May 24, 1955 G. R. BELLGRAU 2,708,757

SPRING ASSEMBLY UNITS AND METHOD OF ASSEMBLY THEREOF

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Fig. 1

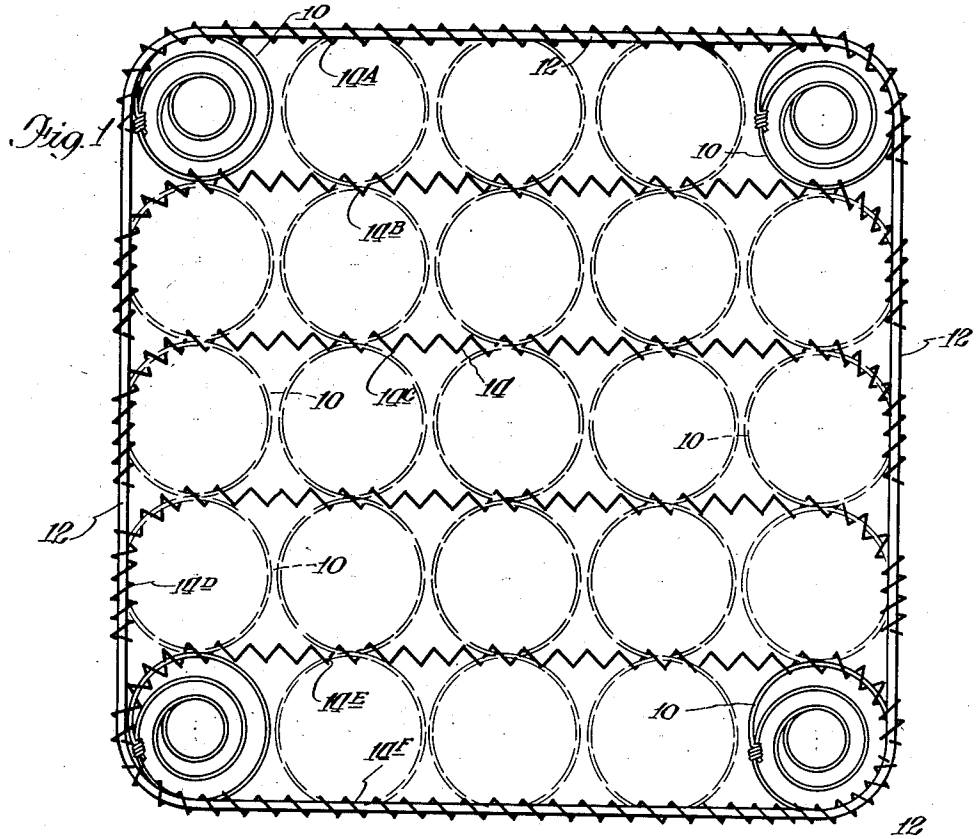
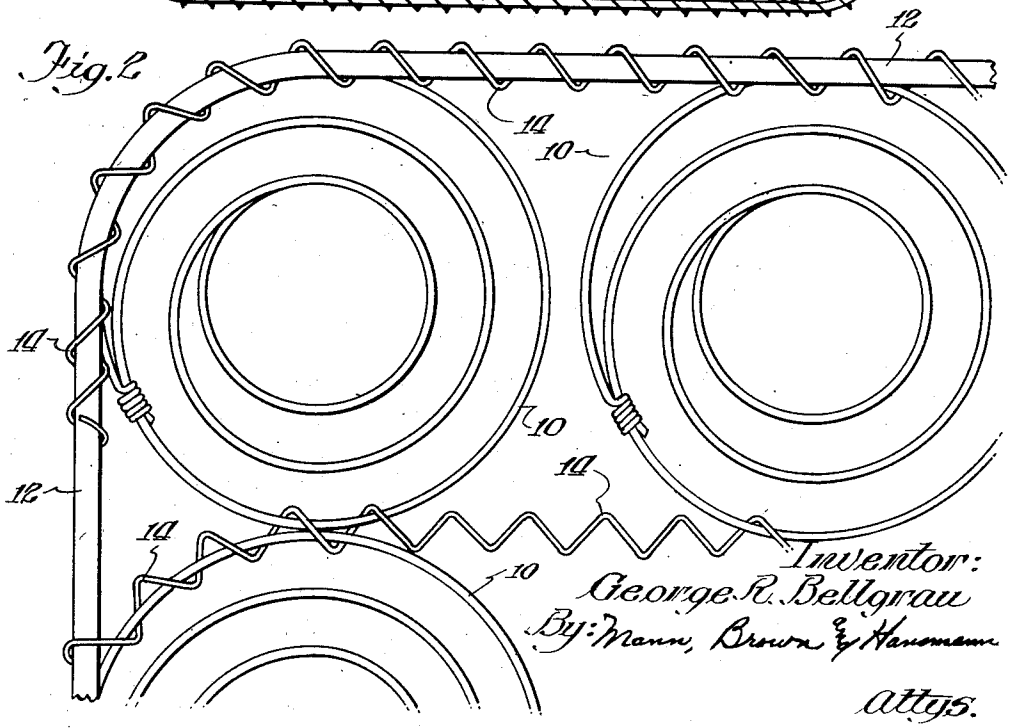


Fig. 2



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SPRING ASSEMBLY UNITS AND METHOD OF ASSEMBLY THEREOF

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2 Claims. (Cl. 5—260)

My invention relates to spring assembly units and a method of assembling such units. My invention is particularly applicable to a spring assembly unit in which a series of helical tie wires are utilized to tie adjacent rows of springs together and to tie the marginal springs of the group to a border wire extending around the periphery of the group of springs.

Heretofore in the manufacture of spring assembly units for cushions, sofas, mattresses and the like, it has been the practice to assemble parallel rows of coil springs, to secure one row of springs to the next adjacent row at both top and bottom by means of clips, hog wires, or by spinning a helical enveloping the adjacent edges of the top coils of the rows of springs. Row after row of springs are thus assembled and when the unit has a sufficient number of rows corresponding with the desired size of the unit, border wires of flat or round wire stock are positioned overlapping the outer edges of the marginal springs of the group, and this border wire is then secured to the coil springs by means of clips, tie wires, or by spinning two or more helicals enveloping the border wire and the portions of the coil springs overlapped by or adjacent to the border wire. When the top of the assembly is thus completed, the spring unit is turned over and another border wire is secured to the bottom in like manner.

The patent to Gleason No. 2,473,706 of June 21, 1949 discloses a form of prior art spring assembly which has gone into widespread commercial use. This patent typifies the prior art constructions wherein the complete assembly is first formed as a subassembly consisting of rows of coil springs held together by helical tie wires and such subassembly is subjected to a series of additional operations in which the top border frame is attached by helical tie wires and then turned over, and the lower border frame is similarly attached. In commercial practice two helical tie wires are ordinarily provided for attaching each border wire to the coils of the marginal springs, each of such helical tie wires starting at one corner and running along two sides to the diametrically opposite corner. These helical tie wires for attaching the border wire are therefore of different length than the helical tie wires which connect the rows of coil springs of one row to the coil springs of an adjacent row.

An object of my invention is to provide a new and improved construction and method of assembly whereby the same helical tie wires which connect the coils of one row with those of an adjacent row also serve to attach the border wire to the end coils of the rows.

Another object of my invention is to provide a new and improved construction and method of assembly whereby all of the helical tie wires may be of the same or substantially the same length.

Another object of my invention is to provide a new and improved construction and method of assembly wherein all of the helical tie wires may be started from one side of the complete assembly or part of the helical tie wires can be started from one side and the remainder started from the other side as desired.

Another object of my invention is to provide a construction and method of assembly whereby all of the helical tie wires may be started and finished substantially simultaneously.

Another object of my invention is to provide a new and improved construction and method of assembly whereby the connecting of the rows of coils and the attachment of the border wire thereto may be effected simultaneously.

A further object of my invention is to provide a new and improved construction and method of assembly which permits greater flexibility in manufacture.

Another object of my invention is to provide a new and improved construction which more readily adapts itself to different loadings and more fully compensates for shifts in position of loads imposed thereon.

Another object of my invention is to provide a new and improved construction and method of assembly which can be produced at lower cost by conventional methods of mass production manufacture.

Other objects and advantages will become apparent as the description proceeds.

In the drawings:

Fig. 1 is a top plan view of my improved spring assembly unit; and

Fig. 2 is an enlarged fragmentary portion in the upper left-hand corner of Fig. 1.

Referring to the drawings, it will be seen that my new and improved unit comprises a plurality of coil springs **10** which may be of any conventional or suitable type. These springs are arranged in rows as shown, the number of rows and the number of springs in each row being determined by the ultimate size and shape of the spring assembly unit desired. For example, a spring assembly unit for a seat cushion might have the particular number and arrangement of coil springs shown in Fig. 1, whereas a similar unit for a mattress ordinarily would have more coils in each row and many more rows to give the usual rectangular shape of such structures.

When the coil springs **10** are arranged in rows as shown in the drawing, the upper and lower coils of the springs in each row are in substantially abutting relationship with the upper and lower coils of the springs in each adjacent row. The border frames **12** are preferably formed of either round or flattened wire and have a rectangular or square shape corresponding to the shape of the completed unit. In most instances, identical border frames are attached to the top and bottom coils of the border springs but for certain special purposes, only one border frame may be attached in the manner herein set forth and a different kind of frame or support may be provided for the base of the assembly unit.

The border frames **12** are attached to the coil springs **10** by helical tie wires **14***a*, **14***b*, **14***c*, **14***d*, **14***e*, and **14***f*, which may be of the same length or substantially so. The tie wires **14***b*, **14***c*, **14***d*, and **14***e* serve both to connect abutting coils of springs **10** in adjacent rows and to connect the end springs of one row to a portion of the border frame, whereas helical tie wires **14***a* and **14***f* connect ends of the border frame to the coil springs of the end rows but do not serve to connect together coil springs in adjacent rows.

It will be apparent that the helicals **14** can be spun in place commencing from either side of the assembly and that great flexibility is permissible in the manner in which this is accomplished. For example, all of the helicals for connecting the top and bottom border frames to the coil springs and for connecting together the several rows of springs can be applied simultaneously, or in groups, or one at a time, as best suited to different manufacturing techniques, and this flexibility in manufacture is an important aspect of my invention.

It will be noted that each helical starts at one side of the assembly just beyond the point of maximum overlap of the border frame with a top or bottom coil of the spring **10** at the end of the row. The helical is so spun that it envelops the top or bottom coil of the end spring of the row and the border wire and then proceeds upwardly along the border wire from a point just below the point where the border wire overlaps the end coil of the top row. The helical proceeds around the curve of the border wire and envelops the border wire and the edge portions of the top convolutions of all of the coil springs of this row overlapped by the border wire.

At the other end of the row the helical follows the path of the curved border wire and the arc of the end coil to a point just below the point where the coil spring leaves the path of the border wire. This point is approximately opposite that from which the helical commenced. After the helical wire is thus spun in place, the edges of the helical are folded back upon the coil and crimped to lock the helical wire in place.

In the second row the helical **14***b* is spun on to the border wire at a point just below the point where the border wire overlaps the end coil of the second row and proceeds along the border wire enveloping both the border wire and the edge of the coil spring overlapped by the border wire and then proceeds along the curve of the top convolution of the end coil to a point where the upper edges of the coils of the second row abut the edges of the coils of the first row. The helical is then moved forwardly to envelop the edges of the top convolutions of the springs of both rows. The helical proceeds along this path, enveloping the top convolutions of the springs of both rows, until it reaches the end spring of the second row where it follows the arc of the top convolution of the end coil of the second row and envelops both the border wire and the outer edge of this end coil. The helical then proceeds to a point approximately opposite that of the point where it commenced. The ends of this helical are then folded back to lock the helical in place.

This same procedure is followed for the various rows of the spring assembly unit, the last row of springs being secured to the border wire the same as the first.

With this improved spring assembly unit, it is apparent that I have provided a resilient structure in which the springs are secured in place and prevented from shifting out of substantial alignment and in which the individual rows are tied to the border wire and to the adjacent rows of springs by the same operation. It is also apparent that this structure lends itself to a simple assembly in which the border wire and rows of springs are secured in place by a small number of spinning operations as compared with the procedures and practices heretofore adopted. The structure described above permits the use of many helicals of the same length and obviates the difficulties of storage and handling of many different length helicals as well as the expense of production thereof.

This construction also provides for a more ready assembly of the unit since all of the helicals may be attached simultaneously or sequentially from either side or may be alternated from side to side depending upon the positioning of the machines for spinning these helicals.

An important feature of my invention is the reduction in cost of manufacture. This is due partly to the elimination of steps in the process and partly to the elimination of waste. In the prior art process, the helicals which connected the rows of coil springs together were made longer than the length of the row and were trimmed at each end, whereas in my novel assembly such trimming is unnecessary.

Having thus described my invention, what is claimed as new and desired to be secured by United States Letters Patent is:

1. A spring assembly unit, comprising a group of coil springs arranged in adjacent rows with the springs in the adjacent rows abutting against each other, a border wire extending around the group of springs tangent to and in abutment with the end springs in said rows, and a plurality of homogeneous helical tie wires for securely interconnecting said abutting springs in said adjacent rows and for securing the end springs in said rows to said border wire, each of said helical tie wires being arranged to extend along a pair of said rows and being coiled around the abutting springs in said rows of said pair at the points of abutment between said springs, each tie wire also being coiled around each end spring in one of said rows of said pair between its points of abutment with the adjacent end spring and the border wire, said tie wire being coiled around the border wire and said end springs of said one row.

2. In a spring assembly unit, the combination comprising a plurality of coil springs arranged in two adjacent rows with the adjacent springs in the respective rows abutting against each other, a border wire extending tangent to and abutting against the end springs in the respective rows, a homogeneous helical tie wire extending along said rows and coiled around said abutting springs at the points of abutment therebetween, said tie wire being coiled around each of the end springs in one of said rows between the point of abutment with the corresponding spring in the adjacent row and the point of abutment with said border wire, said helical tie wire also being coiled around said border wire at its point of abutment with each of said end springs in said one row.

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