July 26, 1938. W. W. GLEASON 2,124,695

SPRING ASSEMBLY

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Fig. 1.

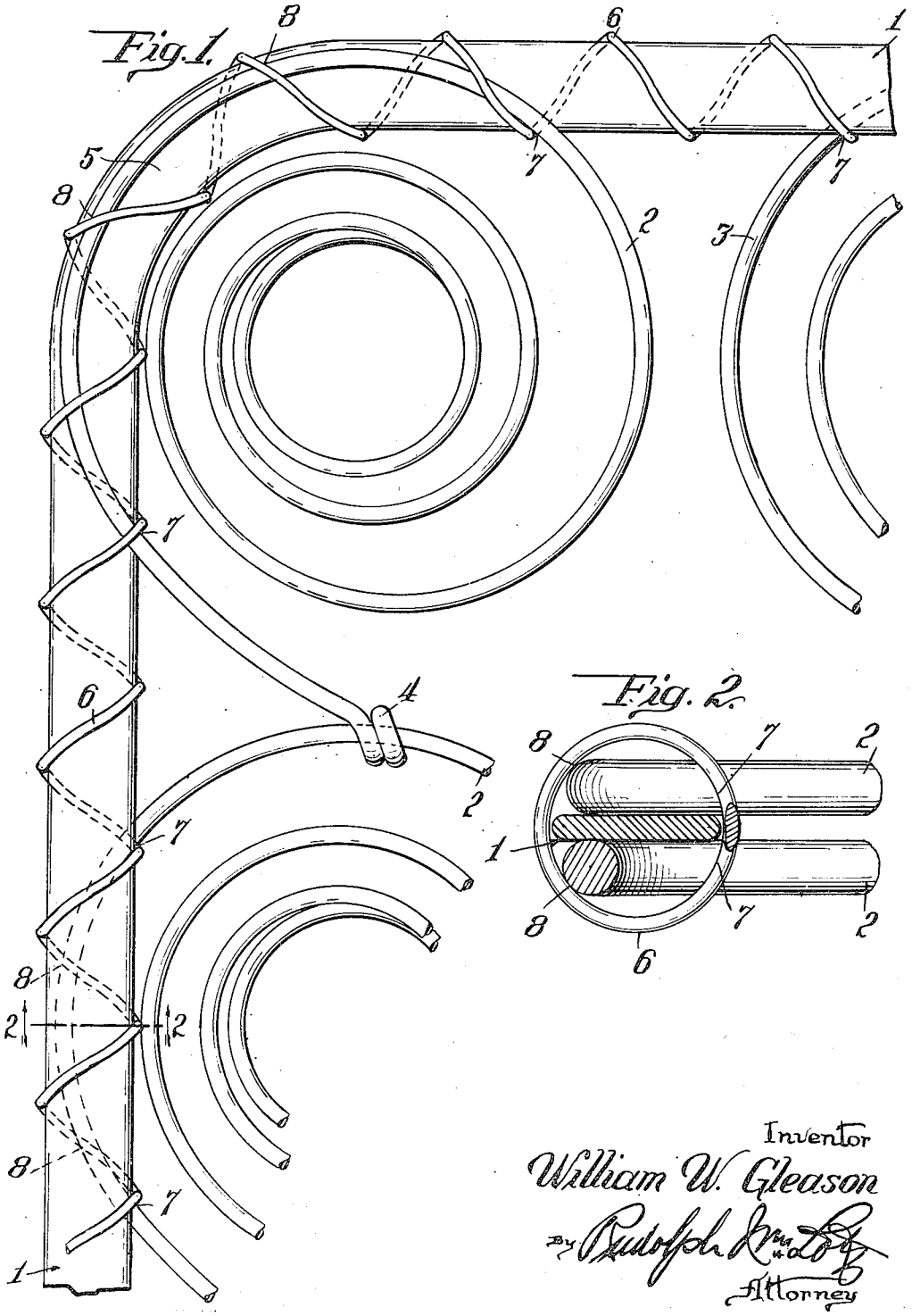


Fig. 2.

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SPRING ASSEMBLY

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9 Claims. (Cl. 5—260)

The present invention relates to spring assemblies for upholstery, and has for its main object to provide means whereby the assembly, which may be of any of the well-known conventional types, is made either entirely of metal, or wherein the individual springs or rows of springs are encased in fabric and held in predetermined relative positions by the fabric or other means, and which is prevented from contracting and becoming distorted under the influence of the lateral pressures exerted thereon by the cover ticks and padding encasing the spring assembly in the manufacture of mattresses and cushions of the spring-filled type.

A further object of the invention is to provide means adapted to function as aforesaid, which are simple and easily applied.

A suitable embodiment of the invention is illustrated in the accompanying drawing, wherein:

Fig. 1 is a fragmentary top plan view of a spring assembly constructed in accordance with the invention.

Fig. 2 is a fragmentary detail cross sectional view of the same on an enlarged scale taken on the line 2—2 of Fig. 1.

In the art of manufacturing spring assemblies for mattresses and cushions of the various conventional types aforesaid, great difficulty is experienced in preventing the springs from overlapping each other when the assembly is crowded into the customary outer structure comprising the cover tick and padding of the mattress and cushion.

It is also extremely difficult to accurately form upholstery springs and also accurately assemble the same, either by metallic fastening means or by encasing the spring in fabric pockets, as in the well-known Marshall type structure and the type illustrated, for example in the patent to Suekoff No. 1,411,227, as to produce assemblies having lateral dimensions which are always the same. Thus, for example, in a large number of spring assemblies supposed to be uniform in size, it is very probable that the majority will be slightly longer or shorter than the desired dimensions and also slightly wider or narrower and in many instances both dimensions will be slightly inaccurate.

The present day practice in the mattress art in cutting the cover ticks and boxing strips to accurate predetermined dimensions at the mill, makes it absolutely necessary that the spring assembly be also of accurate lateral dimensions and that means be provided for preventing these spring assemblies from being contracted in lateral dimensions under the influence of the pressures exerted against the peripheral edges of the assembly when padding is introduced between the boxing strip and the spring assembly or which may result from the formation of roll edges in the mattresses, whereby an appreciable additional pressure is caused to be exerted against the said peripheral edges of the assembly.

Resort has been had to many types of devices, such, for example, as wire stakes disposed between adjacent rows of springs and secured thereto, and the employment of relatively stiff and heavy border wires secured to the marginal portions of the marginal springs of the assembly to prevent these lateral contractions of the assemblies, but none of these means has proved satisfactory for the reason that in order to preserve the resiliency of the spring assembly and to permit the same to yield sufficiently to cause the mattress to fit itself, so to speak, to the body of the occupant, the stakes and other means employed have been required to be extremely resilient and this resiliency permits such stakes to buckle responsively to said lateral pressures and thus permit contraction of the assembly.

The most successful means known to me for preventing contraction of a spring assembly under the influence of the said lateral pressures lies in the use of border wire frames marginally of the top and bottom surfaces of the spring assembly which are composed of a highly resilient flat strip of metal equipped with rounded corners and composed of a single piece of metal welded together at its meeting ends to form what may be termed rectangular hoops.

It is obvious that this flat metal disposed substantially in the planes of the upper and lower faces of the assembly will resist lateral contraction very efficiently, but it is also true that these flat wire hoops or border frames will distort with a sort of twisting motion between the ends of their rails under the influence of lateral pressures.

These flat wire border frames can be made easily of exactly the desired lateral dimensions of which the spring assembly is specified to be made, and it is the main object of the present invention to provide means for securing the said flat wire frames to the springs of the assembly in a cheap and efficient manner at low cost and at the same time, so secure the same to the spring assembly as to obviate all chances of buckling of the rails of said frames under the influence of lateral pressure. It is also essential that the resiliency of said flat wire strips be maintained in order that the spring assembly may be rolled up

for baling purposes and otherwise without causing the same or any portion of said spring assembly to become permanently distorted.

In Fig. 1 of the accompanying drawing, there is illustrated only a corner portion of a flat wire border frame 1 and a spring assembly for either a mattress or cushion. In the instance illustrated, said frame 1 is secured to the outer portion of the terminal coils of the marginal springs 2 and 3 of a spring assembly, wherein the springs 2 are connected with each other by means of knotting an extremity 4 of each of the springs 2 to the terminal coil of the next adjacent spring so that all of the springs 2 will constitute an articulate row thereof. The springs 3 are similarly connected with each other to provide an articulate row thereof extending parallel with the row of springs 2. In the instance illustrated the springs 2 and 3 are shown as spaced from each other, but it will be understood that they may be closely associated and connected with each other by means, such as illustrated in Letters Patent to Hetherington No. 1,888,666, or in any other suitable manner. The wire frame 1 will be of exactly the outer dimensions as to length and width that is desired to be maintained in the spring assembly, and the rounded corners 5 of said frame will be of a radius substantially equal to that of the terminal coil of the conventional hour glass type of spring shown and commonly used in the manufacture of spring assemblies.

In my pending application Serial No. 164,328 filed September 17, 1937, border wire frames of flat metal, such as flattened wire, are shown to be secured to the outermost portions of marginal springs of the assembly by means of sheet metal clips. Said securing means are very satisfactory from a structural standpoint, but have been found to be relatively expensive and in some instances are unsatisfactory because of the fact that they can slide along the wire frames and thus permit some of the springs to become displaced from their normal positions in the structure. To overcome the last-mentioned difficulty and also to reduce the cost of production, I have contrived to secure the springs 2 and 3 to the frame 1 at top and bottom of the spring assembly by means of a helical wire tie 6.

It will be noted by reference to Fig. 2 that the edges of the frame 1 are arcuate or convex, the same being composed of normally round wire which is flattened in any suitable manner and therefore presents arcuate edges which are very well adapted for the purposes of the invention.

The helical tie wire 6 is of slightly greater inner diameter than the width of the flat strip 1 so that the helical wire may be caused to embrace the same without undue frictional resistance.

The width of the strip of which frame 1 is composed is such as to overlap the terminal coils of the marginal springs of the assembly throughout the major part of the width of the strip 1 as shown, and the pitch of the helical wires is such that the length of two complete convolutions or coils thereof are of a combined length equal to the cord of the arc formed by the inner edge of the strip 1 when the latter is positioned upon the terminal coil of a spring 2 or 3 in such manner as to cause said strip to be overlapped by said coil over the major part of the width of the strip. Owing to the diameter of the wire of which the springs 2 and 3 are made, the thickness of the strip 1 between its top and bottom faces and the inner diameter of the helical tie wire 6, each portion of a spring 2 or 3 overlapped by the strip 1 will be engaged at the ends of the aforesaid cord, as shown at points 7, and will also be engaged by the helical tie wires at points 8 lying between the points 7 and spaced laterally therefrom. Thus the two complete coils of the tie wire, as aforesaid, present three points in contact with or opposed to the inner edge of the strip 1, two of said points being engaged with the inner faces of the terminal coil of a spring 2 or 3 where intersected by the vertical plane of the inner edge of the strip 1 thus holding the spring 2 or 3 against inward movement relatively to said strip 1. The terminal coils of the springs 2 and 3 are thus practically rigidly engaged with the flat strip 1 and by reason of the lateral and longitudinally spaced apart points of engagement 7 and 8, respectively, the strip 1 is held very firmly against twisting or similar distortion by the combined action of the helical tie wires and the springs 2 and 3.

This resistance to buckling of the strip 1 is very efficient and permits the border frame composed of the strip 1 and referred to as element 1, to exert lateral stresses on the spring assembly which will correct the slight variation in width and length of the latter, these variations being usually only a fraction of an inch.

In order to prevent any slight distortion or buckling of the strip or frame 1, the terminal coils of alternate springs 2 and springs 3 will be disposed upon opposite faces of the frame 1 as herein illustrated and as also illustrated and described in my aforesaid pending application Serial No. 164,328. Inasmuch as the helical tie wire 6 extends to a higher elevation throughout the periphery of the structure than the terminal coils of any of the springs 2 and 3, this relative staggered relation of the terminal coils of adjacent springs does not affect the continuity of supporting surface presented by the spring assembly; that is to say, there is no visible or tangibly appreciable difference in the level of the terminal coils of the component springs of the assembly due to this relative staggered positioning of the outermost portions of the terminal coils of the marginal springs.

As shown with respect to the corner springs 2, it will be noted that the portion of the terminal coil of the latter which in this instance rests upon the upper face of the frame 1, is substantially concentric with said corner portion of the latter and is engaged with the arcuate portions of the tie wire 6 at a plurality of points between the contact points 8.

The spring assembly made in accordance with the present invention retains its predetermined dimensions very efficiently and by reason of the four point engagement of each of the springs disposed in the row between the corner springs thereof and the even greater number of points of engagement between the tie wire and corner springs, all of the springs engaged with the frame 1 are held against all movement relatively to the strip or frame 1.

The instant illustration may be taken to show part of a spring assembly for a mattress wherein the terminal coils of the springs 2 and 3 are of large dimensions, such as four inches.

In order to effect the engagement of the helical tie wire with each marginal spring at the respective points 7 and 8, the springs 2 and 3 must be spaced from each other a distance which is a multiple of the length of each coil of the tie

wire and width of the strip 1 must be so proportioned to the diameters of the terminal coils of the springs 2 and 3 as to assure engagement of the tie wire with the latter at said points 7 and 8. All of this is quite easily accomplished.

It is essential that the points of engagement 8 shall be disposed equidistantly from and between the points of engagement 7.

While the tie wire 6 is shown herein as extending around the corner portion of the frame 1, it will be understood that this is not essential as the terminal portions of two tie wires extending transversely to each other may embrace said corner portion, this modification being omitted from illustration as unnecessary to cause the same to be readily understood by persons skilled in the art.

The tie wire 6 is composed of resilient material which is self-restoring after any displacement due to rolling up of the assembly in a bale.

Obviously, if the rails of the strip 1 are subjected to any torsional strain tending to twist them about their own axes, they must turn on the points 7 as fulcrums and this will be so resisted by the partial choking of the space within the helical tie wire 6 by the portions of the springs 2 and 3 embraced by the latter, as to limit this twisting to a negligible degree even though all of the springs 2 and 3 overlap the same face of the frame 1.

I claim as my invention:

1. A spring assembly for upholstery comprising a group of springs, a single-piece marginal frame composed of flat resilient metal disposed in overlapping relation to the outermost portions of terminal coils of the marginal springs of the assembly with its flat faces horizontally disposed, the said overlapped portions of said springs projecting outwardly beyond the middle of the respective rails and corner portions of said frame, and helical tie wire encircling said frame and the portions of springs overlapped thereby, the pitch of the said tie wire being so proportioned to the length of the several portions of the rails of the frame overlapped by the springs and the spacing apart of said marginal springs being such that the outermost of the overlapping portions of said springs are engaged by two contiguous points constituting terminals of one coil of the tie wire and thus held against outward movement relatively to the rails of said frame, and that the terminal points of two coils of the tie wire engage the inner portions of the coils of the springs at their points of intersection with the inner edges of the rails of the frame to hold said springs against inward movement relative to said frame, said first-named two points being spaced from and lying between the last-named two points.

2. A spring assembly for upholstery comprising a group of springs, a single piece marginal frame composed of flat resilient metal disposed in overlapping relation to the outermost portions of terminal coils of the marginal springs of the assembly with its flat faces horizontally disposed, the said overlapped portions of said springs projecting outwardly beyond the middle of the respective rails and corner portions of said frame and helical tie wire encircling said frame and the portions of springs overlapped thereby, the pitch of said tie wire being so proportioned to the length of the several portions of the rails of the frame overlapped by the springs and the spacing apart of said marginal springs being such that the outermost and innermost portions of the terminal coils of the springs overlapped upon the frame are engaged by two points in the coils of the tie wire, the outermost points of engagement lying between the innermost thereof and the latter being engaged with the inner faces of the said terminal coil at the points of intersection of the latter with the inner edge of the frame for holding said coil against inward movement relatively to the latter.

3. A spring assembly comprising a group of inter-connected upholstery springs occupying a substantially rectangular area, a border-wire frame composed of relatively wide flat resilient metal with its outer flat face disposed in a horizontal plane and having outer dimensions substantially equal to those of said area and overlapping the outermost portions of the marginal springs of the assembly aforesaid, each of said overlapped portions of said marginal springs disposed in contact with a flat face of said frame over substantially the entire width of said face, and a means embracing and surrounding said frame and the portions of the springs overlapped thereby and engaging the inner and outer edges of the frame and the portions of the several springs next adjacent thereto and retaining said frame and springs against lateral movement in a horizontal plane relatively to each other.

4. A spring assembly comprising a substantially rectangular frame composed of flat resilient metal having its flat faces disposed in parallel horizontal planes, a group of inter-connected upholstery springs having the outermost substantially arcuate portions of its marginal springs overlapping a face of the said frame over substantially the entire width of the latter, and a continuous tie and coupling means surrounding the said frame and snugly engaging its side edges and engaging the outer and innermost points in the said arcuate portions of the springs overlapped with said frame and acting to prevent substantially all lateral movement of said frame relatively to said springs in a horizontal plane.

5. In a spring assembly, a frame member having a face of substantial width, an upholstery spring having an arcuate portion lapping said face of said frame member and extending across said face, and a tri-point tie securing the arcuate portion of the spring and the frame member in snug facial engagement and with lateral binding points alternating interiorly and exteriorly of said arcuate portion of the spring, whereby to prevent substantially all lateral movement of the arcuate portion of the spring relative to said frame member.

6. A spring assembly comprising a group of inter-connected upholstery springs occupying a substantially predetermined area, a border frame composed of resilient metal and equipped with flat faced rails disposed in a horizontal plane and of outer peripheral form and dimensions of the predetermined area to be occupied by said group of springs, said frame being overlapped over substantially the entire width of its several rails by the outermost portions of terminal coils of the marginal springs of the group, and resilient foraminous means extending the entire length of each of the several rails of the frame and embracing each of the latter and engaging said overlapping portions of each of said springs at relatively staggered spaced-apart points along the inner and outer edges of said rails and serving to substantially prevent relative movement between the latter and said springs over the surface portions of the rails overlapped by said respective springs.

7. A spring assembly comprising a group of

interconnected upholstery springs occupying a substantially predetermined area, a border frame composed of resilient metal and equipped with flat faced rails disposed in a horizontal plane and of outer peripheral form and dimensions of the predetermined area to be occupied by said group of springs, said frame being overlapped over substantially the entire width of its several rails by the outermost portions of terminal coils of the marginal springs of the group, and resilient foraminous means extending the entire length of each of the several rails of the frame and embracing each of the latter and engaging said overlapping portions of each of said springs at relatively staggered spaced-apart points along the inner and outer edges of said rails and serving substantially to prevent all relative movement of said springs relatively to said rails.

8. A spring assembly comprising a group of interconnected conventional upholstery springs, a border frame of resilient metal equipped with flat-faced rails overlapped over the entire width of its several rails by the outermost portions of terminal coils of the marginal springs of said group, said over-lapping portions of said springs being disposed substantially tangentially to the outer edges of said rails, and resilient foraminous means extending over the entire length of each of said rails and completely enveloping the latter and said overlapping portions of said springs and engaging the latter at a plurality of points each along the inner and outer edges of said rails and thereby securing the said portions of said springs substantially against all movement relatively to said frame.

9. A spring assembly comprising a group of interconnected conventional upholstery springs, a border frame of resilient metal equipped with flat-faced rails overlapped over the entire width of its several rails by the outermost portions of terminal coils of the marginal springs of said group, said overlapping portions of said springs being disposed substantially tangentially to the outer edges of said rails, and resilient foraminous means extending over the entire length of each of said rails and completely enveloping the latter and said overlapping portions of said springs and engaging the latter at a plurality of points each along the inner and outer edges of said rails and thereby securing the said portions of said springs substantially against all movement relatively to said frame, the latter including corner portions enveloped by said resilient foraminous means and the latter being held against longitudinal movement along said rails by said corner portions of said frame.

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