April 26, 1938. E. W. SCHLAPPRITZI ET AL 2,115,400

SPRING STRUCTURE

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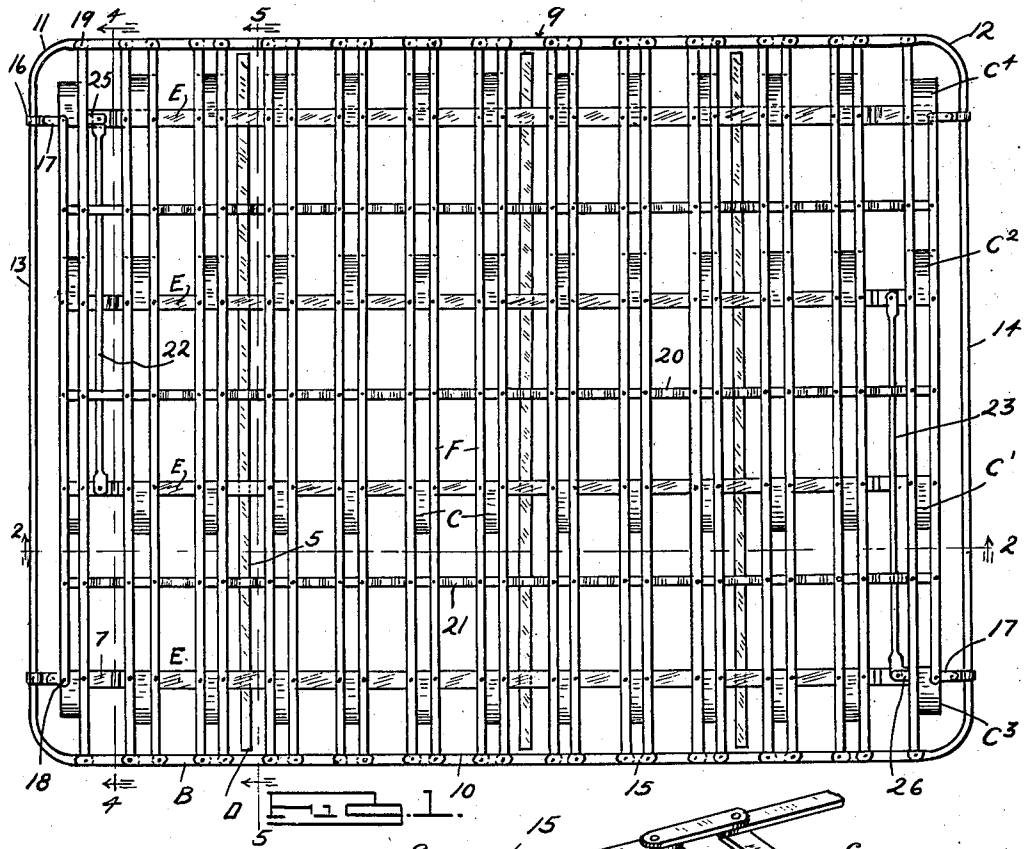


FIG. 1.

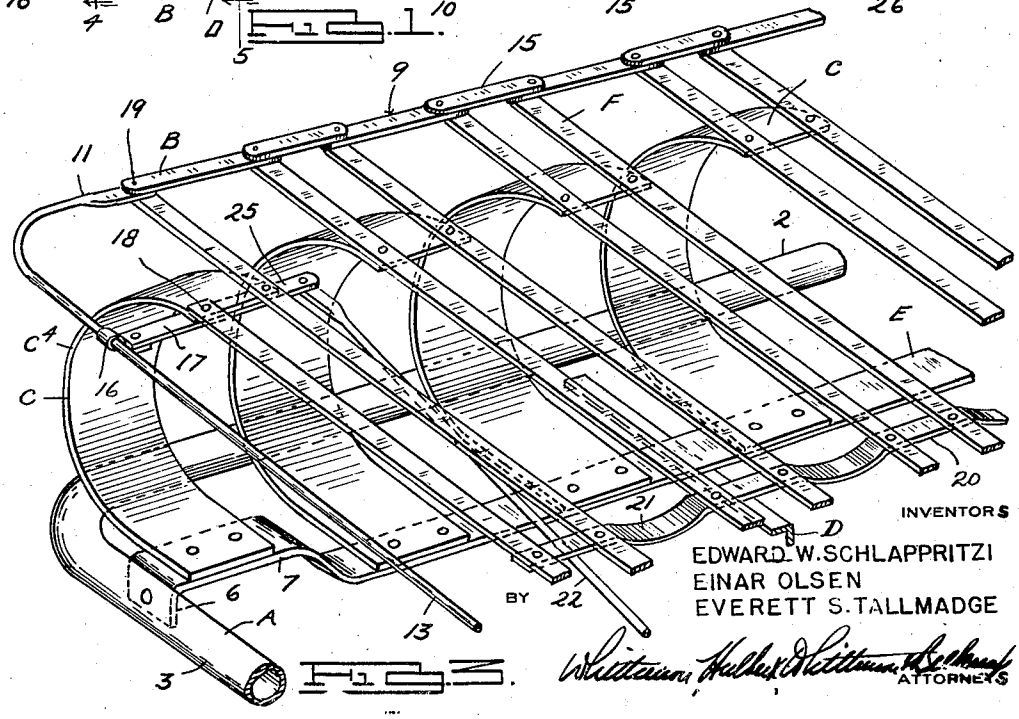


FIG. 3.

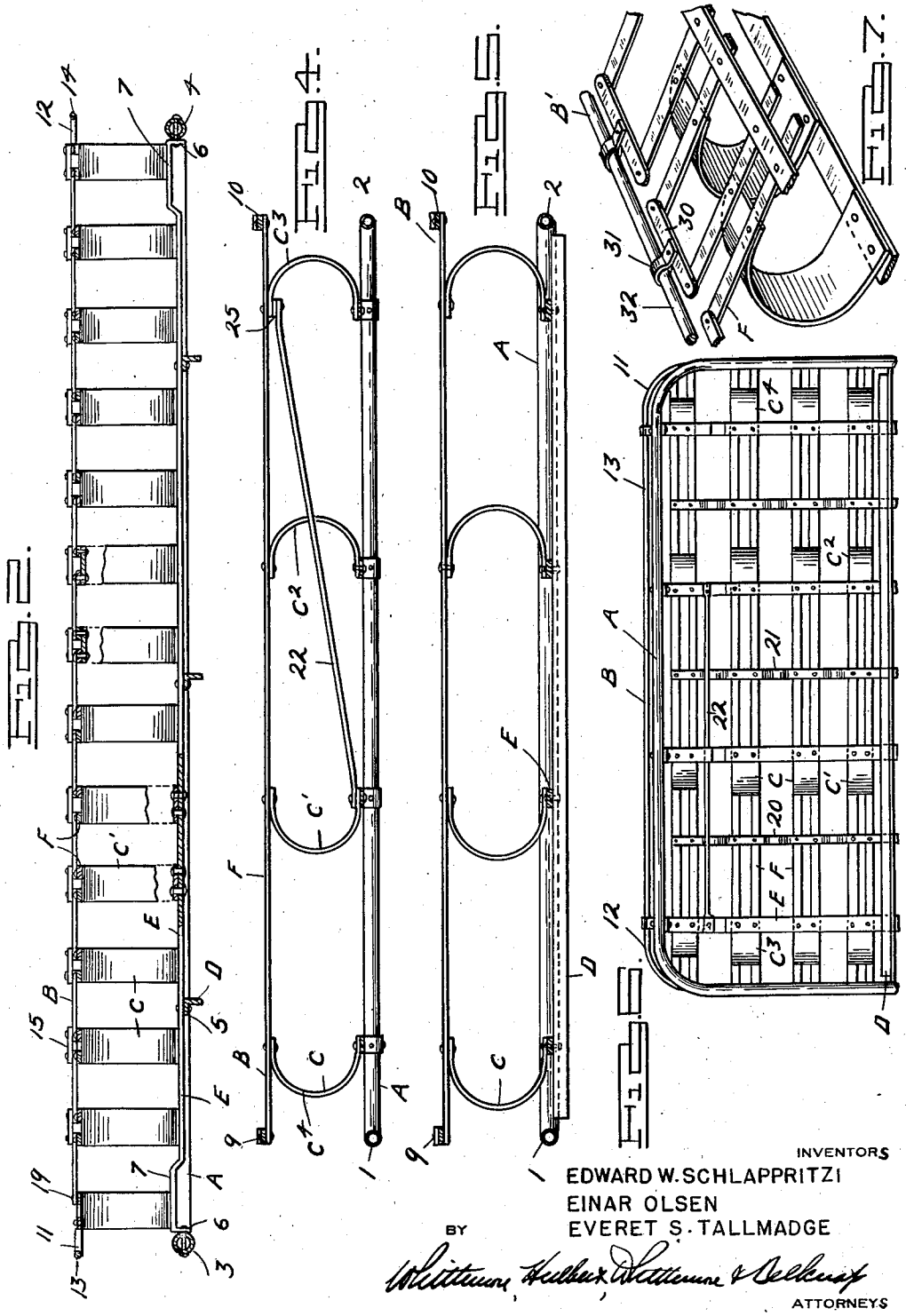
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SPRING STRUCTURE

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8 Claims. (Cl. 5—247)

This invention relates generally to spring structures and refers more particularly to bed spring constructions.

One of the essential objects of the invention is to provide a spring structure of this type wherein substantially C-shaped leaf springs are utilized between lower and upper frames for cushioning the latter.

Another object is to provide a spring structure wherein opposite sides of the upper frame are flexible and hinge-like in action so as to compensate for flexing of other parts of the structure.

Another object is to provide a spring structure wherein opposite ends of the upper frame are formed of wire and are connected to opposite sides of said frame and to adjacent tie members for the C-shaped springs.

Another object is to provide a spring structure having stabilizers at opposite ends thereof.

Another object is to provide a spring structure wherein the lower frame is formed of tubing.

Another object is to provide a spring structure wherein the tie members for the C-shaped springs are themselves braced by flexible straps or bands.

Another object is to provide a spring structure wherein the bands just mentioned have arched, corrugated or longitudinally curved portions which not only prevent the bands from buckling or snapping, but also compensate for flexing of the tie members and C-shaped springs.

Other objects, advantages and novel details of construction of this invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:

Figure 1 is a top plan view of a spring structure embodying our invention;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a fragmentary perspective view of the structure;

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

Figure 5 is a sectional view taken on the line 5—5 of Figure 1;

Figure 6 is a fragmentary bottom plan view of the structure;

Figure 7 is a fragmentary perspective view of a slight modification.

Referring now to the drawings, A and B, respectively, are the lower and upper frames, and C are the intermediate substantially C-shaped leaf springs of a bed spring embodying our invention. As shown, the lower frame A is substantially rectangular in configuration and is formed of tubing. D are transversely extending metal bars terminally secured to opposite sides 1 and 2, respectively, of the lower frame at spaced points longitudinally thereof, while E are laterally spaced longitudinally extending bars formed from substantially flat stock and terminally secured to opposite ends 3 and 4, respectively, of said lower frame. Preferably the horizontal flanges 5 of the bars D are welded to the tubing forming the lower frame, while the last mentioned bars E rest upon and are riveted to said horizontal flanges 5 of the transversely extending bars D and have depending flanges 6 at their opposite ends riveted to the tubing of the lower frame. Adjacent the flanges 6 the bars E are offset upwardly as at 7.

Preferably the C-shaped springs C are arranged in rows above and extend upwardly from the longitudinally extending bars E. As shown, the innermost rows C′ and C^2 of springs open inwardly toward each other, while the outer rows C^3 and C^4 also open inwardly in conformity with the rows C′ and C^2. Preferably these springs C are riveted at their lower ends to the bars E and are riveted at their upper ends to tie bars F which in turn are terminally secured to opposite sides 9 and 10, respectively, of the upper frame B. Preferably the tie bars F are formed of spring metal and are arranged in pairs on the leaf springs C. Likewise, opposite sides 9 and 10 of the upper frame are formed of spring metal and are riveted to the curved ends 11 and 12, respectively, of wire rods 13 and 14 which form opposite ends of the upper frame. As shown, each side of the upper frame comprises a series of relatively short spring metal strips 15 which are secured together in overlapping relation. Thus, the sides 9 and 10 are flexible and hinge-like in action.

16 are clips fastened on the rods and riveted to strips 17 of spring metal which in turn are riveted to the adjacent bars of tie members F. Preferably the same rivets 18 used to connect the end C-shaped springs to the end tie members F are used to hold the strip 17. Likewise, the same rivets 19 used to fasten the tie members F at opposite ends of the structure to the sides 9 and 10 are used to secure the curved ends 11 and 12 of the rods to the said sides.

20 are laterally spaced spring metal bands extending longitudinally of the structure and riveted to the underside of the tie members F. Preferably portions 21 of said bands between adjacent bars of the tie members are arched, corrugated or longitudinally curved, as shown, to compensate for flexing and to prevent the parts

from buckling and snapping. 22 and 23, respectively, are transversely extending wire rods which serve as stabilizers for the structure. Preferably the rod 22 inclines upwardly from the bar E adjacent the side 10 to an extension 25 of one of the spring strips 17 adjacent the side 9, while the rod 23 inclines upwardly from the bar E adjacent the side 9 to an extension 26 of another of said spring strips 17 at the opposite side of the structure.

In use, the sides 9 and 10 of the upper frame B are yieldable, hence they increase the flexibility of the tie members F and prevent the latter from buckling and snapping. The C-shaped springs C prevent the tie member F from caving in and also help to equalize the flexibility of the upper frame B. The wire rods 13 and 14 and the connections with the sides 9 and 10 and adjacent tie members F serve to reinforce the structure, but are of such a nature that they permit the desired flexibility of the other parts. The bends 21 in the spring metal bands 20 prevent the bands from buckling or snapping, while permitting the upper frame parts and tie members to flex. The stabilizers 22 and 23 at opposite ends of the spring structure prevent the said structure from rocking or twisting about its longitudinal median line and insure proper action of the spring parts.

As an alternative, the tie bars F' for the C-shaped springs may be secured at their opposite ends to short links 30 which in turn may be secured intermediate their ends by clips 31 to a border wire 32, as illustrated in Figure 7. In this construction the wire 32 may extend all around the spring structure and the top thereof so as to comprise an upper frame B' therefor. Actually such wire 32 permits the proper resilient action of the spring structure while at the same time provides a firmer edge therefor and materially reinforces the same.

One advantage of our improved construction is the flexibility of the upper portion or what might be termed the "mattress frame" without permitting objectionable sagging in the center thereof. This is due to the fact that the C-springs are mounted at their lower ends upon longitudinally extending bars in the base frame, said bars being terminally connected to an outer and comparatively rigid border frame. On the other hand, the upper ends of these C-springs are connected to transversely extending flexible strips, the springs being of a width sufficient to bridge between a pair of these strips, while the outer ends of the strips are connected to linked side members of a border frame and intermediate ends are connected by bowed longitudinally extending members. The whole effect is to permit depression at every point in the area of the mattress frame sufficient to conform to the shape of the body supported thereon, but without permitting the central portion to sag any greater amount under the same load than the ends or side portions. Stability is imparted to the structure, first by reason of the fact that the C-springs are comparatively wide so that their flexure is chiefly in a transverse plane, while by placing the springs on one side of the center to face opposite from those on the other side a balancing effect is produced. Still further stability is obtained by the diagonal brace members which connect the upper and lower frames.

What we claim as our invention is:

1. In a bed spring construction, a lower frame, parallel C-shaped leaf springs arranged to flex in transverse planes, carried by said lower frame and disposed in a plurality of transverse and longitudinal rows, an upper frame having end and flexible side members, transverse tie bars connected at their ends to said side members and intermediate their ends to said transverse rows of leaf springs, and longitudinally extending flexible strips terminating at each end short of the end members of said upper frame and secured to said tie bars intermediate the connections between said tie bars and said C-shaped leaf springs.

2. In a bed spring construction, a lower frame, parallel C-shaped leaf springs arranged to flex in transverse planes, carried by said lower frame, and disposed in a plurality of transverse and longitudinal rows, an upper frame having end and flexible side members, transverse tie bars connected at their ends to said side members and intermediate their ends to said transverse rows of leaf springs, and longitudinal strips extending substantially the entire length of said frame, but terminating at each end short of the end members of said upper frame and secured at their ends to the tie bars adjacent the ends of said frame and to the intermediate tie bars along lines intermediate the connections between said tie bars and said C-shaped leaf springs.

3. In a bed spring construction, a lower frame, parallel C-shaped leaf springs arranged to flex in transverse planes, carried by said lower frame and disposed in a plurality of transverse and longitudinal rows, an upper frame having end and flexible side members, transverse tie bars connected at their ends to said side members and intermediate their ends to said transverse rows of leaf springs, and longitudinally extending flexible strips terminating at each end short of the end members of said upper frame and secured to said tie bars intermediate the connections between said tie bars and said C-shaped leaf springs, said tie bars being arranged in pairs, with each pair connected to a single transverse row of leaf springs, the connection between said tie bars and side members including a link pivoted intermediate its ends to said side members, and disposed between adjacent pairs of tie bars, the end of each tie bar being pivotally connected to an end of the adjacent link.

4. In a bed spring, a lower rigid frame, an upper frame having end and flexible side members, intermediate transverse tie bars connected at their ends to said side members, a plurality of rows of C-shaped leaf springs arranged to flex in transverse planes, carried from the lower frame and connected at their upper ends to said tie bars, the tie bar adjacent the end members of said upper frame terminating short of the side member of said upper frame at the point of connection with the outside leaf spring, a strut secured to the end of said frame adjacent said leaf spring, and extending longitudinally a short distance beyond and secured to said leaf spring, and a diagonal brace rod secured to said strut adjacent its free end and to said lower frame.

5. In a bed spring, a lower rigid frame, a plurality of transverse rows of C-shaped leaf springs arranged to flex in transverse planes, an upper frame supported from said springs, intermediate transverse tie bars connected at their ends to said upper frame, and intermediate their ends to said transverse rows of springs, a pair of transverse tie bars next adjacent the end of said upper frame secured intermediate their ends to the end row of said springs, the inner bar of said pair

of bars connected at its end to the sides of said frame, the outer bar of said pair of bars terminating short of the sides of said frame, a strut secured to the end of said frame connected to the end of said outer bar and extending transversely thereto to a point inwardly of said inner bar, and a diagonal brace bar connected to the free end of said strut to said lower frame.

6. In a bed spring construction, a lower frame, a plurality of C-shaped leaf springs arranged to flex in parallel planes, carried by said lower frame and disposed in a plurality of transverse and longitudinal rows, an upper frame having end and flexible side members, transverse tie bars connected at their ends to said side members and intermediate their ends to said transverse rows of leaf springs, longitudinally extending flexible strips terminating at each end short of the end members of said upper frame and secured to said tie bars intermediate the connections between said tie bars and said C-shaped leaf springs, and diagonally extending stabilizer bars interconnecting said lower and upper frames and disposed in a plane parallel to the planes of flexure of said leaf springs.

7. In a bed spring construction, a lower frame, a plurality of C-shaped leaf springs arranged to flex in parallel planes, carried by said lower frame and disposed in a plurality of transverse and longitudinal rows, an upper frame having end and flexible side members, transverse tie bars connected at their ends to said side members and intermediate their ends to said transverse rows of leaf springs, longitudinally extending flexible strips terminating at each end short of the end members of said upper frame and secured to said tie bars intermediate the connections between said tie bars and said C-shaped leaf springs, said strips being provided with bowed portions between adjacent transverse rows of leaf springs.

8. In a bed spring construction, a lower frame, a plurality of C-shaped leaf springs arranged to flex in parallel planes, carried by said lower frame and disposed in a plurality of transverse and longitudinal rows, an upper frame having end and flexible side members, transverse tie bars connected at their ends to said side members, said tie bars being arranged in pairs, each pair being secured intermediate its end to a single transverse row of leaf springs, and longitudinally extending flexible strips terminating at each end short of the end members of said upper frame and secured to said tie bars intermediate the connections between said tie bars and said C-shaped leaf springs, said strips being provided with bowed portions between adjacent pairs of tie bars.

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