United States Patent

[11] 3,602,926

[72] Inventors **Thomas O. Marini**
1500 Prospect Blvd., Haddon Heights, N.J. 08035;
Louis G. Marini, 316 Springhouse Lane, Moorestown, N.J. 08057

[21] Appl. No. **771,890**
[22] Filed **Oct. 30, 1968**
[45] Patented **Sept. 7, 1971**

[54] **FOLDING BED OR COT**
4 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** **5/111,** 5/191
[51] **Int. Cl.** **A47c 19/16**
[50] **Field of Search** 5/110, 111, 191

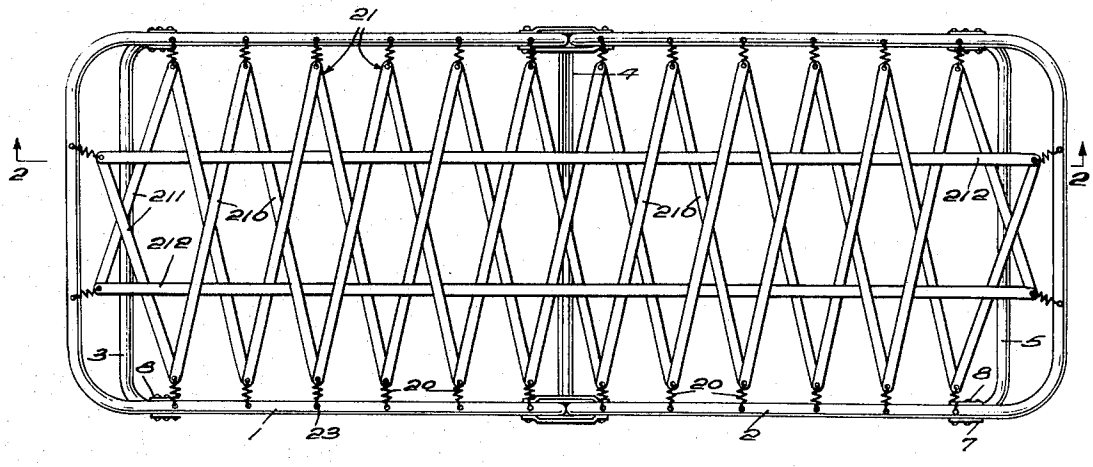
[56] **References Cited**

UNITED STATES PATENTS

614,222	11/1898	Duwe	5/191 X
989,383	4/1911	McCredy	5/191 X
3,089,151	5/1963	Sevcik	5/111 X

Primary Examiner—Bobby R. Gay
Assistant Examiner—Andrew M. Calvert
Attorney—Lilling & Siegel

ABSTRACT: A foldable bed including at least two frame parts hingedly interconnected for folding movement toward and away from another between an extended in-use position and an upright storage position, there being a series of coil springs each connected at one end at similar intervals along the inner sides of the frame parts so as to be arranged in opposed pairs, a plurality of transverse resilient metal bands interwoven transversely of the major axis of the bed in extended position, at least two longitudinal resilient metal bands extending uninterruptedly from end to end of said frame parts, each band being connected to two coil springs and the longitudinal bands being interwoven with the transverse bands except those adjacent said hinge means so that when the frame parts are folded toward one another the longitudinal bands fold about such a radius of curvature as to prevent undue stressing or kinking.



PATENTED SEP 7 1971

3,602,926

SHEET 1 OF 3

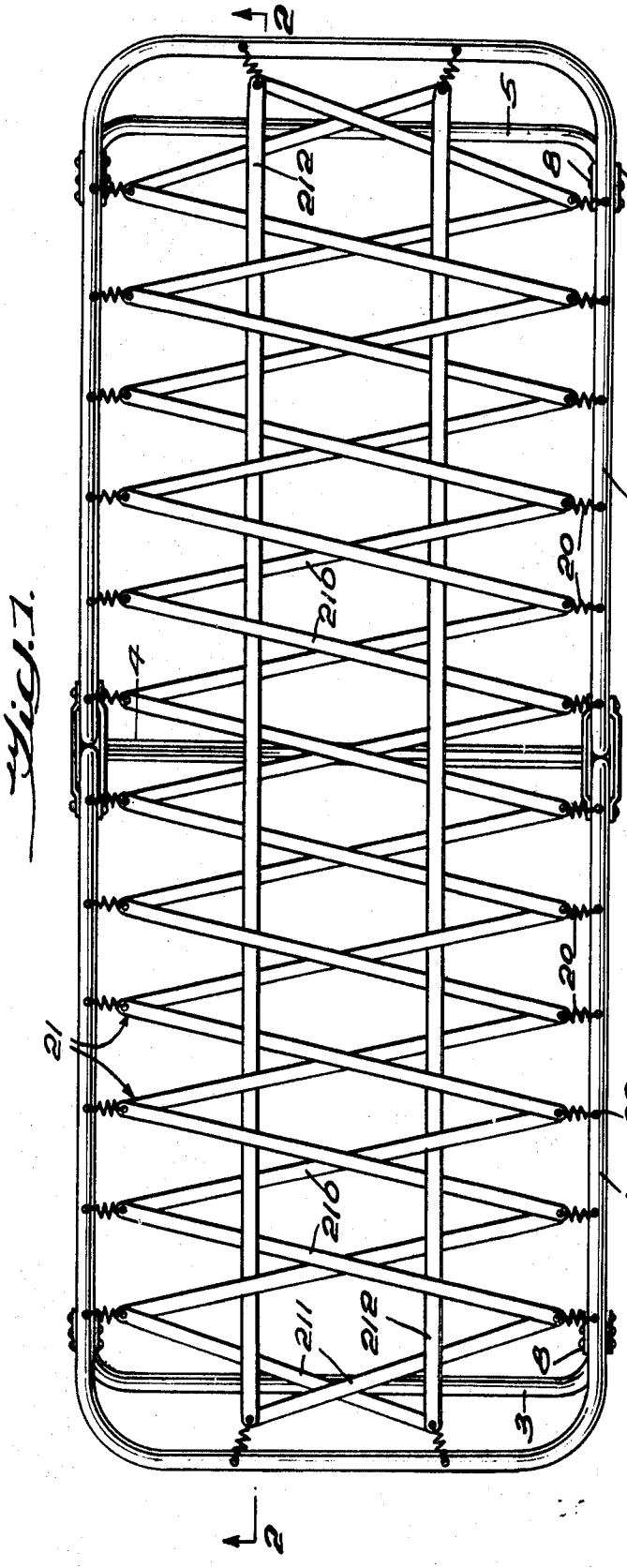


Fig. 1.

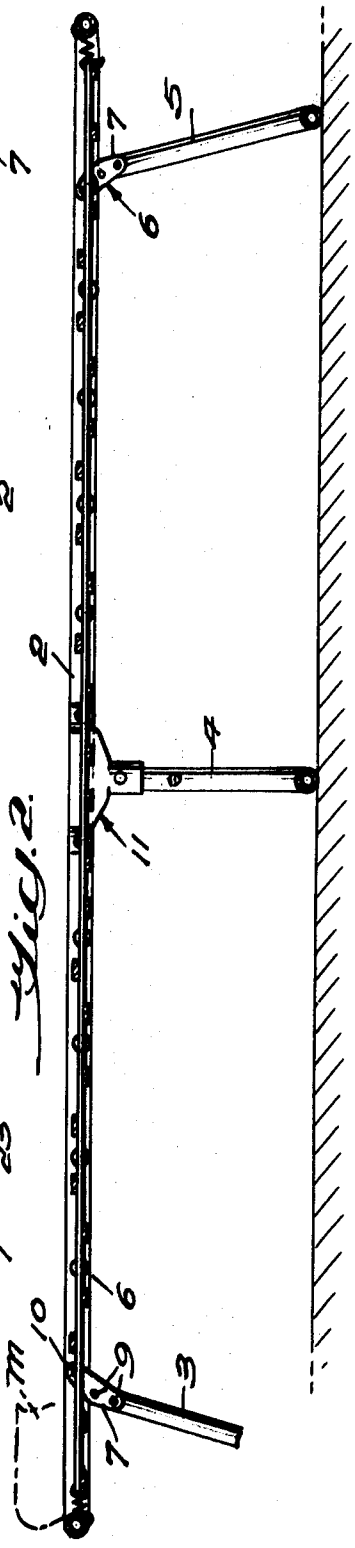


Fig. 2.

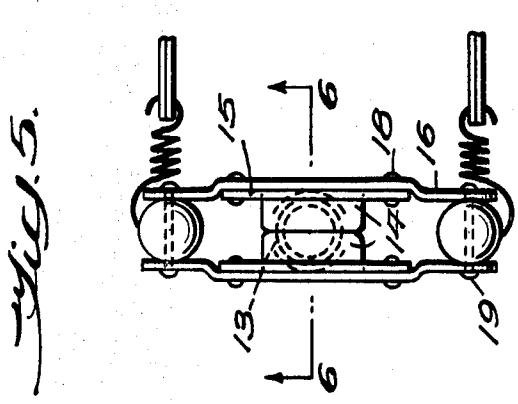


Fig. 5.

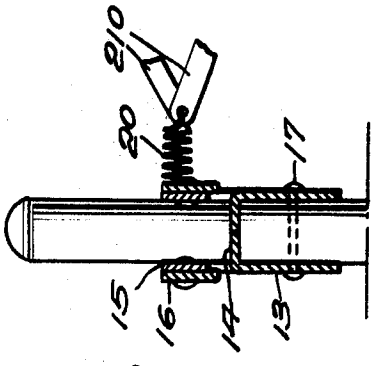


Fig. 6.

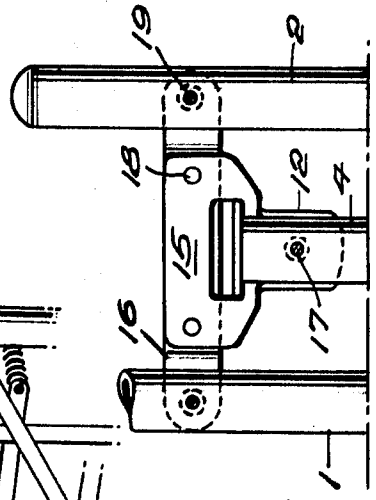


Fig. 4.

Fig. 3.

Fig. 7.

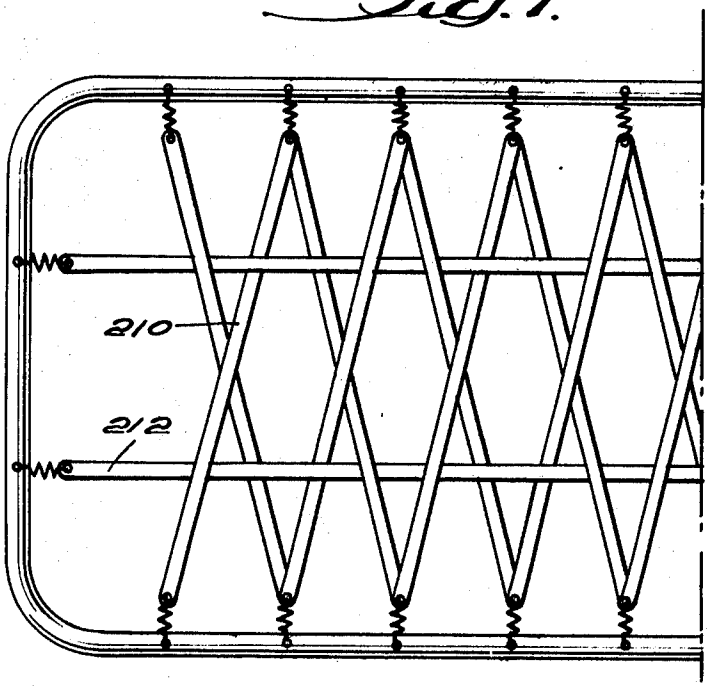


Fig. 8.

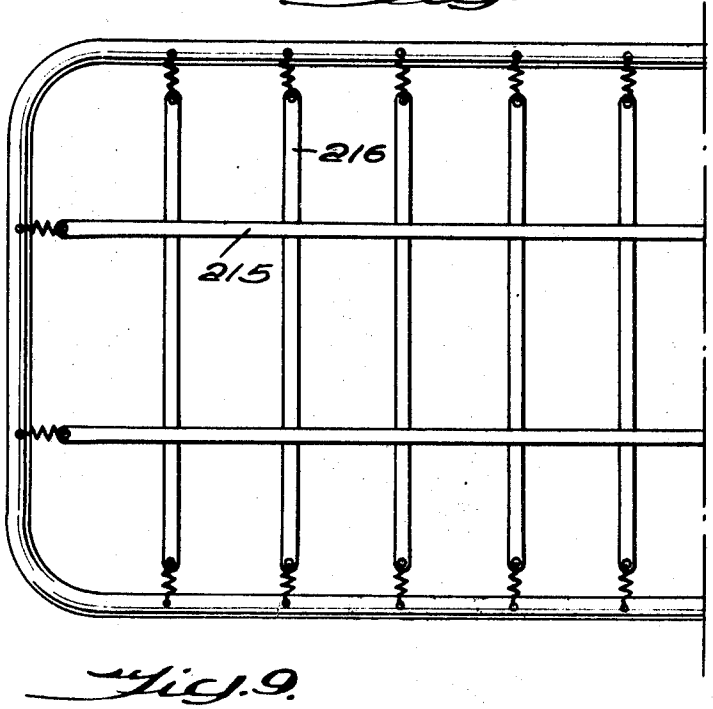
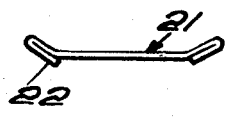


Fig. 9.



FOLDING BED OR COT

This invention relates broadly to the art of foldable furniture. More particularly this invention relates to a fold-away bed.

Folding beds or cots are known in the art which include a foldable frame or support, a spring arrangement and a mattress. Many such foldable beds have lightweight frames, fold up in the middle and accommodate the mattress between the two halves of the frame for storage purposes.

Accordingly, this invention has for an object to provide a folding bed that is attractive in appearance, can be readily and economically manufactured, is light in weight, yet is strong enough to hold up to 500 pounds.

A more particular object is to provide such a folding bed or cot that incorporates a two-part frame, hinge means about which the parts can fold toward and away from one another and a spring support including interrelated metal bands or strips and coil springs respectively connected between the frame parts and the bands and so arranged that when the frame parts are folded toward one another, the bands or strips will fold without stressing or kinking.

It is a further object of the invention to provide a folding bed having an improved metal-band-type spring fabric and perimetrical coil spring arrangement that is woven and connected in such a manner as to provide a chain reaction support from every spring to more effectively distribute weight.

It is a still further object to provide such a folding bed which includes an aluminum frame comprising a pair of U-shaped, tubular spring-supporting members, at least three U-shaped and shorter tubular leg members, hinge brackets connecting the spaced-apart ends of two of the leg members to the spring-supporting members, hinge bracket means connecting the ends of the spring-supporting members to the spaced ends of the other leg member so that the frame can be extended to dispose the spring-supporting members in facing, aligned relation with the leg members extending downwardly therefrom and such frame can be folded to dispose the spring-supporting members in spaced-apart parallel relation with the first two leg members folded against such supporting members, and the other leg means has been the supporting members a plurality of coil springs arranged around the inner periphery of the spring-supporting members, a plurality of resilient metal bands each connected at one end to one coil spring and at its other end to a diagonally arranged coil spring with the bands crossing one another in series from one end of the frame to the other, there being at least two bands connected to each side spring, and at least a pair of longer metal bands connected between the coil springs at the ends of the frame, extending longitudinally of the frame and so interwoven with the other bands as to permit bending of such longer bands without kinking when the frame is folded.

It is an additional object to provide a foldable frame and associated spring support that includes a series of coil spring units connected at one end at similar spaced intervals along the inner sides of the frame members so as to be arranged in opposed pairs, two sets of equilength resilient metal bands connected between the coil spring unit of one pair on one side of the frame and the opposite coil spring unit of the next adjacent pair on the other side of the frame, the bands of one set crossing the bands of the other set so that each coil spring unit is connected to one band of each set whereby weight applied to any band is distributed through the coil spring units to the other bands.

Further and more specific objects will be apparent from the following description taken in connection with the accompanying drawing in which:

FIG. 1 is a top-plan view of one form of foldable bed in unfolded condition;

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary perspective view illustrating the midportion of the frame in folded condition;

FIG. 4 is a fragmentary view, partly in elevation and partly in section and illustrating one of the hinge brackets connecting the side rails of the frame to the supporting center leg;

FIG. 5 is a fragmentary top-plan view of the components shown in FIG. 4;

FIG. 6 is a cross-sectional view taken along line 6—6 of FIG. 5;

FIGS. 7 and 8 are fragmentary top-plan views illustrating modified forms of spring arrangements; and

FIG. 9 is a transverse cross-sectional view on an exaggerated scale, illustrating one of the resilient metal bands.

The illustrated from of folding bed is one form of such bed that is termed a three-legged bed. Other forms are utilized which embody different hinge brackets and have four legs. Further the mattress M to be used is not fully illustrated and consists of a polyurethane foam mattress covered with cotton ticking and of the desired thickness, such as 1 inch, 1½ inch, 2 inch and 3 inch.

The folding bed illustrated is one in which the side rails of the top frame are made in two sections whose adjacent ends are hingedly connected to one another and to the upper end of a normally upright frame-supporting leg by a hinge bracket means constructed to provide for the side rails to extend in horizontal continuation of one another and be supported substantially at their connection points by said leg and also to permit the sections to fold toward one another in substantial parallelism with one another and with the supporting leg. Two similar end legs are hingedly connected to the respective side rail sections, near the outer ends thereof, to fold outwardly therefrom in bed-supporting relation and to fold toward the respective side rail sections when the bed is being folded for storage purposes.

The side rail sections 1, 2 and the three legs 3, 4 and 5 are made of heavy duty, 1-inch aluminum tubing and are of U-shape. The dimensions of these components can vary in accordance with the size of the bed and the height it is to be above a floor. Generally the bed will be 24 inches or 26 inches in width and 72 inches or 73 inches in length and stand about 12 inches off of the floor. The end legs 3 and 5 are hingedly connected to the side rail sections by bracket means 6, each of which includes two opposed ears 7 and 8 that are triangulated in plan as shown. These ears are riveted to the opposite sides of the legs by a pair of rivets 9 and a single rivet 10 which connects the ears to the opposite sides of the respective side rail section so that the 30 legs can hinge or pivot toward one another and lie flat against the respective side rail sections.

The center leg is connected to the adjacent ends of the side rail sections by hinge bracket means generally designated at 11. Each hinge bracket means is made of four pieces of sheet steel and includes a pair of leg-embracing members 12 that are each shaped to form not only a socket part 13 to fit over the upper end of the associated leg, but also a half web-forming portion 14 and an upright flange portion 15. A pair of strengthening and pivot-accommodating bands 16 complete each hinge bracket. The socket-forming portions are riveted to the end of each leg by rivets 17 so that the web-forming portions 14 are in juxtaposition on top of the associated leg, see FIG. 6. The strengthening bands 16 are riveted to the flange portions 15 by rivets 18 and further rivets 19 connect the hinge bracket to the ends of rail sections 1 and 2 so that said sections can be extended as shown in FIGS. 1 and 2 and folded as shown in FIGS. 3 and 4.

The salient feature of this invention resides in the spring support for the mattress as partially shown in FIG. 2. This support provides a flat surface area for increased comfort, is strong and holds more weight than conventional spring wire fabrics.

The spring support consists of a combination of coil spring units 20 and resilient steel bands generally designated 21. The coil springs are eight coils to the inch and of ¾-inch diameter. The steel bands 21 are 0.012 gauge steel initially seven-eighths inch wide and then hemmed along each side to provide a ⅛-inch overlap at 22 so that the bands are five-eighth inch wide with rounded edges. This is shown in FIG. 9.

The spring-support arrangement is illustrated in FIG. 1 from which it is clear that in one example of foldable bed there are six coil spring-receiving apertures 23 spaced along each of the sides of the U-shaped side rail sections 1, 2 and two such apertures on each end of the side rail sections the spacing between the apertures 23 on the ends of the rail sections is greater than the spacing between the apertures along the sides of such sections. The steel bands 21 include 22 equilength sections of steel bands 210, four shorter-length sections 211 and two longer sections 212. These sections are woven in interconnection with the coil spring units 20 so that the equilength sections 210 extend diagonally from one coil spring unit 20 on one side to the unit on the other side that is directly across from the next adjacent unit on said one side. All of the bands extending from one side overlap the bands extending from the other side. Thus in FIG. 1, the bands 210 that extend up from the lower sides of the side rail sections 1 and 2 overlie the bands 210 that extend down from the side rail sections. The shorter band sections 211 extend from the end coil spring unit 20 at the side of each rail section to the farthest unit 20 on the end of the rail section. The longer bands 212 are interwoven with the other bands in an over and under relation except that at the under portion of the bed frame, the bands 212 overlie some of the bands 210 so that when the frame is folded for storage, as shown in FIG. 3, the bands 212 can bend around such a radius of curvature that they will not be unduly kinked.

In the illustrated embodiment one band 212 overlies five bands 210 at the upper portion of FIG. 1 and six bands 210 at the lower portion of FIG. 1.

With beds that embody one center leg support as shown in FIGS. 1 and 2, the bands 212 must overlie at least those bands 210 that cross one another at the center of the frame. Usually they will overlie several of the bands 210. If the bed is of another construction, such as one having four legs and utilizing a 2-inch thick mattress, the hinging relation will be different and the longitudinal bands will have a greater radius of curvature when the sections are folded together so that they can be interwoven without regard to their positioning.

Thus the essential aspect is that there be sufficient unobstructed space between the two points where a band 212 starts to bend that the radius of curvature is such that the band will bend without undue kinking. This is effected by either having the bands 212 overlie enough bands 210 to prevent kinking when bending or by having the plane of the folded bed sections sufficiently far apart that they can bend without kinking even if one or more bands 210 are on top of a band 212 in folded condition.

The spring fabric arrangement is such that two bands are connected to one end of each coil spring unit so that when a weight is applied the stress is distributed completely throughout the series of bands whereby none of the bands are overstressed.

There is in effect a chain reaction support from every coil spring unit and thus the bed will hold up to 500 pounds which is far in excess of the weight that can be held by conventional wire fabric spring supports.

Furthermore, the bed is far more comfortable in that the spring-steel bands provide 400 percent more surface area than the conventional wire fabric supports. Thus a 1-inch thick foam mattress on the bed of the invention will equal in comfort a 2½-inch thick mattress supported by the conventional wire fabric.

The embodiment of FIG. 7 is similar to that of FIG. 1 in all respects except that the bands 211 are omitted. This form is merely a modification of a flat-surface-area bed support utilizing bands 210 and 212 in interwoven relation.

FIG. 8 illustrates another form in which the bands comprise longitudinal bands 215 and transverse bands 216. The longitudinal bands can overlie all the transverse bands or be interwoven.

Neither of the forms in FIGS. 7 and 8 provide the complete chain reaction spring support of the preferred arrangement. However, both of these forms provide the flat surface area for the comfort aspects and will support adequate weight.

In all forms of the invention it is to be emphasized that the longitudinal bands are continuous from end to end of the frame and all bands are connected to coil spring units at each of their ends.

What is claimed is:

1. In a foldable bed, a frame means including at least two parts, hinge means about which the parts can fold toward and away from one another between an extended in-use position and an upright storage position, a spring-support means including a plurality of coil spring units connected to the frame means at one of their ends and spaced around the inner periphery thereof, and a plurality of transverse resilient metal bands interwoven transversely of the major axis of the frame in extended position and at least two longitudinal resilient metal bands extending uninterruptedly from end to end of said frame means, each band being connected to two coil spring units and the longitudinal bands being interwoven with said transverse bands except those adjacent said hinge means so that when the frame parts are folded toward one another, they fold about such a radius of curvature as to prevent undue kinking.

2. A foldable bed as claimed in claim 1 in which said transverse metal bands are arranged diagonally of the bed.

3. A foldable bed as claimed in claim 1 in which said coil spring units include a series of coil springs each connected at one end at similar spaced intervals along the inner sides of the frame parts so as to be arranged in opposed pairs, said transverse metal bands comprising two sets of equilength bands connected between the coil spring of one pair on one side of the frame and the opposite coil spring of the next adjacent pair on the other side of the frame, the bands of one set crossing the bands of the other set on the same side thereof so that each coil spring is connected to one band of each set whereby weight applied to any band is distributed through the coil springs to the other bands.

4. The foldable bed as claimed in claim 1 in which said two frame parts comprise a pair of generally U-shaped members, at least three U-shaped and shorter leg members, hinge brackets connecting the spaced-apart ends of two of the leg members to the first-mentioned U-shaped members, said hinge means comprising hinge bracket means connecting the ends of the first-mentioned U-shaped members to the ends of the other leg member so that the frame can be extended to dispose the first-mentioned U-shaped members in facing aligned relation with the leg members extending downwardly therefrom and folded to dispose the first-mentioned U-shaped members in spaced-apart parallel relation with the first two leg members folded against the first-mentioned U-shaped members and the third leg member between such U-shaped members, and said transverse metal bands each being connected at one end to one coil spring and at its other end to a diagonally arranged coil spring with the bands crossing one another in series from one end of the frame to the other, there being at least two bands connected to each side coil spring.