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UPHOLSTERY CONSTRUCTION

Filed March 12, 1959

2 Sheets-Sheet 1

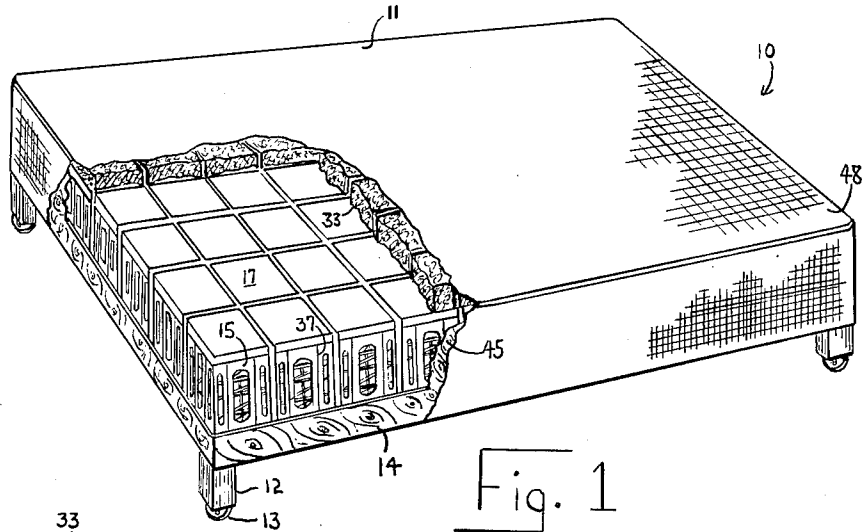


Fig. 1

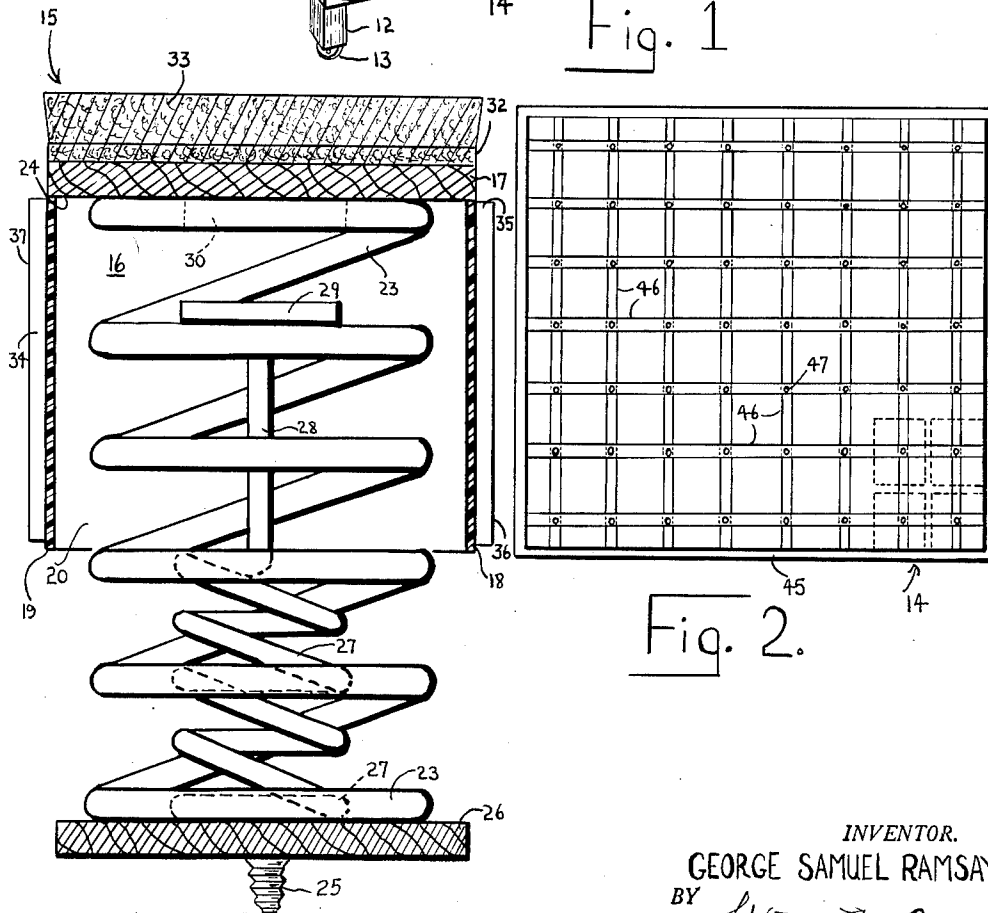


Fig. 2.

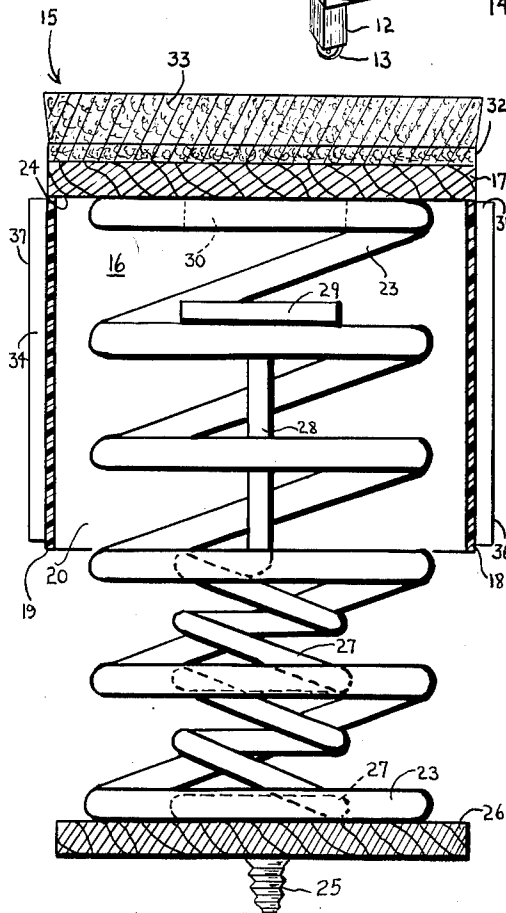


Fig. 3.

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Fig. 4.

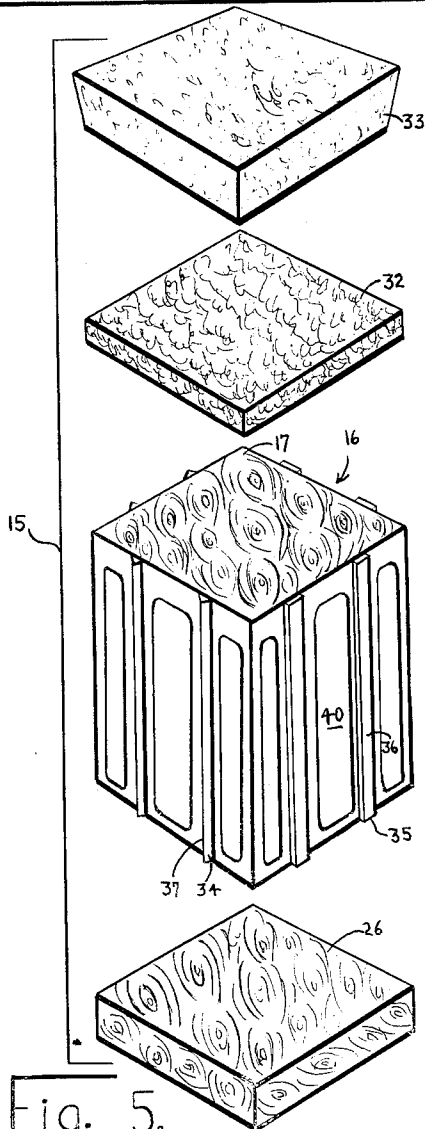
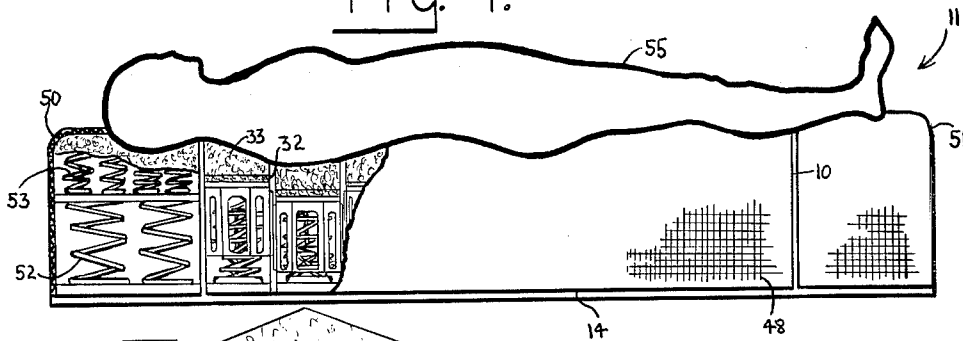


Fig. 5.

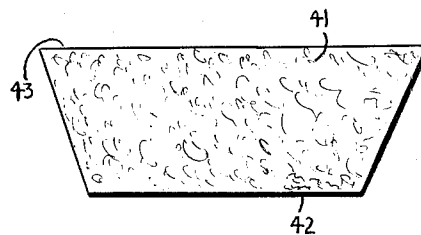


Fig. 6.

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UPHOLSTERY CONSTRUCTION
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This invention relates in general to a novel form of upholstery construction and more particularly to the cushioning structure and arrangement of elements of box spring and mattress combinations and other upholstered furniture.

It has long been a primary goal of the upholstery industry to provide furniture which will support an individual resting thereon with the optimum degree of comfort and good posture. The correct positioning of a sleeper, for example, is a requisite of comfort, since improper posture necessarily results in strain and the resultant aches and muscular fatigue.

The basic form of present day box spring construction, however, has rendered attainment of such optimum conditions impossible. At present, cushion construction comprises rows of cylindrical springs covered by padding. Adjacent springs are tied together to give unity to the structure. Such tying of adjacent springs results in a distribution of strain from the spring on which the downward force is exerted to the tied springs adjacent thereto, and then to the springs tied to those adjacent springs, and thus throughout all the springs of the construction.

The tying of springs results in the sloping of a mattress, for example, toward the point where the pressure is applied, and thus improper support is provided for a reclining individual. In such an arrangement each cylindrical or helical coil spring does not merely support that portion of the body overlying it. Instead certain springs underlying relatively light portions of the body will be unduly depressed by the action of tied springs underlying relatively heavy body portions. In such a case the relatively light portions of the body must either extend downwardly in an unnatural position to gain firm support from the unduly depressed springs underlying them or bridge these springs. Neither alternative results in proper support.

Another disadvantage of tied spring construction is most evident in box spring and mattress combinations for double beds. When a bed is shared, for example, by a heavy man and a light woman, the latter will invariably find herself forced to maneuver away from the pit in the mattress caused by her heavier companion. The rest of the surface of the mattress slopes downwardly toward that depression. This condition is a result of tied spring construction, the man's body not only depressing those springs under his body, but depressing to a lesser extent every other spring in the bed. As the resiliency of the springs decreases due to wear, this problem becomes more pronounced.

It is, therefore, an important object of this invention to provide an upholstery construction which gives even, firm support to every portion of an individual resting thereon.

It is another object of this invention to provide an upholstery construction which substantially eliminates any sloping of the supporting surface from a non-supporting area downwardly toward a supporting area.

It is still another object of this invention to provide a combination box spring and mattress which supports a sleeper in natural, relaxed to an optimum extent which has not heretofore been achieved.

In order to accomplish the aforementioned objects, the device of this invention relies on supporting spring units which are not tied to one another and which move individually without imparting motion to adjacent spring

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units. Such units are normally arranged in groupings which contain many units closely adjacent to each other.

While conventional groupings of spring units then require that the springs be joined to each other so that the grouping, which may be a combination box spring and mattress, will form a sturdy structure capable of supporting a sleeper, the present invention does not so require. Instead, each spring unit has an upper, supporting surface and a multiplicity of side, bearing surfaces. These side surfaces bear against one another, but are so constructed that one or two contiguous bearing surfaces may move without inducing motion in the other surface.

In a preferred form of the invention, of two contiguous side surfaces one will carry at least one knife member and the other a bearing block on which the knife member presses. When these members and blocks are formed from proper materials, such as a self-lubricating plastic, friction between each knife member and its corresponding block will be reduced to a minimum to permit relative motion between a knife member and block. Still, the contiguous member and block will support their respective units, one against the other, to give the same unity of structure and firmness against lateral movement formerly attained by tying adjacent springs together.

The individual spring unit as used in a combination box spring and mattress according to this invention also includes novel features which are important to the function of the combination. In one embodiment of the spring unit a main spring body supports an open bottom container, which has a top wall to support a downward force thereon. The main spring body is attached to and elastically supports the container above a fixed base on which the spring body is anchored. A secondary body of compressible spring material also extends between the container and the base to elastically reinforce the main spring body after the latter has been partially compressed.

It has been found advantageous to form the main spring body of loops of relatively large diameter and attach the body to the container at the under surface of the top wall thereof. In this embodiment both the main and secondary spring bodies are anchored to the base, and the secondary body, likewise in the form of loops, extends within the main body and terminates upwardly in a rod-like center post. This center post has a plate at its upper end, which plate is fixed to the main spring body and underlies the top wall of the container. As the container descends against the main spring body, the top wall contacts the plate and then must push against the secondary spring body, too.

Another feature of the invention is found in the cushion material which overlies the upper surface of the top wall of the container. An individual pad of compressible material is secured to each top wall. In one form each pad is trapezoidal in cross section, with the base of the trapezoid extending upwardly so that the upper surfaces of pads of adjacent units will abut each other.

These and other objects, features and advantages of this invention will become more apparent from the following, detailed description of an illustrative embodiment of the invention. The detailed description refers to the accompanying drawings, which form a part hereof, and in which:

FIG. 1 is a perspective view, partly cut away, of an embodiment of the assembled invention in the form of a combination box spring and mattress;

FIG. 2 is a top plan of the frame of FIG. 1;

FIG. 3 is a vertical sectional view of one form of spring unit according to the invention;

FIG. 4 is a side elevational view, partly cut away, of a bed including a combination box spring and mattress according to the invention;

FIG. 5 is an exploded view, in perspective, of some of the elements of the spring unit of FIG. 3, and

FIG. 6 is a side elevational view of a modified form of pad of the spring unit.

Referring now to the drawings, and to FIG. 1 thereof in particular, the present invention may be embodied in a one-piece section of furniture 10, which includes a combination box spring and mattress 11 mounted on legs 12 terminating in castors 13, so that the section 10 may be rolled over a floor to a desired position. Individual spring units 15, best seen in FIG. 3, are mounted on a frame 14, which is illustrated separately in top plan view in FIG. 2.

The structure of an individual spring unit 15 is an important part of the present invention. Referring to FIG. 3, the spring unit 15 shown there comprises a container 16, which is rectangular in cross section and has a top wall 17, side walls 18 and 19, and a back wall 20. In the view of FIG. 3 the front wall is not seen. There is no bottom wall. The walls that form the inverted container 16 are all substantially rigid, and the top wall 17, in particular, is capable of sustaining a heavy load.

The main spring body 23, which is illustrated as a cylindrical coil of resilient, spring material, is fixed to the under surface 24 of the top wall 17 and extends within and then without the container 16 to the base 26, to which it is firmly secured. Main spring body 23 is deformed so that its normal shape will be an elongated one in which the container 16 is maintained with its side, back and front walls well spaced from the base 26. It will thus be apparent that a downwardly directed force on the top wall 17 of the container 16 will tend to compress the main spring body 23 as the side, front and back walls thereof are pressed toward the base 26, secured to the frame 14 by a threaded pin 25.

When any single spring, such as main spring body 23, must bear a heavy load, there is the possibility that the spring will lose some of its resiliency with an accompanying sag in that portion of the combination box spring and mattress. To relieve main spring body 23 from supporting all the weight of a heavy load, a secondary spring body 27, located within the loops of the main spring body 23 and anchored at its lower end to the base 26, is provided. Secondary spring body 27 is formed from material less elastic than the main spring body. Secondary spring body 27 terminates upwardly in a center post 28, which is located with its axis in a vertical plane. To the upper end of the center post 28 is fixed a support or plate 29, which is spaced from the main spring body 23.

Secondary spring body 27 is only utilized in the operation of a spring unit 15 when the container 16 has been depressed against the tension of the main spring body 23 until the under surface 24 of the top wall 17 can contact the plate 29. Then further depression of the top wall 17 must act against both the main and secondary spring bodies, compressing them simultaneously. A cushion 30 secured to the under surface 24 of the top wall 17 above the plate 29 mitigates any shock or noise if the secondary spring body 27 is suddenly contacted upon the rapid depression of the top wall 17 by a strong force.

The embodiment of the spring unit 15 of FIG. 3 is illustrated with two layers of padding overlying the top wall 17 of the container 16. Each such unit carries its own padding, which is cut to the size of the top wall 17. As shown, a base layer 32 of shock absorbent material is secured directly on the top wall 17. An upper layer 33 of more elastic shock absorbent material is secured to and overlies the base layer 32, so that a sudden downward force is first cushioned by the upper and base layers. It has been found desirable to have the upper layer 33 be substantially thicker than the base layer 32. In practice a one-inch base layer of cotton felt has been overlaid with a four-inch upper layer of rubberized hair. However, the order in which the layers 32 and 33 are applied

may be reversed. However, the order in which the layers 32 and 33 are applied may be reversed.

Other parts of the structure of the spring unit 15 shown in FIG. 3 are a knife member 34 and a bearing block 35 attached to the side walls 18 and 19, respectively. No structure on the outer surface of the back wall 20 can be seen in FIG. 3. The function of these members will be appreciated more fully when described in connection with FIG. 5, where a spring unit 15 of the invention is revealed in an exploded, perspective view.

As seen in FIG. 5, bearing blocks 35 are in the shape of strips having a flat outer surface 36. The knife members 34 are triangular and terminate in sharp edges 37. Knife members 34 may be molded with containers 16 in one piece, as shown, or individually attached to the containers. The distance from an edge 37 to its adjacent wall is approximately equal to the distance from the bearing surface 36 to its adjacent contact wall.

When the spring units 15 are assembled to form an article of furniture, as shown in FIG. 1, an edge 37 of a knife member 34 is pressed against the bearing surface or contact wall 36 of a bearing block 35. Due to the fine edge of the knife member 34 and the smoothness of the bearing surface 36, the edge 37 can slide against the surface 36 with a minimum of friction. Because this sliding action is almost frictionless, the downward or upward movement of a container of one spring unit will have no appreciable effect on an adjacent spring unit the container of which buttresses the moving container against undesirable lateral motion.

This almost frictionless motion is dependent to a large extent on the materials of which the knife members 34 and the bearing blocks 35 are composed. A self-lubricating plastic has been found to meet performance standards while having long life and almost no maintenance requirements. Other materials yield adequate performance, but many of these require that the article of furniture be at least partially disassembled and lubricated from time to time. With some materials it has been found advantageous to groove the bearing surface 36 so that the sharp edge 37 can ride therein.

It will be seen from FIG. 5 that some adjoining walls of one unit each carry the same type of contact member, i.e., bearing blocks 35 or knife members 34, while other adjoining walls carry different types of contact members. Any arrangement of contact members on walls may be utilized if, when a plurality of units are assembled, a knife member of one unit will contact a bearing block of an adjacent unit. In regard to those units which lie on the periphery of an assembly, it has been found advantageous to form all containers 16 which contact the side structure of the frame 14 with knife members on their frame-facing sides. This obviates the difficulty of forming knife members on the inner surface of the side structure of the frame. Such an arrangement is illustrated in FIG. 1.

The side walls of FIG. 5 are shown with portions 40 thereof cut out. These cutout portions reduce the weight of a spring unit and are particularly desirable if the containers 16 are to be moldably formed.

A modified form of upper layer of padding for a container 16 is seen in FIG. 6. The upper layer 41 is trapezoidal in cross section, and is secured to a base layer of padding along its lesser parallel surface 42. The greater parallel surface 43 extends laterally beyond the walls of the container, barely meeting upper layers 41 of adjacent units. With upper layers 41 overhanging the spaces between adjacent containers, a continuous surface is presented to a body reclining thereon, thus providing more even support. If the upper layers 41 are made from rubberized hair, they will substantially maintain their shape under normal work loads.

One example of a frame 14 to which the individual spring units 15 may be attached is shown in FIG. 2. The

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frame 14 has a rigid side structure consisting of four side walls 45. Extending between opposed sides are a series of parallel cross straps 46, which intersect each other at right angles. One of the intersecting straps overlies the other. At each of the intersections a bore 47 is drilled through both of the straps 46. In each of the bores 47 the threaded pin 24 fixed in the base 26 of a spring unit 15 is inserted. The broken lines in FIG. 2 indicate the positions of the units. A wing nut (not shown) or the like holds the base 26 in upright position on the cross straps 46 and permits easy removal of an individual spring unit for repair or replacement. After all the units are in place on the frame, the assembly is covered by fabric 48 (FIG. 1) and is then ready for use. The fabric or ticking is usually cut to size and fitted to each unit individually. The fabric or ticking is usually cut to size and fitted to each unit individually.

In FIG. 4 a bed having a construction which utilizes the section 10 according to the present invention is illustrated. Section 10 of FIG. 1 is combined with individual head rest 50 and foot rest 51. These rests are of conventional construction, e.g., head rest 50 provides spring support by means of lower and upper tiers 52 and 53, respectively. The same fabric 48 may be used to cover all three sections.

The occupant 55 reclining on the bed of FIG. 4 exerts varying downward pressures along the length of his body. It will thus be seen that the downward pressure on that portion of the section 10 underlying the shoulders of the occupant 55 is greater than that portion underlying the neck of the occupant 55. As a consequence, those spring units underlying the shoulders will be depressed to a greater extent. Each spring unit is depressed without affecting the depression of any other unit, so that each spring unit provides the firm support necessary for optimum reclining comfort.

While a preferred embodiment of the invention has been described hereinbefore and illustrated in the accompanying drawings, it will be apparent that the novel features of the invention may be embodied in other forms. It is desired, therefore, that the invention be limited only by the scope of the following, appended claims.

What I claim is:

1. A unit of upholstery construction, comprising an open bottom container having side walls and a top wall to receive force exerted downwardly thereon, a body of compressible spring material secured to the under side of said top wall and extending downwardly therefrom to a rigid base, and an individual pad of compressible material overlying said top wall and forming a plane of contact between said pad and said top wall, said pad extending laterally only to the periphery of said top wall at said plane of contact, said side walls of said container being free of compressible material.

2. A unit of upholstery construction as claimed in claim 1, said pad being, in cross section, in the form of a trapezoid, and so positioned that the lesser parallel surface of said trapezoid is secured to said top wall of said container.

3. A unit of upholstery construction, comprising an open bottom container having side walls and a top wall to receive force exerted downwardly thereon, a body of compressible resilient material secured to said container and extending downwardly therefrom to a rigid base, a relatively thin individual pad of less easily compressible material overlying said top wall and forming a plane of

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contact between said pad and said top wall, said pad extending laterally only to the periphery of said top wall at said plane of contact, and a relatively thick individual pad of more easily compressible material overlying said relatively thin pad.

4. A unit of upholstery construction, comprising an open bottom container having side walls and a top wall to receive force exerted downwardly thereon, and a body of compressible resilient material secured to said container and extending downwardly therefrom to a rigid base, at least one of said side walls including a low friction contact member having a knife edge and at least one other of said side walls including a bearing surface adapted to be contacted by said knife edge of said low friction contact member.

5. A unit of upholstery construction as claimed in claim 4, said bearing surface being part of a bearing block.

6. In a section of upholstered furniture, a frame and a plurality of individual supporting units mounted on said frame, each of said units including an open bottom container having an upwardly facing supporting surface for receiving a downwardly directed force, a pad of compressible material secured to said supporting surface, each of said containers bearing against and providing support against lateral movement for the containers of adjacent units yet offering little resistance to the vertical movement of said containers, said supporting surface of each of said containers being backed by a spring and movable against said spring in response to said force independently of the movement of the supporting surfaces of the others of said units.

7. A unit of upholstery construction, comprising an open bottom container having side walls and a top wall to receive force exerted downwardly thereon, a main body of compressible spring material secured to said top wall and extending therefrom downwardly through the open bottom of said container to a rigid base, said main body being anchored on said base and spacing said side walls and said base and being elastically compressible between said top wall and said base, and a secondary body of spring material compressible independently of the compression of said main body and anchored on said base and extending upwardly therefrom to a location below said top wall, said secondary body terminating upwardly in a support having a relatively flat surface substantially parallel to said top wall and having a portion thereof in the form of a center post positioned axially of said main body and fixed at its upper end to said support.

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