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SPRING ASSEMBLY

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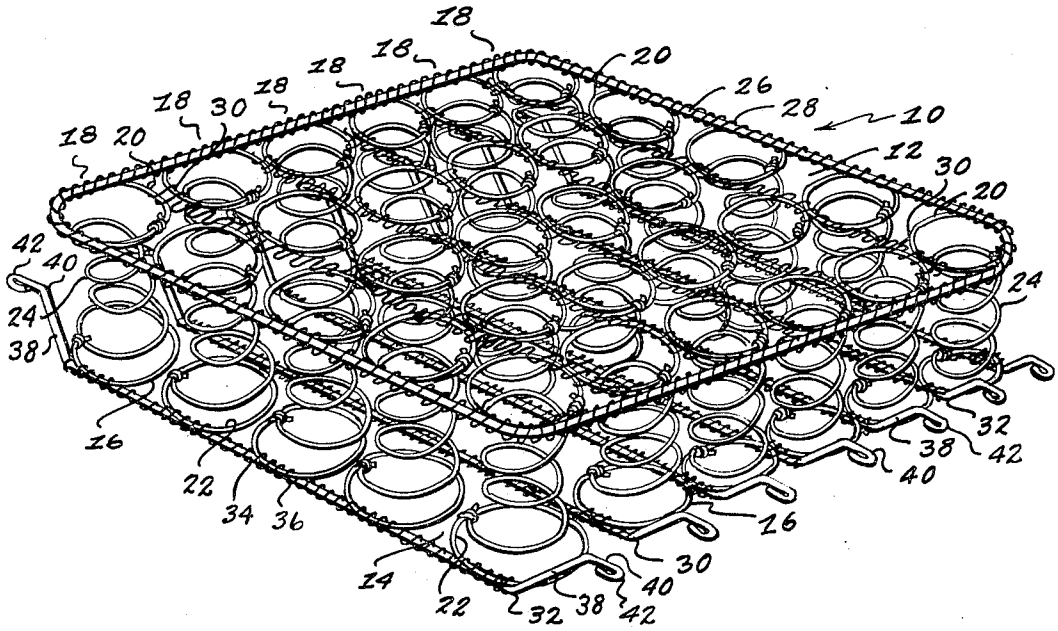
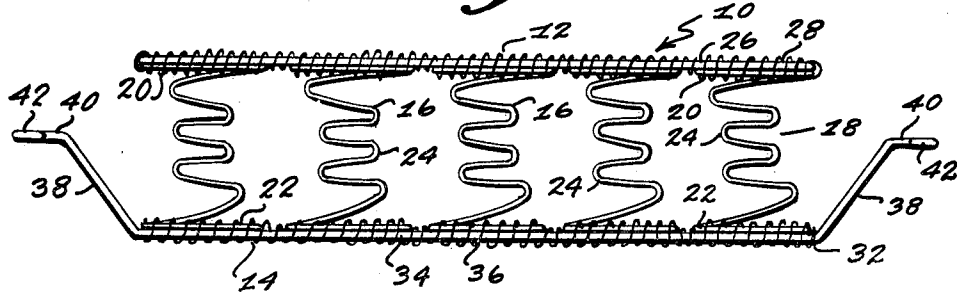


Fig. 1

Fig. 2



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SPRING ASSEMBLY

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ABSTRACT OF THE DISCLOSURE

An assembly of double cone coil springs arranged in contiguous rows on spaced support rods with the outer coils of the springs extending between and attached to adjacent rods. The rods extend outwardly from the rows of springs at an inclination for recessed attachment of the assembly in a furniture frame and are resilient so as to constitute spring members. Further, the rods are the sole support for the springs and are independent of each other, except for the spring attachments. All of the foregoing contribute to provide enhanced cushioning action of the spring assembly.

BACKGROUND OF THE INVENTION

Double cone coil springs are commonly used in spring assemblies for furniture or the like to obtain the advantage of the large coils at both ends of the springs for initial softness with the smaller intermediate coils providing ultimate firmness without bottoming. The springs are retained in the assembly in various ways, usually using the combination of border wires that extend around the top and bottom of the assembly and are connected to the outer coils of the peripheral springs and transverse straight wires or helical tie wires or both that extend across the top and bottom of the assembly and are connected to the outer coils of the springs. In some assemblies these transverse wires connect adjacent spring coils at points of coil contiguity. Examples of these prior art spring assemblies are disclosed in Smith U.S. Patent No. 803,933, Bellgrau U.S. Patent No. 2,708,757 Gleason U.S. Patent No. 2,962,088 and Levine U.S. Patent No. 3,176,325.

Spring assemblies of the foregoing types are normally mounted in a furniture article or the like by placing an assembly on rigid slats, which undesirably limit the spring action of the assembly, or by seating the bottom border wire of an assembly on a rigid framework, which results in portions of the peripheral springs being seated on the framework such as to restrict the action of the peripheral springs and, to some extent, the action of the other springs to which the peripheral springs are connected by the transverse wires. Alternatively, the bottom coils of the peripheral springs may be attached directly onto the framework without using a bottom border wire, as disclosed in Horton U.S. Patent No. 2,609,865, in which the furniture frame itself serves the same purpose as a border wire and similarly restricts the spring action of the assembly.

Another type of mounting is disclosed in Levine U.S. Patent No. 1,872,472, which, though it does not show double cone coil springs, does show a spring assembly with a border wire arrangement. This assembly includes metal strips extending directly under the springs and border wire arrangement and outwardly thereof for attachment to a furniture frame, with the result that both the border wire arrangement and metal strips restrict the spring action.

Other typical spring assemblies utilize sinuous wire bases covered with burlap, or jute webbing bases.

All of the known prior spring assemblies are characterized by limitations with respect to installing in a furniture

article or the like in a manner that will provide maximum spring action efficiency.

SUMMARY OF THE INVENTION

The spring assembly of the present invention overcomes the problems inherent in prior assemblies with a compact construction that can be easily and inexpensively installed and which provides a maximum effective utilization of the springs.

This is accomplished by mounting double cone coil springs on a plurality of parallel spaced support rods with the springs arranged in rows between the rods and with the outer coils of the springs attached to adjacent rods and to the contiguous outer coils of the adjacent row of springs, thus permitting maximum utilization of the spring capabilities. The support rods extend outwardly of the springs at an inclination and terminate in end portions formed for attachment to a furniture frame or the like for recessed support of the spring assembly therein. The attachment at the ends of the rods spaces the springs from the frame so that the spring action is not restricted by the frame and so that the assembly can be easily attached to the frame. The outer coils at the opposite ends of the double cone coil springs are interconnected in a conventional manner, as with a border wire and transverse wires, to retain the springs in general alignment.

In the preferred embodiment of the present invention, the support rods are resilient, constituting spring members that provide enhanced cushioning action of the spring assembly, and are the sole support for the springs, such that the action of the springs is not otherwise restricted. Further, the rods are independent of each other, except for the attachment of the springs to adjacent rods, such that the spring action of the rods can be taken advantage of fully.

In addition, the rods extend at an acute angle outwardly of the rows of springs and the ends extend generally parallel with the outer spring coils for a hammock type support that permits flexing of the rods and transmits a downward, rather than inward, force to the furniture frame, which furniture frames can withstand to better advantage.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a spring assembly according to the preferred embodiment of the present invention; and

FIG. 2 is an end elevation view of the spring assembly of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the accompanying drawings, the spring assembly **10** of the preferred embodiment of the present invention is shown in a form for use as a furniture seat having generally horizontal top and bottom faces **12** and **14**, respectively. The spring assembly **10** is made up principally of a plurality of vertically disposed double cone coil springs **16** arranged in a plurality of horizontal rows **18** with the springs **16** in each row spaced apart a distance sufficient to obtain a selected degree of cushioning action in the overall assembly. The springs **16** have large top and bottom outer coils **20** and **22**, respectively, that provide a desired degree of initial soft spring action and small intermediate coils **24** that provide a desired degree of ultimate firm spring action. Further, the rows **18** of springs **16** are arranged so that the top and bottom outer coils **20** and **22**, respectively, of adjacent rows are tangentially contiguous at their lateral extremities.

The springs **16** are retained in general alignment in the top face **12** of the assembly **10** by conventional means,

such as that illustrated, which consists of a border wire **26** that extends around the top face **12** and is connected to the top outer coils **20** of the peripheral springs by a helical tie wire **28** wound around the border wire **26** and extremities of the top coils of the peripheral springs, and transverse helical tie wires **30** that extend across the top face **12** parallel with the spring rows **18** in alignment with and wound around the contiguous portions of adjacent top coils **20**, so as to interconnect resiliently the springs **16** at the top face **12**.

The springs **16** are supported at the bottom face **14** of the assembly **10** on a plurality of parallel spaced support rods **32** that have horizontally extending center portions **34**. These center portions **34** extend the full length of and parallel with the spring rows **18** and are disposed at the lateral extremities of the bottom outer coils **22** of the springs **16** such that each bottom outer coil **22** extends between adjacent support rods **32**. The support rods at the ends of the plurality of rods are at the lateral outward extremities of the rows of springs at the ends of the plurality of spring rows while the intermediate support rods are each disposed at the aforementioned tangentially contiguous lateral extremities of the bottom outer coils **22**.

The support rods **32** are connected to the bottom outer coils **22** by helical tie wires **36** that are wound around the center portions **34** of the rods and the lateral extremities of the bottom outer coils **22**, with the tie wires **36** on the intermediate rods interconnecting the contiguous bottom outer coils of adjacent spring rows to each other as well as to the center portions of the rods.

The support rods **32** have outer portions **38** extending from the center portions **34** outwardly of the spring rows **18** at an upward inclination toward the plane of the top face **12** of the spring assembly **10**, which inclination preferably forms an acute angle with the assembly bottom face **14**, although a right angle could be used where desired to accommodate seating of the assembly in particular frame construction.

The support rods **32** terminate outwardly of the outer portions **38** with end portions **40** that preferably extend horizontally outward from the outer portions **38** for seating on the surface of a furniture frame. These end portions **40** are formed with loops **42**, as shown, or other convenient means for easy attachment to the furniture frame, such as by screws inserted through the loops. As the end portions **40** are spaced from the springs **16**, the springs are not restricted in action by the furniture frame and do not interfere with easy attachment of the rods **32** to the furniture frame.

Further, the inclined outer portions **38** of the rods **32** provide for a desirable recessed mounting of the assembly **10** in the furniture frame, and importantly in combination with the horizontal center portions **34** permit a degree of vertical flexing of the support rods **32** such that the rods are resilient in action and constitute spring members themselves for enhanced cushioning action of the assembly **10**.

This spring action of the support rods **32** is taken advantage of fully by the substantially independent disposition of each rod. As is seen in the drawings, the rods **32** are independent of each other except for the bottom outer spring coils **22** that are attached to adjacent rods at their opposite lateral extremities.

The spring action of the assembly is further enhanced due to the fact that the support rods **32** constitute the sole support of the springs **16**, which are not otherwise restricted in their cushioning action. Also, the location of the support rods **32** at the lateral extremities of the springs **16**, rather than directly under the springs **16**, permits the intermediate spring coils **24** to extend below the bottom face **14** of the assembly without bottoming when a heavy load is applied to the assembly **10**.

With the spring assembly **10** illustrated and described herein, maximum spring efficiency can be obtained by taking full advantage of the action of the coil springs **16** and support rods **32**, and the assembly can be manufactured inexpensively and installed easily. Further, the construction can be varied to suit particular uses by varying the number of springs, the number of rows of springs, the spacing of the springs in each row, the configuration of the springs, the inclination of the support rods, and the sizes of the springs and support rods.

It is to be understood that the preceding detailed description has been provided as an example of the present invention and is not intended to limit the scope thereof.

What is claimed is:

1. A spring assembly for use in furniture or the like comprising a plurality of parallel spaced support rods, a plurality of rows of double cone coil springs extending parallel to said rods and having outer coils at one end of said springs extending between adjacent rods and being contiguous with the outer coils of the springs of adjacent rows at the adjacent support rods, said support rods comprising the sole support for said double cone coil springs, helical tie wires attaching said outer coils of each row to said adjacent support rods and to said contiguous outer coils of the adjacent row of springs, and means interconnecting the outer coils at the opposite ends of said springs for retention of said springs in general alignment, said support rods extending outwardly of said rows of springs at an inclination toward the plane of the opposite ends of the springs and terminating in end portions formed for attachment to a furniture frame or the like for recessed support of the spring assembly therein.

2. A spring assembly for use in furniture or the like according to claim **1** and characterized further in that said support rods are resilient and constitute spring members for enhanced cushioning action of said spring assembly.

3. A spring assembly for use in furniture seats or the like comprising a plurality of parallel spaced support rods having horizontally extending center portions, a plurality of rows of vertically disposed double cone coil springs extending parallel to said rods and having outer coils at the bottoms thereof extending between adjacent rods and being contiguous with the bottom outer coils of the springs of adjacent rows at the adjacent support rods, said support rods comprising the sole support for said double cone coil springs helical tie wires attaching said bottom outer coils of each row to said center portions of adjacent support rods and to said contiguous bottom outer coils of the adjacent row of springs, and means interconnecting the outer coils at the top of said springs for retention of said springs in general alignment, said support rods having outer portions extending from said horizontal center portions outwardly of said rows of springs at an upward inclination and terminating in end portions formed for attachment to a furniture seat frame or the like for recessed support of the spring assembly therein.

4. A spring assembly for use in furniture seats or the like according to claim **3** and characterized further in that said support rods are resilient and constitute spring members for enhanced cushioning action of said spring assembly.

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