Oct. 27, 1959 M. LEVINE 2,910,114

COIL SPRING ASSEMBLY FOR FURNITURE SEATS AND THE LIKE

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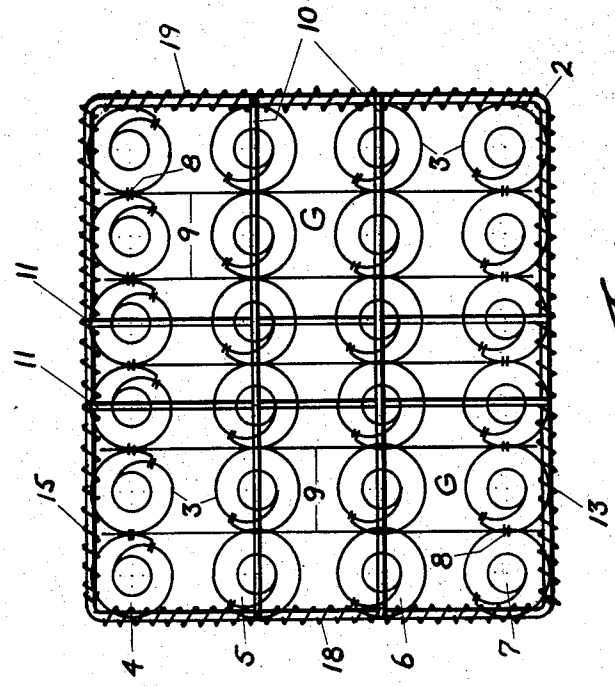


Fig. 3.

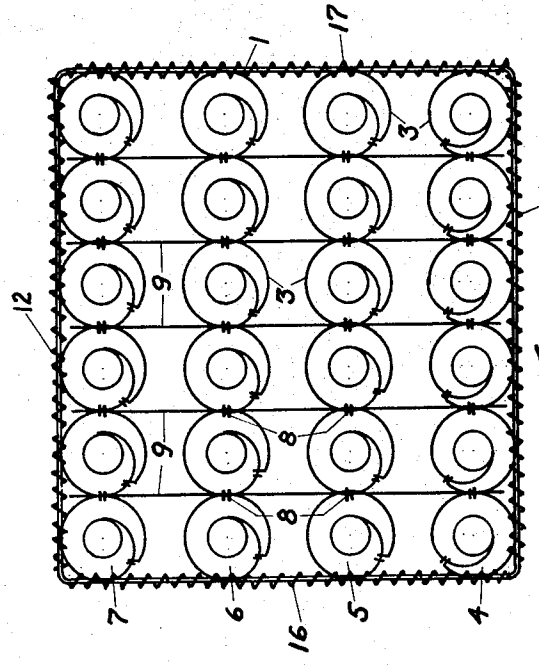


Fig. 2.

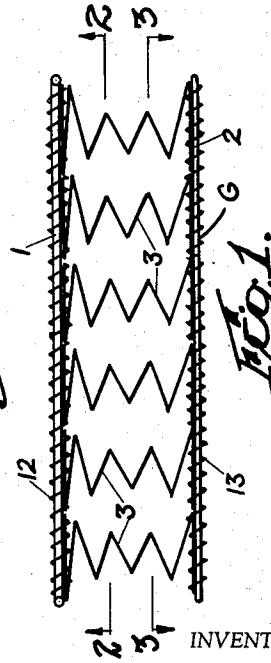


Fig. 1.

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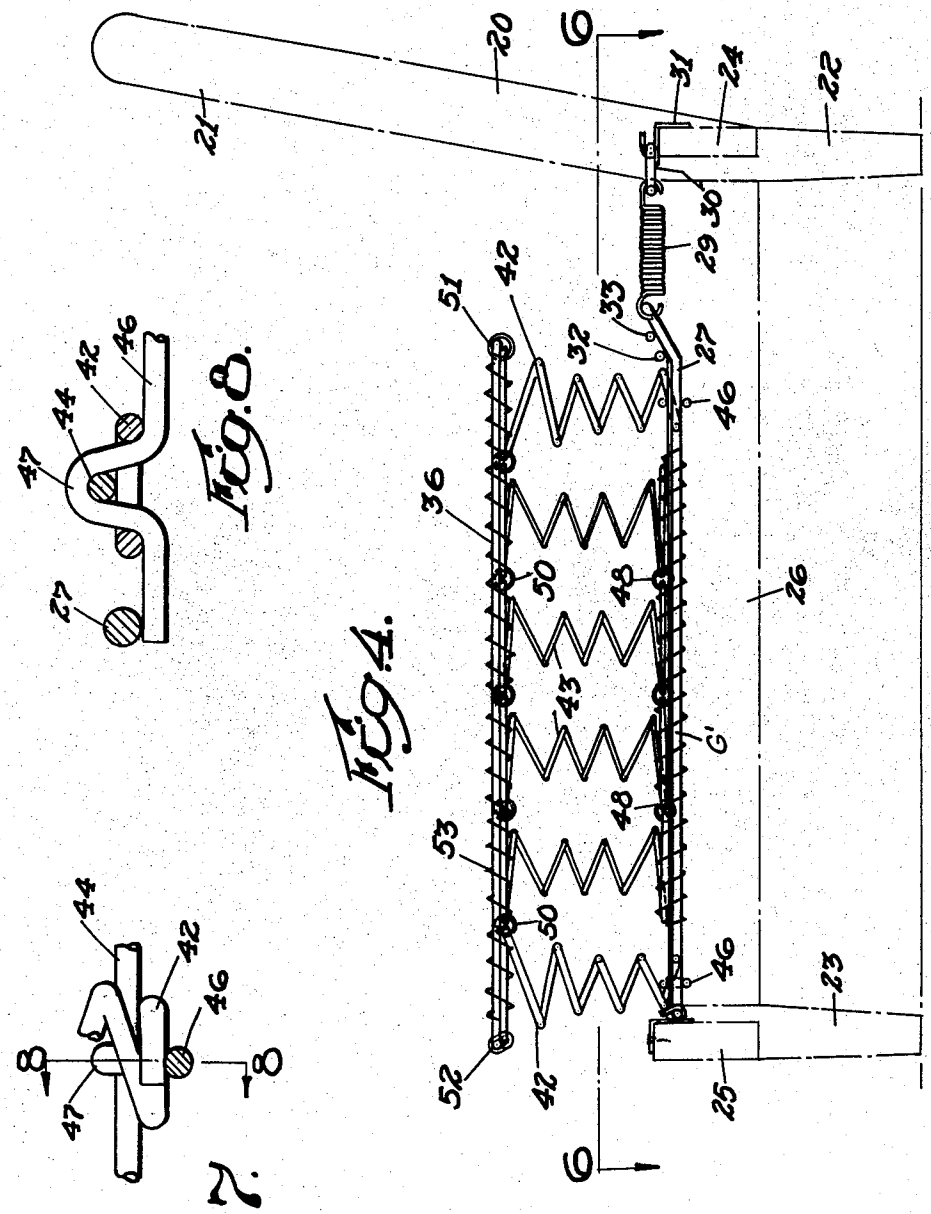


FIG. 4.

FIG. 8.

FIG. 7.

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COIL SPRING ASSEMBLY FOR FURNITURE SEATS AND THE LIKE

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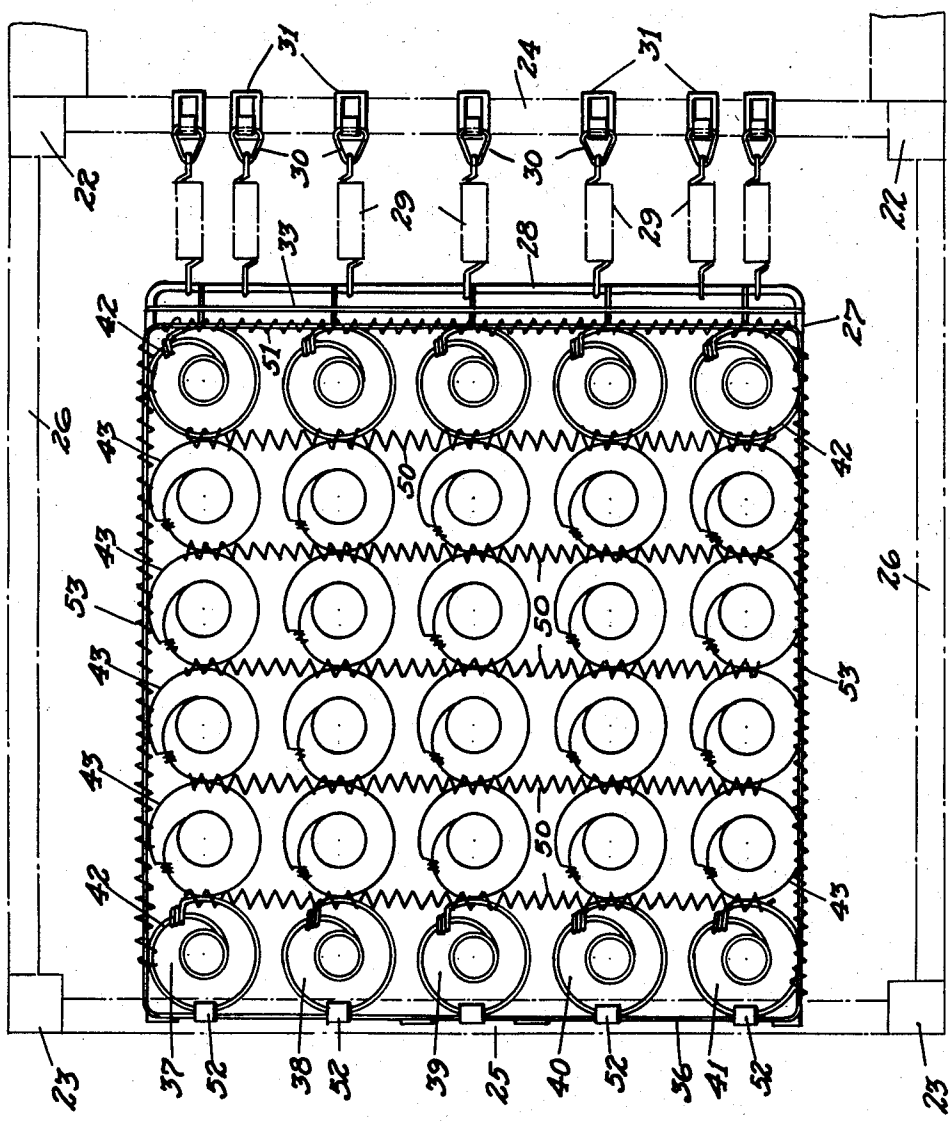


Fig. 5.

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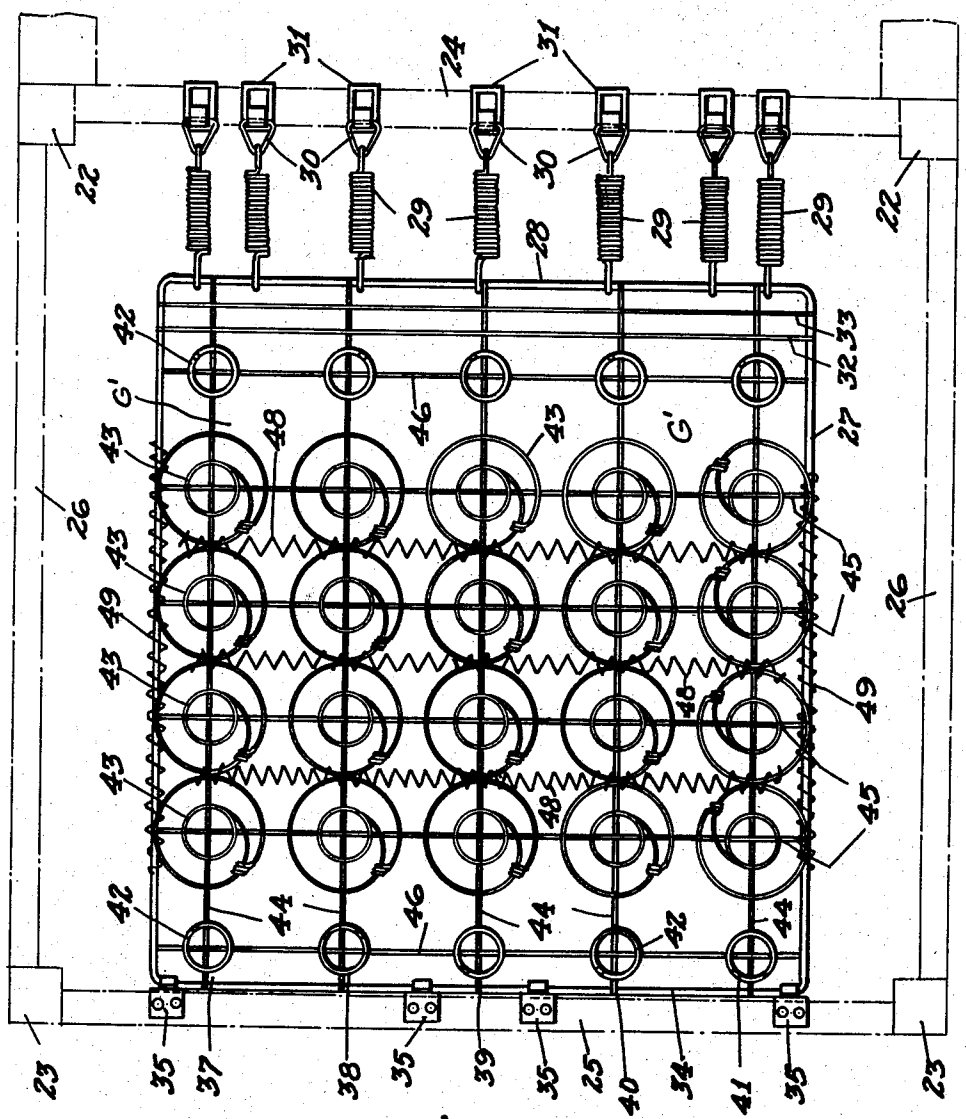


Fig. 6.

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COIL SPRING ASSEMBLY FOR FURNITURE SEATS AND THE LIKE

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6 Claims. (Cl. 155—179)

The present invention relates to a novel coil spring assembly for use in the seat portions of upholstered furniture.

In the construction of upholstered chairs, divans, etc. it is conventional practice to use a platform providing a multiplicity of upright coil springs for the support of the cushion, or cushions, upon which the user will sit. Such a spring platform is generally built into the chair or divan by hand, which operation is cumbersome and expensive. This operation is too well known to require any discussion in detail; briefly, however, the construction of a spring platform involves the tying and cross-tying of the springs into position by hand, using twine or heavy string.

In addition to the hand-tied spring platforms referred to above, several types of prefabricated or "drop-in" spring platforms have been tried and found wanting. For the most part, these "drop-in" spring platforms are crudely made and decidedly lacking in the necessary balance and resiliency required of spring platforms. Also, these "drop-in" spring platforms are difficult to attach to the frame structure of the chair or divan.

The present invention eliminates the necessity of any hand-tying of springs by providing a prefabricated unit which constitutes or includes the spring platform, as will hereinafter appear. Also, the present invention provides a prefabricated spring platform construction which is vastly superior to all previous so-called "drop-in" types, both from the standpoint of spring balance and the ease of attachment to the frame structure of the chair.

Therefore, it is a principal object of my invention to provide an improved spring platform construction which may be installed as a self-contained unit into a chair, or the like, so as to eliminate the cumbersome method of tying springs by hand, as conventionally employed.

Another object of my invention is to provide a prefabricated spring platform construction which may be easily and readily attached to the chair or divan with which it is to be employed.

Other and further objects and advantageous features of my invention will hereinafter more fully appear from the following detailed description thereof, taken in connection with the accompanying illustrative drawings, in which

Fig. 1 is a side elevation of one embodiment of my new coil spring assembly, in a relatively simple form which permits its use, for example, as the interior construction of an irreversible seat cushion.

Fig. 2 is a horizontal sectional view, looking upwardly from the plane of section line 2—2 of Fig. 1, in order to show the connections of the several springs, only at their upper ends, to each other, and to the upper frame member.

Fig. 3 is a horizontal sectional view, looking downwardly from the plane of section line 3—3 of Fig. 1, in order to show the connections of the several springs, only at their lower ends, to each other and to the lower or foundation grid structure of the assembly.

Fig. 4 is a side elevation of another embodiment of my new coil spring assembly, in a form which provides a "drop-in" spring platform for an upholstered chair or divan, to support the latter's seat cushion or cushions.

Fig. 5 is a top plan view of the construction depicted in Fig. 4, and showing, in a fashion similar to Fig. 2, the connections of the several springs, only at their upper ends, to each other and to the upper frame member.

Fig. 6 is a horizontal sectional view, looking downwardly from the plane of section line 6—6 of Fig. 4, in order to show the connections of the several springs, only at their lower ends, to each other and to the lower or foundation grid structure of the assembly.

Fig. 7 is a fragmentary large scale view, illustrating the connection of certain heavy end-of-row springs to the foundation structure.

Fig. 8 is a sectional view taken along section line 8—8 of Fig. 7.

In the form of my invention shown by Figs. 1, 2 and 3, the coil spring assembly includes an upper rectangular wire frame 1, a matching lower frame 2, preferably of heavier gauge wire, and a multiplicity of frame-encircled upright coil springs 3, 3. The latter, as hereinafter described, support the upper frame 1 above a foundation grid structure G, which is constituted in part by the lower frame 2. The several coil springs 3, 3 are preferably provided in a plurality of rows running endwise of the frames; in this illustrated embodiment, said springs are arranged in four spaced rows 4, 5, 6 and 7, with each row consisting, as here shown, of six double-cone coil springs, with their respective top convolutions and their respective bottom convolutions in substantially tangential relationship. At their points of tangency at their tops and bottoms, the springs of each row are flexibly connected to each other in any suitable way, as by small coils of wire 8, 8, etc. The rows themselves are maintained in their spaced relation at the tops and bottoms thereof, by wire strands 9, 9, etc., which pass between adjacent springs, transverse to the rows. Strands 9, 9, etc. are directly connected to the small coils 8, 8, etc., but are not connected to the sides of the respective upper and lower frame members 1 and 2.

As shown by Fig. 2, the upper frame member 1 surrounds and is suitably connected to the top convolutions of the border springs of the so-interconnected rows of springs 4, 5, 6 and 7. For this purpose, I have shown elongated helical wire coils 14 and 12 which connect the springs of outside rows 4 and 7 respectively to the sides of upper frame 1, and similar elongated helical wire coils 16 and 17 which connect the end springs of each row to the ends of said upper frame 1.

As shown in Fig. 3, the means for supporting all of the springs is a foundation grid structure G. This is constituted by the lower frame 2 and by the latter's illustrated sets of lengthwise and crosswise stiffening wires 10, 10 and 11, 11 which are of relatively heavy gauge, and have their terminals firmly attached (as by welding or the like) to the opposite ends and sides respectively of said frame members 2. The foundation grid structure G, as thus formed, is of great rigidity and is extremely resistant to any bending or sagging. Its longitudinal stiffening wires 10, 10 underlie the intermediate rows of springs 5 and 6, and its crosswise stiffening wires 11, 11 underlie the third and fourth springs of each of the rows 4, 5, 6 and 7.

Said foundation grid structure G, by reason of its stiffness and rigidity, provides a firm and unyielding flat support for the entire coil spring assemblage. It is to be particularly noted however that only the latter's border springs are anchored, at their lower ends, to this foundation grid structure G. That is to say, the springs of the outside rows 4 and 7 are attached to said grid G by

elongated helical wire coils 15 and 13 respectively, and the end springs of each row are attached to said grid G by elongated helical wire coils 18 and 19. But all other springs 3, 3 of said assemblage merely rest at their bottom convolutions upon said grid G, without any anchorage to the latter's longitudinal and crosswise stiffening wires 10, 10 and 11, 11. This makes it possible to insert a piece of burlap or like material between the springs and the grid G for silencing purposes.

The above described coil spring assembly can be used very effectively, not only as a spring platform, for cushion support in various articles of furniture, but also as the interior construction for an irreversible spring cushion. For this last-mentioned use, the assembly may be stuffed with cotton, or other suitable material, and then covered with fabric. If the chair, with which the cushion is to be used, is supplied with a pair of inner rails for supporting the opposite sides of the foundation grid structure G, this cushion may be used without any conventional spring platform or other support.

The advantages of a so-constructed cushion are many; first of all, by reason of the rigid foundation grid G, as provided by frame 2 and its longitudinal and crosswise stiffening wires 10, 10 and 11, 11, it is no longer necessary to supply the chair with a supporting platform, as required conventionally; secondly, since the springs are not attached to the cross wires in any manner, the center of the spring assembly, inwardly of its border springs, is free floating; that is, the center springs can not only move up and down, but also have a limited capacity to change their positions on the support surfaces provided by the stiffening wires 10, 10 and 11, 11 of the foundation grid structure G.

A second embodiment of my invention, which involves several departures from the first embodiment, is illustrated in Figs. 4 to 8 as a drop-in spring platform, per se. However, as in the case of the coil spring assembly shown by Figs. 1, 2 and 3, this second embodiment provides an easily-installed, unitary construction which is vastly superior to the conventional hand-tied spring platform constructions in ordinary use, as well as the "drop-in" spring platform constructions which have heretofore been proposed.

For the purpose of better illustrating my invention, this second embodiment is shown in Figs. 4, 5 and 6 in association with a conventional chair frame 20. The latter, as indicated by broken lines in these figures, has the usual back portion 21, rear legs 22, 22, front legs 23, 23, rear rail 24, front rail 25, and side rails 26, 26. In this form of my invention, as in the first described embodiment, the support for the upright coil springs is a relatively-rigid foundation grid structure (see G' in Figs. 4 and 6) which is constituted in part by a lower rectangular wire frame 27. Said lower frame member 27 serves here also to suspend my improved spring platform between the chair's rear rail 24 and its front rail 25, as will now be described.

Wire frame 27 is bent upwardly adjacent its rear side 28, as shown in Fig. 4. A series of small, tightly wound helical coils 29, 29, etc. are adapted to hook over side 28. The other ends of these helical coils 29, 29, etc. fit into a plurality of V-links 30, 30, etc. which, in turn, fit into a plurality of brackets 31, 31, etc. The brackets are fastened to the rear rail 24 by means of nails or screws (not shown). For permitting a variable adjustment of the platform, as best shown in Fig. 6, I have provided a pair of heavy wires 32 and 33 which are attached to the upwardly bent portion of wire frame 27 in parallel relation with end wire 28. The helical coils 29, 29, etc. may be hooked over wire 32 or 33, instead of wire 28 as shown, for adjusting the position of the platform. The front side 34 of wire frame 27 is secured to the front rail 25 of chair 20 by means of brackets 35, 35, etc., which are held in place in the same manner as brackets 31, 31, etc.

Between the upper rectangular wire frame 36 and the

foundation grid structure G' I have provided a plurality of springs arranged in five spaced rows 37, 38, 39, 40 and 41. Each row consists of six springs of which the two end springs 42, 42 are heavy single-cone springs. The inner four springs 43, 43, etc. of each row are double-cone springs constructed from somewhat lighter wire.

Five longitudinal stiffening wires 44, 44, etc. are attached to the front and back sides of wire frame 27 so as to underlie directly the rows of springs. Four transverse stiffening wires 45, 45, etc. are attached to the sides of the frame 27 at right angles to the stiffening wires 44, 44, etc. These stiffening wires 45 are transverse to the rows 37 to 41, directly underlying the double-cone springs 43. All of the stiffening wires, 44 and 45, are so attached to the frame member 27 as to form in conjunction therewith the foundation grid structure G'. The latter, by reason of its stiffness and rigidity, provides a firm and unyielding flat support for all of the upright coil springs of this drop-in spring platform construction.

Two stiffening wires 46, 46 transverse to the rows 37 to 41 at the ends thereof, are attached to the sides of frame 27 in parallel relation with the transverse stiffening wires 45. These stiffening wires 46 are attached to the under side of frame 27. Unlike the stiffening wires 44 and 45 which are straight, stiffening wires 46 are provided with a series of U-shaped loops 47 which go over and around the stiffening wires 44 at their points of crossing, as shown in Figs. 7 and 8. The lowermost portion of each single-cone spring 42 rests on the upper surface of stiffening wire 46 on opposite sides of the loop 47. This same lowermost portion also bears against the under side of stiffening wire 44 so as to lock each spring 42 at its lower end.

At their lower ends, as seen in Fig. 6, springs 43 are held together by means of three elongated helical coils 48, 48, 48 which are transverse to the rows 37 to 41. The lower ends of the springs 43 in rows 37 and 41 are fastened to the sides of frame 27 by means of elongated helical coils 49, 49.

At their upper ends, as best seen in Fig. 5, five elongated helical coils 50, 50, etc., running transverse to the rows, bind the springs together. Another elongated coil 51 connects the edges of springs 42 at the rear ends of rows 37 to 41 to the rear side of frame 36. A series of clips 52, 52, etc. connects the edges of the springs 42 at the front ends of rows 37 to 41 to the forward side of frame 36. Another pair of elongated helical coils 53, 53 connect the edges of the springs in rows 37 and 41 to the sides of frame 36.

It should be apparent that the coil spring assembly of Figs. 4 to 8 is similar in a great many respects to the coil spring assembly of Figs. 1 to 3. As in the case of the first embodiment, the later shown embodiment has a free floating center, since the lower ends of the springs 43 are not connected to the stiffening wires. Single-cone springs 42 are used in the second embodiment to give added rigidity to the front and rear ends of the construction. Note also in Fig. 4, that the use of single-cone springs 42 at the forward end of the construction permits the upper frame 36 to project forward of the lower frame 27 so as to overlie the front rail 25 of the chair. This latter feature will provide a straight front for the chair after the spring construction has been stuffed and covered with fabric.

The coil spring assemblies shown in Figs. 1 to 8, as described above, relate to preferred embodiments of my invention. The terms used in their description, and the particular configurations illustrated, should not be considered as limiting of my invention. For example, the types of springs selected and their exact arrangement is entirely arbitrary. The shapes of the wire frames do not have to be rectangular as shown. The cross-wires do not have to follow the exact patterns shown. But, on the other hand, my invention must have an upper and lower frame; there must be an intermediate spring arrangement;

and, most important of all, there must be some type of grid structure or supporting surface attached to the lower frame for supporting all of the springs, while at the same time permitting the interior springs of the assembly to shift sidewise on said supporting surface.

With particular reference to the embodiment shown in Figs. 1 to 3, the shapes of frames **1** and **2** do not have to be rectangular. More or less than four rows of springs may be used, and more or less than six springs may be employed in each row. The rows may be touching one another instead of being spaced, as shown. Also, the springs in each row may be spaced from their adjacent springs, such that no two springs in the entire construction are touching one another. The springs may be straight helicals, single cones or double cones, as desired. The thickness of the wire in the springs will be a matter of selection or design. If, for any reason, it is desired to make certain portions of the construction more rigid than others, stiffer springs may be employed in those portions. Instead of the cross-wires **10** and **11**, as shown in the drawings, any other supporting surface, such as a mesh or screen, may be used, providing such mesh or screen has the required rigidity for supporting the springs.

With particular reference to the embodiment shown in Figs. 4 to 8, the type and arrangement of the springs is, again, arbitrary. Because the construction shown in these figures would normally require a greater rigidity along the front and rear ends, I have shown heavier coils **42** at these positions. Generally speaking, however, heavier coils may be and should be employed wherever greater rigidity is required or desired.

As in the case of the first embodiment, the shape of the frames **27** and **36** is not significant. It is important, however, that lower frame **27** be of such shape that its attachment to the front and rear rails only of the chair (or other piece of furniture) will suffice. Heretofore, the prior spring platforms of "drop-in" type have had to be attached not only from front to rear, but also from side to side, as well. In view of the unusual and varying shapes used in present-day furniture constructions, it should be apparent that the design of a satisfactory spring platform capable of attachment to all four sides of any or all chairs would be very difficult. My invention obviates this difficulty by providing a construction which may be suspended from two sides only of the chair, or, as shown in the drawings, from front to back. My spring platform is pivotally attached to the front rail **25** and resiliently attached to the rear rail **24**.

In Figs. 1 to 3 the springs are shown as tied together by means of small coils **8**, **8**, etc. and wire strands **9**, **9**, etc. In Figs. 4 to 7 the springs are held together by means of elongated helicals **48** and **50**. In addition to these two types of spring ties, other means such as clips or links may be used to connect the springs to each other or to the wire frames.

Many other changes, apart from those indicated herein, may be made within the spirit of my invention.

I claim:

1. In a coil spring assembly for furniture seats and the like, a multiplicity of equal-length upright coil springs flexibly attached to each other by their top and bottom convolutions, an upper frame member surrounding and substantially co-planar with the top convolutions of said springs, and connected to and supported by the top convolutions of the border springs of said assembly, a lower frame member having rigidly attached thereto a plurality of lengthwise and crosswise stiffening members, the latter forming with said lower frame member a rigid foundation grid structure substantially co-planar with and underlying the lower convolutions of all of said springs, and means for anchoring to said foundation grid structure only the border springs of said assembly, such that the lower ends of said assembly's other springs, inwardly of said border springs, have a limited capacity to change their positions on the support surfaces provided by said foundation grid structure.

2. The coil spring assembly as claimed in claim 1, in which the coil springs are arranged in substantially parallel rows in two directions at right angles, with at least some of said rows in substantial alinement with the respective lengthwise and crosswise stiffening members of said rigid foundation grid structure.

3. The coil spring assembly as claimed in claim 2, in which the coil springs at opposite ends of each row in one direction are heavier than the other coil springs of such assembly, thereby to resist undue shifting in said direction of the upper frame, relative to said rigid foundation grid structure.

4. The coil spring assembly as claimed in claim 3, in which said heavier coil springs at the ends of the rows are interlocked by their lower convolutions with the lengthwise stiffening members of said rigid foundation grid structure.

5. A coil spring assembly of the class described, to provide a spring platform for a chair cushion, comprising a generally rectangular upper wire frame, a plurality of rows of upright double-cone coil springs within said upper frame area, the said springs of each outside row having their uppermost convolutions substantially tangent to the sides of said upper frame and flexibly connected to the latter at said points of tangency, and said double-cone coil springs of each row having their uppermost and lowermost convolutions in juxtaposed relation and flexibly connected together at their points of tangency, each row of springs including at its opposite ends an upright coil spring of downwardly tapering spiral form, whose uppermost large diameter convolution is flexibly connected to said upper frame, in combination with a lower foundation wire frame, co-planar with the lowermost convolutions of all of said coil springs, said foundation frame having a plurality of lengthwise stiffening wires welded thereto and each underlying one row of coil springs, and a plurality of crosswise stiffening wires welded thereto and each underlying corresponding and alined coiled springs of the several rows, the lowermost small diameter convolutions of the end springs of each row of springs being anchored to said underlying stiffening wires of said foundation frame, but the other double-cone coil springs of said assembly having connection to said foundation frame only by the lowermost convolutions of said springs in the two outside rows, at the respective points of tangency of said convolutions to the sides of said foundation frame, such that all interior double-cone coil springs of said assembly are devoid of rigid connection at their lower ends to said underlying lengthwise and crosswise stiffening wires of said foundation frame.

6. The coil spring assembly as claimed in claim 5, in combination with means for attaching one end of the foundation frame to the front rail of a chair frame, and means for resiliently connecting the opposite end of said foundation frame to the rear rail of said chair frame.

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