March 20, 1973 J. J. BOND 3,720,960

SPRING ATTACHMENT CLIP

Filed May 21, 1971

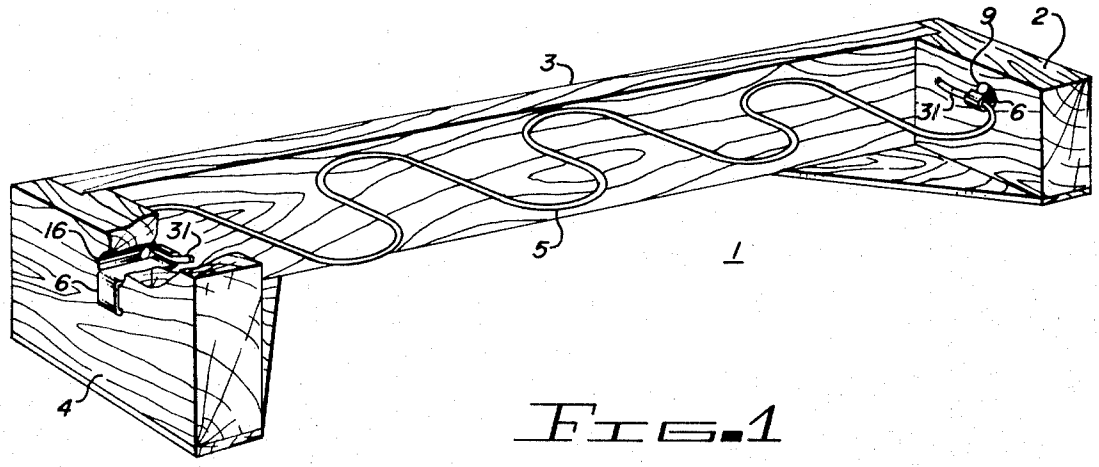


FIG. 1

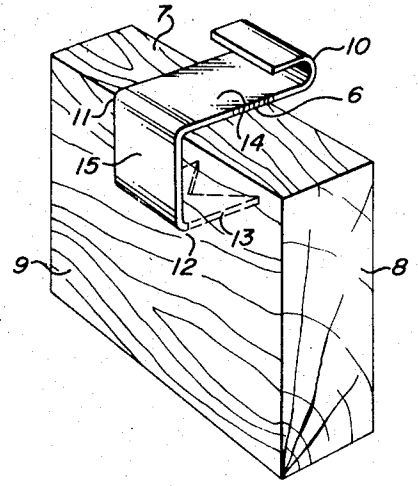


FIG. 2

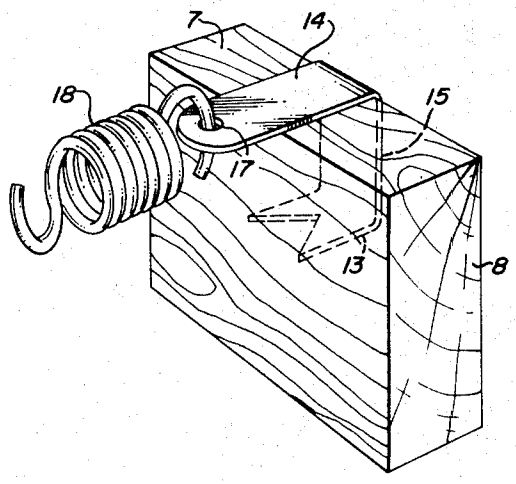


FIG. 3

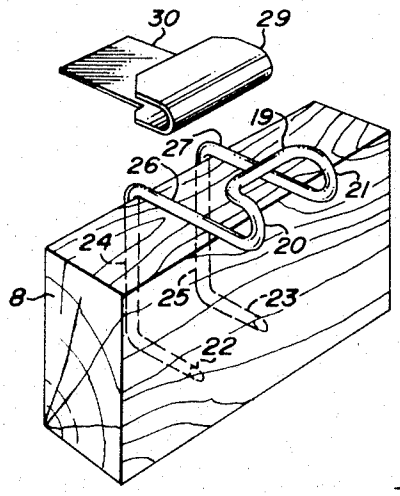


FIG. 4

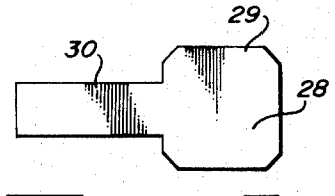


FIG. 5

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SPRING ATTACHMENT CLIP

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ABSTRACT OF THE DISCLOSURE

A device which provides an inexpensive and rapid means for suspending springs within a framework. The device, in its simplest form, comprises a flat strip of sheet metal having one end bent upwardly in an arced configuration. At the end opposite thereto a portion of the strip is bent downwardly at an angle of 90° to form a flange and the end dependent therefrom is bent at an angle of 90° such that the latter portion is essentially parallel to the main body of the strip. If desired, the end portion may be pointed or notched to provide two or more pointed ends. In operation, the pointed end is hammered into the outside of the frame with the main part of the strip resting on the frame. Thusly, the arced end points toward the interior of the frame and the spring to be suspended within the frame is hooked within the arced portion. The clip provides vertical support of a cantilever type due to the main part of the strip resting on the frame and lateral support due to the pointed ends being anchored to the frame. The longitudinal force exerted by the spring is countered by the first 90° bend acting as a flange against the frame itself.

The present invention relates to devices useful in securing materials to open framework structures.

Particularly in the field of furniture construction, there is a continuing need for devices with which springs may be attached to the framework defining the piece of furniture. In the past, various clip-like devices have been used, generally comprising a bent portion with which to engage the spring and the remaining portion of the clip providing the base for attaching the clip to the framework. Invariably, the base was perforated with one or more apertures through which securing means, such as nails, screws, or staples, were used to secure the clip to the framework. Generally these devices were satisfactory in their performance; however, the requirement of using an additional means for attaching the clip to the framework were added expenses in material and labor costs. Further, unless the nails, screws or staples were securely fastened to the framework, there usually resulted some play, permitting the clip to slide. With use of the piece of furniture, the securing means often loosened, permitting play and eventual disengagement.

In order to design and manufacture comfortable furniture, a variety of springs may be used for different parts of the furniture. These springs are suspended between the frame of the piece of furniture and secured thereto by devices called fixing clips, or simply clips. As the furniture industry has a continuing need for large numbers of these clips for each piece of furniture, the choice of the type of clip used is important. With the increasing cost of both labor and materials, the utility of each article used must be carefully measured to obtain the maximum usefulness from it and to have it perform as many different functions as possible without any substantial increase in complexity or cost.

The clips that are well known and presently used in the furniture industry require additional means, such as nails, screws or staples, for securing the clips. These additional elements increase the time required during which the clip must be in registration with the frame until it is

permanently secured. Thus, the assembler, if manual labor is used, must not only drive the securing means home, but must concurrently insure that the clip remains positioned correctly until the seating is accomplished. Clips of this ilk primarily depend upon the shear strength of the securing means. The tensional strength of the clip is generally many times greater than that required due to the clip design being primarily dependent upon the amount of bearing surface for the spring that is desired. As shear strength for any given cross section is substantially less than the tensional strength for the same cross section, the critical factor in insuring that the clip does not sever from the frame due to excessive loading is that of the shearing strength of the securing means. Thus, the securing means must be of a relatively substantial size.

In prior art clips incorporating securing means driven through apertures in the clip and into the frame, lateral forces exerted by the springs tended to translate into a torque acting on the clip which, in turn, tended to cause the clip to rotate about one or another of the securing means. This rotation tended to laterally displace the securing means and thereby enlarged the hole formed in the frame from driving the securing means into it. Wooden frames have the property of being resilient, but only to a given limit, depending upon the type of wood used. Continued displacement of the securing means will ultimately enlarge the hole to such an extent that the clip is no longer securely fastened to the frame. From this point onward, the clip will tend to extract the securing means and aggravate the displacement motions, resulting in an ultimate detachment of the clip from the frame.

Noise is always a problem and a serious factor to be considered in expensive furniture. It should emit no noises during use which might distract or annoy the user or those within earshot. As it is well known that steel sharply contacting steel will produce a "squeaking" sound, the possibility of such a contact should be reduced to a minimum. The continuing lateral movement as described above will produce noises and reduce the appeal of what might have been an expensive piece of furniture.

It is therefore a primary object of the present invention to provide a device for securing material to a frame without requiring any additional means for attaching the device to the frame.

Another object of the present invention is to provide a device for securing material to a frame which, through its inherent operation, will continue to remain rigidly attached to the frame.

Another object of the present invention is to provide a device which minimizes noise-producing elements.

Still another object of the present invention is to provide a device which may be attached to the frame by a simple one-step process suitable for manually operated tools or mass production techniques.

A further object of the present invention is to provide a device readily suitable for a variety of materials and configurations while retaining its basic attributes.

The present invention may be described by reference to the accompanying drawings, in which:

FIG. 1 illustrates an environment for utilizing the invention.

FIG. 2 illustrates the basic invention.

FIG. 3 illustrates a modification of the invention.

FIG. 4 illustrates a further modification of the invention.

FIG. 5 illustrates an insert for the invention.

Referring to FIG. 1, the basic environment of the invention is shown. A portion of an open frame **1**, as depicted by the wood pieces **2**, **3**, and **4**, may comprise the seat, back, or other portion of a piece of furniture. A spring **5**, sometimes referred to as a serpentine, arc,

or sinuous spring, is suspended between the frame **1** and attached by clips **6**. The function of the spring **5** is to provide the basic support for the subsequent furniture upholstering materials.

In order to describe the invention in more detail, reference is made to FIG. 2. The clip **6** may comprise a piece of sheet metal, such as steel for strength, having one end **10** bent into a U-shaped configuration. The U-shaped end **10** is designed with a radius such that it will receive the spring **5** (FIG. 1), the latter usually being of a circular cross section. The remaining portion of the sheet metal is bent 90° at two points (**11**, **12**) so that it too forms a U-shaped portion having square corners, whereby the overall configuration may be thought of as representing an S-shaped device in profile. The outer leg **13** of the square-shaped U may be pointed or notched as shown. In operation, the base **14**, defined as that portion of the clip **6** comprising the common leg to both U-shaped portions and also defined as that portion generally aligned with the force exerted by the spring **5**, is aligned with the top **7** of the wooden frame **1**. The side **9** represents the outside of the frame **1**. The outside leg **13** of the square-shaped U is driven by a sharp blow from a hammer or other impact tool into the frame **1** until the base of the square-shaped U is in contacting relationship with the side **9** to act as a flange **15** with respect to the base portion **14**. The clip **6** is thus firmly attached to the frame by the two contacting sides (**14** and **15**) and the embedded third side (**13**).

Where the frame **8** does not have a hight angle between the surface **7** of the frame co-operating with the base portion **14**, and the side **9** of the frame **1**, the clip, at point **11**, must be bent to match that angle. In such instances, the angle at point **12** should be the supplement of the angle at point **11** in order that the base **14** and the leg **13** remain parallel.

The means for attaching the clip **6** as described herein tends to more securely engage the clip **6** with the frame **1** as the forces exerted by the spring **5** are translated into a force tending to drive the notched portion **13** more deepely into the frame **1**. Thus, the problems of the prior art devices having the net forces tending to disengage the clip from the frame are circumvented.

When the clip **6** is firmly affixed to the frame **1**, the flange **15** is the load-bearing surface for the normal and expected longitudinal forces and the structural strength of the frame itself is of no detrimental effect. In fact, it is conceivable that after extended use, the clip **6** may tend to compress the portion of the frame coincident with the flange **15** and create a depression to more securely align the clip **6** with the frame **1**.

The placement of the clip **6** as shown in FIG. 1 is apt, in configurations where the spring **5** is, not to be flush with the top of the frame **1**. In such applications, an aperture **16** may be made in the side of the frame of sufficient size to permit at least one of the U-shaped ends of clip **6** to pass therethrough. In the simplest form, the aperture **16** may be drilled, providing a round hole. In such situations, the base portion **14** of the clip **6** cannot rest against the flat portion of the frame **1**, but there is only minor, if any, loss of strength or firmness if the edges of the base portion **14** are in contacting relationship with the sides of the aperture **16**. The notched portion **13** of the clip **6** is then driven home into the frame below the aperture **16**.

The spring length, if designed to be less than that of the distance from one clip to its counterpart on the other side of the frame, will maintain the spring **6** in tension at all times and thus inhibit the spring **6** from separating from the arced portion **10** of the clip **6**. The arced portion **10** acts in the nature of a journal for the spring **6** and, as there may be some noise emitted due to the rotation of the spring within the journal, it may be desired to coat the inner surface of the arced portion with some plastic or plastic-like material to overcome steel-to-steel contact. The amount of rotation in terms of degrees is in direct proportion to the noise producing capability. Thus, with proper design of the spring arrangement, the maximum deflection of the spring, causing rotation within the journal, may be minimized. The noise produced from such a minimal amount of rotation is generally imperceptible or nonexistent, and may obviate the need for a plastic coating.

As shown in FIG. 1, the end portion **31** of the sinuous spring may be bent inwardly. This will tend to inhibit the spring **5** from sliding out of the clip **6**, should any lateral forces be exerted upon the spring **6**.

FIG. 3 illustrates a modification of the clip **6** where a spring other than a serpentine spring is to be attached to the frame **1**. Instead of the generally semi-circular U-shaped portion of clip **6** retaining the spring, the base portion **14** may simply have a hole **17** in it to receive a portion of the helical spring **18**. The remaining portion of the clip **6** is unaltered to retain the inherent benefits of a clip constructed in accordance with the present invention. Thus, the notched end **13** is again driven into the frame section **8** to secure the base portion **14**, cooperating with flange **15**, to the frame.

FIG. 4 illustrates yet another modification of the clip as depicted in FIG. 2. In some cases it may be cheaper or more expedient to utilize a clip **6** constructed from a piece of wire. Such a clip may be described as a length of wire initially bent into a U-shaped form having generally square corners with legs **26**, **27** substantially longer than the bottom of the U. The bottom **19** of the U, with a portion of each of the legs bent into a corresponding arc (**20**, **21**) of approximately 180°, forms the spring-retaining portion of the clip **6**. The remainder (**24**, **25**) of the legs may be bent into the form of a square-shaped U whereby the ends **22**, **23** of the legs become that portion of the clip embedded into the frame **8**; the portions **24**, **25** become that portion of the clip adjacent the outside of the frame.

FIG. 5 illustrates a piece of material **28**, which may be non-metallic, that may be fitted within the clip **6** described by the arced portions (**20**, **21** of the embodiment of FIG. 4 or 10 of the embodiment of FIG. 2) and which directly receives the spring **6**. This material provides insulation against metal-to-metal contact and a degree of soundproofing as the spring is rotated within the curved portion (acting as a journal) of the clip during use of the piece of furniture. The material may be shaped such that the portion **29** contacting both the spring and the clip is wider than the clip **6** to insure no spring-to-clip contact. A tail **30** may be added which is particularly suitable for the wire clip (see FIG. 4) as it fits between the base portions **20**, **21** of the clip lying on top of the frame **8**. The resultant keying of the material **28** prevents it from working loose and thus does not require any additional means for retaining it in place.

Where the two arced portions **20**, **21** of the wire clip are thought not to provide sufficient bearing area for the use intended, the material **28** may be used as a journal. In such an application, the configuration of the material may be as described above, but the composition could be brass, copper, beryllium copper, etc. The use of these materials not only provides a substantially greater bearing surface, but also tends to inhibit noise caused by the spring rotating within the arced retaining portion.

Although the previous discussion of the utility of the clips has centered around the attachment of springs, the clip **6** may also be used for attaching webbing or other material serving the function of webbing or having the resilience of springs.

While the invention has been described in its preferred embodiment, it is to be understood that the words which have been used are words of description rather than limitation and that changes and variations may be made without departing from the proper scope or fair meaning of the subjoined claims.

I claim:

1. In furniture of the type utilizing springs secured to the furniture frame, a device for attaching a spring extending across the furniture frame to one side of the furniture frame said device comprising:

a first portion for engaging one end of one spring;

a second portion extending from said first portion and generally aligned with the force exerted by the spring, said second portion engaging a part of the furniture frame and extending interior to the space defined by the furniture frame;

a third portion forming a first angle with said second portion in conformance with the angle between the outer side of the furniture frame and the part of the furniture frame engaged by said second portion; and

a fourth portion including at least one pointed end and forming a second angle with said third portion supplementary to said first angle, said fourth portion being embedded in the furniture frame to position said third portion adjacent the outer side of the furniture frame, whereby the spring is engaged by said first portion and supported interior to the furniture frame by the combination of said second, third, and fourth portions engaging the furniture frame.

2. The device as claimed in claim 1 wherein said first portion forms, in profile, a U-shaped configuration for receiving and supporting an end of said spring.

3. The device as claimed in claim 1 wherein said device comprises a length of sheet metal bent along lines transverse to its longest dimension to form said first, second, third and fourth portions.

4. The device as claimed in claim 3 wherein said first portion includes an aperture through which the spring to be suspended may be hooked.

5. The device as claimed in claim 3 wherein said fourth portion is notched to provide two generally pointed ends at its extremity.

6. The device as claimed in claim 1 wherein said first, second, third and fourth portions comprise parallel lengths of wire, said parallel lengths joining each other at said first portion and forming two pointed ends at said fourth portion.

7. The device as claimed in claim 6 wherein said first portion comprises a U-shaped configuration in profile and describing an arc of more than 90 degrees.

8. The device as claimed in claim 6 including:

a sheet of material configured to have a first generally rectangular section and a second generally rectangular section where a small side of said second rectangular section joins the middle portion of the longer side of said first rectangular section, where the longer side of said first rectangular section is equal to or greater than the width of said first portion and the shorter side of said second rectangular section is less than the width of said second portion, whereby said first rectangular section may be curved to lodge within the arc formed by said first portion and said second rectangular section may be placed between the lengths of wire comprising said second portion.

9. The combination set forth in claim 1, wherein said second portion is impervious.

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