April 17, 1951 J. GOLDSTEIN 2,548,968

SPRING CONSTRUCTION

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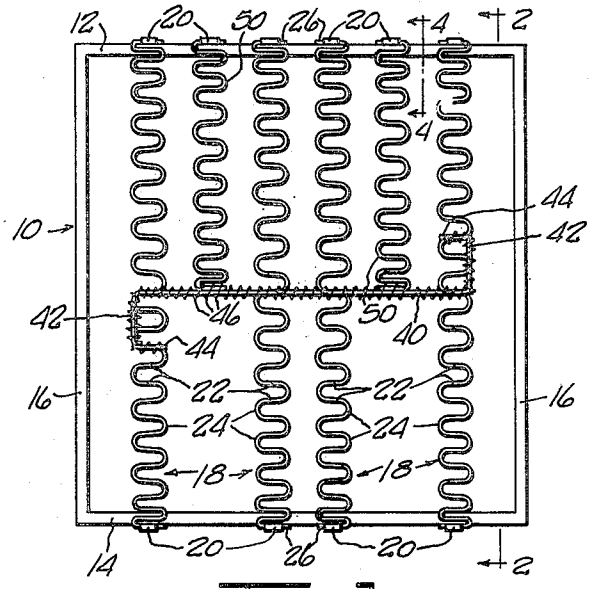


FIG. 1

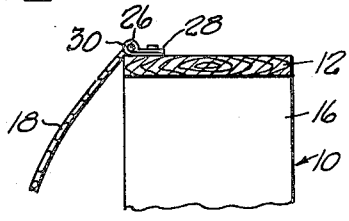


FIG. 3

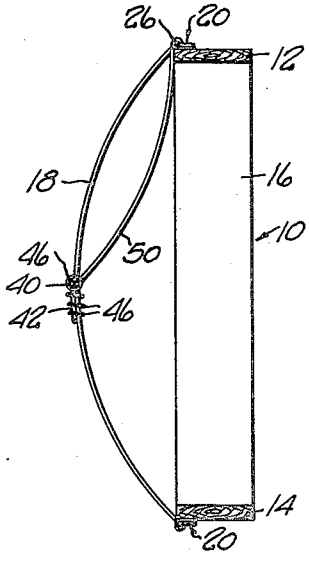


FIG. 2

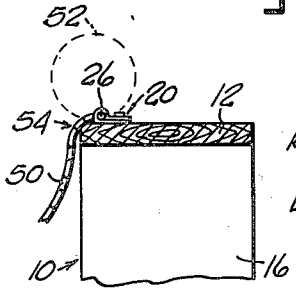


FIG. 4

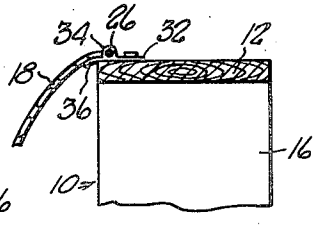


FIG. 5

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SPRING CONSTRUCTION

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5 Claims. (Cl. 155—179)

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This invention relates to improvements in spring construction, and particularly to spring constructions used in upholstered furniture.

One form of spring which has come into wide usage in furniture manufacture constitutes an elongated spring wire bent in zig-zag or wavy form uniformly throughout its length and coiled about an axis substantially parallel to the transverse runs of the spring. When this unit is uncoiled it assumes a longitudinally bowed form if its ends are secured at points spaced less than the over-all length of the spring element, by virtue of its tension and tendency return to coiled shape. The bowed form yields under pressure to afford a furniture spring over which upholstering or covering material and padding may be applied and shaped. The spring is used principally in the backs of chairs, davenports and like items of furniture, although it may also be used for arm rests, etc., and for seats and other horizontal surfaces.

The principal disadvantage of these springs is that the spring tension thereof decreases from the ends to the center thereof. Hence the springs tend to yield excessively at their center portions. When used in a chair back, this intermediate portion of minimum resilience occurs adjacent shoulder height, so that a person seated on the chair experiences a sensation of inadequate springing and of support at only the upper portion of the chair, i. e., at or near his neck.

The primary object of this invention is to overcome the disadvantage aforementioned.

A further object is to provide a spring construction formed from elongated bowed springs of the type formed from wire bent zig-zag along its length, in which the tension at the intermediate portion of the unit is increased in comparison with conventional constructions using springs of this type.

A further object is to provide a spring unit utilizing elongated and longitudinally bowed springs wherein certain of said springs span a support and others are secured to said support at only one end and are bowed reversely to and act upon the central portions of said first springs to increase the spring tension at an intermediate portion of the unit.

Other objects will be apparent from the description and appended claims.

In the drawing:

Fig. 1 is a front view of a spring unit embodying my invention.

Fig. 2 is a longitudinal sectional view taken on line 2—2 of Fig. 1.

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Fig. 3 is an enlarged fragmentary detail sectional view taken on line 2—2 of Fig. 1.

Fig. 4 is an enlarged fragmentary detail sectional view taken on line 4—4 of Fig. 1.

Fig. 5 is a fragmentary detail sectional view similar to Fig. 3 illustrating a modified embodiment of the invention.

Referring to the drawing, which illustrates the preferred embodiment of the invention, the numeral 10 designates a frame, such as the frame of the back rest of a chair (not shown). The frame has a top rail 12, a bottom rail 14 and side rails 16, all firmly connected in a unitary rigid frame unit.

A plurality of elongated springs 18 are secured by suitable brackets 20 to the top rail 12 and bottom rail 14 at their ends to span the frame. The springs 18 are arranged in spaced parallel relation as illustrated in Fig. 1. Each spring is formed from a long stiff wire bent in uniform zig-zag or wavy form along its length to provide a plurality of uniformly spaced transverse runs 22 interconnected by integral curved portions 24. The ends 26 of the springs preferably extend transversely. The spring so shaped is bent in a tight coil wherein the runs 22 and 26 thereof extend substantially parallel to the axis of the coil. The spring 18 are of an over-all length exceeding the spacing of the frame rails 12 and 14 to which they are secured, whereby the spring assumes a substantially uniform bowed form as best illustrated in Fig. 2 by virtue of its tendency to return to coiled shape. The brackets 20 by which the springs are anchored to the frame rails preferably constitute sheet metal plates bent upon themselves at 28 and providing a generally cylindrical retainer 30 for the end runs 26 at their bends. The superimposed end plate portions 28 are suitably apertured to receive nails for securing the brackets in spring-retaining form. It will be understood that any other type of bracket found suitable may be used in place of that above described.

A substantially rigid cross member 40 intersects the elongated springs 18 at an intermediate point thereof. As here shown the member 40 constitutes a stiff wire member lying alongside a transverse run 22 of each spring 18 and having portions 42 bent perpendicularly therefrom to lie alongside the outermost bends 24 of the outermost springs 18. Inwardly return bent end portions 44 project from portions 42 and are adapted to lie alongside transverse runs 22 of springs 18 spaced from those adjacent to the member 40. Member 40 may be secured to springs 18 by any

suitable means. The means here illustrated constitutes a helical wire coil 46 extending the full length of the member 40 and encircling the same and any part of springs 18 adjacent to any of the parts 40, 42 and 44 of said cross member.

One or more springs 50 of the same construction as springs 18, but of shorter length, are assembled in the device. The springs 50 are preferably positioned in spaced relation to and between springs 18 as illustrated in Fig. 1. One end of each spring 50 is secured by a bracket 20 to one of the frame rails 12—14, preferably to the top rail 12 as shown. The manner in which the spring 50 is mounted is best shown in Fig. 4 and preferably entails the positioning of the end run 26 thereof spaced from the edge of the rail for purposes to be described. The spring 50 is so secured that when one end thereof is free, the spring coils itself outwardly of the frame as shown in dotted lines 52 in Fig. 4. Hence, when the spring is extended and its opposite transverse end run 26 is positioned adjacent to the cross member 40 to be secured by member 46, the spring is bowed inwardly as shown in Fig. 2.

The combination and assembly in the unit of one or more of the springs 50 serves to impart an outward spring pressure at member 40 supplementing the spring tension at the center of the springs 18. It will be noted from Fig. 4 that the spacing of the end run 26 of spring 50 which is retained by bracket 20 controls the tension applied by said spring 50. In other words, the spring 50 is bent over the edge of the frame rail 12 at 54 in a direction opposite to that in which it was coiled, and consequently the spring is placed under greater tension than would be the case if the anchor point occurred at the edge of the frame rail. This permits application of different amounts of tension to reinforce springs 18 by simply adjusting the position at which spring 50 is anchored with respect to the edge of the frame rail.

While the reinforcement of springs 18 has been illustrated as being applied substantially at the center of springs 18, it may be exerted at any desired point or points along the length of springs 18 by simply changing the location of cross member 40. Likewise, multiple points of reinforcement may be provided by duplicating the springs 50 so that one set thereof is anchored to one of the frame rails to which springs 18 are anchored and another set thereof is anchored at the other frame rail to which springs 18 are anchored. Also, it is contemplated that reinforcing springs 50 may be mounted on the frame to extend transversely of the springs 18 and to bear thereagainst or against a cross member 40. A modified spring anchoring bracket is illustrated in Fig. 5 and comprises an elongated base 32 of stiff resilient sheet metal and a central transverse spring retainer 34. This bracket may be secured to the frame rail so that a portion 36 of its base 32 projects from the rail to provide a yielding support for the end portion of either spring 18 or spring 50. Portion 36 forms a support for one or more transverse spring runs 22 immediately adjacent the transverse end run 26 of the spring.

It will also be apparent that the invention is not limited to the use of the zig-zag wire springs illustrated, but may be practiced with other types of elongated bowed leaf springs and with different types of securing means, etc. In other words,

the invention may be embodied in other forms within the spirit of the invention as described herein and within the scope of the appended claims.

I claim:

1. A yieldable spring foundation adapted to receive thereon upholstery, said foundation comprising a frame having opposite members, sinuous outwardly bowed spring elements arching one side of the frame, the ends of said sinuous springs being anchored to the opposite members of the frame, a stiffening rod extending transversely across the sinuous springs, said reinforcing bar being anchored to each of the outwardly bowed springs, inwardly bowed springs between the outwardly bowed springs, the outer ends of said inwardly bowed springs being anchored to a frame member, the inner ends of said inwardly bowed springs being anchored to the reinforcing bar between the outwardly bowed springs and exerting an outward spring pressure on the reinforcing bar.

2. A device as set forth in claim 1 wherein the ends of the reinforcing bar terminate in opposite positioned L-shaped arms overlying the outer sides of the outer outwardly bowed springs and securing means attaching said L-shaped members to the outwardly bowed springs.

3. A device as set forth in claim 1 wherein the inwardly bowed springs are sinuous in shape.

4. A device as set forth in claim 3 wherein the ends of the transverse reinforcing rod terminate in oppositely extending L-shaped arms, said arms overlying the outer sides of outwardly bowed springs and anchored thereto.

5. In combination with a spring foundation for upholstery, said foundation comprising a frame having opposite members, a plurality of outwardly bowed sinuous springs carried by the frame, the ends of said outwardly bowed springs being anchored to opposite members of the frame, of stiffening means for said outwardly bowed springs intermediate their ends, said stiffening means comprising a transversely disposed rod extending across the outwardly bowed springs, inwardly bowed springs connected to a member of the frame, the outer ends of the inwardly bowed springs being anchored to a member of the frame and having a bearing on the frame for urging the inner ends of the inwardly bowed springs outwardly, the inner ends of the inwardly bowed springs being anchored to the reinforcing rod, said reinforcing rod being also anchored to the outwardly bowed springs on their transverse portions.

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