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SPRING ANCHOR MEANS

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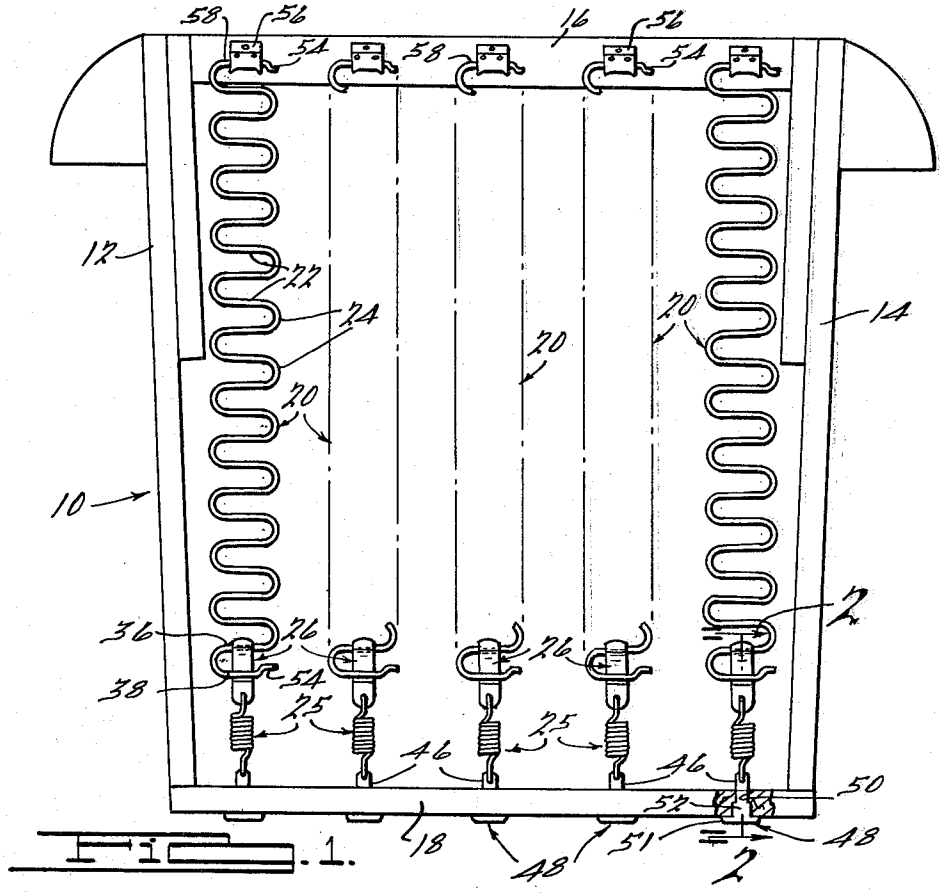

Fig. 1.

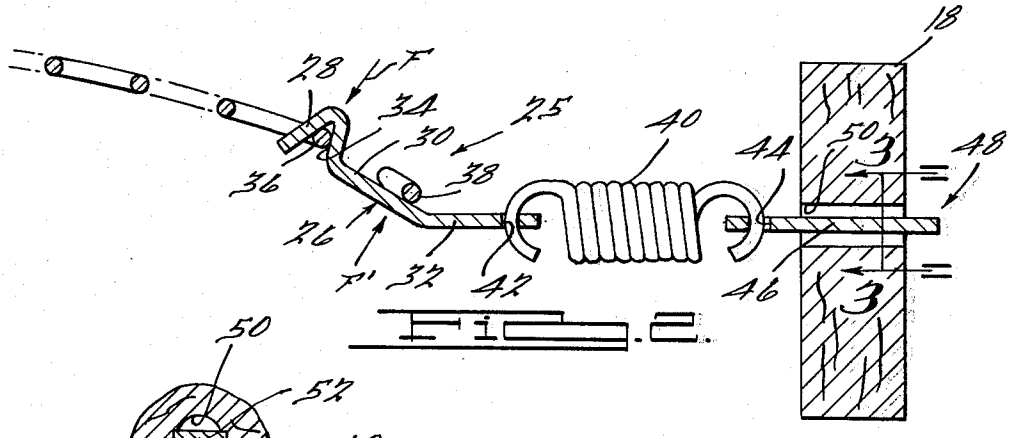

Fig. 2.

Fig. 3.

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SPRING ANCHOR MEANS

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This invention relates to chair bottoms and more particularly to improved means for anchoring prestressed springs of chair bottoms.

It is desirable that chair bottoms having prestressed load-carrying springs of the type comprising a plurality of substantially parallel torsion reaches interconnected by semicircular tension-compression segments defining a longitudinally extending resilient zigzag spring include economical means which can be quickly installed for anchoring the zigzag springs on the frame portions of the chair bottom to provide a spring pattern which has comfortable load-carrying characteristics.

Such load-carrying springs often have one end connected on a forward frame portion of the chair bottom and the other end resiliently anchored to a rear frame portion of the chair bottom. Such an arrangement allows the load-carrying springs to move vertically to a greater extent than would be the case if both ends thereof were directly connected to the chair bottom frame. During such movement the zigzag type springs provide a comparatively soft seat. However, it has been found that in order to obtain ultimate comfort, it is desirable that means for resiliently anchoring such load-carrying springs to the rear portion of the chair bottom effectively transfer a substantial portion of the load carried thereon to the torsion reach portions of such springs.

Therefore, important objects of the present invention are to improve the seating comfort of chair bottoms having zigzag type load-carrying springs with one end connected to the frame of the chair bottom and with the other end resiliently anchored to such a frame; to produce such improved seating comfort in such structure by providing improved spring anchor means to resiliently anchor one end of zigzag type springs to such a frame; to improve such anchoring means by providing a clip element having a hook on one end which is adapted to pivotally engage a penultimate torsion reach portion of such zigzag springs.

Further objects of the invention are to improve such anchoring means by providing such a clip element which further comprises an angularly directed arm portion connected between the hooked end and an offset end portion which connects to retaining means on the frame portion of a chair bottom which force the hook downwardly against the penultimate torsion reach and force the arm portion upwardly against a terminal torsion reach to impose torque on the other torsion reach portions of such springs; to provide such a clip element having its offset end portion connected to one end of a tension spring connected to the frame portion of a chair bottom; and to provide a T-shaped connector in the framing portion of such a chair bottom having means thereon for securing the connector to the framing portion and an inwardly directed leg portion adapted to connect to the end of such a tension spring.

Further objects, features and advantages of this invention will become apparent from a consideration of the following description, the appended claims and the accompanying drawing in which:

FIGURE 1 is a plan view of a chair bottom having spring anchor means constructed in accordance with certain of the principles of the present invention;

FIG. 2 is a view in vertical section taken along the line 2—2 of FIG. 1; and

FIG. 3 is a view in vertical section taken along the line 3—3 of FIG. 2.

Referring now to the drawings, FIGS. 1–3 illustrate one embodiment of a chair bottom 10 constructed in accordance with certain of the principles of the present invention including longitudinally extending side frames 12, 14 which are interconnected by a forward crossarm 16 and a rear crossarm 18 at the front and rear of the chair bottom 10, respectively. The planar area defined by the side frames 12, 14 and crossarms 16, 18 is traversed by a plurality of longitudinally extending prestressed zigzag spring bands 20 each of which comprises a plurality of substantially parallel torsion reaches 22 interconnected by semi-circular tension compression segments 24. The reaches 22 resist torque imposed on either end of the band 20 when a load is placed on the chair bottom and the semi-circular segments 24 resist tension forces imposed thereon under loaded conditions.

An improved resilient anchoring structure 25 constructed in accordance with certain of the aspects of the present invention produces unusually comfortable seating characteristics by resiliently connecting one end of each spring band 20 to the rear crossarm 18 at a point which often carries the heavier loads imposed on the chair bottom 10. The improved resilient anchoring structure 25 includes a clip element 26 having a hook 28 on one end thereof connected by an elongated arm portion 30 to an offset end portion 32. The hook 28 is tapered to form a downwardly facing surface 34 which is adapted to pivotally engage a radially outer surface of a penultimate reach portion 36 of the band 20. The spring bands 20 may be formed from different gages and the taper of the hook 28 assures that the spring will properly engage the inner surface of the hook 28. The clip 26 fits between the penultimate reach 36 and a terminal reach 38 with the upper surface of the arm 30 engaging the underside or radially inner surface of the terminal reach 38.

One end of a coil tension spring 40 connects to the offset clip end portion 32 through an aperture 42 therein and its opposite end connects through an aperture 44 in an inwardly directed leg portion 46 of a T-shaped connector element 48 carried in a hole 50 extending through the rear crossarm 18. The T-shaped connector element 48 has a head portion 51 and a shoulder 52 located rearwardly of the leg portion 46. The width of the shoulder 52 is greater than the inside diameter of the hole 50. Therefore, the shoulder 52 deforms the inner surface of the hole 50 as best illustrated in FIG. 3 to secure the connector element 48 in the rear cross arm 18. Such T-shaped connector elements 48 are economical and can be quickly secured to the crossarm 18 during the assembly of the chair bottom 10. The location of the connector element 48 can be varied throughout the vertical extent of the rear cross-arm 18 to obtain desired seating characteristics by placing the hole 50 at the desired location and fitting the leg portion 46 of connector element 48 therein.

The other end of each band 20 is fixedly connected to the forward crossarm 16 by fastening means such as a tab 56 having one of its ends connected directly to the crossarm 16 and the other of its ends turned over a terminal reach 58 of the band 20 and fastened on the crossarm 16.

The spring bands 20 are held in an upwardly directed arcaute shape as best illustrated in FIG. 2, by means of the tabs 56 and the tension springs 40 which pull the clips 26 rearwardly toward the crossarm 18 so that the downwardly facing surfaces 34 thereon will impose a downward force F on the upper or radially outer surface of

the penultimate reaches 36 and so that the upper surface of the elongated arm portion 30 thereof will impose an upward force F' on the lower or radially inner surface of the terminal reaches 38.

It has been found that the resilient anchoring of one end of the spring band 20 produces unusually comfortable seating characteristics which are in part due to the fact that such an arrangement allows the load-supporting zig-zag spring bands 20 to move vertically to a greater extent than would be possible if both ends were connected on the crossarms 16, 18. Such improved comfort is also in part due to the clips 26 which effectively transfer a substantial portion of the load on the spring bands 20 to the torsion reaches 22 through the couple action of the downward and upward forces F and F' on the ends of the spring bands 20 to smoothly deflect the spring bands 20 downwardly to form a downwardly directed dished spring pattern which is lower at the rear of the chair bottom 10 than at the forward crossarm 16.

Chair bottoms having such resilient anchoring structures 25 are unusually economical since a standard spring band 20 is adapted to connect to the clip elements 26 thereof to provide the desired spring characteristics. Moreover, the spring bands 20 can be quickly assembled on the chair bottom 10 by cutting a longitudinal length of the zigzag band material to length. Offset end portions 54 on the terminal reaches 28, 38 may be formed during the cutting operation. Then the forward terminal reach 58 of the band 20 is connected on the crossarm 16 and the band 20 is pre-tensioned across the space defined by the side frames 12, 14 and crossarms 16, 18 by merely securing the hook 28 of the clip 26 on the penultimate reach 36 and fastening the offset end 32 of the clip 26 to the tension spring 40. This operation can obviously be carried out in an expeditious manner.

It will be understood that the specific construction of the improved spring anchor means which is herein disclosed and described is presented for purposes of explanation, illustration, and is not intended to indicate limits of the invention, the scope of which is defined by the following claims.

What is claimed is:

1. In a supporting seat structure, a frame, a fore and aft extending zig-zag spring disposed in an arched path and having substantially parallel reaches joined by semi-

circular portions, an elongated fore and aft extending clip having a surface adjacent its front end pivotally engaging a radially outer surface of one of said parallel reaches of said arched spring and an elongated flat portion extending rearwardly from said clip front end and engaging a radially inner surface of an adjacent reach of said arched spring, means connecting the front end of said spring to said frame and means including a tension spring connecting the rearward end of said spring to said frame and for holding said spring under tension in its arched path.

2. In a supporting seat structure, a frame, a fore and aft extending zig-zag spring disposed in an arched path between opposed portions of said frame and having substantially parallel reaches joined by semi-circular portions, an elongated fore and aft extending clip having a hook-like end providing a surface adjacent the front end of said clip pivotally engaging a radially outer surface of a reach of said arched spring adjacent the rearward end thereof, an elongated flat portion extending rearwardly from said clip front end and engaging a radially inner surface of the rearmost reach of said arched spring, means connecting the front end of said spring to one of said opposed frame portions and means including a tension spring connected to the other of said opposed frame portions and to the rearward end of said clip and supporting said spring under tension in its arched path between said opposed frame portions.

3. The structure called for in claim 2 in which said other frame portion is provided with an aperture, and a T-shape anchor member having its leg extending through said aperture and connected with the rearward end of said tension spring so that said T-shape member connects the rearward end of said tension spring to said frame portion.

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