Oct. 28, 1941. A. KRAKAUER 2,260,627

MATTRESS SPRING

Filed Jan. 12, 1938

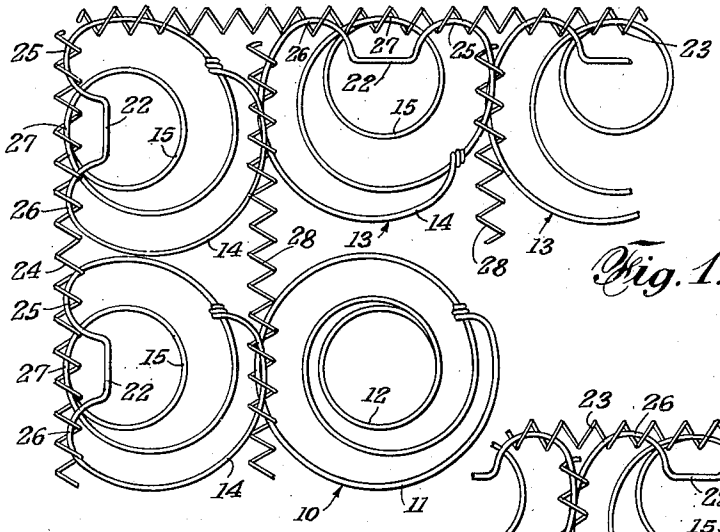


Fig. 1.

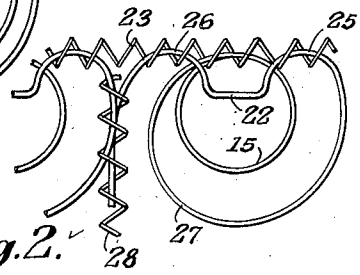


Fig. 2.

Fig. 3.

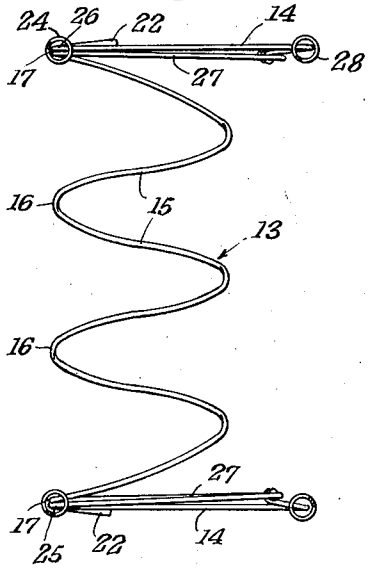
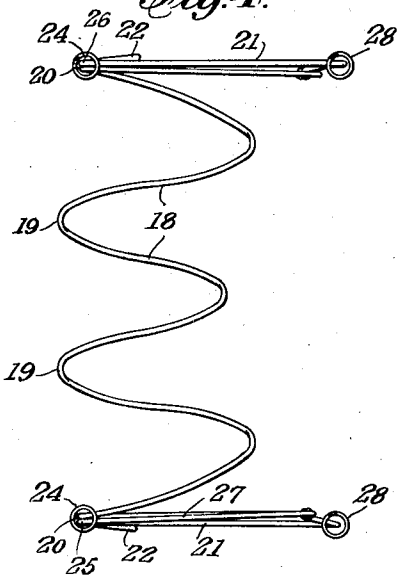


Fig. 4.



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MATTRESS SPRING

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11 Claims. (Cl. 5—260)

This invention relates to coil springs and particularly to those employed at the margins of the inner spring units of mattresses, cushions and the like.

It has been proposed that so-called "offset" springs be used in the marginal rows at the side and end edges of mattresses to prevent the objectionable collapse and concaving of said edges during use of the mattress. Such offset springs are provided with end coils arranged eccentrically and not coaxially of the remaining or intermediate coils of the spring. However, when the end coils of the rows of such offset marginal springs are connected by helicals, the intermediate coils tend to snap past the helical or the end coil of the offset spring on the compression of the spring, thereby causing a disagreeable clicking noise. Hence, those parts of the intermediate coils of the offset spring which are adjacent the side and end edges of the mattress have not heretofore been brought into vertical alignment with the end coils at the side and end edges of the mattress but have been spaced inwardly a sufficient distance to clear the end coils on compression of the spring. The inward spacing of the intermediate coils, if sufficient to avoid the clicking noises just described, is insufficient to support the edge of the mattress thereby resulting in the objectionable permanent collapse and concaving of such edges.

Furthermore, when the smaller intermediate coils snap past the larger end coil on the compression of the spring, they protrude through the end coil and tend to work their way through the upholstery covering material for the unit.

This invention therefore contemplates the provision of stop portions on the end coils of the marginal springs whereby the intermediate coils cannot pass the end coils nor pass the connecting helicals and the objectionable noises are prevented, the intermediate coils being also prevented from working their way through the upholstering or stuffing material surrounding the springs.

The invention further contemplates the provision of a simple and efficient marginal spring adequately maintaining the edge of the structure in which it is used against permanent collapse and concaving while eliminating the clicking noises resulting from the use of previously known offset springs.

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 the corner portion of an inner spring structure for mattresses and the like showing my new marginal springs.

Fig. 2 is a fragmentary plan view of a modified form of the invention wherein the end part of the end coils of the springs are not knotted or tied.

Fig. 3 is a front elevation of the marginal spring.

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

In the practical embodiment of the invention shown by way of example, the non-marginal springs 10 of the inner spring unit are of the usual hour glass shape, the end coils 11 thereof being arranged substantially coaxially of the intermediate coils 12. The marginal springs 13 are not necessarily offset springs and are provided with mutilated end coils 14, and with smaller intermediate coils 15, which intermediate coils may be of the same or different diameters. As best seen in Fig. 3, the outermost points 16 of the coils 15 are preferably in vertical alignment with the outermost points 17 of the mutilated end coils 14. In other words, parts of the intermediate coils and of the end coils lie in the same vertical plane, which plane is parallel to the axis of the intermediate coils. Or as shown in Fig. 4, the outermost points 19 of the intermediate coils 18 may extend slightly outwardly of the outermost points 20 of the end coils 21 to make the edge of the unit slightly convex. In either case, the stuffing or upholstering material which pads the outside of the marginal springs is adequately supported by the intermediate coils of said springs against inward movement into the spring unit during repeated use of the mattress of which said unit forms a part.

The upper and lower end coils 14 and 21 are each mutilated or bent, and thereby provided with means for preventing the passage therepast or therethrough of the respective intermediate coils 15 or 18. As shown, said means takes the form of a reentrant portion or indent 22 of any suitable shape extending inwardly a substantial distance and bent from a portion of the end coil, and slightly out of the plane thereof, (Fig. 4) if desired. Preferably, the indent 22 extends inwardly a distance approximately a third of the diameter of the intermediate coil, thereby providing an adequate stop past which the intermediate coils cannot be forced. By so bending the indents, curved portions 25 and 26 are formed on each side of the indent, the outermost points 17 of said curved portions being vertically above

the points **16** of the intermediate coils, or in the form shown in Fig. 4, the points **20** are slightly inwardly of the points **19**. When the marginal spring is compressed to its limit, it must, therefore, necessarily flatten substantially to a plane, the intermediate coils nesting within the end coils and at least one of the intermediate coils engaging each of the indents **22** to be held thereby against possibility of movement through the larger end coil.

The marginal helical **23** connects the springs of an end edge row together, while the helical **24** connects the side edge marginal springs. Said helicals pass about the curved portions **25** and **26** on each side of the indent **22** of the end coil and also pass about the outer part of the next succeeding coil **27** of each marginal spring to hold the indent and the coil **27** in contact with each other, the helical being of the proper size for that purpose. Similarly, the intermediate helicals **28** connect the end coils of each corresponding pair of adjacent springs of each row which is parallel to the end edge row.

As shown in Figs. 1 and 3, the end part of the end coil may be knotted or tied to the next succeeding intermediate coil **27**. If desired, however, said end part may be left free (Fig. 2) and held in place by winding the helical thereabout without a knotting or tying bend, or the necessity for clips.

It will be seen that when the marginal spring is compressed, the intermediate coils next succeeding the end coils are engaged by the indents **22** at points spaced a substantial distance apart and are compelled to remain at all time between the end coils. The outermost points **16** or **19** of the intermediate coils cannot snap past the helicals **23** or **24** to produce a clicking sound, nor can they snap past the outermost part **17** of the end coils to produce such sound. The mere engagement or contact of the coils with each other or with the helical does not result in the objectionable noise, which is usually produced when such parts move past each other while in contact with each other.

The indents **22** need not be of any particular shape provided that they are sufficiently wide and extend inwardly a sufficient distance to perform their function of preventing movement of the intermediate coils past the end coils. Said indents while shown preferably as extending outwardly somewhat out of the planes of the end coils, may if desired, be made coplanar with the end coils in an obvious manner which requires no illustration. When so made, the intermediate coils do not collapse quite into coplanar relation with the end coils even though the spring is compressed to its limit.

It will further be seen that I have provided an inner spring unit of simple construction and effective to prevent permanent concaving of the side edges of the mattress in which it is used, in which construction clicking noises cannot occur, nor can the intermediate coils of the marginal springs work their way past the end coils thereof and through the padding, and that I have provided a structure well adapted for practical use.

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

I claim:

1. In a coil spring having generally circular end coils and smaller intermediate coils, a reentrant portion on each of said end coils extending inwardly past the intermediate coils and constituting stop means for engaging at least one of the intermediate coils on the compression of the spring and preventing any movement of said intermediate coils through the end coils, and means for securing together part of an end coil and part of the next adjacent intermediate coil, said means comprising a helical spring passing around spaced parts of the end coil adjacent the extremities of the reentrant portion and also passing around that portion of said next adjacent intermediate coil arranged between said extremities.

2. In a coil spring having substantially circular end coils and smaller intermediate coils, a reentrant portion on each of said end coils extending inwardly past the intermediate coils and constituting stop means for engaging at least one of the intermediate coils on the compression of the spring and preventing any movement of said intermediate coils through the end coils, and means for securing together those parts of an end coil adjacent the reentrant portion and part of the next adjacent intermediate coil, parts of said end coils and said intermediate coils being arranged in a position of tangency to a vertical plane parallel to the axis of said intermediate coils.

3. In a spring structure, a coil spring having end coils and a plurality of smaller intermediate coils, a reentrant indent extending inwardly from each of the end coils, said indent being of sufficient width and depth to engage widely spaced points of the adjacent intermediate coil when the spring is compressed, spaced convex portions on the end coil joining the ends of the indent to the remainder of the end coil, and a helical spring wound about said convex portions and also wound about a portion of said adjacent intermediate coil and maintaining said portions in contact at all times.

4. In a spring structure, a coil spring having end coils and a plurality of smaller intermediate coils, a reentrant indent extending inwardly from each of the end coils, said indent being of sufficient width and depth to engage widely spaced points of the adjacent intermediate coil when the spring is compressed, spaced convex portions on the end coil joining the ends of the indent to the remainder of the end coil, and a helical spring wound about said convex portions and also wound about a portion of said adjacent intermediate coil, said coils being arranged in such position that a vertical plane tangent to said convex portions is also tangent to said intermediate coils.

5. In a spring structure, a row of marginal coil springs each having end coils and smaller intermediate coils, a reentrant portion on each of the end coils constituting stop means for maintaining the intermediate coils of each spring between the end coils of said spring at all times and for preventing movement of any of said intermediate coils past the end coils, and a helical spring wound about those parts of the end coil adjacent the reentrant portion and also wound about part of the next adjacent intermediate coil of all of said springs in the entire row.

6. In a spring structure, a row of marginal coil springs each having end coils and smaller intermediate coils, a reentrant portion on each

of the end coils constituting stop means for preventing movement of any of said intermediate coils vertically past the end coils, the coils of each spring being so arranged that a vertical plane tangent to the extremities of the reentrant portion is substantially tangent to said intermediate coils, and a helical spring wound about those parts of the end coils of each marginal spring adjacent its reentrant portion and also wound about part of the next adjacent intermediate coil of all the springs in the row.

7. In a spring structure, a row of marginal coil springs, each of the marginal springs having end coils substantially circular except for the reentrant indent thereof hereinafter mentioned and having smaller circular intermediate coils, a reentrant indent on each of the end coils constituting stop means for preventing movement of said intermediate coils past said end coils, spaced convex portions on each of the end coils joining the ends of the indent to the remainder of the end coil and crossing the next adjacent coil at substantially right angles, the intermediate coils being arranged eccentrically to the end coils and in such position that a vertical plane tangent to said convex portions is also tangent to said intermediate coils at points thereof adjacent a marginal edge of the structure, the remaining points of said intermediate coils being arranged inwardly of corresponding points of the end coils, and a helical spring wound about the convex portions of corresponding end coils of all the marginal springs in a row.

8. In spring structures for use in bed mattresses, pillows and cushions, the combination of vertically disposed spiral springs having top and bottom convolutions of relatively large size, and having the next adjacent convolutions smaller than the top and bottom convolutions but also of relatively large size, and having succeeding convolutions of smaller size, the outer edges of all of the convolutions lying in substantially the same vertical plane on one side of the spring, and a horizontally disposed connecting spring of small diameter, said spring embracing the outer convolutions and the next adjacent convolutions of the vertically disposed spiral springs.

9. In spring structures for use in bed mattresses, pillows and cushions, the combination of spiral springs having top and bottom convolutions of relatively large size, and having the next adjacent convolution of a smaller size but having one portion of said convolutions disposed in the same vertical plane as the corresponding portion of the top and bottom convolutions, and having intermediate convolutions of like diameter throughout and smaller than the preceding convolutions, the corresponding portions of said intermediate convolutions also being disposed in the same vertical plane as the corresponding portions of the top and bottom convolutions, and horizontally disposed connecting springs of small diameter, said springs embracing the outer convolutions and the next adjacent convolutions of the vertically disposed spiral springs.

10. In spring structures for use in bed mattresses, pillows and cushions, the combination of vertically disposed spiral springs having top and bottom convolutions of relatively large size, and having the next adjacent convolutions smaller than the top and bottom convolutions but also of relatively large size, and having succeeding convolutions of smaller but like size, the outer edges of all of the convolutions lying in substantially the same vertical plane on one side of the spring, and connecting means extending between the vertical spiral springs and secured to the outer convolutions and the next adjacent convolutions to tie the springs together.

11. In spring structures for use in bed mattresses, pillows and cushions, the combination of vertically disposed spiral springs having top and bottom convolutions of relatively large size and having succeeding convolutions of graduated smaller size and having the smallest convolution at the central portion of the spring, the outer edges of all of the convolutions lying in the same vertical plane on one side of the spring, and a horizontally disposed connecting spring of small diameter, said spring embracing the outer convolutions and the next adjacent convolution of the vertically disposed spiral spring.

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