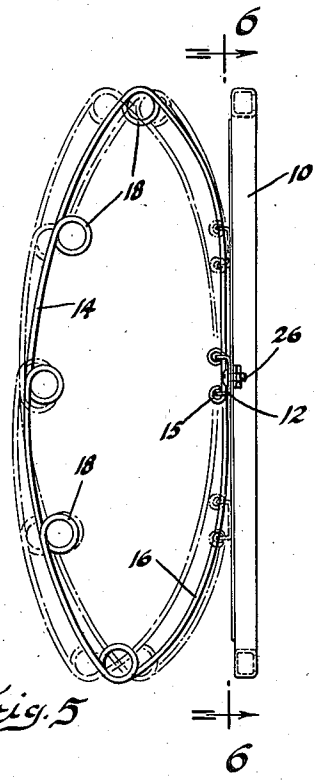


Fig. 5

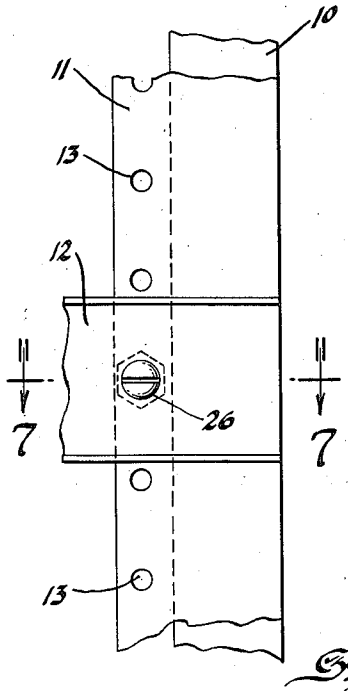


Fig. 6

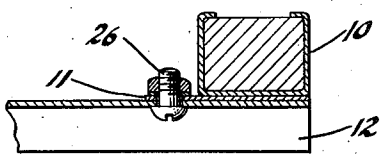


Fig. 7

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UPHOLSTERY SPRING STRUCTURE

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6 Claims. (Cl. 155—179)

1

This invention relates to improvements in cushion spring assemblies and particularly to structures of the character employed therein.

It is specifically adaptable to the cushion back of an automobile seat and other light cushion assemblies but is applicable generally to upholstery spring cushion structures.

One object is to provide a simple spring unit of the character described which is light in weight and inexpensive and easy to manufacture.

Another object is to provide such a spring unit which employs a minimum amount of material and wherein the upholstery supporting springs not only serve such purpose but also serve to define the top boundary or margin of the spring cushion assembly.

More specifically, the spring assembly is one wherein the lower boundary of the cushion is defined by the supporting base and the upper boundary of the cushion is defined by the upholstery supporting springs, and a rigid top boundary frame and diagonal cross braces such as are in conventional use are eliminated.

An important characteristic is that the spring unit comprises a plurality of generally elliptic springs supported upon a base frame in substantially parallel spaced apart relationship with the opposite ends of the springs terminating superposed above the opposite sides of the base frame. Extensible cross spring members extend between the vertices of the elliptic springs and serve with certain of the elliptic springs to define the top boundary of the cushion assembly.

Another object is to provide a spring unit for a cushion assembly which spring unit includes a plurality of generally elliptic spring elements supported in substantially parallel spaced apart relationship upon a base. These springs are connected and held together in yieldingly spaced apart relationship by helical cross springs including helical cross springs extending between the adjacent vertices of the elliptic springs.

A preferred meritorious feature is that the helical cross springs are so arranged and connected with the elliptic springs as to maintain them in determined yieldable spaced apart relationship.

Another object is to provide a spring unit including a plurality of generally elliptic springs disposed in spaced apart substantially parallel relationship and so supported upon a base frame, through the lower leaves of the elliptic springs, that the stiffness of the spring unit may be varied as between the two side margins of the

2

frame by varying the disposition of the spring support as between said margins.

Other objects, advantages and meritorious features of the invention will more particularly appear from the following description, appended claims and accompanying drawings, wherein:

Figure 1 is an elevation of a cushion assembly embodying my invention.

Figure 2 is a vertical sectional view taken on line 2—2 of Figure 1.

Figure 3 is a fragmentary plan partly in section taken on line 3—3 of Figure 2.

Figure 4 is a plan of a fragment of a portion of the spring unit showing the arrangement and connection of the helical cross springs with the elliptic springs.

Figure 5 is a side elevation of one of the elliptic springs showing how it may be supported at different positions upon the base frame to vary its stiffness as between the two side margins of the frame.

Figure 6 is a cross sectional view taken on line 6—6 of Figure 5.

Figure 7 is a cross sectional view taken on line 7—7 of Figure 6.

Figure 8 is a fragmentary view showing a manner of attaching an elliptic spring to the spring supporting member permitting adjustment thereover.

This particular spring structure embodies a spring unit which is of light weight and employs a minimum amount of material. It is particularly adapted for the back cushion of an automobile seat as distinguished from the seat cushion but it is applicable to spring cushion assemblies generally.

It is shown as assembled upon a base frame indicated as 10 in the figures of the drawing. This frame is here shown as of generally rectangular shape as is common in many cushion assemblies. It is provided with opposite ends and opposite sides. The frame is here illustrated as comprising a metal sheath surrounding a cellulose insert but obviously may be formed of wood, metal, or other suitable structural material.

The frame includes a spring supporting member or means 12 which may be a channel shaped metal strip suitably formed and proportioned to carry the springs as shown. This means 12 is here shown as extending between the ends of the frame linearly of the sides and spaced between said sides.

This spring supporting member 12 carries the elliptic springs. A plurality of these elliptic spring elements are here shown mounted upon

the member 12 and arranged in spaced relationship and extending transversely of the frame. These spring elements are here illustrated as of generally elliptic form and as having a top leaf 14 and a bottom leaf 16. The top leaf and bottom leaf of the spring elements shown constitute merely top and bottom portions of a spring strip bent into the form of a full ellipse with the meeting ends 15 of the strip or wire which forms the spring element secured as shown in Figures 2 and 3 to the spring support 12. The term "leaf" is here used to designate these particular portions of the elliptic springs.

Each spring element is provided with a plurality of spaced spring loops 18 formed in its top leaf as shown in Figure 1, 2, 4 and 5. One of these loops is at the end of each top leaf as shown particularly in Figures 2 and 5 and connects the top leaf with the bottom leaf imparting resiliency and strength to the spring. Any number of such loops may be provided and any desired number of turns may be employed in the formation of the loops.

The opposite vertices of the several elliptic spring elements, by which is meant the opposite ends of the ellipse form which go to make up the complete spring unit, superpose the opposite sides of the frame 10 as shown particularly in Figure 2. These elliptic spring elements are connected together in spaced apart relationship by helical coil cross springs 20 as shown particularly in Figure 4. These helical cross springs maintain the top leaves of the elliptic springs in a determined spaced apart arrangement while permitting yielding extensibility therebetween responsive to utilization of the spring structure.

The helical cross springs which extend between and connect loops 18 at the end of the spring elements form top side margins of the spring unit. The top leaves of the two elliptic spring elements disposed at the ends of the frame 10 define, together with the two marginal helical spring assemblies the top boundary of the spring unit.

Upholstery material in the form of upholstery cloth and padding as desired, indicated generally and collectively as 22, is stretched over the spring unit and secured as at 24 as by tacking or the like to base frame 10. It will be seen, therefore, that the base frame 10 defines the bottom boundary or margin of the cushion assembly. The top boundary or margin of the cushion assembly is defined, as hereinabove suggested, by the marginal cross helical springs at the sides and the top leaves of the two elliptic springs at the ends of the cushion and is a yielding boundary line which permits full flexibility to any part of the spring unit while maintaining a definite top boundary thereabout.

The helical cross springs 20 are arranged in pairs as shown particularly in Figure 4. Two helical coil springs make up each pair and these are interwoven together by threading one into the other and interwoven across the elliptic spring elements so that the top leaves of these elliptic spring elements are maintained in determined spaced relationship. The helical cross springs are extensible to permit independent compression of one or more elliptic springs without producing equal compression of other elliptic springs located at a different place in the unit.

The spring supporting member 12 is shown in Figures 1 and 2 as located approximately midway between the two side frame members but in slightly closer proximity to one side than to the other side. The elliptic spring elements 16 are shown as solely supported through their bottom leaves upon this spring supporting means 12.

In a spring cushion assembly it is commonly desirable to make the cushion somewhat more stiff along one margin such as along the rear margin of a seat cushion as compared with the front margin thereof, or along the bottom margin as compared with the top margin of a back. This is for the purpose of providing a comfortable posture for the user. In a cushion back the cushion is generally stiffer along the bottom margin than the top margin. This may be accomplished in the instant construction by positioning the spring supporting means 12 in closer proximity to the lower edge of the frame than to the top edge. This provides a better support for the back of an individual using the seat.

In Figure 5 the spring supporting member 12 is shown in dotted outline as shifted from an approximate mid-point position to one side or the other and the elliptic springs are shown in dotted outline in the position they might occupy following such shifting. Obviously, the spring supporting member 12 might be adjustable along the lower leaves of the elliptic springs as shown in Figure 8. On the other hand, the spring unit might be initially fabricated in such a manner that the meeting ends of each elliptic spring would be passed through apertures in one side flange of the channel member 12 and twisted through an aperture in the opposite side flange as shown in Figure 3.

In Figures 6 and 7 the frame 10 is shown as provided with a projecting part 11 which in turn is provided with perforations 13 spaced along its length. Springs support 12 is secured to the frame by bolts 26 receivable therethrough and through any one of the perforations 13 to adjust the spring support between the two sides of the frame. Nuts are threaded on the bolts 26 to secure the support 12 to the frame 10.

In Figure 8 the lower leaf 16 is continuous and extends through apertures provided in the support 12. This support 12 may be adjusted along the frame 10 and secured in place at opposite ends by the bolts 26, and during such adjustment it is also adjusted along the lower leaves of the springs. The attachment of the upholstery material to the frame 10 maintains the cushion in place upon such frame.

What I claim is:

1. In a spring cushion, a substantially rectangular base frame having sides and ends defining the bottom boundary of the cushion and including a spring supporting frame element extending between and secured to the ends of the frame and spaced from the sides thereof, a plurality of elliptic springs the bottom leaves of which are secured to the spring supporting frame element between the vertices of the springs positioning said springs in substantially parallel spaced apart relationship, two pairs of helical cross springs respectively extending between and securing together the correspondingly adjacent vertices of the elliptic springs, one pair being along one side margin of the cushion, the other pair being along the other side margin, the two helical springs in each pair being interwoven together and interwoven with and across the elliptic springs maintaining them in yieldingly spaced apart relationship, said two pairs of helical coil springs and the top leaves of the two elliptic springs at the ends of the cushion defining the top boundary of the cushion and upholstery material ex-

tended over said springs and secured to the supporting base.

2. In a spring unit, a supporting frame having opposite spaced apart sides and spring supporting means extending linearly of and parallel to said sides and spaced therebetween, a plurality of elliptic springs supported upon said frame in substantially parallel spaced apart relationship and parallel to the ends of the frame by having their bottom leaves secured to said supporting means with the opposite vertices of the elliptic springs terminating superposing the opposite sides of the frame, said spring supporting means being movable along the length of the bottom leaves of the springs and with respect to the sides of the frame to position the supporting means in closer proximity to one side of the frame than to the other side thereof.

3. The invention as defined in claim 1 characterized in that the spring supporting frame element is movable upon the frame and along the lower leaves of the elliptic springs toward and away from either side of the frame.

4. In a cushion assembly, a supporting base having a front side, rear side, and two ends, a spring supporting element secured to and extending between said ends spaced between the front and rear sides of the base, a plurality of spring elements each in the form of an ellipse secured to and supported upon said spring supporting element in spaced apart relationship parallel to each other and parallel to the ends of the frame, upholstery material extending over said springs and secured to the frame, said spring supporting element being movable along the length of the springs and along the base lengthwise of said ends of the base and toward or away from either side of the base.

5. In a spring unit, a supporting frame having opposite spaced apart sides and spring supporting means extending linearly thereof spaced between said sides, a plurality of generally elliptic spring elements supported upon said means in spaced apart relationship and extending transversely across the frame with opposite vertices of the elliptic springs superposing in spaced relationship the spaced apart sides of the frame, each spring element being formed of a linear strip bent into elliptic form and having its two ends secured to said supporting means, two pairs of helical cross springs respectively extending between and securing together the correspondingly adjacent vertices of the elliptic springs, one pair being along one side margin of the cushion, the other pair being along the other side margin, the two helical springs in each

pair being interwoven together and interwoven with and across the elliptic springs maintaining them in yieldingly spaced apart relationship, said two pairs of helical coil springs and the top leaves of the two elliptic springs at the ends of the cushion defining the top boundary of the cushion and upholstery material extended over said springs and secured to the supporting base.

6. In a spring unit, a substantially rectangular supporting frame having opposite spaced apart ends and sides and spring supporting means secured to the ends of the frame and extending therebetween spaced between said sides, a plurality of generally elliptic springs supported on the frame in spaced apart parallel relationship solely through securement to said means by having their bottom leaves secured thereto, said elliptic springs extending transversely of the frame and having their opposite vertices terminating superposing the opposite sides of the frame, said spring supporting means being movable along the ends of the frame toward or away from either side thereof and movable along the lower leaves of the springs toward or away from either side of the frame.

DESIRE H. VAN HOVE.

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