July 28, 1942. A. KRAKAUER 2,291,390

SPRING MATTRESS STRUCTURE

Filed May 11, 1938

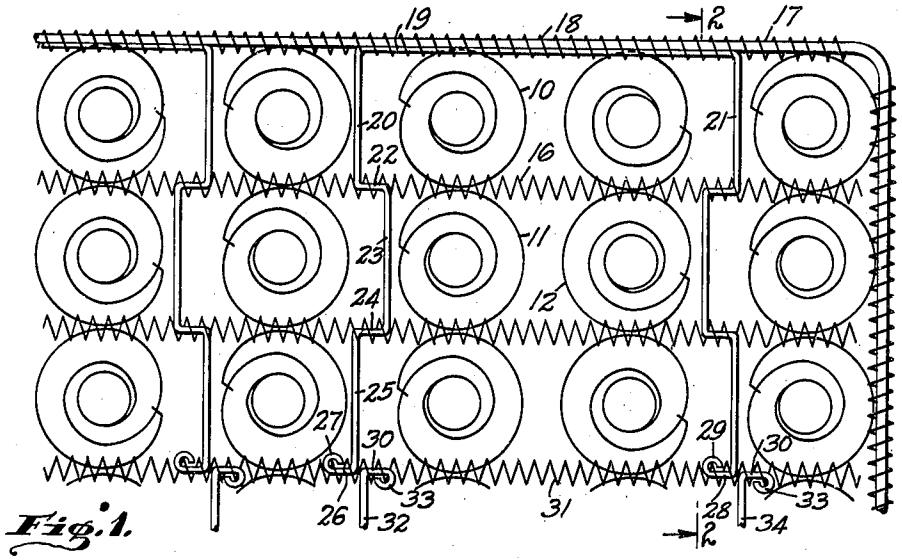


Fig. 1.

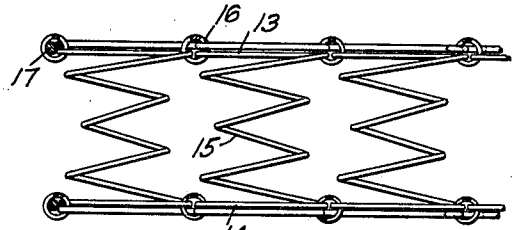


Fig. 2.

Fig. 3.



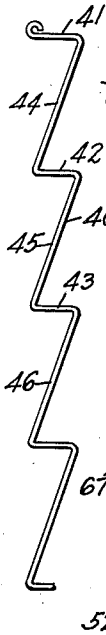


Fig. 4.

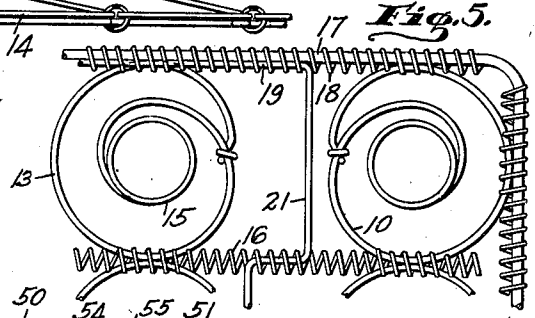


Fig. 5.

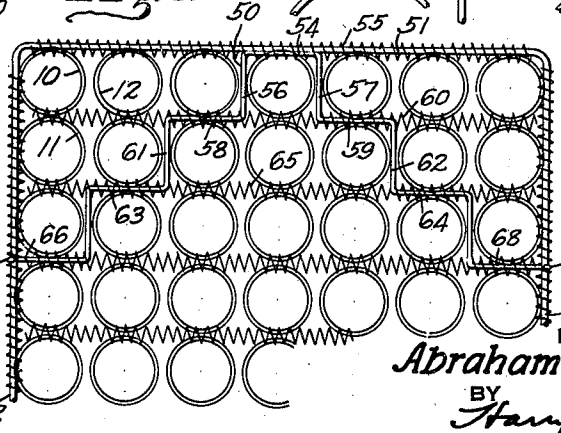


Fig. 6.

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SPRING MATTRESS STRUCTURE

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7 Claims. (Cl. 5—267)

This invention relates to inner spring structures for mattresses, cushions and the like, and particularly to those wherein corresponding pairs of springs in adjacent longitudinally extending rows are held together by transversely extending helical springs wound about the end coils of said pairs of springs.

It is customary in making spring assemblies to complete the inner spring unit separately and then to insert said unit into a padded casing, finally finishing and closing the casing to form the complete mattress or cushion. Inner spring units of the type above described tend to buckle when longitudinal pressure is put thereupon as during the stage of forcing the unit into the prepared padded casing. The result is that the spring unit does not present a smooth surface but buckles along the helical springs at various places, creating projections and depressions which require additional padding to smooth it. Furthermore, the longitudinal stresses applied to the spring unit when it is pushed into its casing tends to shorten the effective length of the unit, particularly at the middle of its end edge, so that the end edge becomes concave and the unit does not completely fill the casing as it should. Hence, additional padding at the open end of the casing becomes necessary.

My invention therefore contemplates the provision of means, which while permitting ready handling of the inner spring unit stiffens said unit sufficiently to prevent the buckling or shortening thereof during the step of inserting it into its casing.

This invention further contemplates the provision of bracing wires inserted between the rows of springs in the spring unit and shaped to resist the longitudinal bending thereof whereby the upper surface of the unit is maintained in its flat condition and the formation of the concave end edges on the unit is prevented, the end edge being maintained in its proper flat state.

The various objects of the invention will be clear from the description which follows and from the drawing, in which,

Fig. 1 is a fragmentary top plan view of an inner spring unit to which my invention has been applied.

Fig. 2 is a longitudinal vertical section of the same taken on the line 2—2 of Fig. 1.

Fig. 3 is a plan view of one form of the bracing wire used between the rows of springs.

Fig. 4 is a similar view of a modified form of the same.

Fig. 5 is an enlarged fragmentary plan view of the spring structure, similar to Fig. 1, showing a typical arrangement of the bracing wires therein.

Fig. 6 is a similar view of the same, showing a modified form of the bracing wire.

In the practical embodiment of my invention which I have shown by way of example, I have applied my improved bracing means to an inner spring unit comprising the springs 10 arranged in longitudinally extending spaced rows as 11 and 12. The springs 10 of each row are in closely adjacent relation and are of the usual coil spring form, each having enlarged end coils as 13 and 14 and smaller intermediate coils as 15. The corresponding adjacent pairs of springs of each row are held together by means of the transversely extending helical spring 16, wound about the uppermost end coils, and a similar spring wound about the lowermost end coils. The usual border wire 17 is held to the marginal springs by a similar helical spring.

It will be noted that the helical springs 16 serve to hold corresponding pairs of adjacent springs of each row together to permit the hinging movement of one spring of the pair relatively to the other. If longitudinal pressure is applied to the spring structure, the entire structure will tend to bend about one of the helical springs as a pivot so that the structure will buckle and distort the uppermost and lowermost surfaces thereof from their normal, flat or coplanar position to a more or less wavy form. Furthermore, since the structure is stiffer at its side edges than at its middle, the buckling and consequent shortening will be accentuated at the middle of the end edge.

In order to prevent such buckling and shortening, I have arranged suitable bracing members in the structure in such a manner that while they adequately perform their bracing function, they do not interfere in any way with the normal method of assembling the springs, while utilizing little additional material and adding little or no appreciable weight to the spring unit. As shown in Figs. 1 and 5, the bracing means takes the form of a light wire member extending generally in a longitudinal direction and having the end transversely extending portion 19 thereof arranged adjacent the border wire 17, being held to the border wire by the helical spring 18. Said spring 18 is wound about the portion 19 at the same time that it is wound about the border wire and the marginal springs 10. Bent from the ends of the portion 19 are the longitudinally extending portions 20 and 21 of the bracing member, said portions being arranged conveniently in the spaces between adjacent rows of springs.

At the end of the portion 20 and preferably at right angles thereto, is the offset transversely extending portion 22 parallel to the edge portion 19 and so arranged that the helical spring 16 may be screwed around said portion 22 at the same time that it is screwed around end coils 13 of the springs 10. From the right end of the portion 22 is bent the longitudinal portion 23, similar to the portion 20 and approximately parallel thereto. The portions 24 and 25 are similar

to the portions 22 and 20, respectively, and similarly arranged, the portion 24 being offset transversely toward the left and parallel to the portion 22, while the longitudinal portion 25 is parallel to and substantially aligned with the portion 20. From the portion 21 extend similar alternating transversely and longitudinally extending portions.

To permit the inner spring unit to be transported and readily handled without substantial loss of flexibility, the bracing members need not be made completely throughout the length of the spring unit in one piece, but may be made in separate pieces as shown in Fig. 1, being preferably confined, however, to the end parts of the structure, so that the middle part may be free of bracing members, if desired. In such case, the end portion 26 of the bracing member which is bent from the portion 25 instead of continuing further, may terminate in a suitable hook or small loop as 27 hooked about one of the coils of the adjacent helical spring. The other end 28 of the bracing member may terminate in a similar loop or hook 29.

The next bracing members 32, 34 each comprises the end portion 30 arranged adjacent and in substantial alignment with the portion 27 or 28 and also provided with a loop 33 hooked about a coil of the spring 31. The remainder of the next bracing member may be similar to the remainder of the first-described bracing member comprising comparatively short offsets parallel to the axis of the adjacent helical spring, the offsets being joined by longitudinal portions arranged between the rows of coil springs. The connecting edge portion 19, however, may be omitted, if desired.

As many short offsets 22 and 24 may be provided in the bracing member as may be found desirable, so that as many rows of springs may be braced by a single member, as is found convenient. For example, in Fig. 3 I have shown a bracing member 35 provided with five longitudinal sections and therefore, adapted to brace five rows of springs, though the number of said longitudinal and offset portions may be varied at will as is obvious.

In that form of the invention shown in Fig. 4, the bracing member 40 is provided with the transversely arranged portions or short offsets 41, 42, 43, etc., which are joined by the respective inclined portions 44, 45 and 46. By inclining the connecting parts 44, 45, 46, it becomes possible to arrange said connecting parts conveniently in the space between adjacent rows of springs so that they do not interfere in any way with the springs 10 and said springs are permitted to yield and expand without danger of contacting with or having their function and operation impaired by the bracing members.

As shown in Fig. 6, the bracing member 50 extends between the middle of the end border wire 51 and the side border wires 52, 53, so that the end portion of the spring structure is adequately braced against the concaving of the end edge thereof. In this form of my invention, a bracing wire 50 is used at each end of the structure and no intermediate bracing wires are used, though it will be understood that additional bracing wires of the form shown, for example, in Figs. 3 and 4 may be additionally used at the center part of the structure, should they be found necessary. The wire 50 comprises the portion 54 arranged adjacent the end border wire 51 and held thereto and to the adjacent spring by the helical spring 55. From the portion 54 extend the opposed longitudinally arranged portions 56, 57. From the inner ends of said portions 56 and 57 extend respectively the offset portions 58, 59 parallel to the portion 54 and coaxial with and held by the helical spring 60. Said offset portions are, in the case shown, of a length substantially equal to the distance between rows of springs so that the next longitudinal portions 61, 62 are arranged between the next outermost adjacent rows of springs. Similarly, the offset portions 63, 64 extend parallel to the corresponding portions 58, 54 and are held by the helical spring 65 to the pairs of adjacent springs in the next rows. The stepped form of the bracing wire may thus continue up to the last offset portion 66 which is adequately secured in place as by means of the bend 67 thereof hooked about the side border wire 52. Similarly, the other end portion 68 of the wire 50 may be hooked as at 69 about the other side border wire 53.

The stepped form of the bracing wire provides a generally triangular brace at the end portions of the mattress, bracing the middle of its end edge against the sides and preventing the formation of the objectionable inward concavity on the end edges of the spring structure.

It will be understood that the relation and arrangement of the coil springs in each row may be such as is customarily used in spring structures and may take any of the usual forms and that while I have illustrated a typical arrangement of such coil springs, the shapes of the end coils and the relative arrangement thereof and the spacing between the rows and between individual springs of each row may be greatly varied without affecting the present invention.

It will be seen that I have provided simple but efficiently operating means for preventing buckling of an inner spring unit of a mattress or undue concaving of its end edges during the process of making it, without destroying the longitudinal flexibility thereof and that as a result, the unit may be inserted into a mattress casing while the surfaces thereof are maintained substantially flat and that the overall length of the unit is maintained during and after the mattress making operations.

While I have shown and described certain specific embodiments of my invention, I do not wish to be understood as limiting myself thereto, but intend to claim the invention as broadly as may be permitted by the state of the prior art and the scope of the appended claims.

I claim:

1. In a spring structure, a plurality of transversely spaced and longitudinally arranged rows of coil springs, a border wire continuous and uninterrupted along at least one side and one end of the structure, a helical border spring passing around the end coils of the marginal springs of the rows and around the border wire, a series of row-connecting transversely extending helical springs each passing around the end coils of a pair of adjacent springs in a row and around the corresponding pairs of adjacent springs in the remaining rows, and means for longitudinally bracing the coil springs at the end parts of the rows comprising a bracing wire having a plurality of transversely extending portions thereon and also having connecting portions joining the transversely extending portions and

extending in a generally longitudinal direction in the spaces between the rows, that transversely extending portion nearest the border wire passing through the border helical spring and being yieldably held thereby to the border wire, each of the remaining transversely extending portions passing through a different one of the row-connecting helical springs and each of the longitudinally extending portions having a length substantially equal to the diameters of the end coils of the coil springs.

2. In a spring structure, rows of coiled body springs, each row being separated transversely from the adjacent rows to provide spaces between the rows, a one-piece border wire, a border helical spring the coils of which engage the border wire and the end coils of the marginal body springs, transverse row-connecting helical springs each engaging the end coils of a pair of adjacent springs in each row, and a bracing wire bent to provide a series of substantially longitudinally extending portions each of a length substantially equal to the diameters of the end coils of the body springs and each arranged in one of said spaces between a pair of corresponding body springs in adjacent rows, said portions being connected by transversely extending portions of said wire, one of said transversely extending portions being in engagement with the coils of the border helical spring and yieldingly held in place thereby, the remaining transversely extending portions being each engaged by the coils of a different one of the transverse row-connecting helical springs, and a terminal one of said transversely extending portions terminating in a hook, the end coils of said body springs and the helical springs cooperating with the bracing wire to resist shortening and buckling of the spring structure under longitudinal stresses transferred thereto by the bracing wire.

3. In a longitudinally compressible spring structure having transversely spaced rows of coil springs joined by parallel, spaced, transverse, helical springs wound about the end coils of the coil springs, a border wire, a border helical spring yieldingly holding the marginal coil springs to the border wire, a bracing wire having portions thereof extending in a generally longitudinal direction between the rows, each longitudinal portion being out of alignment with the preceding and succeeding portions, said wire having other portions thereof each arranged between a pair of springs of a row and each engaged by the coils of a different one of said helical springs, said other portions being parallel and a consecutively arranged pair of said other portions extending from the opposite ends of a longitudinal portion in opposite directions.

4. A spring structure comprising a plurality of longitudinally extending and transversely spaced rows of coil springs, a transversely extending helical spring screwed about the end coils of adjacent corresponding springs of the rows, a border wire, a border helical spring loosely holding the end coils of the marginal springs of the rows to the border wire, and means for longitudinally bracing the marginal spring and at least two other non-corresponding springs of the rows against longitudinal compressive stresses comprising a series of bracing wires each having the mid-portion thereof loosely passing through the border helical spring and yieldingly held thereby, a plurality of transversely extending spaced parallel portions on the bracing wire arranged within the transversely extending helical springs, the remaining portions of the bracing wire extending between the adjacent helical springs and between adjacent rows and connecting said parallel portions.

5. In a longitudinally compressible spring structure having rows of coil springs joined by parallel, spaced, transverse, helical springs wound about the end coils of the coil springs, a top border wire, a helical spring holding the top coils of the marginal rows of springs to the border wire, means for longitudinally bracing the structure for a part only of its length comprising transversely spaced bracing wires having longitudinally extending portions and transversely extending portions between the longitudinal portions, the mid-portion of each of said wires comprising a transversely extending part held loosely by the border helical spring, the remaining transversely extending portions being arranged within and held by the remaining helical springs, there being two of said transversely extending portions in each of said remaining helical springs, the alternate longitudinally extending portions being in alignment with each other, and succeeding longitudinal portions extending from the ends of each transversely extending portion in opposite directions.

6. In a longitudinally compressible spring structure having rows of coil springs joined by parallel, spaced, transverse, helical springs wound about the end coils of the coil springs, a border wire, a border helical spring passing around the border wire and around the end coils of the marginal coil springs, a bracing wire having a plurality of comparatively short transversely extending and parallel portions extending between a pair of adjacent rows, each of said portions passing through a different one of the helical springs, and successive portions passing through successive helical springs, that one of said portions nearest the end of the wire passing through the border helical spring, and inclined portions joining said short portions, each of said inclined portions being arranged at an angle other than a right angle to the short portions joined thereby.

7. In a spring structure, a plurality of longitudinally arranged rows of coil springs, each row being separated transversely from the adjacent rows to provide spaces therebetween, a border wire around the structure, a border helical spring passing around the end coils of the marginal springs of the row and around the border wire, a series of row-connecting transversely extending helical springs each passing around the end coils of a pair of adjacent springs in a row and around the end coils of the corresponding pairs of adjacent springs in the remaining rows, and a bracing wire having a plurality of transversely extending parallel portions thereon and also having connecting portions, each of the connecting portions joining one of the transversely extending portions with the next succeeding transversely extending portion, each of said connecting portions extending between a pair of adjacent helical springs and being arranged in one of the spaces between the rows, that transversely extending portion of the bracing wire nearest the border wire passing through the border helical spring and being yieldably held thereby to the border wire, and each of the remaining transversely extending portions passing through a different one of the row-connecting helical springs.

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