Aug. 4, 1936. W. LEWIS 2,050,105

SPRING CUSHION

Filed April 5, 1933

Fig. 1.

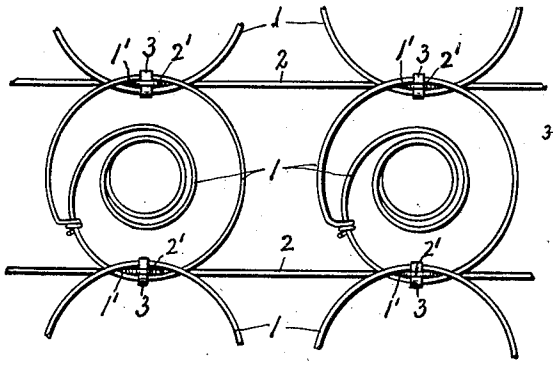


Fig. 2.

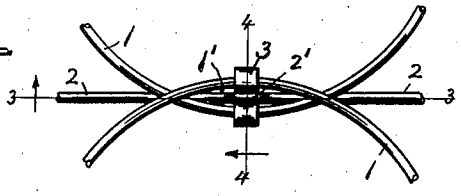


Fig. 3.

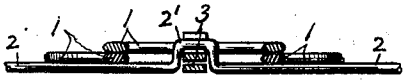


Fig. 4.

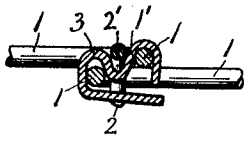


Fig. 5.

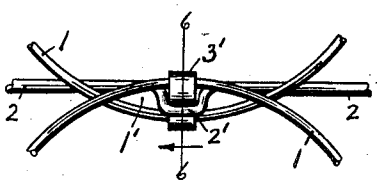


Fig. 6.

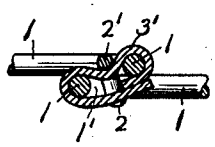


Fig. 7.

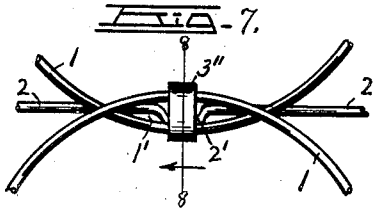


Fig. 8.

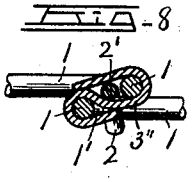


Fig. 9.

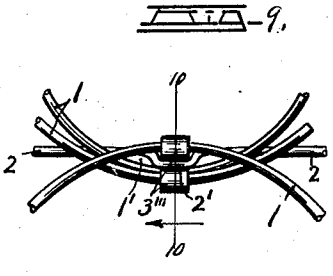


Fig. 10.

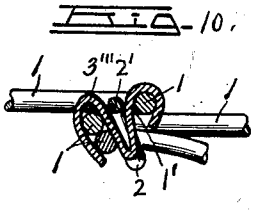


Fig. 13.

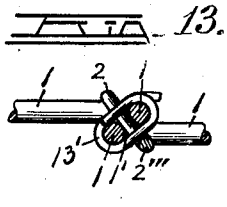


Fig. 11.

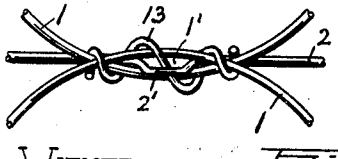


Fig. 12.

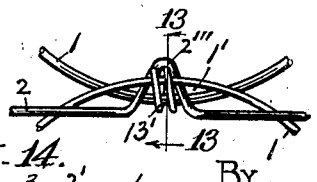
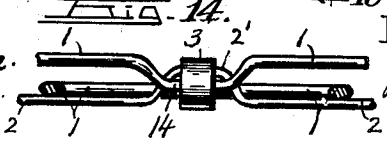


Fig. 14.



WITNESS

H. L. Meade.

INVENTOR

Wm. Lewis

BY

Dewson & Thompson

ATTORNEYS

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2,050,105

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SPRING CUSHION

William Lewis, Utica, N. Y.

Application April 5, 1933, Serial No. 664,541

7 Claims. (Cl. 5—267)

This invention relates to a spring cushion comprising a system of helical springs arranged side by side in rows with their axes parallel and adapted to be used in mattresses for beds, couches and analogous furniture including the seats and backs of chairs, motor vehicles and the like.

These springs are usually mounted at one end upon a suitable support, leaving their other ends free to yield axially for the reception of suitable upholstering for finishing purposes and one of the objects of the invention is to hinge contiguous helixes of adjacent rows to each other in overlapping relation in such manner as to allow their free axial or relatively tilting movement independently of each other under pressure and at the same time to automatically return to their normal parallel relation when the pressure is removed.

In other words, I have sought to provide a spring cushion which is substantially noiseless in action and which is free to flex axially at any point under pressure and return to its normal symmetrical relation when the pressure is removed.

Another object is to tie the contiguous overlapping helixes of the springs of the several rows together in such manner as to hold said helixes against relative lateral displacement without in any way interfering with the free action of the springs or any part of the system of springs.

Other objects and uses relating to the method and to the means for hingedly connecting the overlapping helixes and for normally holding them in definite relation to each other will be brought out in the following description.

In the drawing:—

Figure 1 is a top plan of a portion of a spring cushion or mattress embodying the preferred form of my invention.

Figure 2 is an enlarged top plan of the overlapping portions of the helixes of two of the helical springs together with the tie wire and clip hingedly connecting the same.

Figure 3 is a detail vertical sectional view taken on line 3—3, Figure 2.

Figure 4 is a further enlarged detail sectional view taken on line 4—4, Figure 2.

Figure 5 is a top plan similar to Figure 2 showing a slightly modified form of clip connecting the overlapping portions of the helixes and tie wire.

Figure 6 is an enlarged detail sectional view taken on line 6—6, Figure 5.

Figure 7 is a top plan similar to Figure 2 showing a further modified form of clip hingedly connecting the overlapping helixes and tie wire.

Figure 8 is an enlarged detail sectional view taken on line 8—8, Figure 7.

Figure 9 is a top plan similar to Figure 2 showing a still further modified form of clip connecting two of the helixes of one spring with one of the overlapping helixes of the adjacent spring and tie wire.

Figure 10 is an enlarged detail vertical sectional view taken on line 10—10, Figure 9.

Figure 11 is a top plan similar to Figure 2 showing a wire clip for hingedly connecting the adjacent overlapping portions of the helixes of two springs and the tie wire.

Figure 12 is a top plan similar to Figure 2, showing another form of wire clip for hingedly connecting the overlapping portions of the helixes and tie wire.

Figure 13 is an enlarged detail sectional view taken on line 13—13, Figure 12.

Figure 14 is a sectional view similar to Figure 3, in which the overlapping portion of one of the helixes is provided with an axially depressed offset for receiving the clip.

In Figures 1 to 4 inclusive, I have shown a portion of a spring cushion or mattress comprising a plurality of, in this instance three, lengthwise rows of helical springs 1 arranged side by side to form transverse rows, the portions of the helical springs of the outer rows being broken away.

These coil springs are preferably of the conventional frusto-conical or double conical type and may be supported at one end in any well-known manner so that the remaining portions thereof are free to yield axially, those of each lengthwise row being arranged in spaced relation so as to avoid contact with each other while the contiguous sides of the helixes at the free ends of the springs of the transverse rows are arranged in overlapping relation to form openings 1' between the overlapping portions.

Suitable means is provided for hingedly connecting the overlapping portions of the helixes of adjacent springs to each other for holding the latter against relative lateral displacement without in any way interfering with the free flection of the hinge joints.

Additional means is also provided for holding the free ends of the springs of the several transverse rows against relative movement in the direction of length of the cushion or mattress and to cooperate with the first-named means in hold-

ing the free ends of the springs against relative transverse displacement.

In order to carry out these purposes, suitable tie wires 2 are extended lengthwise of the cushion or mattress in transversely spaced parallel relation and along the chords of the arcs of the overlapping portions of the helixes of the springs of the lengthwise rows, as shown more clearly in Figure 1.

Each of the tie wires 2 is preferably extended across the inner sides of the overlapping portions of the outermost helixes of the springs of adjacent rows and along the chords of the arcs of said overlapping portions and is provided at intervals with offset loops 2' registering with and extending from the inner side into the corresponding openings 1' and preferably beyond the outer face of the inner underlapping helix, as shown more clearly in Figures 3 and 4.

Each of the loops 2' is adapted to receive a bendable clip 3 of sheet metal, wire or other suitable material which, as shown more clearly in Figure 4, has its central portion extended through the corresponding loop and its opposite ends extended over the outer faces of the contiguous overlapping portions of the adjacent helixes of the springs 1 and wrapped around contiguous portions of said helixes as shown to establish a hinge connection between the outer end helixes of the adjacent springs and loop 2' of the adjacent tie wire.

The construction shown in Figures 5 and 6 is quite similar to that shown in Figures 1 to 4 inclusive except that the offset loop 2' is disposed at a slight angle to the axis of the spring and the ends of the clip as 3' are brought into engagement with each other around the overlapping portions of the helixes 1.

The construction shown in Figures 7 and 8 is quite similar to that shown in Figures 5 and 6 except that the clip as 3'' is somewhat S-shaped in that one end is returned outwardly and radially around its adjacent helix while the other end is returned inwardly and laterally around the corresponding helix.

The construction shown in Figures 9 and 10 is also quite similar to that shown in Figures 1 to 8 inclusive except that the clip as 3''' is arranged to embrace two of the adjacent helixes of one spring and a single helix of the other spring and that the central portion of the clip extends downwardly or axially a greater distance than those shown in the previous figures.

In Figure 11, I have shown a wire clip as 13 having a central portion extended through the loop 2' of the wire 2 and across the outer faces of the overlapping portions of the helixes 1, the ends of said wire clip being bent around said helixes adjacent their crossing portions to establish a hinge connection between the overlapping helixes.

In Figures 12 and 13, the offset loop 2''' of the tie wire 2 is disposed at an angle of approximately 45 degrees to the axes of the adjacent springs and is passed through the opening or space between the overlapping portions of the helixes which are hingedly connected to each other by a clip 13' passing through the loop 2' and having its opposite ends wrapped in opposite directions around their respective helixes 1.

The construction shown in Figure 14 is quite similar to Figures 1 to 4 inclusive except that the central portion of the outermost overlapping helix is depressed at 14 in a direction of the axis of the spring to receive a clip 3 similar to that shown in Figure 4.

It will be noted that in each of these modifications, the invention is directed to the arrangement of the outermost or upper helixes of adjacent springs in overlapping relation and to the means for hingedly connecting the overlapping helixes to each other to permit them to flex in the direction of the axes of the springs and at the same time to hold the hingedly connected helixes against relative lateral or circumferential movement so that when the springs are assembled into a complete system to form a spring mattress, seat or cushion, the outer or free ends of the springs will be free to yield under pressure and will automatically return to their normal positions under their own tension when the pressure is relieved without liability of relative displacement of the springs from their normal relation.

It will also be observed that when the loops 2' of the tie wire 2 are passed into or through the openings between the corresponding overlapping portions of the helixes of the adjacent springs together with the passing of the clips 3, 3', 3'' or 3''' through the loops in the manner described not only holds the springs of each row against lengthwise displacement along the tie wires 2 but also establishes hinge connections between the overlapping portions of the transverse rows of springs to hold the latter against relative lateral displacement and at the same time affording a maximum resiliency of the entire system of springs.

Furthermore, the tie wires 2 which extend along the chords of the arcs of and across the undersides of the inner overlapping portions of the helixes serve to tie the springs of the several rows to each other and assist in transmitting axial motion from one to the other as the outer ends of the springs are compressed, thereby tending to normally hold the outermost helixes in substantially the same plane.

In other words, if any one of the outer ends of the springs is compressed under load, it will simply tilt the outer helixes of adjacent springs through the medium of the hinge clips 3, 3', 3'' and 3''', 13 and 13', while the tie wires 2 will serve to transmit this depression to adjacent springs so that the outer helixes of all of the springs of the system will be more or less effected by the compression of any one of the springs all of which tends to maintain the entire system of springs in proper relation.

It will also be evident that the application of pressure at any one of the hinge joints between the overlapping portions of adjacent springs will cause the later to tilt toward each other but this tilting movement will be resisted somewhat by the adjacent tie wires 2 which will serve to transmit a part of the load to other adjacent springs.

In other words, the use of my invention in a spring mattress or cushion not only enables the springs to conform to the contour of the object resting thereon, but also assures self-restoration of all of the springs of the system to their normal relation.

It is, of course, obvious that various other modifications might be shown without departing from the spirit of the invention. It is to be understood that all of the springs 1 will be under more or less compression when assembled to form a spring cushion and that under these conditions the clips 3''', Figure 10 and overlapping portions of the springs 1 engaged thereby will be held against axial displacement one from

the other aided by the fact that the tie wire 2 engaged the underside of the outermost helix of one spring will also engage in the central loop of the clip 3''' which, in turn, is wrapped around the upper surfaces of both of the overlapping portions of the springs, thereby locking the clip to said overlapping portions and to the tie wire against displacement axially of the springs irrespective of whether the lower ends of the loops of the clip are opened and closed.

It will be seen, however, that the openings in the bottoms of both loops of the clip are slightly less than the diameter of either one of the overlapping portions of the spring 1 embraced thereby. This latter condition, however, is not so important as to have the loops engage the upper faces of the overlapping portions of the helixes with the tie wire engaging the upper face of the clip and undersides of the overlapping portions of the helixes as shown more clearly in Figures 4, 6, 9 and 10.

What I claim is:—

1. In a spring cushion, adjacent rows of helical wire springs arranged side by side and having portions of contiguous helixes arranged in overlapping relation, a tie wire extending along a chord common to the arcs of the overlapping helixes of adjacent rows and provided with offset loops projecting between said overlapping portions, and clips extending through the loops and around the adjacent overlapping portions and tightly embracing the latter for hingedly connecting the corresponding helixes to each other and to the tie wire.

2. In a spring cushion, adjacent helical springs having portions of their helixes arranged in overlapping relation, a tie wire having an offset loop extending between said overlapping portions, and a clip having an offset portion in interlocking relation with said loop and end portions wrapped around the respective mid portions of the overlapping arcs of said helixes for hingedly connecting the helixes and for holding them against relative lateral movement.

3. In a spring cushion, the combination with adjacent rows of helical springs arranged side by side and having portions of contiguous helixes arranged in overlapping relation and a tie wire extending along a chord common to the arcs of the overlapping portions of adjacent rows, said tie wire having offset loops projecting between the overlapping portions, and clips having a central offset portion in interlocking relation with the offset loops of said tie wire and end portions wrapped around the respective mid portions of the overlapping arcs of said helixes for hingedly connecting the overlapping helixes and for holding them against relative lateral movement.

4. In a spring cushion, adjacent helical springs having portions of their end helixes arranged in overlapping relation, a tie wire underlying said overlapping portions and extending along a chord common to the arcs of said overlapping portions, said tie wire having an offset loop projecting between said overlapping portions, and a clip having a central portion underlying said loop and end portions tightly wrapped around the respective mid-portions of the overlapping arcs of said helixes hingedly interlocking the overlapping helixes and said tie wire and holding the helixes against relative lateral movement along said tie wire.

5. In a spring cushion, adjacent helical springs having portions of their end helixes arranged in overlapping relation, a tie wire underlying said overlapping portions and extending along a chord common to the arcs of said overlapping portions, said tie wire having an offset loop projecting between said overlapping portions, and a clip having a central offset portion underlying and in interlocking relation with said loop and end portions wrapped around the respective mid-portions of the overlapping arcs of said helixes for hingedly interlocking the overlapping portions of said helixes and said tie wire and for holding the helixes against relative lateral movement along said tie wire.

6. In a spring construction, a plurality of rows of helical springs, said rows being arranged in spaced relation, the springs in each row being arranged side by side having portions of the respective end helixes arranged in overlapping relation, a plurality of tie wires, each extending along a chord common to the arcs of the overlapping helixes of adjacent springs in the respective rows, said tie wires having offset loops projecting between the overlapping portions, and clips having their central portion extending through said loops and their end portions wrapped around the respective mid-portions of the overlapping arcs of said helixes for hingedly interlocking the overlapping helixes and tie wires and for holding the rows against lateral displacement.

7. In a spring cushion, adjacent rows of helical springs arranged side by side and having portions of contiguous helixes arranged in overlapping relation, a tie wire extending along a chord common to the arcs of both of the overlapping helixes of adjacent rows and provided with offset loops projecting between said overlapping portions, and clips extending through the loops and around the adjacent overlapping portions, tightly embracing the latter for hingedly connecting the corresponding helixes to each other and to the tie wire, one end of each clip being extended into lapping relation to the other end of the clip.

WILLIAM LEWIS.