Jan. 28, 1964 R. GOODMAN 3,119,126

BOX SPRING ASSEMBLY

Filed March 6, 1962

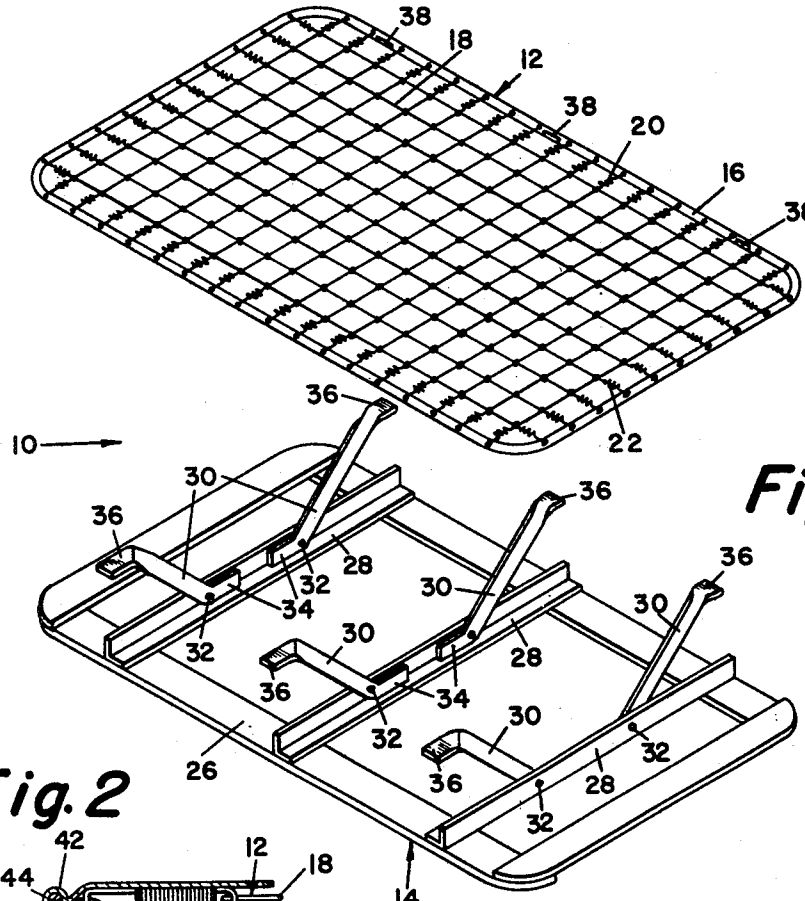


Fig. 1

Fig. 2

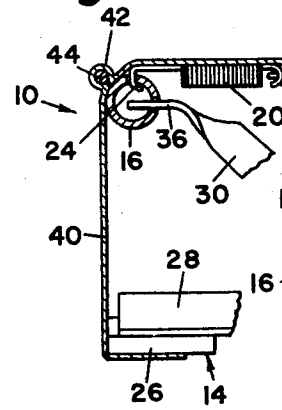


Fig. 3

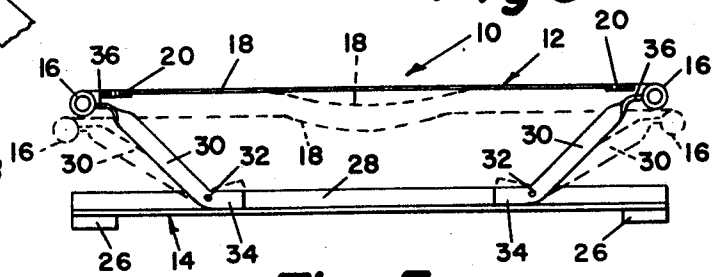


Fig. 4

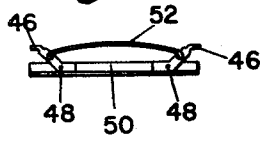
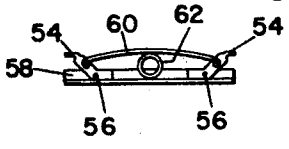


Fig. 5



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BOX SPRING ASSEMBLY

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This invention relates to new and improved box spring assembly for beds, sofas and the like, and it particularly relates to a box spring assembly of the aforesaid type which provides for constant flexible support of a load regardless of the weight or position of the load supported by the assembly.

Heretofore, box springs usually consisted of an upper deck formed of a lattice or cross-wire network, a lower deck in the form of a frame of wood or the like and with a bottom formed of cross-slats or the like, and a plurality of coil springs between the upper and lower deck for flexibly supporting the upper deck. Among the disadvantages inherent in this prior type construction was the tendency of the coil springs to become deformed in certain areas because people always tend to sit or lie in the same position placing the stress and strain always on the same area. Furthermore, if persons of different weights used the device, the coils would not give the same support to the heavier persons as to those of lighter weight, while if the coils were made of sufficient strength to support heavier persons with the greatest degree of comfort, they would be too rigid for lighter persons who would therefore not receive the full advantage of spring flexibility.

It is one object of the present invention to provide a box spring assembly which will overcome the above disadvantages by providing constant fully flexible support for all loads regardless of the size and weight of the load and regardless of where the force of the load is applied.

Another object of the present invention is to provide a box spring assembly of the aforesaid type wherein any tendency to warpage or distortion during use is eliminated.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is an exploded perspective view of a box spring assembly embodying the present invention, the fabric cover portion being omitted for clarity.

FIG. 2 is a fragmentary, sectional view of an edge portion of the box spring assembly of FIG. 1, in assembled condition.

FIG. 3 is a sectional view of the assembled device of FIG. 1, with the cover omitted for clarity.

FIG. 4 is a sectional view, somewhat similar to FIG. 3, of a modified form of the invention.

FIG. 5 is a sectional view, similar to FIG. 4, but showing a further modified form of the invention.

Referring now in greater detail to the various figures of the drawing wherein similar reference characters refer to similar parts, there is shown a box spring assembly, generally designated 10, comprising an upper deck 12 and a lower deck 14. The upper deck 12 consists of a generally rectangular, tubular frame 16 having rounded corners and constructed of generally flexible

material such as spring metal or the like. Stretched between the ends and sides of the frame 16 is a cross-wire network 18 of generally standard construction wherein the cross-wires are attached to their respective side or end sections of the frame 16 by springs 20 hooked to the wires as at 22 and inserted in the tubular frame 16 as at 24 (see FIG. 2).

The lower deck 14 comprises a generally rectangular frame 26 with rounded corners and preferably constructed of separate side and end strips connected to each other at the rounded corners by any desirable means such as screws, nuts and bolts, adhesive, etc. This frame 26 is preferably constructed of wood because of the relative strength with lightness and because of its relatively low cost. However, any other desired material may be used.

Extending across the frame 26 are a plurality of spaced, parallel cross-bars 28, here shown as three in number. Each cross-bar 28 comprises an angle-bar made of steel, iron, aluminum or any other desired material. Each cross-bar 28 is secured at its opposite ends to the respective side sections of the frame 26 by any desired means such as rivets, screws, nuts and bolts, etc.

Each cross-bar 28 is provided with a pair of arms 30. The arms 30 are pivotally connected to the corresponding cross-bars 28 by pivot pins, rivets or the like, indicated at 32, and are each provided with an integral extension 34 beyond the pivot. The arms 30 of each pair are laterally spaced from each other and extend diagonally upward and outward in opposite directions from each other. At its upper end, each arm 30 is provided with a twisted, ninety degree offset portion 36 which engages within a corresponding slot 38 in the respective side of the tubular frame 16 of the upper deck.

Enclosing the entire assembly, including the upper and lower decks and the arms 30, is a fabric cover 40 (see FIG. 2), which extends across the entire upper deck and partially encompasses the frame 26 of the lower deck to which it is connected in any desired manner as by screws, nuts and bolts, etc. The cover 40 is provided with a peripheral bead 42 within which is positioned a cord 44. This forms a strengthening edge in a standard manner.

The above-described structure operates as follows: When the bed is in normal position, as indicated in full line in FIG. 3, with no load thereon, the springs 20 of the upper deck maintain the wire network 18 in taut position and also exert a tension on the side portions of the frame 16 which is contra to the force of gravity acting on the arms 30 and tending to pivot these arms 30 downwardly. The two forces are here in equilibrium because the extensions 34 act as stops when they abut against the horizontal web of their respective angle-bars 28. However, when a load is placed on any part of the upper deck, this load will be transmitted to both arms 30 of each pair in an equal distribution throughout the upper deck because whatever force is applied to one of the arms will be automatically compensated by the other arm according to the well-known physical law of action and reaction.

The downward force of the load will act to spread the arms 30 (as indicated in dotted outline in FIG. 3), a lighter load (as indicated by the upper dotted line) resulting in less of a spread and consequently in less lowering of the upper deck than when a heavier load is

used (as indicated by the lower dotted line). In both cases, however, despite the fact that the upper deck may be closer to the lower deck under a heavier load than under a light one, the tautness of the wire network of the upper deck remains substantially constant regardless of the weight of the load. Consequently, there will be the same firm but flexible support for any person using the device and regardless of whether he is lying or sitting in the center or in any offset position on the bed.

The spreading of the arms **30** does not affect the enveloping cover **40** because this cover is connected to the inner framework only at the bottom of frame **26**. Therefore, as the tubular frame **16** shifts its position, the cover will also shift its position becoming lower but wider in accordance with the lowering of the frame **16**.

The above type of construction not only provides for an even and constant firmness, flexibility and weight-distribution but avoids distortion and warpage due to fatigue of the coil springs used heretofore.

The above-described structure completely solves the problem of lateral or cross-wise equalization of weight distribution. However, there may sometimes be a tendency of the box spring to sag somewhat in the center of the longitudinal plane thereof because of the fact that the bulk of the weight of a person is found in his torso which is usually positioned in the center of the bed. Although this tendency to sag is usually slight and is substantially compensated for by the spring construction itself, in order to eliminate any such tendency completely while maintaining the lateral equalization features, a modification of the device may be used as illustrated in FIG. 4.

The modification illustrated in FIG. 4 comprises a central pair of arms, designated **46**, which correspond to the central pair of arms **30** of FIG. 1. These arms **46** are pivoted at **48** to the cross-bar **50** and are connected by a spring strip **52** of upwardly-bowed construction. This spring strip **52** acts as an auxiliary flexible support at the center of the device and, being connected to the arms **46**, flexes in synchronism therewith so that both lateral and longitudinal equilibrium of load is achieved.

In order to provide an even greater central support against longitudinal sagging when so desired, a further modification may be used such as illustrated in FIG. 5. In this form of the invention there are provided a pair of arms **54**, similar to arms **46** and pivoted at **56** to a central cross-bar **58**. The arms **54** are connected to each other by a bowed spring strip **60** similar to spring strip **52** in FIG. 4. However, an additional flexible bracing means is provided in the form of a circular spring **62** which is connected to the spring strip **60** and which is either connected to or bears upon the horizontal web of cross-bar **58**. This form of the device provides a very firm yet completely flexible center support to unequally distributed longitudinal loads.

Other types of lateral spring support means may also be used, such as a circular spring connected at opposite portions to the arms and with the linear spring strip eliminated.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

The invention claimed is:

1. A box spring assembly comprising a spring-tensioned upper deck, a rigid lower deck and oppositely-disposed supporting arms pivoted to the lower deck and fixed to the upper deck, said arms being biased by gravity to pivot in one direction and being yieldably held against said biased movement by the spring-tensioned upper deck, the spring tension on said upper deck being provided by horizontally-tensioned springs in the plane of the upper deck, the entire upper deck, including the periphery thereof, being vertically movable in a common plane relative to the entire lower deck including the periphery thereof.

2. The assembly of claim 1 wherein means are provided to limit movement of said arms under the force of said spring-tensioned upper deck.

3. The assembly of claim 1 wherein a flexible cover envelops said upper deck and said supporting arms, said cover being distortable by movement of said upper deck.

4. A box spring assembly comprising an upper deck, a lower deck and supporting means between the upper and lower decks the spring tension on said upper deck being provided by horizontally-tensioned springs in the plane of the upper deck, the entire upper deck, including the periphery thereof, being vertically movable in a common plane relative to the entire lower deck including the periphery thereof, said upper deck comprising a flexible frame having a spring-tensioned cross-wire network extending thereacross, and said supporting means comprising at least one pair of arms individually pivoted to said lower deck and being laterally spaced from each other, said arms extending upward and outward from their respective pivot points in opposite directions relative to each other and being fixed to opposite portions of said flexible frame of said upper deck.

5. The assembly of claim 4 wherein a flexible cover envelops said upper deck and supporting means and is attached to said lower deck, said cover being distortable into varying contours responsive to the varying positions of said upper deck.

6. The assembly of claim 4 wherein said lower deck comprises a rigid frame having at least one cross-bar, said pair of arms being pivoted to said cross-bar.

7. The assembly of claim 4 wherein each of said arms is provided with a stop means to prevent movement of said arms around their pivots beyond a predetermined position under the influence of said spring-tensioned cross-wire network.

8. The assembly of claim 4 wherein said arms are laterally connected to each other by a spring means constructed to flex in synchronism with movement of said arms about their respective pivots.

9. The assembly of claim 4 wherein said arms are laterally connected by a linear, upwardly-bowed spring strip which is constructed and arranged to flex in synchronism with movement of said arms about their respective pivots.

10. The assembly of claim 4 wherein said arms are laterally connected by a linear, upwardly-bowed spring strip, and a circular spring underlying said spring strip and constructed and arranged to exert an upwardly flexible force thereon.

11. A box spring assembly comprising an upper deck, a lower deck and supporting means between the upper and lower decks the spring tension on said upper deck being provided by horizontally-tensioned springs in the plane of the upper deck, the entire upper deck, including the periphery thereof, being vertically movable in a common plane relative to the entire lower deck including the periphery thereof, said upper deck comprising a flexible frame having a spring-tensioned cross-wire network extending thereacross, said lower deck comprising a rigid frame having a plurality of spaced, parallel cross-bars extending thereacross, each of said cross-bars being an angle-bar having a vertical web and a horizontal web, a pair of arms individually pivoted to the vertical web of each cross-bar, the arms of each pair being spaced from each other at their pivot points and extending upwardly and outwardly from their pivot points in opposite angular directions, the arms of each pair being rigidly connected to a corresponding portion of the flexible frame of the upper deck, each arm having an extension

adjacent its pivot point and extending oppositely from the arm itself, said extensions being arranged to abut the horizontal webs of their corresponding cross-bars at predetermined positions of their respective arms, and a flexible cover enveloping said upper deck and supporting means, said cover being distortable into varying contours responsive to varying positions of the upper deck.

12. The assembly of claim 11 wherein said arms are laterally connected to each other by a spring means constructed to flex in synchronism with movement of said arms about their respective pivots.

References Cited in the file of this patent

UNITED STATES PATENTS

986,141	Clucus	Mar. 11, 1911
1,541,425	Lindsley	June 9, 1925
2,661,486	Roher	Dec. 8, 1953

FOREIGN PATENTS

499,113	France	Nov. 8, 1919
782,792	France	Mar. 25, 1935
505,361	Canada	Aug. 24, 1954
539,953	Belgium	Aug. 13, 1955