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SPRING SUPPORT STRUCTURES AND RELATED HARDWARE FOR FURNITURE

Filed Jan. 28, 1964

FIG. 1

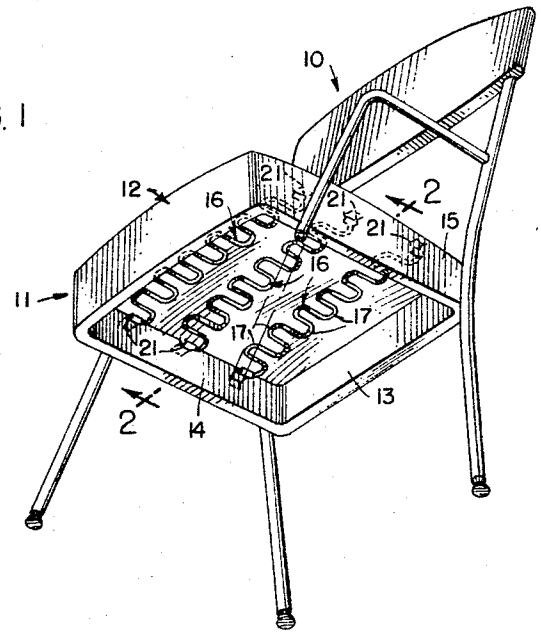


FIG. 2

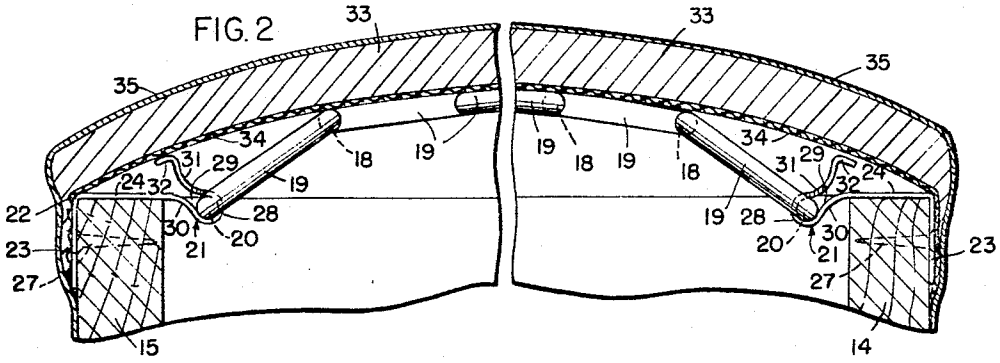
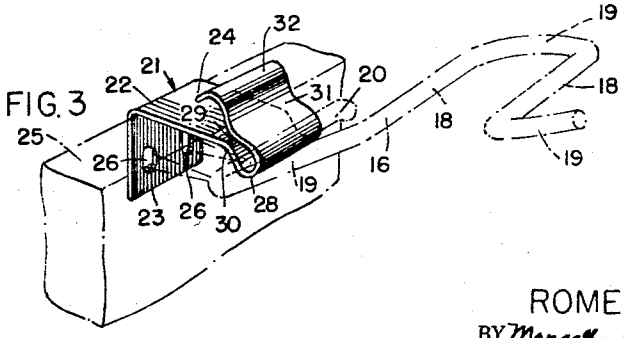


FIG. 3



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SPRING SUPPORT STRUCTURES AND RELATED HARDWARE FOR FURNITURE

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5 Claims. (Cl. 287—189.35)

This invention in general pertains to furniture structures and more particularly pertains to spring structures and spring-support clips used therewith.

One type of furniture to which the invention pertains is chairs or like seating furniture in which the seat is padded, and the padded seat resiliently supported by metal springs mounted across the frame structure of the seat and/or back rest. The spring-support clips of the invention are mounted rigidly on opposite sides of the frame. Opposing clips pairs receive opposite ends of a seat spring, which is a spring wire with a series of convolutions or zig-zags lying in the lateral plane of the spring. The spring wire further may be arched upwardly, as viewed in side elevation, from the outer ends toward the mid-portion of the spring. A side-by-side series of these springs forms an economical, spring support structure for the padded seat and/or padded back rest.

When a person is seated on furniture of this type, the upward arch of the spring is depressed. This results in outward thrust forces exerted by the ends of the springs which ends are supported on the frame, e.g., in spring-support clips.

The spring-support clips of this invention comprise a metal band or thin bar bent about transverse bending axes into an arcuate, transverse seat for the laterally-extending end of a spring wire, which end is the outermost leg of the outermost convolution or zig-zag of the spring wire. The end of the spring generally is substantially parallel to the side of the frame on which its supporting clip is mounted.

The arcuate, transverse, spring seat of the clips is formed by reverse bending of the metal clip band about a transverse bending axis into an arc, as viewed in side elevation, which is more than a semi-circle but less than a full circle. The arc radius of the inner wall of the spring seat is the same as or slightly smaller than the radius of the spring wire seated therein. The spring seat of the clip opens at a narrow spreadable neck extending therefrom upwardly and outwardly. The neck is formed by transverse bends juxtapositioned in the metal band, one of which bends is formed between a side of the spring seat and a plate portion formed at one longitudinal end of the bend and adapted to be attached to the frame and the other of which bends is formed between the opposite side of the spring seat and a hook portion formed at or near the other longitudinal end of the metal band. The hook portion is formed so as to be able to hook the end of a spring when it is being mounted on the frame. This structure, as hereinafter further elucidated, can be used to spread the narrow necks of the spring-mounting clips during the mounting of the springs across the frame in opposing clips.

The invention, its objects and its advantages will be further appreciated in the following description of a preferred embodiment of the invention taken in conjunction with the drawings.

In the drawings:

FIG. 1 is a bottom perspective view of a chair in which the preferred embodiment of the clip and spring structure for a chair seat is employed.

FIG. 2 is a sectional view, in fragment, of the chair seat as taken on section 2—2 of FIG. 1.

FIG. 3 is a perspective, enlarged view of the clip and fragments of the seat frame and spring.

Referring to the drawing, there is shown a typical chair **10**, the particulars of the general structure of which are not important herein inasmuch as the invention, as illustrated, centers in the structure in the seat frame **11** and its spring undersupport. The seat frame **11** is an open rectangular frame composed of the integrally formed or joined panels or boards comprising front panel or board **12**, rear panel or board **12**, and side panels or boards **13, 14**. The spring undersupport of the seat comprises a series of springs **16** extending between opposite sides of the seat frame.

The springs **16** are made of spring wire bent to form convolutions or zig-zags **17** formed by straight leg segments **18** transverse to the longitudinal axis of the springs and alternating U-bends **19**. The transverse end legs **20** of the springs are seated in spring-mounting clips **21**.

The clips **21** are metal bands bent about transverse bending axes into the shape illustrated. One end of the spring clips has a right angle bend **22** forming an L-bend segment having a leg **23** adapted to seat against the outer side of a seat frame member, e.g., side members **14** and **15**, and a leg **24** adapted to seat on the upper side **25** of the frame member. The leg **23** has holes **26** through which nails **27** (or screws, bolts, etc.) extend to secure the clips on the seat frame members.

The end legs **20** of zig-zag springs **16** are seated in arcuate seats **28** formed by convex transverse bends in the metal bands in the form of a circular arc which is more than a semi-circle but less than a full circle. The seats **28** of the clips have a spreadable, narrow neck **29** forming a transverse opening for the arcuate seats **28**. The metal bands forming the clips each have a concave transverse bend **30** at the end of the leg **24** and an opposing, concave, transverse bend **31** in the free, springable end of the clip which concave bends together form the narrow neck **29**.

The radius of the inner sides of the seats **28** is substantially the same as or slightly less than the radius of the end legs **20** of the zig-zag springs **16** so that the end legs fit relatively tightly in the seats. The metal bands forming the clips have sufficient resiliency so that the neck **29**, which has a throat width less than the diameter of the end legs **20**, can spread sufficiently to allow the end leg **20** to pass therethrough into seat **28**.

To facilitate mounting of springs **16** in the clips **21**, the clips may have a transverse, convex bend forming an inwardly-facing hook **32**. The hook **32** may be used to advantage in mounting the springs. For example, one end leg **20** of a spring **16** may be pressed into a seat **28** of one spring clip **21**. The spring is stretched across the seat frame **11** toward the opposing clip. The other leg **20** of the stretched spring is placed in the hook **32** in the springable end of the clip. The tension of spring **16** causes the springable end to spring and the neck **29** to spread—making it simpler to push end leg **20** into its seat **28**.

The springs **16**, as viewed in side elevation, have an upward arch. The arch is depressed or flattened under weight on the padding **33** of the seat, which padding is encased by an underlayer of fabric **34** and an outer, upholstery **35**. The latter covers the seat padding and the outer sides of the seat frame panels **12–15**.

A further advantage of the structure of the spring clips **21** is that the spring ends **20** remain securely seated in seats **28** even when the springs' arches are depressed under weight. The forces on the spring ends **20** with the springs in the latter state are downward forces due to the downward weight force and outward forces arising when the normal arches of the springs are depressed. Since the necks **29** open upwardly and outwardly, and since these forces are assimilated by the lower segments of

seats **28** adjacent bend **30**, the spring ends **20** remain securely seated in the clips.

The advantages of the invention, therefore, are severalfold.

The invention is hereby claimed as follows:

1. A spring support structure for articles of furniture which comprises a frame; a series of zig-zag springs made of spring wire extending across said frame, opposite end legs of each of said springs being seated in clips each having one end securely mounted on opposite sides of said frame; a clip on said frame being formed from a metal band having a plurality of transverse bends including a convex bend defining an arcuate seat in which respective end legs are seated, said arcuate seat having an arc which is greater than a semi-circle but less than a full circle, said seat opening outwardly and upwardly in a neck defined by opposing concave bends, said neck having a throat which is narrower than the diameter of said end legs, and a convex bend defining an inwardly-facing hook near the springable end of said metal band, whereby said neck may be spread by hooking an end leg of said spring when it is under tension.

2. A spring support for articles of furniture which comprises a rectangular, open seat frame defined by frame panels; a plurality of opposing spring clips mounted on opposite frame panels, a clip on said frame being made of a metal band having a plurality of transverse bends including a sharp bend near one end thereof and forming a clip portion lying against the outer and upper sides of said frame panel, a concave bend near the inner sides of said panel, a convex bend defining an arc which is more than a semi-circle but less than a full circle and defining an arcuate seat for an end of a zig-zag spring, a second concave bend opposite said first-mentioned concave bend, said concave bends defining a narrow neck opening upwardly and outwardly from said arcuate seat; and zig-zag springs made of spring wire extending across said frame with the end legs of said springs seated in respective opposing clips mounted on said panels.

3. A spring support for articles of furniture which comprises a rectangular, open seat frame defined by frame panels; a plurality of opposing spring clips mounted on opposite frame panels, said spring clips on one of said panels, each being made of a metal band having a plurality of transverse bends including a sharp bend near one end thereof and forming clip portions lying against the outer and upper sides of said opposite frame panels, a concave bend near the inner sides of said panel, a convex bend defining an arc which is more than a semi-circle but less than a full circle and defining an arcuate seat for an end of a zig-zag spring, a second concave bend opposite said first-mentioned concave bend, said concave bends defining a narrow neck opening upwardly and outwardly from said arcuate seat; and a convex bend on the springable, opposite end of said metal band defining an inwardly-facing hook; zig-zag springs made of spring wire extending across said frame with the end legs of said springs seated in said opposing clips mounted on said opposite panels whereby said narrow neck can be spread by placing an end leg of said zig-zag spring under tension in said inwardly-facing hook.

4. A clip for mounting zig-zag springs on frames of articles of furniture which comprises a metal band having a plurality of transverse bends including a sharp bend near one end thereof defining an L-bend, a concave bend at the end of one of the legs of said L-bend, a convex bend defining an arc which is more than a semi-circle but less than a full circle, a second concave bend opposite said first-mentioned concave bend and defining a transverse, narrow neck opening for said convex bend with a neck throat of a width less than the diameter of the inner side of said convex bend, and a second convex bend on the opposite end of said metal band defining an inwardly-facing hook, whereby said narrow neck can be spread by placing a leg of one of said zig-zag springs under tension in said inwardly facing hook.

5. A clip for mounting zig-zag springs on frames of articles of furniture which comprises a metal band having at one end a portion adapted to be mounted on a frame member and also having a plurality of transverse bends including a concave bend adjacent said portion, a convex bend defining an arc which is more than a semi-circle but less than a full circle, a second concave bend opposite said first-mentioned concave bend and defining a transverse, narrow neck opening for said convex bend with a neck throat of a width less than the diameter of the inner side of said convex bend, and a second convex bend on the opposite end of said metal band defining an inwardly-facing hook, whereby said narrow neck can be spread by placing a leg of one of said zig-zag springs under tension in said inwardly facing hook.

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