July 19, 1960 W. W. GLEASON 2,945,245

COIL SPRING ASSEMBLY

Filed March 17, 1958

FIG. 1

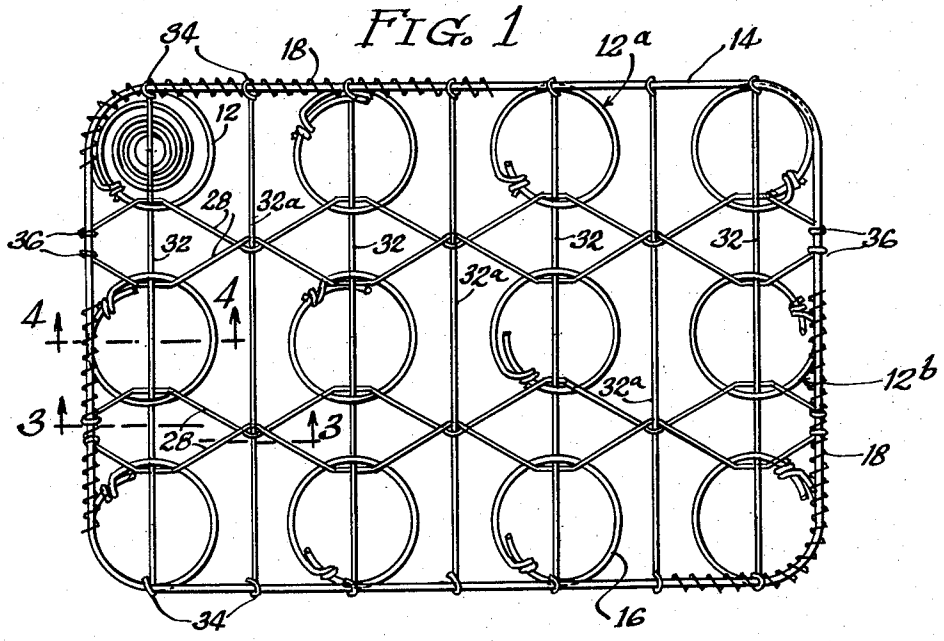


FIG. 2

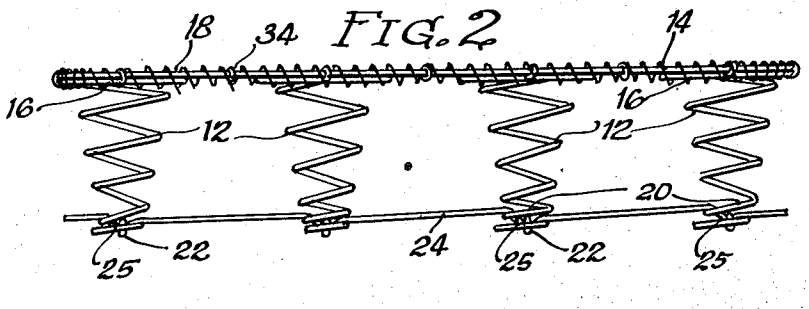
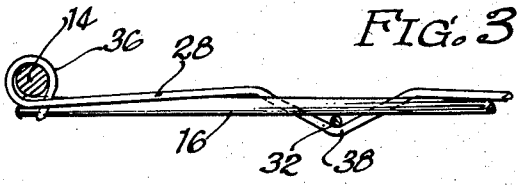


FIG. 3



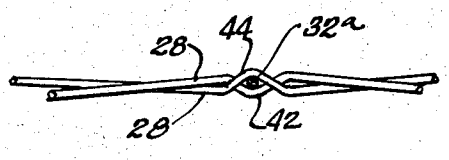


FIG. 5

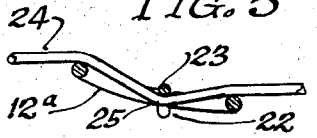
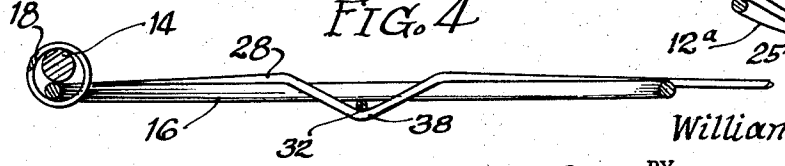


FIG. 4



INVENTOR.
William W. Gleason

BY
Toms, McDougall, Williams & Hersh
Attorneys

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COIL SPRING ASSEMBLY

William W. Gleason, Chicago, Ill., assignor to Nachman Corporation, Chicago, Ill., a corporation of Illinois

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3 Claims. (Cl. 5—351)

This invention relates to a coil spring assembly for use in the fabrication of mattresses, upholstered furniture and the like, and it relates more particularly to a spring assembly used in combination with padding in building up to a final structure.

The invention herein embodies the conventional construction of a plurality of coil springs arranged between border wires in aligned crosswise and lengthwise rows, and it further embodies improvements employed in such combination to enhance the resiliency and support offered by the spring unit coupled with an interdependence between the springs to maintain a desired flatness in the surface and to protect the spring coils from the infiltration of the padding whereby unbalance in construction and operation has been experienced. It further ties in the coil springs in the crosswise and lengthwise rows more effectively to distribute the load and to provide greater resiliency to the composite spring structure.

In arranging the coils to embody the concept of this invention, one of the problems to be faced is the interconnection of the individual coil springs in a manner to militate against the inadvertent displacement from predetermined positions in the assembly. Another problem needed to be overcome in the practice of this invention resides in the tendency for the cushioning or padding material with which the spring unit is overlaid to sometimes break or tear through fragments which intrude into the areas of the coil springs to interfere with the normal actions of the coil springs in compression and recoil and to provide for non-uniformities in the amount of padding present as a layer on the surfaces of the spring unit.

It is an object of this invention to produce a coil spring assembly in which the individual coil springs are arranged and interconnected in a manner to deter or prevent inadvertent displacement from their intended or predetermined position within the assembly.

Another object is the production of a coil spring assembly in which the assembly is provided with means along the surface to block penetration or infiltration of padding or cushioning materials into the area occupied by the coil springs where such material can interfere with the operation of the springs.

Other objects and advantages of this invention will appear from the specification and the appended drawings, which disclosed one embodiment of the invention. It will be understood, however, that other modifications of the invention are possible which also come within the spirit of the invention and the appended claims.

In the drawings:

Figure 1 is a top plan view of a coil spring unit embodying the features of this invention with portions broken away for purposes of better illustration;

Figure 2 is an elevational side view of a portion of the coil spring assembly;

Figure 3 is a sectional view taken along the line 3—3 of Figure 1;

Figure 4 is a sectional view taken along the line 4—4 of Figure 1; and

Figure 5 is an enlarged detailed view of a fragmentary portion of the spring assembly.

As illustrated in the drawings, the spring assembly, embodying the features of this invention, is formed of a plurality of coil springs **12** aligned in rows **12***a*, **12***b* extending crosswise and lengthwise respectively between a top border wire **14**. The spring coils **12**, which are spaced one from the other in the crosswise and lengthwise rows, may be of hour-glass or other conventional shapes but it is preferred to make use of conically shaped coil springs with the terminal coils **16** of largest dimension uppermost in the spring assembly. The coil springs **12** are arranged with the outer portions of the terminal coils **16** of the outermost coil springs adjacent the border wire **14** whereby an assembled relation between the terminal coils of the outermost coil springs and the border wire can be effected by means of a helical tie wire **18** or other conventional interconnecting means.

The coil springs **12** are interconnected at their lower ends **20** by a lattice work formed of crosswise and lengthwise extending wires **22** and **24** respectively which are interwoven with the bottom coils of the coil springs. The lengthwise wires **24** underlie the respective lengthwise rows **12***b* of the coil springs and the crosswise wires **22** underlie the crosswise rows **12***a* of the coil springs. The members **24** are provided with an offset portion **25** spaced apart throughout the length thereof at intervals to coincide with the lower ends **20** of each of the coil springs **12** in the lengthwise rows. Similarly, the crosswise members **22** are provided with a plurality of upstruck portions **23** spaced apart by an amount to coincide with the lower ends of each of the coil springs **12** in the crosswise rows. In the alternative, the upstruck portion and the offset portion may be interchanged as between the wires **22** and **24**.

In assembly, the members **24** are arranged across the top of the bottom coil **20** of the coil springs so that the offset portion **25** extends downwardly into the bottom coil. The other members **22** pass beneath the bottom coil **20** of the lower springs so that the upstruck portion **23** will extend upwardly into the terminal coil and over the offset portion **25** of the members **24** to effect interconnecting relation between the members **22**, **24**, and the terminal coil of the coil springs which militates against inadvertent displacement of the elements from the assembled relation.

The base members **22** and **24** may be formed of spring steel or other relatively resilient materials. In assembly, by virtue of their resiliency and the described interconnected relation, the members **22** and **24** provide a lattice structure interconnecting the coil springs **12** at their lower ends to forego a resilient spring support interconnecting the coil springs one with the other at their lower ends.

An important concept of this invention resides in the construction in the top wall of the spring assembly wherein use is made of a plurality of lengthwise tie wires **28** and of crosswise tie wires **32** extending, in each case, between opposite sides of the border wire **14** to interconnect the coil springs **12** one with another and with the border wires.

The tie wires **32** are dimensioned to have a length corresponding to the spaced relationship between the border wires **14** in their crosswise direction plus free end portions for winding about the border wires for attachment, as at **34**. The tie wires **32**, which may be fabricated of a resilient and flexible material, are arranged to extend crosswise between the border wires in substantial alignment with the axes of the coil springs in the crosswise rows and at a level to span the coil springs immediately beneath the top terminal coils **16** of the coil springs. Thus, the terminal coils are uniformly sup-

ported at their upper ends to maintain a substantially uniform level. Other tie wires **32***a*, similar to the tie wires **32**, also extend crosswise between the border wires **14** in parallel relation with the wires **32** but midway between the crosswise aligned rows of the coil springs.

The lengthwise tie wires **28** are dimensioned to have an effective length corresponding to the distance between the border wires **14** in the lengthwise direction of the spring assembly. The wires **28** are provided in pairs and cooperate one with the other in the pair to interconnect the terminal coils of the coil springs, crosswise wires **32** and **32***a* and the border wires **14** to effect an assembled relationship which ties in the elements one with the other in forming an assembled relation without the necessity to make use of the conventional helical tie wires.

In defining the construction and operation of the tie wires **28**, description will be made as to the function and arrangement of one pair with the understanding that the other pairs are similarly employed. A pair of tie wires **28** extends between each adjacent lengthwise pair of rows of coil springs in the assembly. Each tie wire **28** extends from its connection **36** to the border wire to the upper terminal coil **16** of the coil spring in the first of the crosswise rows of coil springs. The tie wire extends over the adjacent portion of the terminal coil of the coil springs and under the tie wire **32** and then up and over the terminal coil of the coil spring on the other side of the tie wire **32**. From the first coil in the first of the crosswise rows of coil springs, the tie wire **28** extends continuously, obliquely toward the terminal coils of the coil springs in the adjacent lengthwise row of the coil springs and in the second crosswise row of the coil springs until it meets the crosswise wire **32***a* between the crosswise rows of the coil springs. One of the tie wires **28** passes over while its companion wire passes under the crosswise wire **32***a* and then each of the wires reverses its direction to extend obliquely back to the terminal coil of the coil spring which is next in the same lengthwise row previously engaged by the wire **28**. Thus, the wires **28** weave back and forth between the crosswise tie wires **32***a* and the terminal coils of the coil springs in the same lengthwise row to effect the desired interconnected relation.

At the points where the tie wires **28** cross the tie wires **32** within the coil springs, the tie wires are provided with an offset portion **38** which dips within the plane of the upper terminal coil **16** and preferably slightly therebelow to define an opening between the offset portion and the terminal coil **16** (signified in Figure 3) through which the crosswise wire **32** extends in the preferred assembly. In this arrangement, the crosswise tie wire **32** is restrained against lateral movement by the offset portion **38** and by the interengagement with the lengthwise tie wires **28** which extend up and over the terminal coils of the coil springs thereby to promote a more stable assembly.

At those points where each pair of the tie wires **28** crosses each other in passage over and under the crosswise tie wires **32***a*, one of the tie wires is provided with an offset portion **42** while the other is provided with an upstruck portion **44** which together in juxtaposition provide an opening **46** therebetween. The crosswise tie wires **32***a* extend through the openings **46** and are thus restrained against sidewise displacement in the assembly. It will also be seen that as the lengthwise cross wires **28** extend between the opposite lengthwise ends of the border wire **14**, said lengthwise tie wires overlie the areas between the individual coil springs **12** to cooperate with the crosswise tie wires **32** and **32***a* in the formation of a network or screening member lying substantially in a single plane to provide a support for the padding while

at the same time blocking the openings between the coil springs to prevent penetration of the padding into the area of the spring assembly. The result of a network of the type formed by the crosswise and lengthwise tie wires and the coil springs is to present a substantially flat surface on which the cushioning and padding material may be installed and maintained in uniform distribution to provide a flat but resilient cushion.

It will be understood that the network of crosswise and lengthwise tie wires **32**, **32***a*, and **28** coupled with the border wire **14** and the terminal coils of the coil springs will together form a flexible and resilient means capable of distributing load imposed upon any portion of the spring assembly thereby to provide a more substantial and resilient support for the mattress or the upholstered furniture.

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

I claim:

1. A spring assembly comprising a plurality of coil springs arranged in a series of spaced crosswise and lengthwise rows, a border wire extending continuously about the spring coils adjacent the outer edges of the upper coil of the outer coil springs, means interconnecting the border wires with the adjacent portion of the upper terminal coil of the coil springs, a first group of tie wires extending continuously from the border wire on one side to the border wire on the opposite side and in alignment with the spring coils in one direction and in between the spring coils in the same direction with the wires in alignment with the spring coils passing beneath the terminal coils of the coil springs, a second group of crossing tie wires extending in pairs in the direction transverse to the first group of tie wires from the border wire on the one side to the border wire on the opposite side, said second group of tie wires engaging the adjacent inner edges of the terminal coils in adjacent rows of the coil springs at non-crossover points and engaging each other at the crossover points between the aligned coil springs in the rows with the wires at the non-crossover points passing over the terminal coils and under the first tie wire extending in opposite direction beneath the terminal coils and with the wires at the crossover points crossing each other about the tie wire extending in the opposite direction between the coil springs thereby to interconnect the terminal coils of the coil spring one with the other and the border wires in a protective network.

2. A spring assembly as claimed in claim 1 in which each wire in each of the pairs of the other groups of tie wires zig-zags back and forth between the inner edge of the terminal coils in each of the coil springs in one row and the tie wire extending in the opposite direction midway between the adjacent rows of the coil springs.

3. A spring assembly as claimed in claim 1 which includes a supporting base member comprising a plurality of elongate, resilient, and substantially rigid elements interconnected one with another and with the bottom terminal coils of the coil springs.

References Cited in the file of this patent

UNITED STATES PATENTS

790,614	Bridgewater	May 23, 1905
902,011	Staples	Oct. 27, 1908
1,451,924	Reidenbach	Apr. 17, 1923
1,465,996	Reidenbach	Aug. 28, 1923

FOREIGN PATENTS

614,986	Great Britain	Dec. 30, 1948
725,483	Great Britain	Mar. 2, 1955