Feb. 11, 1969 D. D. ROBINSON 3,426,371

SPRING ASSEMBLY

Filed Feb. 20, 1967

FIG. 1

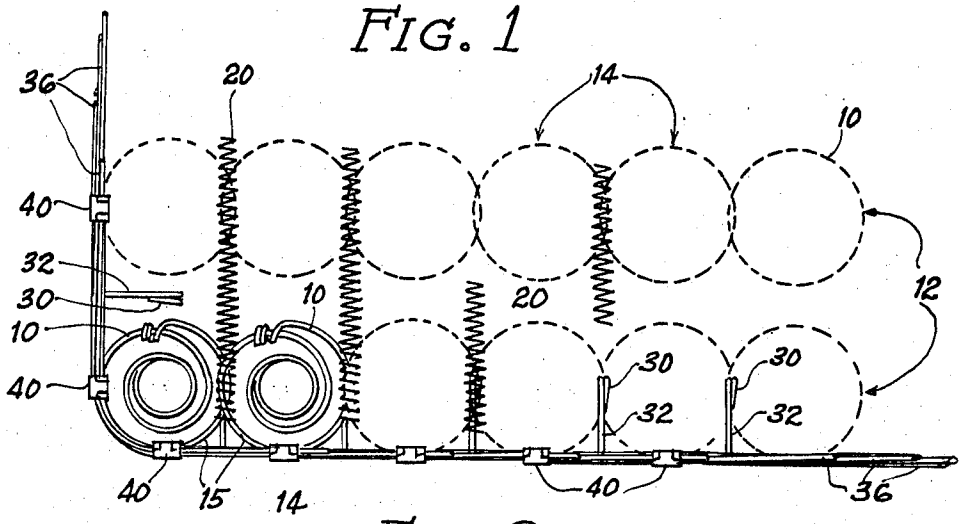


FIG. 2

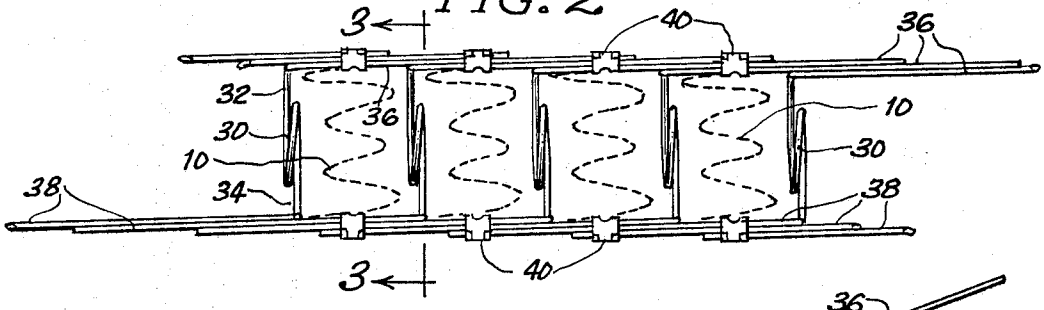


FIG. 3

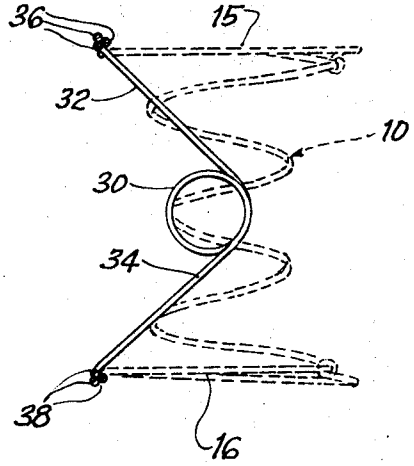


FIG. 4

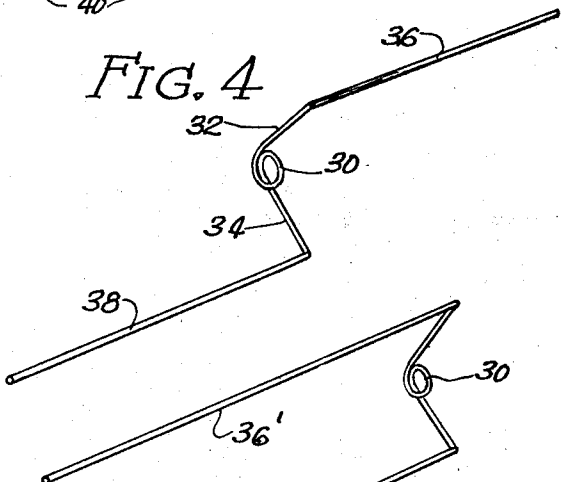


FIG. 5

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SPRING ASSEMBLY

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Int. Cl. A47c 23/04, 25/00

ABSTRACT OF THE DISCLOSURE

This invention relates to a spring assembly formed of a plurality of coil springs arranged in lengthwise and crosswise rows with the edge construction formed of a plurality of spring elements having a central spring supporting portion and arm portions extending lengthwise in parallel relationship adjacent the terminal coils of the coil springs outermost in the rows with the arm portions in overlapping relationship and interconnected to the coil springs to provide the features of a continuous border wire with edge supports.

This invention relates to a spring assembly formed of a plurality of coil springs with edge reinforcement and support for use in mattresses, box springs and the like cushioning structures.

To the present, spring assemblies of the type described are fabricated of a plurality of coil springs arranged in aligned crosswise and lengthwise rows and interconnected one to another to provide a unitary structure confined between continuous upper and lower border wires to which the terminal coils of the outermost coil springs in the rows are attached, as by helical tie wires.

When such innerspring mattresses or box springs are used over a long period of time, the edge portions of the mattress or box spring become weakened and sag. The edge portions are incapable of support of load and the mattress or box spring becomes uncomfortable and poor in appearance. Further, such edge portions usually contain a lesser concentration of supporting springs than are available for support of load in the interior such that excessive flexure occurs when one sits or lays on the edge of the bed by comparison with the interior portions thereof.

Numerous attempts have been made to reinforce the edge portion of the spring assembly and to increase its load supporting ability by the insertion of load supporting members between the upper and lower border wires. While such edge supporting members have been universally adopted, their utilization encounters a number of deficiencies, such as relative movements between the individual edge supporting members and the border wire or frame members whereby load distribution and support becomes non-uniform.

Support is limited to spaced apart portions along the border frame members whereby continuous and overall support along the edges is not available. The support members flex in a manner which usually conflicts with the normal flexure of the spring assembly whereby firmness is difficult to achieve over the entire area of the spring assembly. Such edge supports are usually limited to use in the straight edge portions of the spring assembly, as distinguished from the corners, whereby the corner portions remain excessively soft and uncomfortable.

It is an object of this invention to produce and to provide a method for producing multiple spring assemblies for use in mattresses, box springs, cushions and the like in which edge support and reinforcement is continuous even around the corners; in which the spring assembly remains firm over its entire surface thereby more uniformly to support load on its edges, corners or intermediate portions; which makes use of edge supporting members which form a part of the border wires thereby to tie in each support with the border construction in a manner to prevent relative movements and to provide continuous support all about the spring assembly; in which the edge supporting members are integral with the border wires and react to flexure in a manner to tension adjacent portions of the spring assembly thereby more uniformly to distribute load while increasing the firmness and support of the assembly; and in which a quiet spring is provided.

These and other objects and advantages of this invention will hereinafter appear and for purposes of illustration, but not of limitation, embodiments of the invention are shown in the accompanying drawings, in which—

FIG. 1 is a top plan view of a portion of the spring assembly embodying the features of this invention;

FIG. 2 is a side elevational view of the spring assembly shown in FIG. 1;

FIG. 3 is an enlarged sectional view taken along the line 3—3 of FIG. 1;

FIG. 4 is a perspective view of a spring edge member employed in the spring assembly of FIG. 1; and

FIG. 5 is a perspective view of a modified form of spring edge member which may be employed in the practice of this invention.

In the illustrated modification, the spring assembly is formed of a plurality of vertically disposed coil springs **10** arranged in lengthwise rows **12** and crosswise rows **14**, with the coil springs **10** in the lengthwise rows **12** being arranged in edge to edge relation with the peripheral edges of the top and bottom terminal coils **15** and **16** of the adjacent coil springs in contact one with another, while the coil springs **10** in the crosswise rows are spaced one from the other to provide a lateral spacing between the lengthwise rows. The terminal coils of the adjacent coil springs are interconnected one with another by helical tie wires **20** which extend crosswise between the crosswise rows.

It will be understood that the coil springs may be arranged without spacing between the lengthwise and crosswise rows and that other means for interconnection between the adjacent terminal portions of the upper and lower coils of the coil springs can be employed, such as tie wires, hog rings, brads and the like, and that use can be made of hour glass springs, zig zag springs and the like instead of coil springs.

An important concept of this invention resides in the construction wherein the edge supporting members are in the form of edge springs which are joined in a manner also to constitute the border wires whereby the elements interact to provide continuous support all around the spring assembly.

For this purpose, use is made of a plurality of spring elements each of which is formed of a length of spring wire having a central portion formed with one or more loops **30** with adjacent portions **32** and **34** extending angularly outwardly in opposite directions at an obtuse angle for a distance therebetween corresponding to the spaced relationship between the terminal coils of the outermost coil springs in the rows. The remainder of each end portion of the spring wire is turned to extend perpendicularly from the adjacent portions **32** and **34**, in opposite directions, to provide arm portions **36** and **38** extending in opposite directions in substantially the same plane but spaced therein by an amount corresponding to the height of the coil springs outermost in the rows.

In practice, the lengths of the arms **36** and **38** are dimensioned to span at least two rows of coil springs and preferably about three or more. Thus the spring elements con-

stitute a pair of vertically spaced apart arms lengths extending in opposite directions with an intermediate interconnecting looped portion projecting substantially perpendicularly from the inner ends of the arms. When the spring element is positioned alongside the edge of the spring assembly, one arm **36** will extend alongside the upper terminal coils of the outermost coil springs in two or more adjacent rows while the other arm **38** will extend alongside the lower terminal coils of the outermost coil springs in two or more rows which are adjacent to the first group with the looped portion **30** extending inwardly perpendicularly to the edge and preferably located in the spacing between adjacent rows of coil springs.

In assembly, the described spring elements are thus located in longitudinally spaced apart relation alongside the length and width of the assembled coil springs with the spaced relation between the spring elements being less than the length of the arms **36** and **38** so that the arm portions of adjacent spring elements will overlap one another. The elements are joined together by fasteners, such as metal rings or clips **40**, which encircle the overlapping arm portions and the adjacent terminal coils of the outermost coil springs of the row to fasten the spring elements together in an assembled relationship with the coil springs whereby the spring elements function simultaneously as the edge support and also provide the upper and lower border wires for the spring assembly. Thus there is provided a continuous border wire formed of the separate but interconnected spring elements. The rigid attachment of the overlapping portions of the arms one to another provides a continuous support in which forces are transmitted lengthwise along the border wire to distribute force and provide a more stabilized spring assembly. Similarly flexure of the looped portion **30** in response to load operates to transmit force along the border wires to adjacent sections of the assembled springs thereby to stiffen the spring assembly in support of load and to provide greater firmness and support.

Formation of the border wires and edge spring elements as an integral unit eliminates the need for separate addition of edge supports and their loose attachment by helical tie wires to separate border wires whereby the unitary assembly of this invention provides for a quieter and stronger assembly.

By reason of the formation of the border portion of the interconnected spring elements, it is possible to vary the spacing between spring elements to decrease the spacing with corresponding increase in concentration in one portion of the spring assembly by comparison with another where greater firmness and support are required or to decrease the concentration by increasing the spacing at other portions such as at the corners. For example, in a preferred construction, the spacing between the spring elements at the center is one-half the spacing of the spring elements at the corner portions thereby to increase the support of load at the center where greater support is more often required.

It will be apparent that the arm portions **36** and **38** of the spring elements which overlap the corners of the spring assembly will be shaped to correspond to the curvature at the corner to provide the continuous border wire assembly which extends continuously about the assembled springs.

By way of modification, as illustrated in FIG. 5, instead of having the arms extend in opposite directions from the central looped portion, the spring elements can be formed with the arms **36'** and **38'** extending in the same direction in parallel spaced relation but with sufficient length to overlap arm portions of adjacent spring elements for interconnection to provide the continuous border wire as described. Attachment of the overlapping portions with the terminal coils of the coil springs can readily be effected in a manner firmly to interconnect the elements in a manner to prevent relative movements thereby to effect the desired unitary construction.

It will be apparent from the foregoing that I have provided a new and improved spring assembly which makes use of spring elements that combine the features of edge support and a continuous border wire for a quieter and more effective support, which gives continuous support throughout the length and width of the spring assembly, which offers better distribution of load, which eliminates loose parts, which provides greater flexibility in assembly for variation in the amount of support made available at selected portions of the assembly, and which provides a firmer and more uniform spring for use as a box spring, or in mattresses, cushions and the like.

Instead of the single complete loop **30**, the looped portion **30** may be a partial loop or two or more loops with additional loops being preferred for greater spring action or resiliency.

By way of still further modification, the overlapping end portions of the arms may be secured one to the other with metal clips or the like for rigid connection to form the border wire with the use of a conventional helical to interconnect the formed border frame-edge support members to the terminal coils of the outermost coil springs.

It will be understood that changes may be made in the details of construction, arrangement and operation without departing from the spirit of the invention, especially as defined in the following claims.

I claim:

1. A spring assembly consisting essentially of vertically disposed spring elements arranged in a plurality of lengthwise and crosswise rows, means interconnecting the spring elements one with another in the described arrangement, a plurality of spring wire members each of which comprises an integral length of wire in the form of an upper arm and a lower arm in parallel relation spaced by a distance corresponding to the spaced relation between the upper and lower terminal portions of the spring elements and dimensioned to have a length greater than the distance between two rows of said spring elements and a looped portion integral with the inner ends of said arms and extending substantially perpendicularly therefrom, said spring wire members being positioned about the periphery of the interconnected spring elements with the upper arms along the upper terminal portions of the spring elements and the lower arms alongside the lower terminal portions of the spring elements with the looped portion extending inwardly into the area between adjacent rows of spring elements and with the spacing between the spring wire members being less than the length of the arms whereby the arms of one spring element overlap the arms of adjacent spring elements, and means interconnecting the overlapping arm portions and the adjacent terminal portions of the outermost spring elements in the rows.

2. A spring assembly as claimed in claim **1** in which the spring elements are coil springs having upper and lower terminal coils and in which the spring wire members are connected to the terminal coils of the outermost coil springs in the rows.

3. A spring assembly as claimed in claim **2** in which the means interconnecting the spring elements one with another comprises helical tie wires extending lengthwise between adjacent rows to interconnect the terminal coils of adjacent coil springs.

4. A spring assembly as claimed in claim **2** in which the means interconnecting the spring elements comprises metal clips interconnecting the terminal coils of adjacent coil springs.

5. A spring assembly as claimed in claim **2** in which the arms of the assembled spring wire members are dimensioned to span at least two adjacent rows of coil springs for rigid attachment thereto.

6. A spring assembly as claimed in claim **2** in which the means interconnecting the overlapping portions of the arms and the adjacent terminal coils of the coil springs comprises metal clips.

7. A spring assembly as claimed in claim 1 in which the arms of the spring wire border members extend in opposite directions from the looped portion integral with the inner ends thereof.

8. A spring assembly as claimed in claim 1 in which the arms of the spring wire border members extend in the same direction from the looped portion.

9. A spring assembly as claimed in claim 1 in which the looped portion of the spring wire members is formed with a single loop with the adjacent portions extending angularly at an obtuse angle from the loop to the arms.

10. A spring assembly as claimed in claim 1 in which the looped portion of the spring wire members is formed with a double loop with the adjacent portions extending angularly at an obtuse angle from the loop to the arms.

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