Nov. 25, 1969 B. H. HANEY ET AL 3,479,672

UPHOLSTERY EDGE SPRINGS

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FIG. 2A

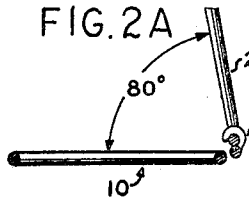
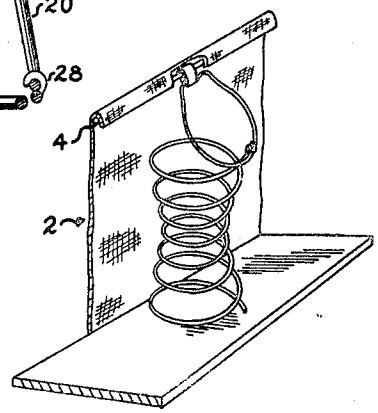


FIG. 1



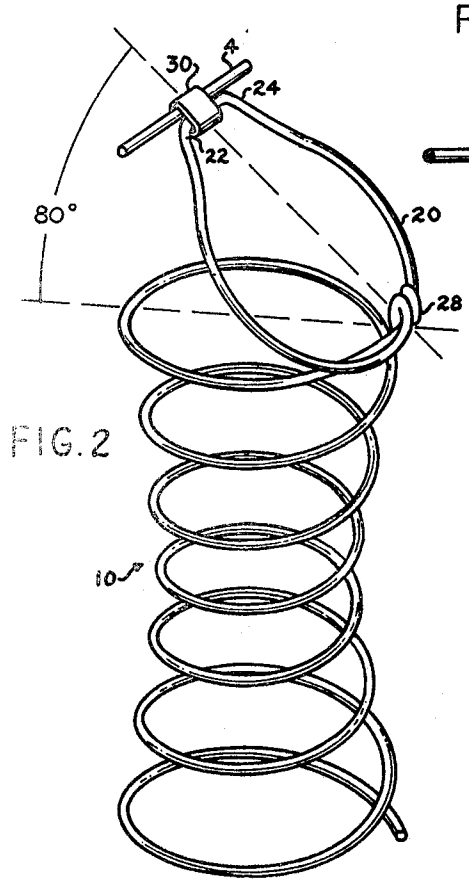


FIG. 2

FIG. 3

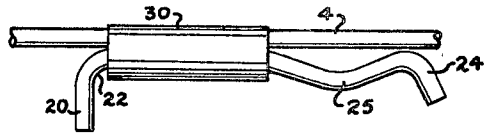
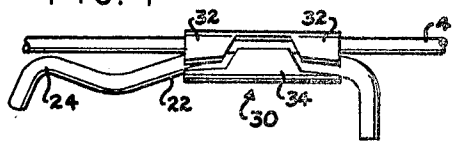


FIG. 4



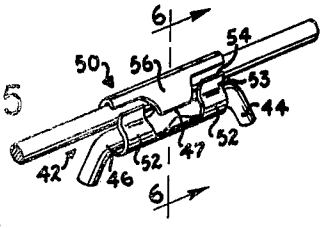


FIG. 5

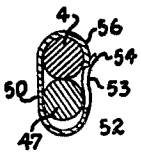


FIG. 6

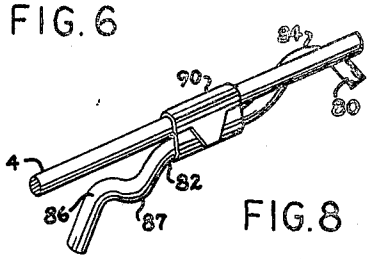


FIG. 8

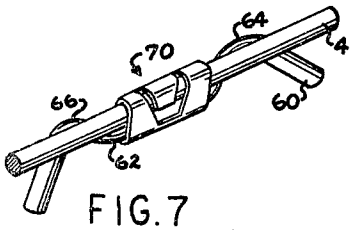


FIG. 7

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FIG. 9

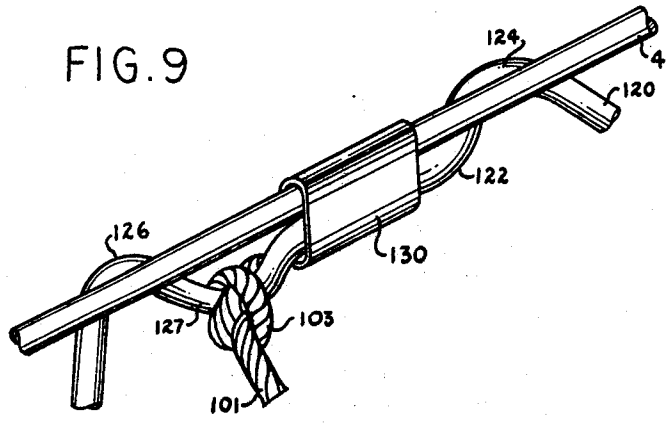
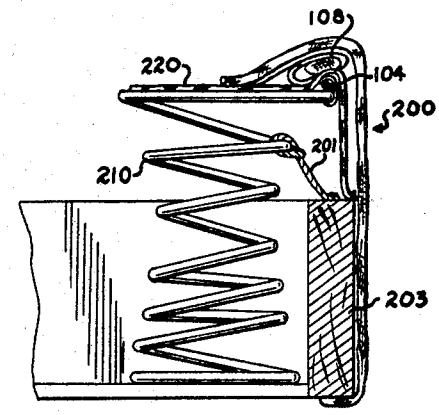


FIG. 10



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UPHOLSTERY EDGE SPRINGS

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Continuation-in-part of application Ser. No. 427,650, Jan. 25, 1965. This application June 6, 1967, Ser. No. 643,929

Int. Cl. A47c *31/00*

U.S. Cl. 5—260 2 Claims

ABSTRACT OF THE DISCLOSURE

Upholstery spring with coils terminating at the top in a heat treated, stress relieved turned up portion.

Cross reference to related application

The present application is a continuation-in-part of application Serial No. 427,650, filed January 25, 1965, entitled Upholstery Edge Springs, which issued June 13, 1967, as U.S. Patent No. 3,324,485.

Background of the invention

The manufacturer usually receives upholstery edge springs which have not been bent. As the furniture is built, the manufacturer turns up the top of the upholstery coil to be positioned in the front row of the seat, by hand, to give a stronger than normal edge to the spring construction. Normally, the unbent furniture springs received by the manufacturer have been stress relieved by heat treatment between 400°–650° F. This heat treatment changes the coil wire into an elastic material that will return to its original shape as long as the stresses applied to it do not exceed the yield point of the material. This "stress relieving" is physically a precipitation of nitrides and carbides in the structure of the steel as a result of the application of heat. Thus, when the manufacturer receives the "conventional" upholstery coil edge spring that has not been turned up—but which has been stress-relieved—he destroys all the benefit gained in stress relieving when he turns the top of the upholstery coil up. This is true because when the manufacturer turns up the coil it is subjected to stresses which exceed the yield strength or the elastic limit of the wire coil. Furthermore, turning up the top of the upholstery coil by hand, into the shape used in the seat, after the coil has been stress relieved in its normal position, may generate cracks and deformities internally in the wire if sufficient force is exerted to exceed the yield point of the wire during the cold working operation of turning up the coil.

Summary of the invention

In order to provide a firm edge which will not break in the finished product, the uppermost coil is turned upwardly 80° from the general plane of the lower coil, before stress relieving by heat treating or normalizing.

That is to say, stress relieving is accomplished after the top of the wire is turned up. The advantages of the spring of the present invention is simply its superior strength to a spring which has been turned up by the furniture manufacturer. In the present invention, stress relieving is accomplished after all the cold work is done. Thus, the problems inherent in subjecting a previously stress-relieved spring to additional cold work by turning the end up is eliminated in the present construction. The improved result of performing all the cold work before stress relieving has been dramatically illustrated by the conspicuous absence of returns of furniture due to broken front edge springs or permanently depressed or set front edge springs.

Description of the drawings

FIGURE 1 is a cut-away view illustrating the position of the novel edge spring and its relation to a border wire running along the edge of the cushion;

FIGURE 2 is a perspective view of the spring constructed in accordance with the present invention, illustrating particularly a first embodiment of a flattened edge and notch construction;

FIGURE 2A is a sectional view illustrating the angular relationship of the top coil of the spring of FIGURE 2 with respect to the principal axis of the coil;

FIGURE 3 is a detail of the flattened section of the upper coil of FIGURE 1 attached to a border wire by a clip;

FIGURE 4 is a detail of the reverse side of FIGURE 3 revealing the clip construction;

FIGURE 5 illustrates a second embodiment of a generally flattened front edge of an upper coil in which curves in the holding edge of the coil prevent the clip and border wire from rotating about the coil;

FIGURE 6 is a cross-section of the embodiment shown in FIGURE 5;

FIGURE 7 is a detail of a third embodiment flattened edge and notch construction.

FIGURE 8 is a detail of a fourth, preferred, embodiment of the invention, in which an additional notch provides separation between clip and tying twine.

FIGURE 9 is a detail of a fifth, preferred embodiment of the invention, combining advantages of the embodiments shown in FIGURES 7 and 8.

FIGURE 10 is a cut away view of an upholstered seat constructed according to this invention.

Description of the preferred embodiments

FIGURE 1 schematically illustrates the position of an edge spring in an upholstered article. The numeral **4** represents a border wire, while **2** generally indicates outer fabric.

Referring to FIGURES 2 and 2A, edge spring **10** comprises a series of coils, of which the upper most coil is turned upwardly at an angle of approximately 80° to add additional torsional strength to the edge. Free end **28** of upper most coil **20** is fixed to the subjacent coil, thereby forming a loop having a fixed segment and an opposite free segment. Flattened edge **22** is formed in loop **20** to facilitate attachment of border wire **4**, as seen in FIGURE 1. Clip **30** secures the border wire in position.

After uppermost coil **20** is turned upwardly and free end **28** thereof fixed to the subjacent coil, the entire spring is stressed relieved. That is to say, after all the cold work is completed, such as drawing the wire, forming the spring and turning upwardly, the entire spring **10** is stress relieved. This stress relieving or heat treatment usually takes place between 400°–650° F. thus changing the wire or coil **10** into an elastic material that will return to its original shape as long as the stresses applied to it do not exceed the yield point of the wire material.

In this manner, it is not necessary for the manufacturer of the furniture to turn the top of the upholstery coil **10** upwardly. Thus, the tendency for the front edge springs of furniture to become broken or permanently depressed is eliminated.

In the detail, FIGURE 3, and curve **24** of coil **20** touches border wire **4** to provide a closed notch **25**, to which coil-tying twine may be secured. FIGURE 4 illustrates the reverse side of the clip **30**, revealing lugs **32** and **34**, which are closed when the wires have been joined. In order to prevent rotation of border wire **4** about flat edge **22** of coil **20**, a second embodiment is discussed below.

FIGURE 5 illustrates a second embodiment, in which generally flattened center portion **42** of an upper coil comprises three curves, **44, 46** and **47**. As clip **50** is attached, lugs **52** are forced about control portion **42**, and extremities **54** of the lugs are pressed against border wire **4**. Thus, a rigid joint is constructed. Curves **44, 46** and **47** hold clip **50**, which in turn fixes the relative position of the border wire. FIGURE 6 is a cross sectional drawing of the elements of FIGURE 5.

FIGURE 7 discloses a third embodiment of the invention in which the border wire is placed atop the generally flattened surface of coil **50**. Ears **64** and **66** project from remote ends of the flat central section **62** under the border wire and hold the border wire in fixed positions as it is drawn downwardly by clamp **70**. In this embodiment, downward force applied on the border wire is borne solely by coil **60**. Thus, changes for clip failure due to tensile forces between border wire **4** and coil **60** are reduced.

FIGURE **8** illustrates another embodiment of the invention in which border wire **4** is secured by clip **90** to coil **80**. The joint is held rigid by a single curve **84**; curved section **86** is spaced from border wire **4**. Notch **87** holds spring-tying twine, and insures that the twine contacts neither border wire **4** nor clip **90**. This embodiment retains the rigidity advantage of the embodiment shown in FIGURE 7 and adds the advantages of twine separation.

A preferred embodiment of the invention, which combines the features and advantages of the spring details of FIGURES 7 and 8 is shown in FIGURE 9. At opposite ends of a flat central portion **122** of upper coil **120**, ears **124** and **126** project under border wire **4**. When clamp **130** holds wire **4** down upon flat section **122**, ears **124** and **126** prevent rotation of wire **4** with respect to coil **120**. Cord holding notch **127** maintains separation of tying twine **101** and its knot **103** from border wire **4** and clip **130**.

An assembled seat **200** employing the springs and joints of this invention is shown in FIGURE 10. Having been tied by cords **201** anchored to frame **203**, springs **210** are compressed; and their upper coils **222** rotated downward to an horizontal position.

Border wires held rigidily in place result in greatly improved edge roll stability. In FIGURE 10 edge roll **108**, which is fixed to border wire **104**, has a tendency to get out of place if the border wire moves. Edge roll **108** plays a very important part in holding a loose seat cushion in its place in an upholstered chair. Fixing a border wire against movement relative to upholstery coils greatly improves stability of the edge roll.

We claim:

1. An upholstery spring, comprising continuous helical coils wound about a longitudinal axis, said coils terminating at one end in a flat loop oriented in a first plane intersecting a second plane perpendicular to said axis at an angle approximately 80°, said loop having a first segment thereof attached to a portion of said coils near said loop and a second free segment, said free segment opposite said first segment defining a generally straight central portion to facilitate attachment to a border wire.

2. An upholstery spring as in claim **1**, wherein said coils including said flat loop have been heat treated to relieve stress.

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U.S. Cl. X.R.

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