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WIRE SPRING FOR CUSHIONED SEATS

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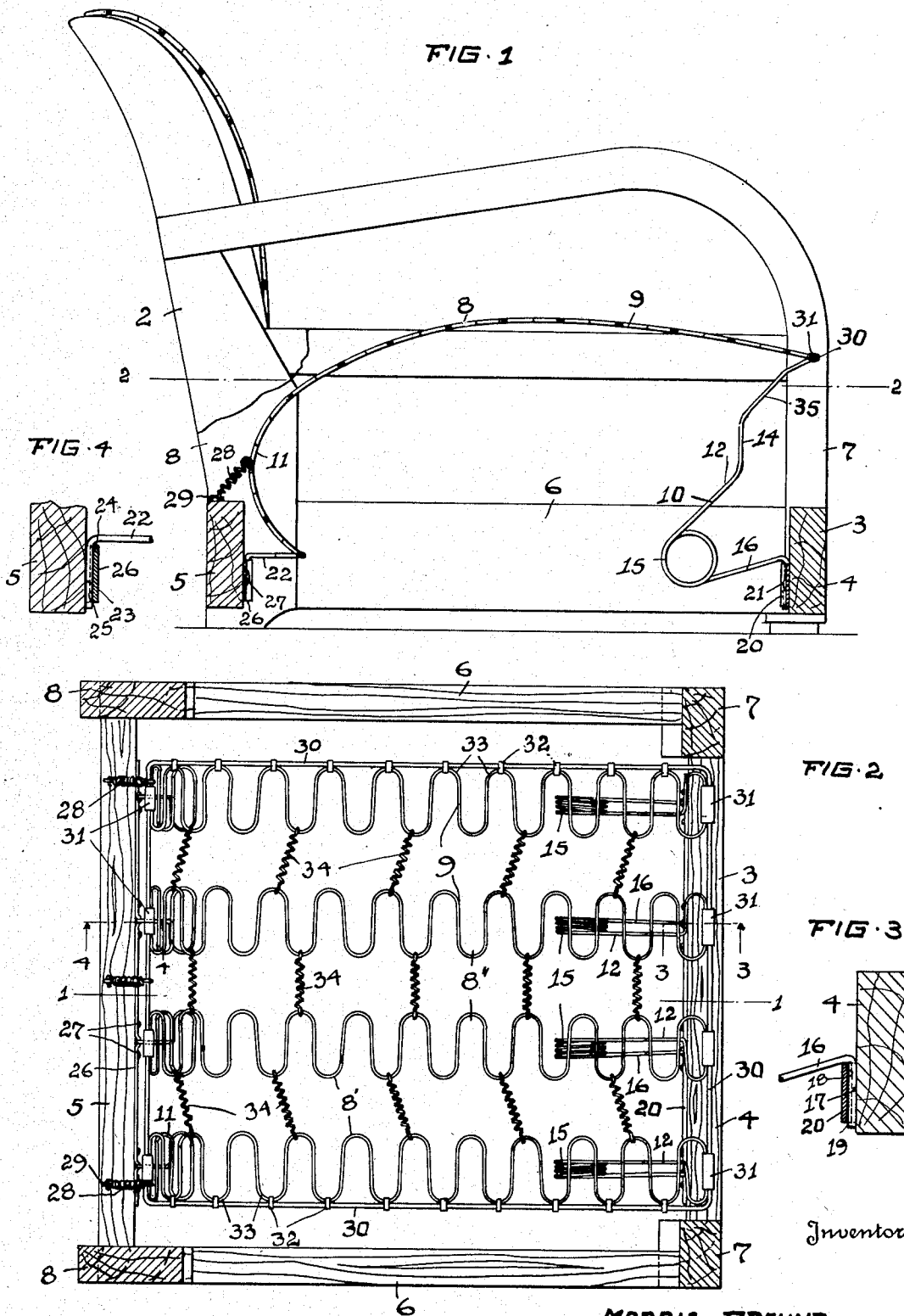


FIG. 2

FIG. 3

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2,177,175

WIRE SPRING FOR CUSHIONED SEATS

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4 Claims. (Cl. 155—179)

This invention relates to flat springs of sinuous or similar shape used for seats of upholstered furniture, cushioned automobile seats or the like, and more particularly to that type of springs described in my co-pending applications Ser. No. 36,175, filed August 14, 1935, now Patent No. 2,047,411, and Ser. No. 68,417, filed March 12, 1936. These springs embody an upper axially compressible and extensible seating portion, preferably made of sinuous-shaped wire, a yielding, rearwardly and downwardly extending supporting means of substantial length arranged at the front end of the seating portion, and a downwardly extending supporting means at the rear end of the seating portion. The supporting means for the seating portion of these springs are integrally formed with the seating portion or rigidly connected to the ends thereof, so as to effect upwardly directed bulging and bending stresses and therewith increased resistance of the seating portion against downward bulging, when a load is placed upon the seating portion. The rearwardly and downwardly extending supporting means at the front end of the seating portion also effect a substantial forward shifting of the front end of the seating portion, and a slighter forward shifting of the rear end of the seating portion of the spring when loaded, which shifting results in longitudinal stretching and stiffening of the seating portion.

Springs of the described type, assembled to a spring structure in the manner disclosed in the applications referred to above, offer sufficient resistance against downward bulging of the seating surface of the assembled structure. However, this structure is easily shifted forwardly and downwardly, particularly by heavier loads and when the springs are made of relatively thin spring wire.

It is the primary object of this invention to overcome this deficiency in spring structures embodying a plurality of flat springs of the type referred to above by providing means for directly coupling the rear supporting portions of the springs to the frame of the structure, which means more effectively and yieldingly resist forward and bending movements of the supporting means for the rear ends of the springs and thus increase the resistance of the spring structure against forward and downward movement of its seating surface without materially decreasing the yielding of said seating surface.

Another object of the invention is the provision of an assembled spring structure embodying flat springs of the type referred to above with

yielding means co-operating with all the supporting means for the rear end of the seating surface of the spring structure in yieldingly resisting forward and downward movement of the seating surface of the spring structure under load.

A further object of the invention is the provision of a spring structure embodying a plurality of flat springs of the type referred to above with means for preventing longitudinal stretching of the seating portions of the assembled springs forming the spring structure, and with means yieldingly coupling said first means to the frame of the spring structure to more effectively and yieldingly resist forward and downward movement of the seating surface of the spring structure, when under load.

Still another object of the invention is the provision of a spring structure embodying a plurality of springs of the type referred to above mounted side by side upon a frame with means pivotally secured to the front and rear ends of the seating portions of all said springs, and with means for yieldingly securing said first means to the rear rail of the frame of said structure.

A still further object of the invention is the provision of a spring structure embodying a plurality of flat springs of the type referred to above mounted side by side upon a frame, each of said springs embodying a horizontally corrugated seating portion and front and rear supporting means for said seating portion rigidly connected thereto, the front supporting means for said seating portion extending rearwardly and downwardly and including portions offset with respect to each other, so as to decrease the zone of contact between the seating portion and the front supporting means, when the seating portion of the spring is forced into contact with the front supporting means.

In addition the invention has certain other marked 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 following specification and 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 this drawing:

Figure 1 is a fragmentary transversal sectional view through a chair embodying a spring structure with flat springs according to the inven-

tion, the section being taken on line 1—1 of Figure 2.

Figure 2 is a cross sectional view through the chair shown in Figure 1, the section being taken on line 2—2 of said Figure 1.

Figure 3 is an enlarged fragmentary sectional view through the front rail of the chair showing the attachment of the flat springs to the front rail, the section being taken on line 3—3 of Figure 2, and

Figure 4 is an enlarged fragmentary sectional view through the rear rail of the chair showing the attachment of the flat springs to the rear rail, the section being taken on line 4—4 of Figure 2.

Referring now more particularly to the drawing, reference numeral 2 represents the frame of a chair embodying at its bottom portion a rectangular open frame 3, the front, rear and side rails 4, 5 and 6 of which are secured to the front and rear legs 7 and 8 of the frame 2 of the chair. The open frame 3 supports on its front and rear rails 4 and 5 a plurality of flat springs 9, made of sinuous-shaped steel wire, the loops 9' of which extend substantially parallel to each other, so as to form seating portions 9. Each spring embodies a front supporting portion 10 and a rear supporting portion 11, and these portions support the portion 9 of the spring and secure the spring to the front and rear rails 4 and 5 of the frame 3. The front supporting portion 10 consists of a rearwardly and downwardly extending lever arm 12, integrally extended from the front end of the spring seating portion 9, which lever arm is bent and offset as at 14 for a purpose later to be described, and coiled or looped at its free end to provide a coil 15, arranged in a plane substantially rectangular to the plane of the curved seating portion 9.

When the spring is mounted on the open frame 3 the free end 16 of the coil 15 is extended forwardly of said coil to permit of an angularly offset extension 17 on said end 16 being sleeved into a recess 18 formed between the front rail 4 and the channel 19 of a metal strip 20, which strip is secured to said rail by means of nails 21. The rear supporting means 11 for the seating portion 9 of the spring is also integrally formed with the seating portion 9 and extends on a curve downwardly and then forwardly to a semi-circular shape. The end of the wire of the rear supporting means is angularly offset to extend towards the rear, so as to form a connecting extension 22, the outer end 23 of which is bent downwardly to permit of said end being sleeved into recess 24, formed between the rear rail 5 and the channel 25 of a metal strip 26, which strip is secured to said rail by means of nails 27.

It should be noted that the spring wire of the rear supporting means is bent to sinuous shape so as to embody a substantial length of wire. Consequently the bending resistance of the supporting means is low in spite of the short bend in said supporting portion. This arrangement simplifies manufacturing of the spring, assures sufficient play and pivot action in the rear supporting means without danger of breakage and is particularly important for spring structures having springs of the type described so interlocked with each other that forward and downward movement of the seating surface cannot effect stretching of the seating portions of the springs. In spring structures of the type just described the forward and downward movement

of the seating surface is entirely controlled by the rear supporting means of the springs which means must of course be constructed accordingly.

The low bending resistance of the supporting means 11 for the rear end of the seating portion 9 of the spring effects little resistance of these supporting means against forward movement of the seating portion of the spring and consequently makes the spring structure unfit for heavier loads. This deficiency is overcome by the arrangement of one or more coiled tension springs 28, which springs pivotally engage the spring structure near the rear end of its seating surface and which are anchored or pivotally attached to the rear rail 5, staples 29 being used for this purpose.

The springs of the assembled spring structure are so interlocked that the seating surface of the structure cannot be stretched. This is effected by means of an edge wire 30, pivotally secured to the front and rear ends of the seating portions of the springs by means of clamps 31, and pivotally secured to the outer loops 33 of the seating portions 9 of the two outer springs by means of clamps 32. The seating portions of all the springs are yieldingly coupled with each other by tensioned coiled springs 34, preferably arranged symmetrically with respect to the seating surface of the spring structure.

The seating portions and the sides of the edge wire 30 are slightly curved, so that under load these portions and the edge wire 30 are forcibly bulged upwardly by the supporting means 10 and 11, as these means exert upwardly directed bulging stresses on the seating portions, stresses, which are proportionate to the load. The pivotal connection between the edge wire 30 and the springs permit of the stresses being readily transferred to the supporting portions.

The bends or offsets 14 in the lever arm 12 at the front end of each seating portion 9 prohibit contact of the coils 15 with the seating portion 9, provided coils 15 are arranged above the upper edge of the front rail 4 of the frame 3, as these offsets limit the zone of contact of the lever arms 12 with the lower face of the seating portions 9 to the short lever portion 35, so that a metal to metal contact between the supporting means and the seating portion of a spring is practically avoided.

Having thus described my invention, what I claim is:

1. A spring structure for upholstered furniture comprising a frame having front and rear rails, a plurality of flat springs mounted in elevated position side by side upon the front and rear rails of said frame, each of said springs embodying a horizontally corrugated seating portion, a rearwardly and downwardly extended front supporting portion and a curved rear supporting portion including an upper rearwardly and downwardly extended portion shorter in length than said front supporting portion, means for directly connecting the ends of said front and rear supporting portions to the front and rear rails of said frame, and resilient means attached to the rear rail of said frame and to the upper portions of said rear supporting portions for yieldingly counteracting axial forward movement of said spring structure under load.

2. A spring structure for upholstered furniture as described in claim 1, wherein a wire frame is attached to the front ends of said seating portions and to the upper portions of said rear supporting portions, and wherein the resilient means

are connected to the rear edge of said wire frame.

3. A spring structure for upholstered furniture as described in claim 1, wherein a wire frame bent to the shape of the seating portion and the upper portion of the rear supporting portion of a spring is rigidly attached to the front ends of said springs and to the upper portions of their rear supporting portions, and wherein said resilient means connect the rear edge of said wire frame at symmetrical points with the rear rail of said frame.

4. A spring structure for upholstered furniture comprising a frame having front and rear rails, a plurality of flat springs mounted side by side upon the front and rear rails of said frame, each of said springs embodying a horizontally corru-

gated seating portion, a downwardly and rearwardly extended front supporting portion for said seating portion, and a curved, corrugated rear supporting portion including an upper, downwardly and rearwardly extended portion, shorter in length than said front supporting portion, means at the ends of said front and rear supporting portions for connecting same to the front and rear rails of said frame, and resilient means connected to the rear rail of said frame and to the ends of the upper portions of said rear supporting portions of said springs for yieldingly counteracting axial and downward movements of said springs under load.

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