United States Patent [19]

Curtis et al.

[11] **3,766,580**

[45] **Oct. 23, 1973**

[54] **PLASTIC SPRING ASSEMBLY CONNECTED TO WIRE FRAME**

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[22] Filed: **May 17, 1972**

[21] Appl. No.: **254,268**

[52] **U.S. Cl.** **5/351**, 5/265, 297/DIG. 8

[51] **Int. Cl.** **A47c 23/04**

[58] **Field of Search** ..... 5/248, 259 R, 264, 5/265, 351, 353; 297/DIG. 8

[56] **References Cited**

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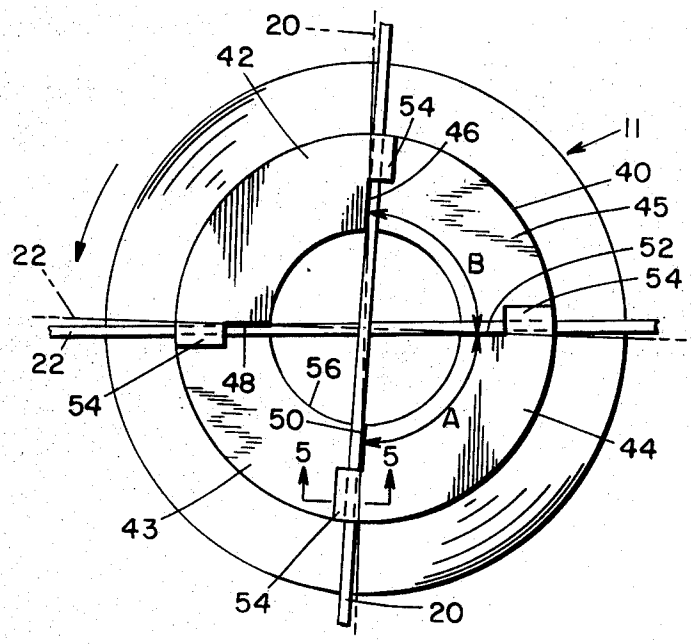
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[57] **ABSTRACT**

Corrugated plastic springs are substituted for metal coil springs in a chair, sofa, or the like. The bottom of the spring is provided with spaced apart wire retaining means for connecting the springs to the wires. The retaining means are so located that the wires, which have been constructed perpendicular to each other, are bent out of a perpendicular relationship and impart opposite rotational forces on the spring, providing for a secure connection therebetween. The tops of the springs are held in such a manner that each spring may be compressed independently of each other and may move laterally to the extent that they do not abut each other.

6 Claims, 6 Drawing Figures



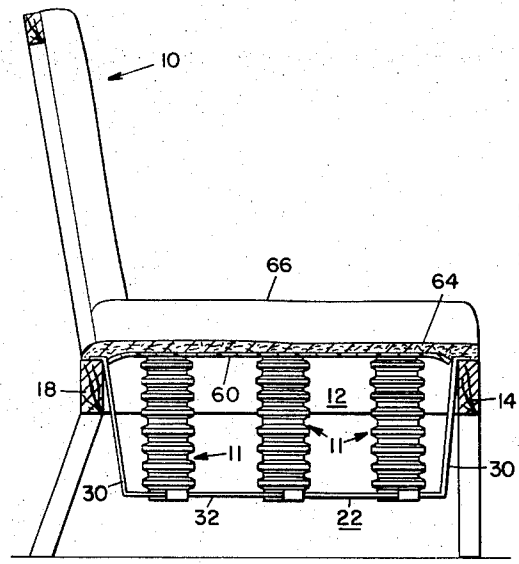


FIG. 1

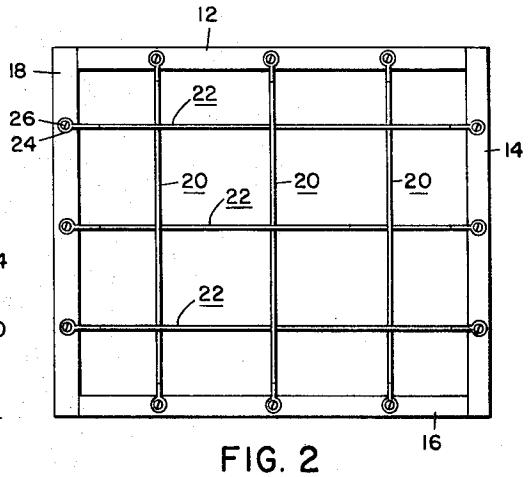


FIG. 2

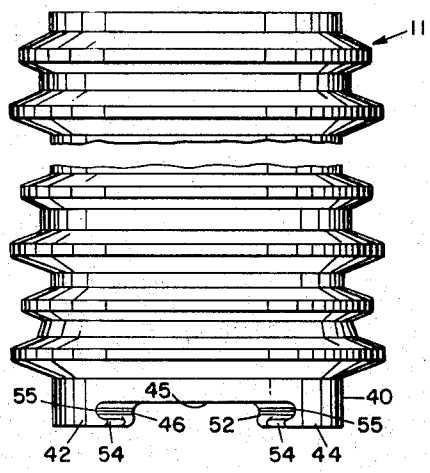


FIG. 3

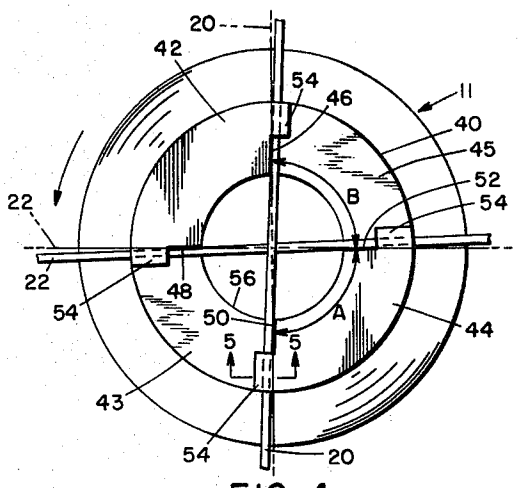


FIG. 4

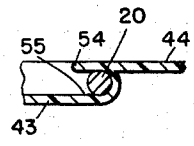


FIG. 5

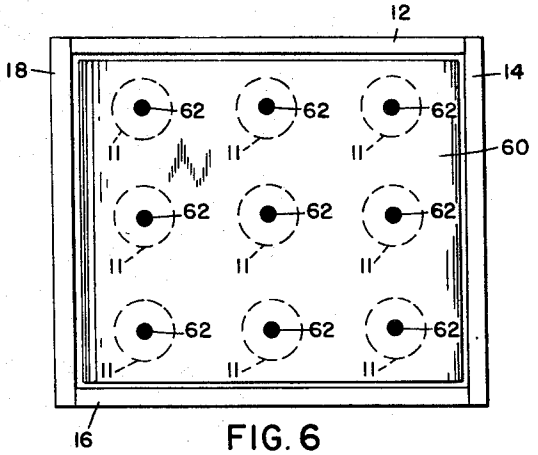


FIG. 6

PLASTIC SPRING ASSEMBLY CONNECTED TO WIRE FRAME

It is an object of this invention to provide a corrugated plastic spring assembly for a chair, sofa or the like which is economical and simple to assemble.

Other objects of the invention will become apparent from the following description with reference to the drawings wherein:

FIG. 1 is a side view of a chair cut away to show a spring assembly;

FIG. 2 is a top view of a wire assembly connected to the chair frame with the springs omitted for simplicity;

FIG. 3 is an enlarged side view of a spring;

FIG. 4 is a partial bottom view of FIG. 1 showing a spring and wire connection;

FIG. 5 is a view along section line 5—5 of FIG. 4; and

FIG. 6 is a top view of FIG. 1 with the cushion shown in FIG. 1 removed.

Referring to FIG. 1, there is illustrated a chair 10 into which a plurality of plastic springs are inserted. Referring to FIG. 2, the chair comprises a wooden frame which includes four side members 12, 14, 16 and 18. Three formed wire members 20 extend between the side members 12 and 16, and three formed wire members 22, at right angles to wires 20, extend between the side members 14 and 18. Each of the wire members has an eyelet 24 at each end, which receives screws 26 therethrough, securing the wire members to the frame. As can be seen from FIG. 1, each of the wire members is generally U-shaped comprising a pair of vertical legs 30, each of which extends downwardly from the eyelet end thereof and a horizontal leg 32 which connects the vertical legs. When the wires are secured to the frame, a pocket is formed into which the plastic springs 11 may be deposited.

Each spring comprises a thin walled hollow corrugated member closed at the upper end by a circular planar surface.

Referring to FIGS. 3 and 4, the bottom of each spring 11 comprises a cylindrical portion 40 on which are four sections 42, 43, 44 and 45 of an annular ring. Sections 42 and 44 are raised relative to sections 43 and 45 and provide four abutment shoulder portions 46, 48, 50 and 52. The shoulder portions 46 and 48 and the shoulder portions 50 and 52 are spaced approximately 91° to 105° apart as shown by angle A. The shoulder portions 48 and 50 and the shoulder portions 46 and 52 are approximately 89° to 75° apart as represented by angle B. The shoulder portions can vary from these angles by placing kinks in the wires at appropriate locations. The important feature is that the wires are placed in stress by the shoulder portions when each spring is assembled. Each shoulder portion has a tab 54 overlying and spaced from the surface of a respective section 43 and 45 to provide a wire receiving groove 55. The bottom surface of the cylindrical portion 40 is provided with an opening 56 to provide for passage of air during compression and recovery of the spring 11.

A very flexible thin plastic sheet 60 is heat welded to a portion 62 of the circular planar surface of each spring 11 whereby a spring unit may be carried by the sheet 60 and dropped into the pocket defined by the wires 20 and 22. The spring assembly is lowered into the cavity formed by the wires 20 and 22 and the wires are connected to the spring by locating the wire 22 within the respective grooves 55 to abut against shoulders 48 and 52, and wire 20 is inserted within the respective grooves 55 to abut against the shoulders 46 and 50. Since the wires 20 and 22 are arranged at right angles to each other, and the shoulders 46 and 52 are separated by an angle less than 90° and the shoulders 46 and 48 are separated by an angle greater than 90°, the wires will be bent out of the constructed position (shown in phantom in FIG. 4) relative to each other and will be exerting opposite rotational forces on the spring in an effort to return to the normal 90° relationship (shown in phantom in FIG. 4) to each other. Thus the wire 22 will exert a force against the shoulders 48 and 52, tending to rotate the spring in a clockwise direction, but this rotational force is resisted by the engagement of shoulders 46 and 50 with wire 20. The wire 20 is exerting a force on shoulders 46 and 50, tending to rotate the spring in a counterclockwise direction, but this force is resisted by the engagement of shoulders 48 and 52 with the wire 22. This arrangement between the springs and the wires provides a very sturdy and stable connection therebetween. After securing the springs to the wires, the flexible sheet 60 is then stapled to the frame members 12, 14, 16 and 18 in such a manner that it is sufficiently flexible to allow each spring to compress independently of each other and allow lateral movement of the springs toward each other only to the extent that the springs will not abut each other. The normal padding and covering generally designated by reference numeral 64 is laid on top of the flexible sheet 34 and is stapled to the frame members 12, 14, 16 and 18. A cushion 66 is placed on top of the padding 64. The spring assembly works in the same manner as the coil spring assembly which the plastic springs replace.

While only one spring assembly has been illustrated, more than one assembly may be used in a chair, sofa or the like by placing one assembly beside another within the same frame.

What we claim and desire to protect by Letters Patent is:

1. A spring assembly comprising:

a frame having four side members, said frame having a first plurality of wire members spaced from each other extending between and connected to opposite side members, a second plurality of wire members spaced from each other extending between and connected to the other two opposite side members, said second plurality of wire members being perpendicular to said first plurality of wire members, all of said wire members being generally in the same plane at their points of intersection; and

a spring having a corrugated tubular wall and a bottom wall, said bottom wall having two wire retaining means, contacting a wire member from said first plurality and a wire member from said second plurality of wire members forcing the angle of intersection of said two wire members to other than 90°, said two wire members exerting opposite rotational forces on said spring to hold said spring.

2. A spring assembly as recited in claim 1 wherein said wire retaining means comprises two pie-shaped raised abutment shoulder portions, the sides of said portions being separated by an angle greater than 90°, said portions being symmetrically located with respect to each other about the longitudinal axis of said spring.

3. The structure as recited in claim 1 wherein the tops of each spring are interconnected by a flexible

sheet connected to said frame, said sheet being connected to said frame in such a manner as to allow compression of any spring relative to the other spring and prevent the springs from abutting each other.

4. The spring assembly as recited in claim 1 wherein said assembly is located in a chair.

5. The spring assembly as recited in claim 1 wherein said assembly is located in a sofa.

6. A spring comprising:

a corrugated tubular wall and bottom wall having two spaced apart pie-shaped raised sections symmetrically spaced with respect to each other about the longitudinal axis of said tubular wall, the sides of each pie-shaped section including two abutment faces, said abutment faces angularly spaced from each other by more than 90°, whereby said abutment faces will contact support wires previously at right angles to each other and will move said wires out of their original constructed position thereby exerting opposite rotational forces on said springs to secure spring to said wires.

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