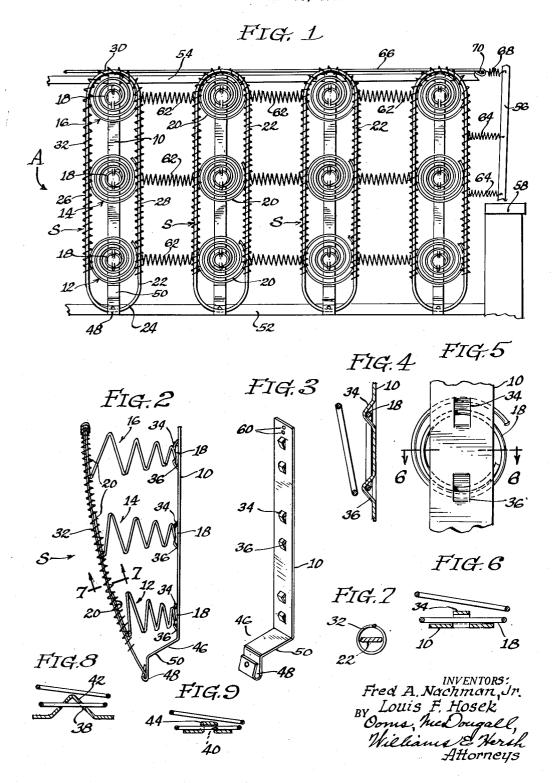
SPRING ASSEMBLY AND UNITS EMPLOYED IN THE MANUFACTURE OF SAME Filed Jan. 10, 1956



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SPRING ASSEMBLY AND UNITS EMPLOYED IN THE MANUFACTURE OF SAME

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This invention relates to spring coil assemblies for use 15 in the fabrication of upholstered furniture and it relates more particularly to spring units which can be fabricated for use in the manufacture of spring assemblies of different shapes and dimension and which have a high degree of flexibility for use in the fabrication of upholstered 20 furniture.

It is an object of this invention to provide a spring assembly for use in the manufacture of upholstered furniture.

It is another object to produce a spring unit which can 25 be prefabricated for usce in the manufacture of spring assemblies having a high degree of resiliency and flexibility in practically all directions and which can be assembled in different combinations to produce a spring assembly of various dimensions for use in the manufacture of upholstered furniture and the like.

These and other objects and advantages of this invention will hereinafter appear and for purposes of illustration, but not of limitation, an embodiment of the invention is shown in the accompanying drawing in which—

Figure 1 is a front elevational view of a part of a spring assembly embodying the features of this invention;

Figure 2 is a side elevational view of a prefabricated spring unit embodying features of this invention and which is used in the manufacture of the assembly shown 40 in Figure 1;

Figure 3 is a perspective elevational view of a back strap member used in the fabrication of the spring unit shown in Figure 2;

Figure 4 is a sectional view lengthwise through the central portion of the back strap showing the lower portions of the coil spring in the assembled relation therewith;

Figure 5 is a top plan view of the portion of the back strap and coil spring shown in Figure 4;

Figure 6 is a sectional view taken along the line 6—6 50 of Figure 5;

Figure 7 is a sectional view taken along the line 7—7 of Figure 2:

Figure 8 is a sectional view taken of a modification in the construction of the back strap member, and

Figure 9 shows a still further modification in the construction of the back strap member.

Referring now to Figure 2 of the drawing, illustration is made of a prefabricated spring unit S embodying the features of this invention and which can be used in various combinations one with another in laterally spaced apart parallel relation to produce a spring assembly A of the type illustrated in Figure 1 of the drawing with the demension of the spring assembly depending upon the number of units S employed and the spaced relation therebetween. 65

Each individual prefabricated unit S comprises a back strap 10 in the form of an elongate bar of rigid and preferably resilient material such as may be formed of spring steel, reinforced plastics or the like or of wood, metal or the like having lesser resiliency. A plurality of spring coils 12, 14 and 16 of conical shape are aligned lengthwise along the back strap to extend endwise sub-

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stantially perpendicularly therefrom in substantially equally spaced apart relation with the end portion 18 of small dimension operatively connected to the top of the back strap and with the terminal coils 20 of larger dimension extending outwardly therefrom.

The outer terminal coils 20 of the aligned coil springs 12, 14 and 16 are joined one with the other in the aligned spaced relation by means of a rigid, resilient border wire 22 of spring metal having an intermediate portion 24 of U shape with two lengths 26 and 28 extending continuously from the ends thereof in parallel relation and spaced laterally one from the other throughout their lengths by an amount corresponding to the crosswire dimension of the terminal coils 20 of the coil springs 12, 14 and 16 so that the two lengths are adjacent to or preferably overlie the opposite lateral edges of the terminal coils of each of the coil springs in the row. The ends of the border wire 22 beyond the portion overlapping the lateral edges of the end coil 16 are turned curvilinearly inwardly to correspond with the curvature of the terminal coil of the coil spring and the ends 30 are of a length to overlap one another and the outer end portion of the terminal coil 20 of the end coil spring 16.

A helical tie wire 32 which is threaded continuously about the border wire 22 from beyond the overlapped portions of the terminal coils of the coil springs interconnect the lateral edge portions of the terminal coil springs 20 to coil springs 12, 14 and 16 with the adjacent portions of the border wire 22 thereby to tie each of the terminal coils of each of the coil springs into the border wire and simultaneously to join the free ends of the border wires to form a continuous loop of the border wire with the intermediate portion 24, free of the coil springs, extending endwise in spaced relation to the coil springs into engagement with an upturned end portion of the back strap to form an interconnected spring unit, as will hereinafter be described.

The back strap 10 has portions struck upwardly intermediate the lateral edges in longitudinally spaced apart relation in pairs wherein the upwardly struck portions in each pair has a spaced relation one from the other corresponding to the space between diametrically opposed parts of the terminal coil 18 in the lower portion of the coil springs and each pair of upturned members is spaced one from the other to correspond with the spaced relation between the lower terminal coils 18 of each of the coil springs when in the assembled relation to enable the wire of the terminal coils 18 to be threaded through the loops 34 and 36 struck upwardly from the strap thereby operatively to interconnect the terminal coils of each of the coil springs to the back strap in a predetermined location.

While it is preferred to form the back strap of a flat bar, the strap may be formed of spring metal having other desirable shapes, such as rods or bars of round, oval, or other polygonal cross-sections. Instead of forming the struck portions into triangular loops 34 and 36, they may be formed to curvilinear shape or to rectangular shape for enabling the wire of the bottom coils 18 of the coil springs to be threaded therethrough. In the alternative, the portions struck upwardly from the back strap for engagement by the wire forming the terminal coils 18 of the coil springs may extend lengthwise as illustrated in Figure 8 and in Figure 9 with aligned crosswise openings 38 and 40 in the upwardly struck portions 42 or 44 through which the turns of the wires in the terminal coils may be threaded. By way of still further modification, the terminal coils of the coil springs can be interconnected with the back strap 10 in the desired locations by various other metal fastening means, such as by welding, soldering or by metal clips, adhesives or the like.

The lower end portion 46 of the strap which extends

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downwardly beyond the coil springs 12, 14 and 16 is formed with a loop 48 on the end through which the U-shaped portion 24 of the border wire 22 extends to secure the border wire in fixed relation to the strap. A section 50 of the back strap between the loop 48 and the portions supporting the spring coils 12, 14 and 16 is offset outwardly at an incline by an amount less than the length of the coil springs to cause the border wire 22 to curve gradually inwardly from the upper end to the lower thereby to provide a curvature which corresponds some- 10 what to that of a piece of upholstered furniture and to locate the looped or flanged portion 48 in a position to be secured to a cross bar 52, such as may be employed to form the base of a back frame member for a piece of upholstered furniture.

In the fabrication of an upholstered piece of furniture, the preassembled spring units S are mounted in the frame, such as a vertically disposed back frame of a sofa or the like formed of horizontally disposed top and bottom frame members 54 and 52 respectively, vertically disposed side 20 frame members 56, which extend from the top to the bottom frame members, and a horizontally disposed arm member 58 which extends forwardly from an intermediate portion of each of the side frame members.

In assembly to form the spring section, it is only necessary to locate a desired number of the preassembled spring units S in laterally spaced apart relation between the side frame members 56. The back strap 10 is dimensioned to extend into engagement with the top and bottom frame members 55 and 52 so that the upper end portion of the 30 back strap can be secured to the upper frame member, as by means of bolts or screws through openings 60 or by other fastening means, such as rivets, nails and the like. The flanged or looped end portion 48 at the lower end of the back strap can be similarly secured to the lower 35 cross frame member 52 as by means of bolts, rivets, screws and the like fastening means.

When all of the prefabricated spring units have been secured in the desired laterally spaced apart relation to the upper and lower frame members, it is desirable resil- 40 iently to interconnect the units between the upper terminal coils of the coil springs. For this purpose, use is made of a number of short connecting coil springs 62 having one end hooked into the border wire 22 of one unit while the other end engages the border wire of the 45 adjacent unit with the connecting springs preferably in crosswise alignment with the spring coils of the spring units.

The end units are interconnected by similar spring members 64 which extend crosswise between the outer 50 border wire of the outer coil section to the adjacent side frame member 56. Thus the outer end portion of the spring coils of each spring unit are interconnected laterally one with the other by resilient means and they are also interconnected longitudinally in each unit by resilient 55 strap for receiving the border wire. means in the form of the border wire 22 and the helical tie wire 32 thereby to permit lateral flexing action as well as longitudinal flexing action as well as downward flexing action for universal resiliency in the spring assembly.

When the units have been mounted in the described relation in the frame members, the terminal coils 20 of the upper spring coils 16 at the end of each unit are interconnected by a top edge reinforcing wire 66 formed of spring metal which extends crosswise into engagement with the terminal coils of the end coil springs and the border wire members in overlapping relation therewith. The free end of the top edge wire 66 is connected by a tie-in spring 68 with the adjacent side frame members. For this purpose, the free end of the top edge wire 66 is formed with a loop 70 for receiving one end of the spring 70 coil 68 while the other end of the coil is secured to an aligned bracket on the side frame members 56.

The top edge wire is fastened to the border wire or to the terminal coils of the outer coil springs in each unit by means of a fastener or the like but it is preferred to thread 75 rows with coil springs 62, use can be made of wire links

the top edge wire 66 through the helical tie wire 32 which is employed to interconnect the terminal coils 20 of the coil springs 12, 14 and 16 to the border wire. The top edge wire 66 and the border wire 22 may be in the form of bands, as illustrated, or in the form of rods of round or oval shape or of other cross-section. The top edge wire 66 and the border wire 22 are usually formed of metal members of larger cross-section than the helical tie wires 32 or the coil springs 12, 14 and 16 to provide a desirable stiffening action and support but the top edge wire and the border wires are preferably formed of rigid but resilient material to enter actively into the spring action available. Similarly, the back strap member 10 is preferably formed of resilient material to impart springiness in use, although improved spring action is available

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from the assembly even in the absence of resiliency in the back strap member.

The freedom of movement of the spring coils laterally and upwardly, downwardly, as well as axially, coupled with the resiliency available from the interconnecting coils 62, the border wires 22, the back strap member 10 and the top edge wires 66, provides for spring actions not heretofore available in spring assemblies for upholstered furniture in that the spring sections can easily and readily conform to accept any load from any direction without distortion or disturbing effect upon adjacent portions of the spring assembly. The resiliency available from the independence of the ends of the spring coils 12, 14 and 16 coupled with their resilient interconnection in the vertical direction and in the cross-wise direction provides for immediate recovery and return of the spring elements to normal position but without excessive force or harshness.

The foregoing describes the preferred method of assembly of the prefabricated spring units in the manufacture of a spring assembly. It will be apparent that various other arrangements and means for interconnecting the parts may be employed to modify the characteristics of the spring assembly without departing from the spirit of this invention.

By way of modification, the units can be mounted in the desired relationship to provide a spring assembly without the use of a bottom frame member 52. In this instance, the strap 10 is secured only at its upper end portion to the upper frame member 54 while the lower end portion hangs free for resilient movement individually and in combination with the others through their crosswise ties to provide greater softness and springiness to the structure. When use is made of a bottom frame member as described in the preferred modification, the lower end portion of the strap 10 can be fixed to the bottom frame member by vertically spaced rivets or screws which can serve also to hold the intermediate curvilinear end portion 24 of the border wire in the desired assembled relation without the necessity of providing a looped end portion 48 in the

As previously pointed out, the border wire can be round, flat or of other polygonal shape in cross-section. The attachment of the lower border wire to the end portion of the strap can be achieved by other means, such as by means of a clip, rivet or the like fastening means but it is preferred to make use of the construction described wherein the border wire is received in the prefabricated unit by way of loop 48 formed in the end portion of the strap.

Instead of joining the lateral edge portions of the terminal coils to the border wire by means of helical tie wires, the desired attachment can be achieved by the use of individual staples or clips or other individual fastening means. This provides for greater independence of the coils although it is preferred resiliently to interconnect the coils with the described helicals 32 to interrelate the spring elements.

By way of still further modification, instead of interconnecting the helicals and border wires crosswise between 5

or clips, or means interconnecting the border wires and helicals crosswise between units may be dispensed with entirely in some applications.

It will be apparent from the description that we have made a marked improvement and simplification in the manufacture of spring assemblies for upholstered furniture and that separate units can be prefrabricated in large numbers and used as desired to fit a given space or to provide a tailor-made type of spring action in a spring assembly wherein the prefabricated units may be incorporated with with little, if any, effort and without the need for highly skilled labor.

It will be understood that the dimensional characteristics of the spring units may be varied and that the number of spring coils connected to the back strap members and 15 their spaced relation one to another may be varied over and above the three units described in the illustrated modification and it will be further understood that other changes may be made in the details of construction, arrangement, operation and the materials without departing 20 from the spirit of the invention, especially as defined in the following claims.

We claim:

1. A spring unit for use in the manufacture of spring assemblies comprising an elongate strap of a relatively 25 rigid material, a plurality of coil springs extending substantially perpendicularly from the strap in longitudinally spaced apart relation, means attaching the bottom end portion of each of the coil springs to the strap for support thereon in the aligned spaced relation, a relatively 30 rigid border wire extending longitudinally adjacent the lateral edges of the terminal coils of the coil springs away from the strap and having an end portion extending beyond the spring coil section into engagement with the coresponding end portion of the strap member, means in- 35 terconnecting the border wires and the adjacent portions of the terminal coils of the coil springs, and means connecting the end of the border wire to the corresponding end of the strap member.

2. A spring unit as claimed in claim 1 in which the 40 strap member has an extension beyond the portion supporting the coil springs and which is offset in the end portion by an amount less than the length of the extended coil springs and connected to the border wire in the end thereof whereby the coil spring adjacent the end of the border 45 wire is compressed by a greater amount than the others to provide a rounded contour.

3. A spring assembly for upholstered furniture having upper and lower frame members and side frame members, a plurality of spring units as claimed in claim 1 arranged in laterally spaced apart parallel relation between the side frame members and with the back strap members ex-

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tending lengthwise from the bottom to the top frame members, means for securing the upper end portion of the back strap to the upper frame member and means for securing the lower end portion of the back strap to the lower member securely to mount the spring units in the frame members, and resilient means interconnecting the border wires of one spring unit with the adjacent border wires of the adjacent spring units to interconnect the border wires and the terminal coils of the coil springs crosswise in the assembly.

4. A spring assembly for upholstered furniture having upper and lower frame members and side frame members, a plurality of spring units as claimed in claim 1 arranged in laterally spaced apart parallel relation between the side frame members and with the back strap members extending lengthwise from the bottom to the top frame members, means for securing the upper end portion of the back strap to the upper frame member and means for securing the lower end portion of the back strap to the lower member securely to mount the spring units in the frame members, resilient means interconnecting the border wires of one spring unit with the adjacent border wires of the adjacent spring units to interconnect the border wires and the terminal coils of the coil springs crosswise in the assembly, a reinforcing top edge wire, which is spaced from and free of the back strap, extending crosswise adjacent the outer edge of the terminal coils of the outer coil springs in the parallel units, and means interconnecting the top edge wire and the adjacent terminal coils of the coil springs.

5. A spring assembly for upholstered furniture comprising a horizontally disposed upper frame member, a plurality of spring units as claimed in claim 1 extending downwardly substantially perpendicularly from the upper frame member with the spring units arranged in laterally spaced apart parallel relation, means for securing the upper end portion of the back strap of the spring units to the upper frame member to mount the spring units in the described relationship, and means interconnecting the border wires of one spring unit crosswise with the border wires of adjacent spring units to interconnect the spring units crosswise in the assembly.

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