April 28, 1942. H. HOPKES 2,280,912

SPRING STRUCTURE

Filed Oct. 27, 1937 2 Sheets-Sheet 1

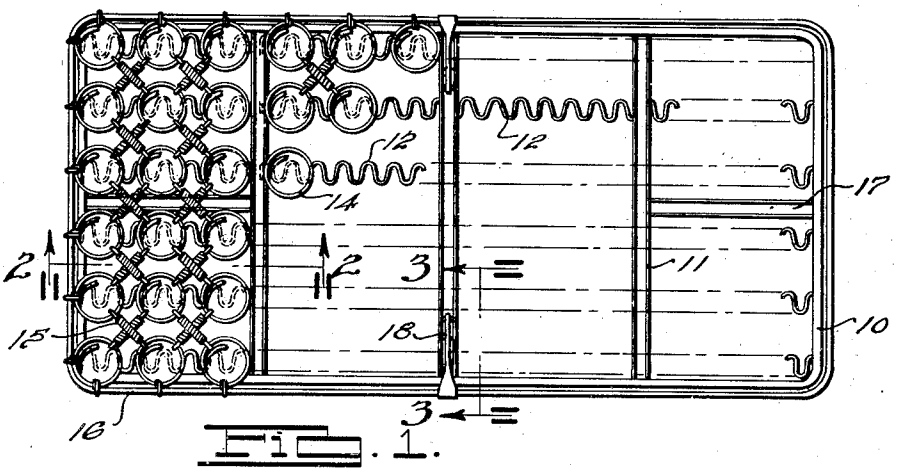

Fig. 1.

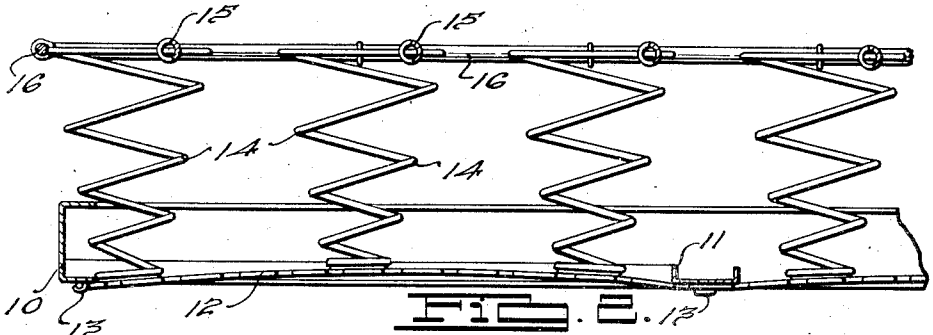

Fig. 2.

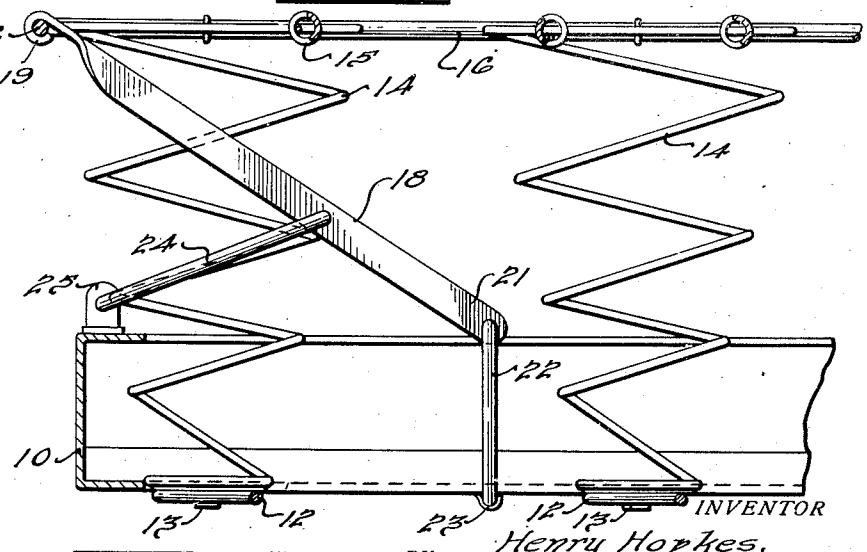

Fig. 3.

INVENTOR
Henry Hopkes.
BY
Hamess, Dickey & Pierce.
ATTORNEYS.

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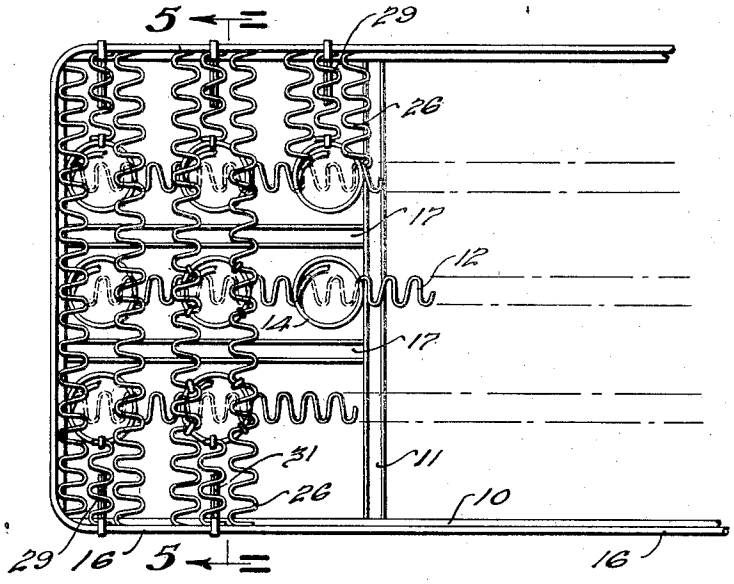

FIG. 4.

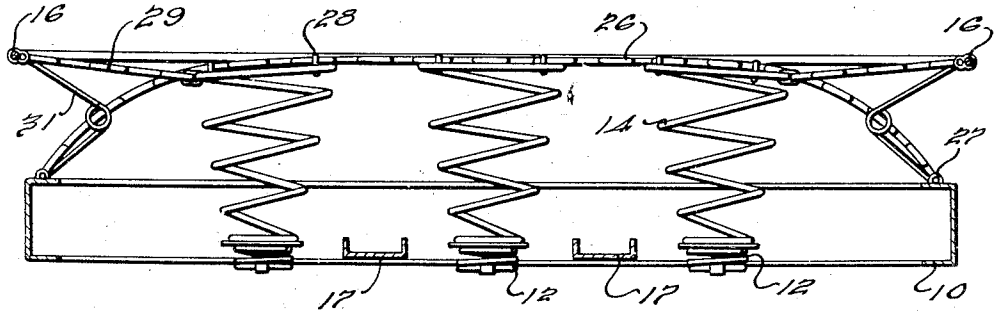

FIG. 5.

INVENTOR
Henry Hopkes.

BY
Harness, Dickey & Pierce.
ATTORNEYS.

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UNITED STATES PATENT OFFICE

2,280,912

SPRING STRUCTURE

Henry Hopkes, Grosse Pointe, Mich., assignor to No-Sag Spring Company, Detroit, Mich., a corporation of Michigan

Application October 27, 1937, Serial No. 171,309

2 Claims. (Cl. 5—266)

My invention relates to spring units, and particularly to a unit wherein the springs are supported on resilient strips to provide additional resiliency to the assembly.

Heretofore when constructing box springs, bed springs, seats, and the like, the springs were mounted on rigid elements and the resiliency of the assembled unit could be attributed directly to the resiliency of the springs. The springs were usually of the helical type, providing a variation in deflection in the presence of increased uniform loading.

While practicing my present invention I utilize a resilient support for the coil springs and thereby provide additional resiliency to the assembly. The top surface of the unit is sensitive to light loads, while under heavier loads the deflection decreases in an inverse ratio. This is very essential in bed springs since an appreciable deflection will be present when the bed spring is occupied by a small child, and a greater deflection in reduced proportion to the increased weight of an adult is likewise obtained.

A strong base frame is formed of a channel or angle element having channel braces extending across the transverse dimension of the frame to brace the longitudinal side portions and provide supports for the resilient strips upon which the springs are mounted. The resilient strips are preferably of sinuously formed wire, such as illustrated and described in the Karl Kadin Patent No. 2,002,399, issued May 21, 1935, under which the assignee of the present application is a licensee. The spring is bent back and forth in a zig-zag manner is to provide a flat strip which is rolled on a mandrel of small diameter to provide a set to the strip on an arc of smaller radius than the radius of the arc the spring strip assumes when secured to the frame. In this arrangement the strip, after assembly, resists downward deflection and thereby provides a resilient support for the coil springs secured thereto.

In another form of the invention the sinuous spring strips may be disposed above the base strip to form the top of the spring assembly and joined by coil springs to the lower base strip at the point of intersection of the two. Additional spring elements are extended from the main strip at the side edges to provide a spring edge to the assembly.

In a further form which my invention may assume, the coil springs may be omitted by employing a double span of the spring strips with additional strips extending therefrom to provide soft edges for the assembly and to thereby form a spring assembly wherein the coil springs are entirely eliminated.

Accordingly, the main objects of my invention are to provide a resilient support for the coil springs of a bed spring, box spring, or the like; to provide a bed spring, box spring, or the like with resilient spring strips which intersect each other at an angle and separate the strips by coil springs which are secured at said points of intersection; to form a bed spring, of an inwardly presented channel or angle base frame having resilient strips disposed thereacross to form a support for the coil springs; to form a box or bed spring from a channel element having strips of resilient material extending between the sides thereof and strips of material disposed thereabove of arcuate shape with the ends secured to the frame and spaced from the first said strips by coil springs; to form a soft edge to a box spring, bed spring, or the like having arcuate spring elements, by resilient elements projected therefrom and having the outer ends resiliently supported; to form a spring unit from arcuate resilient elements disposed between a central brace and outer side elements of a frame and having resilient elements projected from the resilient strip with their ends spring supported to provide a soft edge for the assembly; and in general, to form a spring unit from a plurality of resilient strips secured to a base frame which is simple in construction and economical of manufacture.

Other objects and features of novelty of my 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 bed spring embodying features of my invention;

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

Fig. 3 is an enlarged sectional view of the structure illustrated in Fig. 1, taken on the line 3—3 thereof;

Fig. 4 is a view of structure, similar to that shown in Fig. 1, showing a modified form thereof; and,

Fig. 5 is an enlarged sectional view of the structure illustrated in Fig. 4, taken on the line 5—5 thereof.

Referring more particularly to Figs. 1, 2 and 3, I have illustrated a form of my invention wherein the spring unit is constructed upon a base frame 10, of inwardly presented channel

section and of rectangular form. Transversely disposed channel braces 11 interconnect the longitudinal sides of the frame 10 and form supports for a plurality of spring strips 12. The spring strips 12 are constructed of wire bent in zig-zag form and provided with a set on an arc of smaller radius than the radius of the arc which the spring assumes when secured to the frame. Tabs 13 may be pressed out from the flange in the frame 10 and in the cross-braces 11 as illustrated more particularly in Figs. 2 and 3 for securing the strips 12 thereto. The strips 12 form a support for a plurality of spirally formed coil springs 14, the base of the springs being hog-ringed, clipped, or otherwise secured thereto. The tops of the springs 14 are joined in a conventional manner by a plurality of crossed springs 15 to form a unit top assembly, with the outer springs 14 hog-ringed or otherwise secured to a wire element 16 forming the border edge of the top surface of the unit. The endmost cross-braces 11 are joined to the end portions of the frame 10 by central braces 17 which resists the action of the resilient strips 12 from bending the frame or the cross-brace. The central cross-braces have a balanced pressure provided thereto by the springs disposed on either side thereof.

The top spring wire frame element 16 is connected to the border frame by links 18 which prevent the top from deflecting a material amount outside of the confines of the base frame 10. The link 18 is pivotally connected at 19 to the border wire 16 and has its opposite end 21 pivoted to a link 22 which is pivoted at 23 to the base frame 10. An additional link 24 is pivoted to the link 18 interjacent its ends and to a boss 25 provided on the frame 10. The link arrangement permits the deflection of the springs 14 and border wire 16 and at the same time prevents the spring and border wire from being deflected out of alignment with the base frame 10 any material amount.

Referring to Figs. 4 and 5, I have illustrated a modified form of my invention wherein a plurality of resilient strips 26 form the top spring surface of the assembled units. The strips 26 are anchored at each end at 27 to the base frame 10 and are joined to a plurality of coil springs 14 which are secured to the resilient strips 12 provided on the base frame 10. The strips 12 are disposed longitudinally of the frame while the strips 26 are disposed transversely thereof as illustrated more clearly in Fig. 4. In the construction herein shown, three resilient base strips 12 are disposed longitudinally of the frame and support the coil springs 14. Each of the coil springs supports a pair of the resilient spring strips 26 disposed across the top of the springs and secured thereto by hog-rings 28. Between each of the pairs of strips 26 a strip 29 is secured to the coil spring 14 having the outer end connected to a spring 31 which may be a jack spring as herein illustrated, a coil spring or the like, for resiliently supporting the end of the strip 29. The plurality of strips 29 are joined to the border wire 16 and provides a resilient edge for the assembly. The resilient strips 12 rest upon the cross brace 11 and a pair of braces 17 are utilized for bracing the cross brace 11 to the end of the base frame. A resilient surface having a soft edge is provided by the assembled springs and resilient strips. The deflection to which the assembly is subjected is sensitive to light loads and at the same time resists material deflection in the presence of heavy loads.

While I have described and illustrated several embodiments of my invention, it will be apparent to those skilled in the art that various changes, omissions, additions and substitutions may be made therein without departing from the spirit and scope of my invention, as set forth in the accompanying claims.

What I claim is:

1. A spring unit embodying in combination, a base frame, spaced braces extending across said frame, resilient sinuous spring wire elements spanning said frame, said elements being permanently set upon an arch of less radius than the radius of the arch they assume when fixed in place to said frame and cross braces, coil springs supported directly on said resilient elements and connected thereto, a top frame element joined to said springs, and other like sinuous spring wire elements connected directly to the tops of said coil springs having their ends connected to said base frame.

2. A spring unit embodying in combination, a base frame, spaced braces extending across said frame, resilient sinuous spring wire elements spanning said frame, said elements being permanently set upon an arch of less radius than the radius of the arch they assume when fixed in place to said frame and cross braces, coil springs supported directly on said resilient elements and connected thereto, a top frame element joined to said springs, and other like sinuous spring elements disposed across said last frame element above said coil springs at substantially right angles to said first named sinuous spring elements, said last named sinuous spring elements being connected to said coil spring elements and having their ends connected to said base frame.

HENRY HOPKES.