Oct. 9, 1945. A. H. HABERSTUMP ET AL 2,386,456

SPRING CONSTRUCTION

Filed April 7, 1942 3 Sheets-Sheet 1

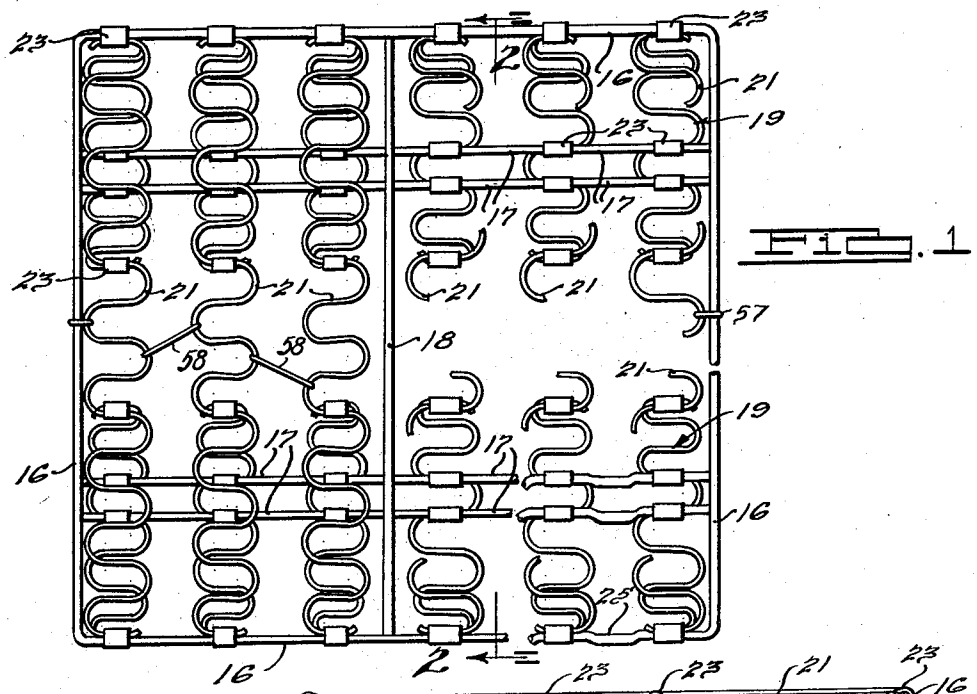


FIG. 1

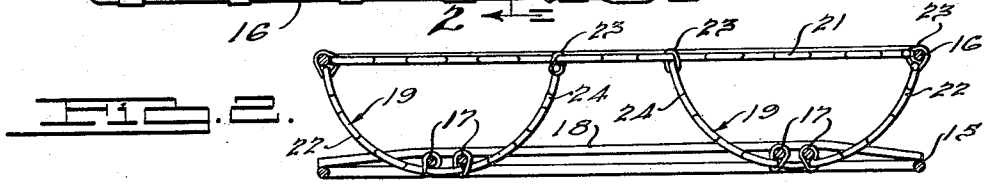


FIG. 2

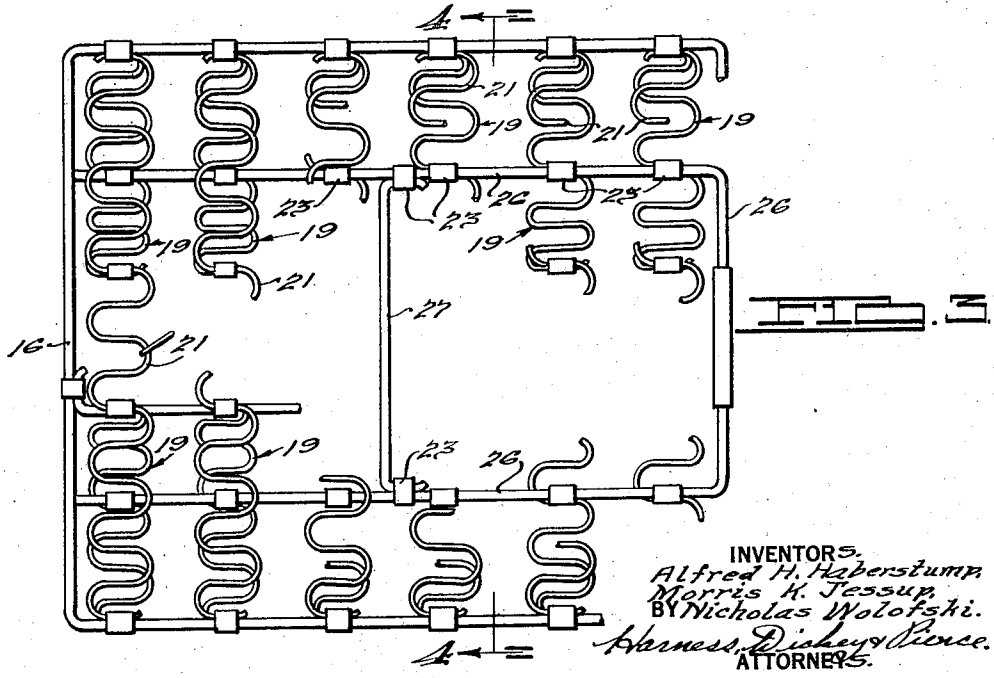


FIG. 3

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SPRING CONSTRUCTION

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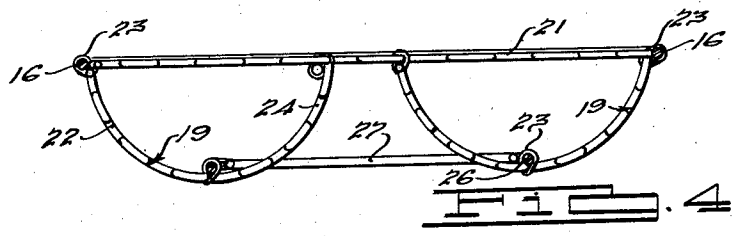


Fig. 4.

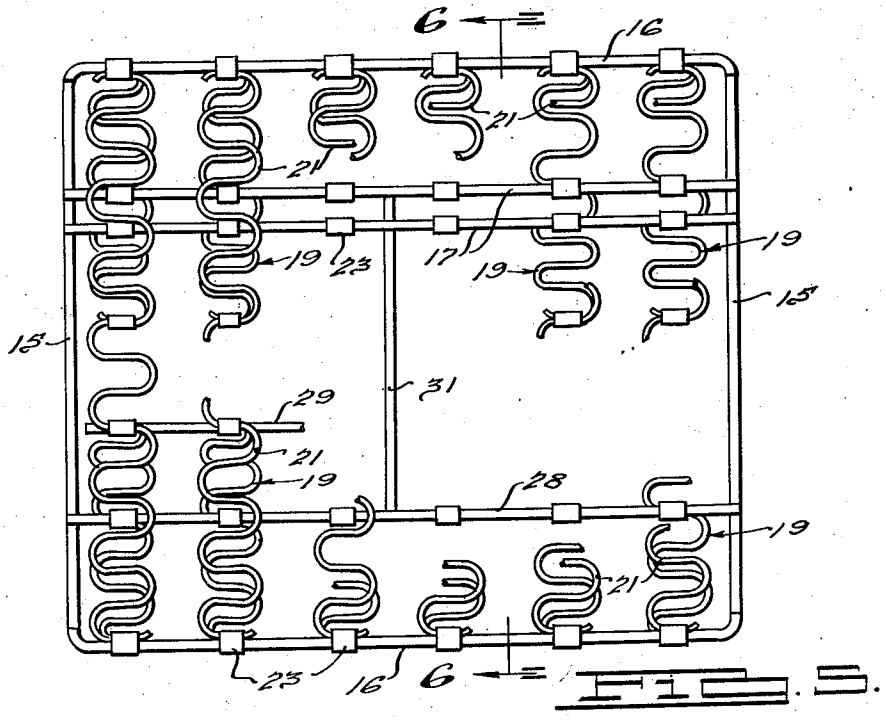


Fig. 5.

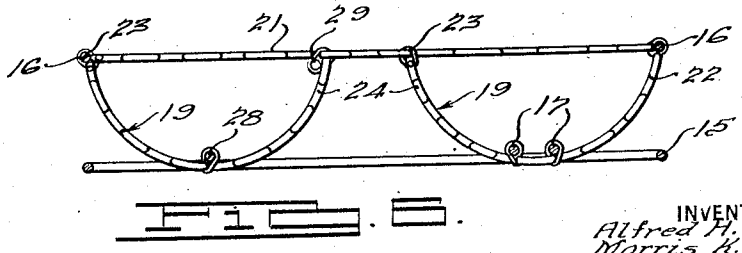


Fig. 6.

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SPRING CONSTRUCTION

Filed April 7, 1942 3 Sheets-Sheet 3

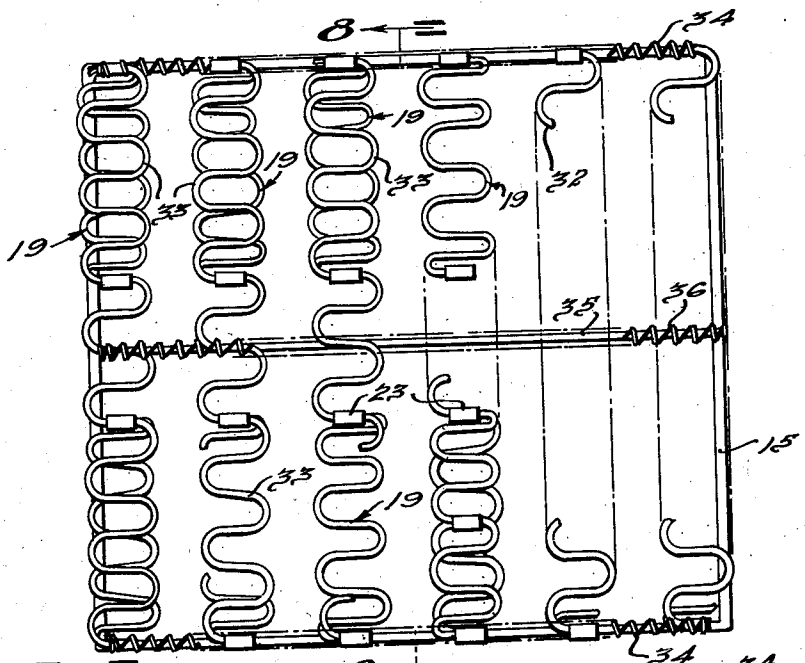


FIG. 7.

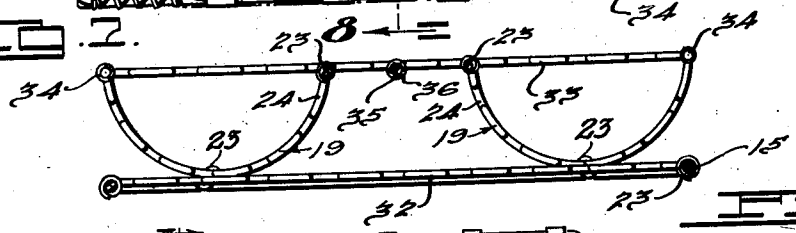


FIG. 8.

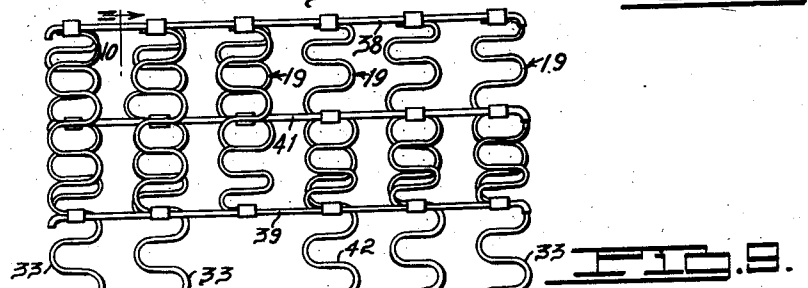


FIG. 9.

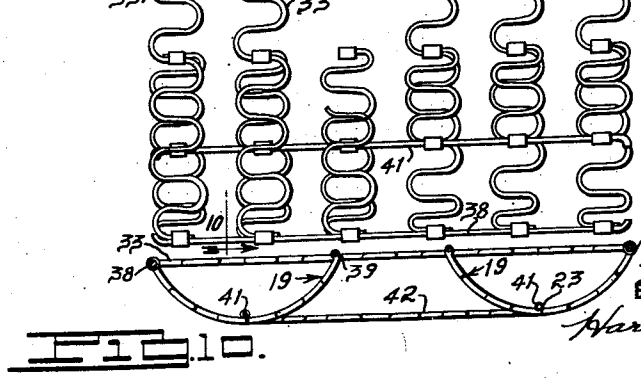


FIG. 10.

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Patented Oct. 9, 1945 2,386,456

UNITED STATES PATENT OFFICE

2,386,456

SPRING CONSTRUCTION

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Application April 7, 1942, Serial No. 438,010

7 Claims. (Cl. 155—179)

This invention relates to spring constructions, and particularly to a spring construction comprising a base frame from which spring strips project, for engaging and supporting a frame having a spring surface formed of like spring strips.

The spring strips of the present invention are similar to the zig-zag type of spring strip illustrated, described and claimed in the Karl Kaden Reissue Patent No. 21,263, issued November 14, 1939, and under which the assignee of the present invention is an exclusive licensee for the automotive industry. The construction of the present spring units from the zig-zag type of spring strip embodies first, the formation of suitable base and spring supporting frames which are spaced apart by additional lengths of the spring strips which are disposed between the frames. A shallow construction is produced which has the desired supporting qualities and resiliency, and which is extremely rugged and not prone to failures.

In all of the constructions the top surface is formed of strips of zig-zag formed wire, the ends of which are interconnected by a frame, sections of frame, or by coil springs or other resilient members. Arcuately disposed strips of the zig-zag wire have the ends presented upwardly when supported on a base frame or sections thereof. One arm of the upwardly projecting spring portions is attached to the outer end of the top spring strip and border element while the other arm is connected to the spring strip which forms the surface medially of its ends. Resilient support is thereby provided to the ends of the top frame and to the central portion of the strips which form the spring surface of the frame.

The upwardly presenting spring strips may be anchored to the base frame at a single point to permit the rocking of the strips when loaded and the deflection of the surface to conform more nearly to the contour of the person occupying the cushion. The central portion of the upwardly presented strips may be anchored at a plurality of points to have the portions projecting upwardly therefrom operate as separate resilient elements independently of each other. It is within the purview of the invention to separate the top and bottom frames by individual spring elements which are angularly disposed therebetween or by lengths of strips which are sinuously positioned relative to each other between the top and bottom spring strips of the top and bottom frame. In all of the constructions a rugged spring construction is provided, having a spring surface which is resiliently supported on a base frame, with the frames spaced a minimum distance from each other.

Accordingly, the main objects of this invention are; to provide a spring construction of top and bottom elements which are resiliently spaced a minimum distance apart; to provide a spring construction having a top surface formed of zig-zag spring strips which are individually positioned and spaced relative to each other by additional zig-zag strips upon which they are supported; to form a spring structure from a top frame having strips of sinuously formed wire extended thereacross and supported on upwardly presented similar spring strips which are attached to the ends of the strips and frame and to the medial portion of the strips; to provide a top and base frame which are spaced apart by arcuately disposed spring strips aligned with additional spring strips disposed across the top frame and connected thereto at the ends and near the mid portions of the strips; to form a spring construction from arcuately disposed, upwardly presented spring strips, the central portion of which is pivotally disposed on a base and the projecting ends of which are attached to spring strips at their ends and near the mid-portion thereof; to form a spring construction from top and bottom spring strips spanning a wire frame and spacing the spring strips and frame from each other by angularly disposed sections of like spring strips; and in general, to provide a spring construction which is rugged, simple in construction, and economical of manufacture.

Other objects and features of novelty of this invention will be either specifically pointed out or will become apparent when referring, for a better understanding of my invention, to the following description taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a broken plan view of a spring construction embodying features of this invention;

Fig. 2 is a sectional view of the structure illustrated in Fig. 1, taken on the line 2—2 thereof;

Fig. 3 is a broken plan view of structure similar to that illustrated in Fig. 1, showing a further form which this invention may assume;

Fig. 4 is a sectional view of structure illustrated in Fig. 3, taken on the line 4—4 thereof;

Fig. 5 is a broken plan view of a spring construction similar to that illustrated in Fig. 1, showing a still further form of this invention;

Fig. 6 is a sectional view of the structure illustrated in Fig. 5 taken on the line 6—6 thereof;

Fig. 7 is a broken plan view of a spring construction, similar to that illustrated in Fig. 1, showing a still further form which this invention may assume;

Fig. 8 is a sectional view of the structure illustrated in Fig. 7, taken on the line 8—8 thereof;

Fig. 9 is a view of structure similar to that illustrated in Fig. 1, showing a further form of this invention; and

Fig. 10 is a sectional view of the structure shown in Fig. 9, taken on the line 11—11 thereof.

In Figs. 1 and 2 a spring structure is illustrated comprising a base frame 15 and a top frame 16 made from wires formed into rectangular shape. The base frame has pairs of wires 17 disposed between the opposite sides thereof, while normal to the pairs of wires 17 a bracing wire 18 joins the wires and the opposite sides of the bottom frame 15. The wires are preferably secured to the frame and to each other in a conventional manner, such as by welding. The pairs of wires 17 support the arcuately disposed zig-zag spring strips 19 through the attachment of a convolution thereof to the wires by the bands 23. The top frame 16 supports a plurality of the zig-zag spring strips 21 across opposite sides of the frame in aligned relation with the spaced strips 19. The end portions 22 of the strips 19 are secured to the opposite sides of the border frame 16 by securing bands 23 which also secure the strips 21 to the frame. Similar bands 23 secure the ends of the portions 24 of the strips 19 to the medial portion of the strips 21. The portions 22 of the strips 19 provide resiliency to the edge of the top frame 16 while the portions 24 provide additional support to the medial portion of the strips 21.

The springs 19 provide the necessary rigidity as well as resiliency to the top surface of the spring unit which is of shallow depth. As illustrated in Fig. 1, the wires 17 and the frame portions 15 and 16 to which the spring strips are attached may be provided with offset portions 25 which prevent the units formed of the strip 21 and the supporting strips 19 from shifting on the base or the top frame. This eliminates the spring ties or wire clips which were employed heretofore for connecting the series of spring strips together for distributing the load and positioning the strips relative to the supporting frame.

In Figs. 3 and 4 a construction similar to that shown in Fig. 1, is illustrated, with the exception that a smaller base frame 26 is employed to which the supporting springs 19 are attached by the bands 23 to be free to rock thereon. The medial portion of the frame 26 may be provided with a bracing wire 27 secured thereto by the bands 23. Not only is resiliency and support provided by the arcuate strips 19, but the strips are free to rock upon the frame 26 so as to distribute the load over the portions 22 and 24, depending upon the points at which the load is applied. In the structure illustrated in Figs. 1 and 2, each portion 22 and 24 of the spring 19 is independently sprung from the pairs of wires 17. In Figs. 3 and 4 portions 22 and 24 of the strips 19 operate in conjunction with each other relative to the point of applied load since they are free to rock about the base supporting frame 26. Otherwise the structure is the same as that hereinabove described and illustrated in Figs. 1 and 2.

In Figs. 5 and 6 a form of construction is shown which is similar to that illustrated in Figs. 1 to 4. In this construction one series of the springs 19 is secured to a pair of wires 17 attached to the base frame 15 while the other series of the spring elements 19 are attached to a single wire 28 which is substituted for the pair of wires 17. The spring elements 19 which are secured to the wire 28 have the portion 24 not only secured to the medial point of the elements 21 but also to a cross wire 29 which ties the spring strips 21 together and permits the rocking of the series of elements 19 on the wire 28 as a unit when loaded. The spring elements 19 attached to the wires 17 have the end portions 24 and 22 independently sprung as in cantilever suspension. A wire 31 braces the wire 28 to the pair of wires 17.

In Figs. 7 and 8 a still further form of construction is illustrated, that wherein the spring elements 19 are attached to spring strips 32 which extend across the base frame 15 and are secured to opposite sides of the base frame by the bands 23. The spring strips 19 may be attached to a top frame 16 in the manner set forth hereinabove with regard to the structure of Figs. 1 to 6 inclusive, and are herein illustrated as independently supporting a plurality of spring strips 33. The spring strips are interconnected at their ends by a length of coil springs 34 which is wound thereover. The end portions 24 of the strips 19 are secured to the spring strips 33 by bands 23. The strips are interconnected substantially on the center line by a wire 35 about which a coil spring 36 is wound to secure the wire to a convolution of the strips. Soft edges are provided to the top ends of the strips 33 when interconnected by the strips of coil springs 34. Further resiliency is provided to the top surface by the spring strips 19 which are supported in pivotal relation on the spring surface 32 by the bands 23 which extend around the wire of the strips in a manner to permit the wire to turn therein. Not only are the spring elements 19 free to rock to provide additional resiliency to the top surface, but the support for the spring strips 19 being resilient also adds to the resiliency provided by the spring strips.

Figs. 9 and 10 illustrate a further form of construction, that wherein wires 38 are substituted for the coil springs 34 at the edge of the top frame, and a wire 39 employed in place of the wire 35 attached to the spring strips 33 and to the end of the portion 24 of the element 19. The spring elements 19 are secured by the bands 23 to the spaced wire 41 and to the ends of the zig-zag spring strips 42 which form a base support therefor. The spring elements 19 are free to rock on the wires 41 and spring strips 42 to distribute the deflection of the spring strips 33 when loaded in proportion to the applied load. The strips 33 deflect in unison with each other since they are tied together by the wires 38 and 39.

In all of the constructions herein illustrated and described the spring structure is formed of a top and bottom element which are closely disposed to each other to provide shallow depth to the construction. Spring strips made of wire bent in zig-zag formation form the top surface of the assembly while sections of the zig-zag spring strips are connected to these spring strips and the bottom elements. The interconnecting strips are so constructed and disposed as to retain the top elements separate from the base element while reinforcing the top spring strips and providing the proper amount of resiliency. The spring strips and border wires are preferably secured together by metal bands which retain them in position relative to each other. The frame

and supporting wires may have offset portions throughout their length to provide additional assurance against shifting of the wires and bands relative to each other. In this manner the spring strips forming the surface are maintained in spaced relation without the use of the interconnecting coil springs or clips which are normally employed. It is, however, within the purview of the invention to employ hog rings 57 and wire clips 58 to interconnect the spring strips to the border frame and to each other when such interconnecting is desirable.

We claim as our invention:

1. In a spring construction, a base frame, a base support including pairs of adjacent wires spanning said base frame, arcuate spring strips having their central portions secured to said wires to have the ends disposed upwardly, and substantially flat spring strips having their ends and central portions connected to the ends of said upwardly disposed portions of said arcuate strips.

2. In a spring construction, a base frame made of wire having pairs of wires disposed thereon interjacent its edges, rows of arcuate spring strips having their central portions rigidly secured to said wires with portions outwardly of said central portions projecting upwardly, spring strips aligned with and secured at their ends to some of the ends of said arcuate strips, and means for securing other of the ends of said arcuate strips to the central portions of said spring strips.

3. In a spring construction, a base frame made of wire having pairs of wires disposed thereon interjacent its edges, rows of arcuate spring strips rigidly secured to said wires with the end portions projecting upwardly, spring strips aligned with and secured to the ends of said arcuate strips, and means for interconnecting the ends and central portions of said strips to the upwardly projecting portions of the arcuate strips.

4. A spring construction including a base support, arcuate spring strips aligned with each other in spaced rows secured at their central portions to said support and with the end portions disposed outwardly thereof and extending upwardly, spring strips having their ends and central portions resting on the ends of the arcuate spring strips, and means for securing the ends and central portions of said spring strips to the ends of said arcuate strips.

5. In a spring construction, a base frame, a base support including pairs of adjacent wires spanning said base frame, arcuate spring strips having their central portions secured to said wires with the end portions disposed outwardly thereof and extending upwardly, substantially flat spring strips connected at their ends and medial portions to the ends of said upwardly disposed portions of said arcuate strips, and a frame made of wire secured to the ends of the flat spring strips and forming a border therefor.

6. A spring construction including a base frame, supporting means spanning said frame, arcuately disposed strips having their central portions secured in aligned relationship to said supporting means, the portions outwardly of the central portions of said arcuate strips extending upwardly, and additional spring strips disposed in parallel relationship and secured to the ends of the arcuate spring strips each of which is aligned with one of said strips.

7. A spring construction including a base frame, supporting means spanning said frame, arcuately disposed strips having their central portions secured in aligned relationship to said supporting means, the portions outwardly of said central portions of said arcuate strips extending upwardly, additional spring strips disposed in parallel relationship and secured to the ends of the arcuate spring strips each of which is aligned with one of said strips, and means for interconnecting the ends of said additional strips to form a unit spring surface.

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