

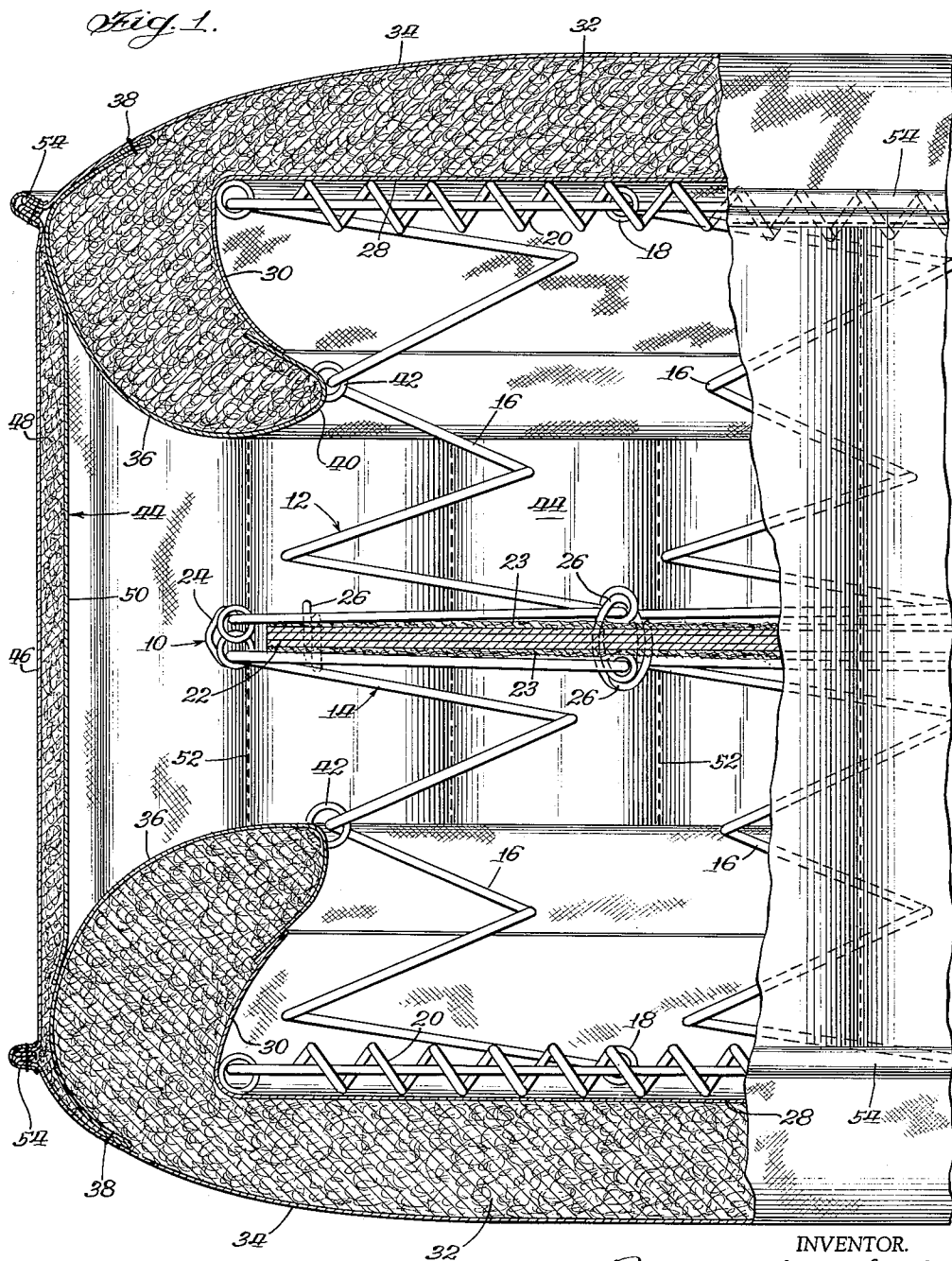
April 11, 1961

R. H. BLECKER
MATTRESS CONSTRUCTION

2,978,715

Filed Jan. 16, 1958

2 Sheets-Sheet 1



INVENTOR.

Raymond H. Blecker

BY

*Loane Anderson Luedeka, & Fitch
Attys.*

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2 Sheets-Sheet 2

Fig. 2.

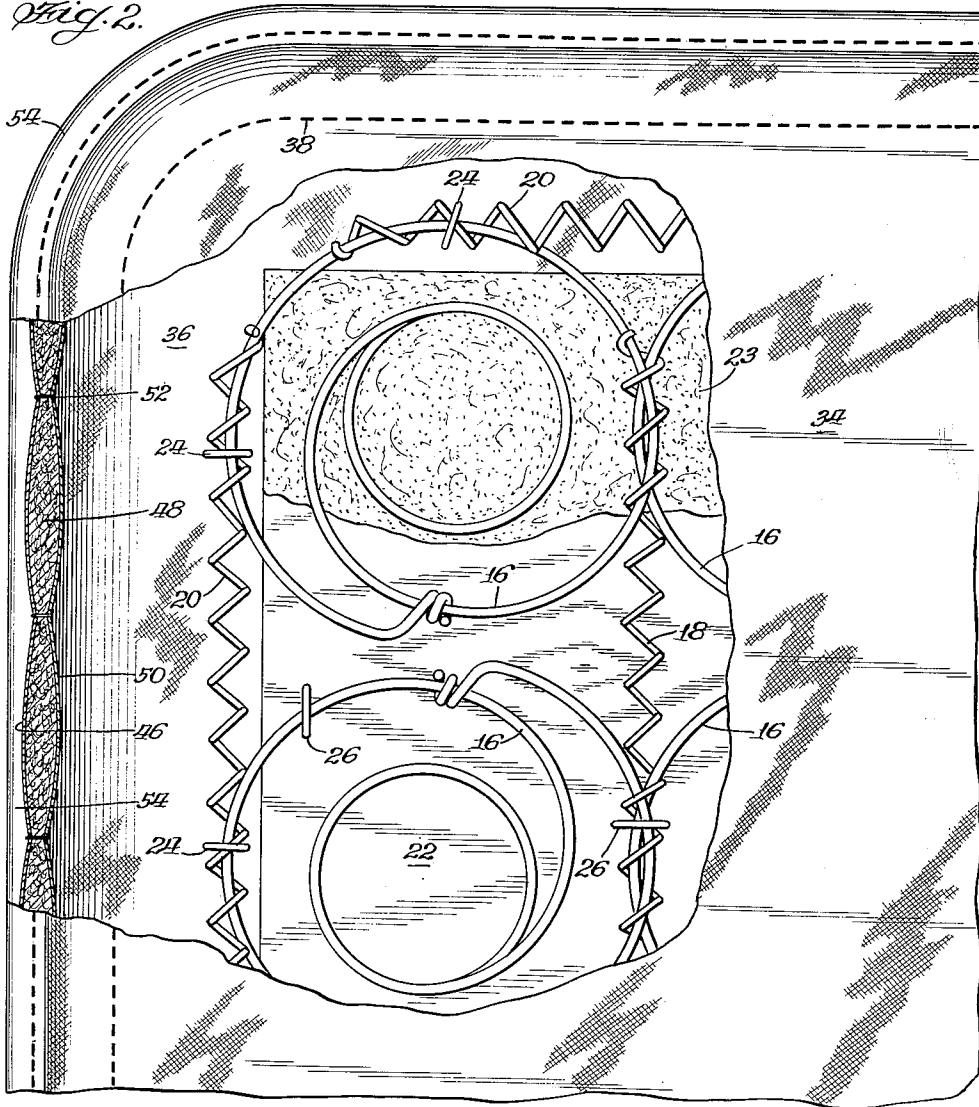
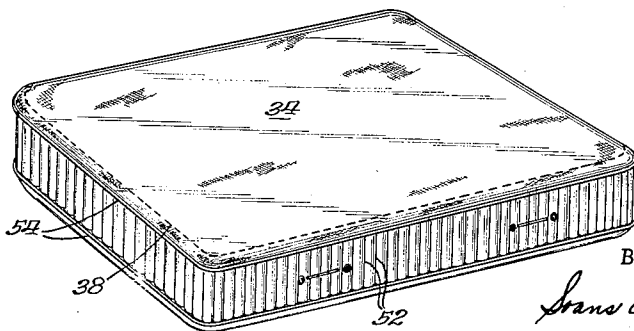


Fig. 3.



INVENTOR.

Raymond H. Blecker

BY

*Irans Anderson Luudeka & Fitch
Attys*

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MATTRESS CONSTRUCTION

Raymond H. Blecker, Kenosha, Wis., assignor to Simmons Company, New York, N.Y., a corporation of Delaware

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3 Claims. (Cl. 5—351)

This invention relates to an improved mattress construction, and particularly to firm mattresses intended for use by persons who consider it more healthful and conducive to rest to sleep on a relatively unyielding mattress.

Most firm mattresses available today are mattresses of otherwise ordinary construction in which the spring coils are made of materially heavier gauge wire. Mattresses of this type are not only firm in terms of their overall load carrying capabilities, but they are also hard, i.e., resistant to depression in local areas, and do not provide satisfactorily continuous support to reposed bodies of normal weight and stature. Accordingly, it is an object of the present invention to provide a mattress which is "firm" in terms of its overall load carrying capabilities, but which is sufficiently yielding in response to local loads to provide substantially continuous body support to persons of ordinary stature. It is a further object of the invention to provide an improved mattress of the type described which will not only accomplish the desired end result, but which will lend itself to prevailing manufacturing methods so as not to unduly increase the manufacturing costs and market prices.

Other objects of the invention will become apparent from the following description taken in conjunction with the accompanying drawings, in which:

Figure 1 is a fragmentary side view of one end of a preferred form of mattress in accordance with the invention, partially broken away to illustrate the interior construction;

Figure 2 is a fragmentary plan view of one corner of the mattress, also partially broken away to better illustrate the interior construction; and

Figure 3 is a perspective view of the entire mattress on a reduced scale indicating generally the overall appearance of a mattress in accordance with the invention.

Briefly, a mattress in accordance with the invention is one which employs two spring constructions assembled in superposed relation with a rigid sheet interposed between the two constructions, and secured thereto. The effect of this structure is to divide the effort of the two spring constructions, the springs of the uppermost construction receiving load in proportion of the distribution of weight of the person reposed thereon, and the lowermost responding, together with those of the upper group, to the overall load. The uniformity of distribution of load to the lowermost spring construction depends upon the rigidity of the dividing sheet, and while, for practical purposes, no available material is perfectly rigid in the sheet form employed in the invention, commercial grades of plywood or like material are sufficiently rigid in relation to loads carried by mattresses to distribute the unequal loads on the upper construction fairly uniformly over the lower construction, thus achieving a firm mattress which has sufficient yieldability in its upper surface so as not to be unduly hard.

The effect can be achieved with some degree of latitude in the selection of appropriate springs, but it has been

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found that the most satisfactory result for the greatest varieties of physical stature and personal preference is a spring construction in which the diameter and shape of the coils and gauge of the wire is just slightly more than adequate to prevent "bottoming" on the median rigid sheet, i.e., the use of springs which are soft enough to yield to local pressure but not soft enough to be completely compressed under the local loads normally encountered. Springs of such design have been found entirely satisfactory for the lower construction as well, the response to local loads being less significant in the lower construction since the load is distributed substantially uniformly to the entire lower construction. Moreover, while a variety of effects can be achieved by varying the stiffness of the spring coils as between the upper and lower constructions, and as between various zones of the upper construction, it is believed desirable in terms of longer mattress life and satisfaction of the greatest number of personal preferences to employ the same type of coil above and below the rigid median plane so as to achieve a "reversible" mattress, i.e., one which has the same characteristics regardless of the face which happens to be uppermost.

In the preferred embodiment, referring particularly to Figures 1 and 2 of the drawings, the spring assembly 10 includes upper and lower "constructions" 12 and 14, i.e., preassembled spring units comprising a multiplicity of individual helical spring coils 16. The individual springs are preferably of the double cone or hour-glass shape, as more fully described hereinafter, and are connected together in aligned rows, and together in each row, by helical tie wires 18 which are threaded about overlapping or juxtaposed portions of the end convolutions of springs in adjacent rows. See particularly Figure 2. The constructions are preferably made with the helical tie wires 18 extending from side-to-side of the mattress, i.e., extending in the short dimension of the mattress, so as to permit a degree of articulation of the upper surface of the spring construction in the long dimension of the mattress, thereby to provide the greater flexibility of the spring construction in the direction along which the more drastic variations of the body weight of the occupant occur.

Each pre-assembled spring construction 12 and 14 is likewise encircled by a border frame 20 which may, as indicated in Figure 2, consist of similar helical tie wires threaded about the end convolutions of the peripheral springs of the upper and lower constructions.

The upper and lower spring constructions are co-extensive, and are assembled one on top of the other with a rigid sheet 22 sandwiched between the two constructions. As indicated, the sheet may consist of a plywood board which is covered on both faces by a layer of silencing material 23, such as burlap or other textile sheeting, to provide insulation between the hard surface of the board 22 and the metal springs 16. A quarter-inch thick sheet of common fir plywood has been found entirely adequate both from the standpoint of its rigidity and adaptation to readily available assembly methods, and will serve as an indication as to the desired properties of substitute materials which might be used.

The median rigid sheet 22 is preferably less than co-extensive with the superposed spring constructions 12 and 14, as indicated in Figures 1 and 2. These relative dimensions facilitate the firm connection of the upper and lower spring constructions to one another about the peripheries of their inner faces by hog ring clamps 24 or other permanent fastenings. As indicated in Figure 2, the clamps 24 should preferably encircle the end convolutions of the peripheral springs 16 as well as the border frame or wire 20.

The median sheet 22 is held securely to the spring con-

structions 12 and 14 by means of stables 26 which encompass the inner end convolutions of the springs of the two constructions, and are driven into the rigid median sheet. The staples are preferably emplaced where they will encompass the juxtaposed turns of springs in adjacent rows, additional staples being also employed to secure the outer portions of the peripheral springs to the median sheet.

While, as already indicated, the stiffening of the mattress by the use of the median rigid sheet 22 permits some degree of latitude in the choice of stiffness of the individual spring coils, it has been found that, with the present construction, a very satisfactory result is obtained by the use in both constructions of hour-glass type springs of $3\frac{3}{8}$ " diameter measured on the end convolution, having a height of $3\frac{3}{8}$ inches and being formed of four convolutions of $13\frac{1}{2}$ gauge spring wire, American Steel & Wire Gauge. These coils are assembled so as to comprise a total of 312 coils in each construction in a mattress of standard double size, i.e., the mattress having an overall width of approximately 54 inches.

As shown in Figures 1 and 2, the diameter of the convolutions of the individual coils 16 graduates rather abruptly from its maximum to a minimum of about $1\frac{3}{4}$ inches, viz., in approximately one convolution, which, in terms of the given pitch, produces a spring which is relatively soft in its initial compression, but stiffens markedly as the compression increases slightly. The overall effect, including that of the rigid median sheet 22, is one of greater initial softness with greater ultimate firmness than is usually found in other types of firm mattresses.

In accordance with the invention, the spring assembly is upholstered without tufts so as to provide throughout the main body of the mattress face a smooth flat appearance. This is achieved by first overlaying the outer face of the spring assembly with a protective layer 28 which in the present case consists of a thin but sturdy sheet of textile fabrics. This inner protective sheet preferably has overall dimensions exceeding the face dimensions of the spring assembly so as to provide a peripheral flap 30 which is turned inwardly about the edges of the face of the spring assembly. The precise character of the inner protective sheet is not material to the invention, other sheet like materials with sufficient strength to support the softer upper padding materials and to prevent them from working down into the springs being suitable substitutes. In the preferred embodiment, however, a thin sheet material is preferred for purposes of controlling the thickness of the mattress.

A thick batt 32 of soft padding material such as cotton or the like is placed over the inner protective sheet 28, and is then topped with the outer retaining sheet 34 of ticking. An inner peripheral flap 36, in the form of a continuous strip of woven textile material, is sewed to the inner surface of the outer ticking sheet 34 near its periphery, as indicated at 38, particularly in Figure 1. The flap 36 is the means by which the padding or upholstery material is secured to the spring assembly 10. As seen particularly in Figure 1, the inner peripheral flap 36, together with a substantial portion of the batt of soft padding material, is turned around the peripheral edge of the spring assembly, folded at 40 to double its thickness, and secured at its folded edge by means of hog ring clamps 42 or suitable substitute to the inner turns of the peripheral springs 16 of the spring assembly.

After both faces of the mattress have been upholstered in the manner described, the mattress is "closed" i.e., a continuous border 44 is stitched to the upper and lower face tickings 34. The border 44 is preferably of the padded type comprising an outer layer 46 of sturdy ticking material, a center layer 48 of padding material such as cotton felt or the like, and an inner layer 50 of textile sheeting, the several layers being secured together at appropriate intervals by cross-lines 52 of stitching which

extend in the vertical direction of the mattress and produce in the border a fluted appearance.

The border 44 is secured to the top and bottom face tickings of the mattress by stitching the edge of the outer layer 46 of the border to the edges of the face tickings 34 of the mattress in a taped seam 54 which extends continuously around the mattress at its upper and lower corners.

The improved mattress construction described above has a smooth external appearance, as indicated in Figure 3, due to the absence of tufting. The central median sheet unifies the action of the springs of the lower construction of the assembly to substantially stiffen or harden the mattress while the springs of the upper construction retain a degree of individual action which permits them to accommodate themselves to varying load exerted by a reposed body. The resulting mattress is firm in its overall character but does not have the extreme hardness of feel which characterizes the so-called "firm" mattresses now available.

Features of the invention believed new and patentable, are set forth in the following claims.

I claim:

1. A reversible mattress including a spring assembly comprising two superposed coextensive innerspring constructions secured together face-to-face by connections along their aligned marginal edges, said constructions having between them a substantially rigid sheet capable of distributing to a large area of one construction loads applied locally to the other, said sheet extending centrally of the adjacent inner faces of said constructions and having its edges spaced inwardly from the interconnected edges of said constructions, said sheet having on each side thereof a layer of sound deadening material between said constructions and said sheet, said sheet and sound deadening layers being secured to the inner faces of said constructions and held therebetween against lateral displacement, a smooth cushion on each outer face of said assembly comprising an uninterrupted outer sheet of ticking having secured thereto on its inner face and adjacent the marginal edges thereof a peripheral flap, an intermediate layer of soft padding material, and an inner protective layer for insulating said padding material from said spring constructions, each said cushion being secured to said assembly by attaching said peripheral flap to the inner convolutions of the peripheral springs of the adjacent construction, and a continuous border surrounding the edges of said assembly and secured to the outer tickings of said cushions.

2. A mattress including a spring assembly comprising two coextensively superposed innerspring constructions secured together by connections along their marginal edges, a substantially rigid sheet which is locally inflexible and which is interposed between said constructions for distributing to a large area of one of said constructions loads applied locally to the other, said sheet being less than coextensive with said innerspring constructions and being secured to the inner faces of said constructions centrally thereof with the edges of said sheet in inwardly spaced relation to said interconnected marginal edges of said innerspring constructions, padding material surrounding said assembly, and an envelope of ticking surrounding the whole.

3. A mattress including a spring assembly comprising two coextensively superposed innerspring constructions, each of said constructions comprising aligned rows of double-cone, vertical springs connected together in rows and in each row by helical tie wires threaded about juxtaposed portions of the end convolutions of the springs of adjacent rows, each construction also having at each face a border wire to which the peripheral springs thereof are secured, said innerspring constructions being secured together by connections joining the border wire and peripheral springs of one construction to the adjacent border wire and peripheral springs of the other construction, a

substantially rigid sheet which is locally inflexible and is interposed between said innerspring constructions for distributing to a large area of one of said constructions loads applied locally to the other, said sheet being less than co-extensive with said superposed innerspring constructions and being secured to the inner faces of said innerspring constructions with the edges of said sheet in inwardly spaced relation to said border wires, padding material surrounding said assembly, and an envelope of ticking surrounding the whole.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,978,715

April 11, 1961

Raymond H. Blecker

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant (only), lines 2 and 12, name of assignee, for "Simons Company", each occurrence, read — Simmons Company --.

Signed and sealed this 26th day of September 1961.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents

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