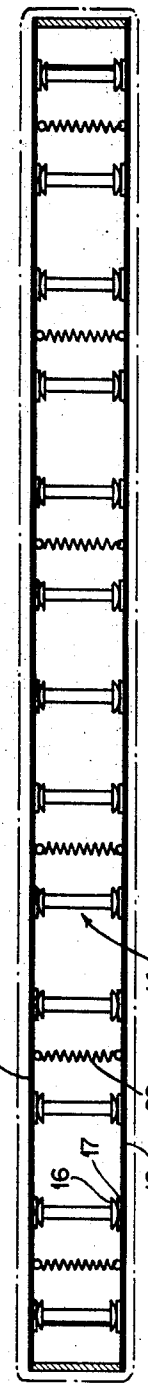
Dec. 15, 1970 JOSE DE ARAUJO BASTOS ET AL 3,546,724

MATTRESSES

Filed July 8, 1968 2 Sheets-Sheet 1

FIG.2



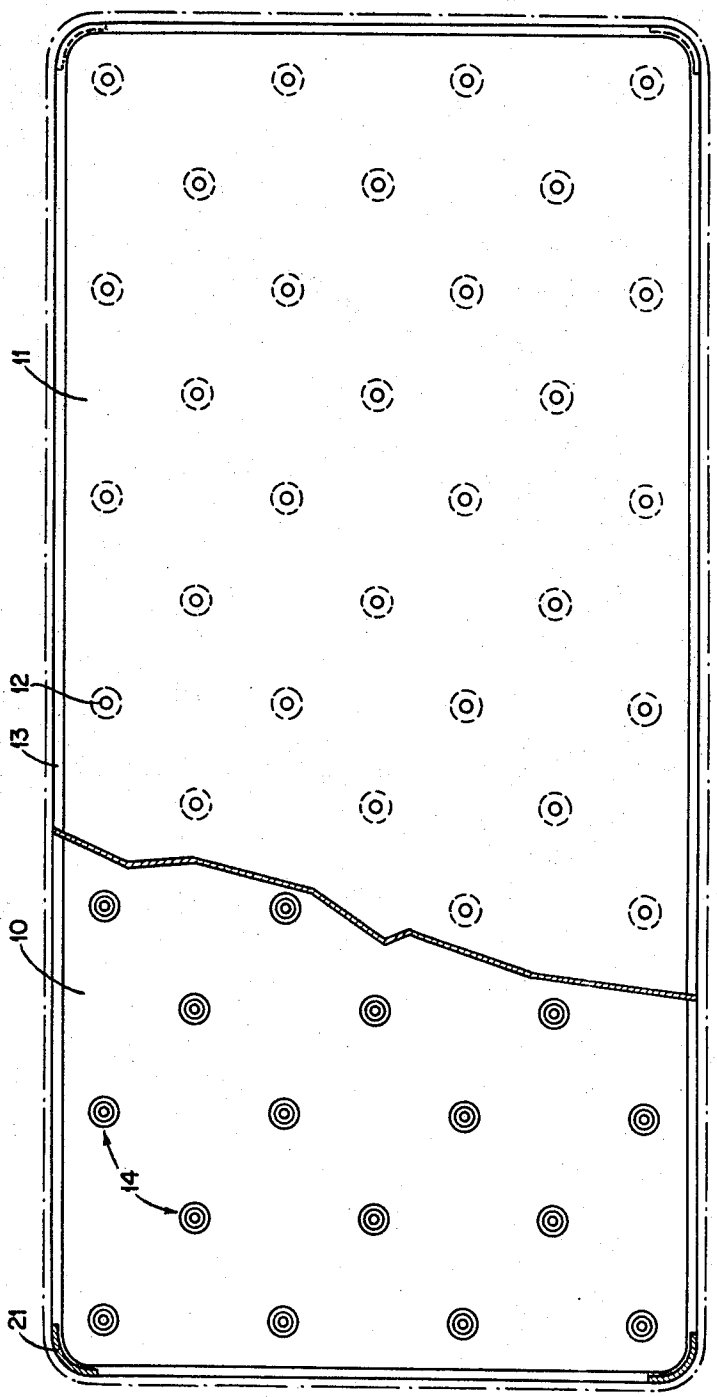


FIG.1

MATTRESSES

Filed July 8, 1968

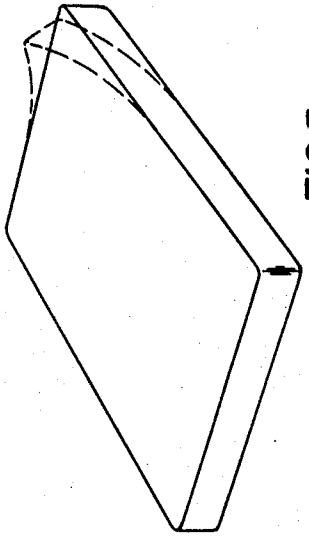


FIG.5

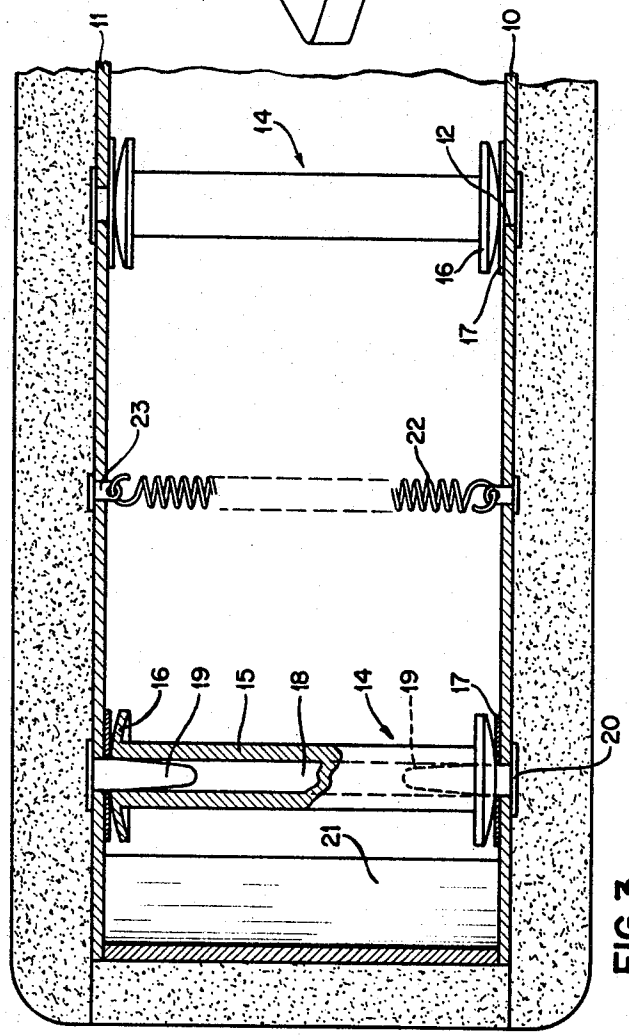


FIG.3

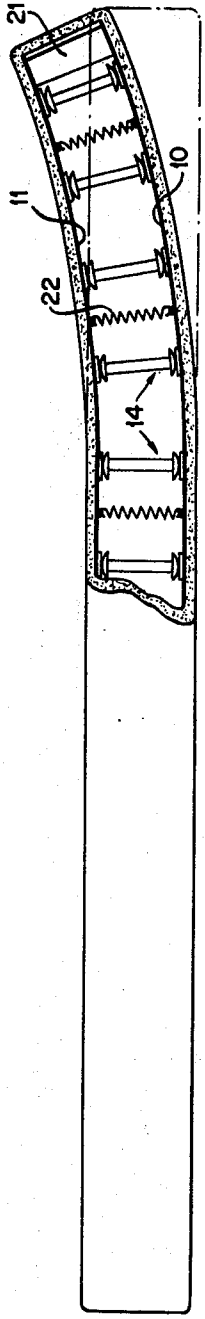


FIG.4

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3,546,724

MATTRESSES

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Int. Cl. A47c 23/00, 27/08
U.S. Cl. 5—351 3 Claims

ABSTRACT OF THE DISCLOSURE

An orthopedic mattress includes a pair of spaced apart non-deformable, flexible plates forming the top and bottom portions of the mattress. Rigid spacer posts are disposed between the plates as are springs under tension, the latter urging the plates toward each other to prevent unintentional separation and assuring that the plates will return to normal position after being flexed while applying bed covering thereto.

This invention relates to mattresses of the hard-surface type, frequently referred to as medicinal, clinical or orthopedic mattresses. Such mattresses, due to their structural non-deformability, do not deflect or sink under the weight of the body of the user.

The qualities of this type of mattress are highly beneficial to the health, and are expressly recommended in clinical cases where one desires to correct defects of the vertebral column frequently acquired through the steady use of relatively soft mattresses, such as those made mainly with springs. Hard-surface mattresses are also recommended in cases where the medical purpose, rather than corrective or therapeutical, is to prevent ailments of the spine from originating or becoming aggravated. However, for reasons always known but never solved, hard-surface mattresses in spite of their unquestionable advantage over those having a soft surface, have never been in a position to compete with soft surface mattresses commercially and have always been restricted within the narrow trade limits to which their medical purpose condemned them.

Since mattresses of this type had to have hard and inflexible top and bottom surfaces in order not to sink under the weight of the body of the user, they were always manufactured starting from basic internal structures as, for instance, simple pinewood packing-boxes or weighty and compact masses of pressed fibres, which were subsequently lined and coated in order to be given an acceptable outward appearance.

Said constructions, even though they permitted the manufacturing of hard-surface mattresses which reasonably satisfied the purposes of a specifically medical nature for which they were designed, did not solve relevant problems which had never been coped with by the specialized industry. Among such problems were: (a) the problem of internal ventilation of the mattresses, actually chronical in the case of said compact structures of pressed material; (b) the problem of the mattress weight which turned out to be too high, a circumstance that made their daily handling in homes and hospitals extremely difficult; and, finally, (c) the problem inherent to the absolute structural rigidity of such mattresses, which renders the household work of partly lifting them to place the borders and ends of the sheets under their sides and corners during the daily work of making up the bed, practically impossible.

Obviously shortcomings, such as the excess weight and absolute structural rigidity of said mattresses, which make the above referred-to normal work of a housewife difficult, have always been directly responsible for the commercial stagnancy to which all mattresses of the so-called medicinal type have come.

Accordingly, the primary object of the present invention is to overcome the aforesaid disadvantages of the prior art and to provide a mattress of the hard-surface type whose main advantage is that of combining apparently opposite attributes, viz the non-deformability of the mattress back under the weight of a person's body, utmost lightness and an outstanding structural flexibility capable of affording the housewife the possibility of partly raising the sides and corners of a mattress to put the borders and ends of the sheets under them with a minimum of effort.

Generally speaking, the improvements provided by this invention are fundamentally characterized by the fact that the internal structure of a medicinal-type mattress is made of two relatively thin plates which form the backs or upper and lower surfaces of the mattress, which are spaced from each other and are interconnected by support elements spaced therebetween, such as blocks, posts, poles, etc. Said support elements are fastened at their ends, by means of joints, to the internal opposite faces of said plates and are evenly distributed along the hollow internal area of the structure.

The invention is now more fully described with reference to preferred embodiments, illustrated in the accompanying drawings in which:

FIG. 1 is a top plan view, partly in section, of a mattress embodying the invention;

FIG. 2 is a side elevation, partly in section, of the mattress shown in FIG. 1;

FIG. 3 is a fragmentary section of the construction shown in FIG. 2;

FIG. 4 is a side elevation of the mattress with a portion of the cover removed and one end of the mattress being shown in a flexed position as would occur when applying a bed covering thereto;

FIG. 5 is a perspective view showing in dotted lines, one end of the mattress in a flexed position.

Referring to the drawings in detail it will be seen that the mattress includes two parallel plates, **10**, **11** which form the backs of the mattress. The plates are of generally rectangular shape and are made of plywood or the like. The surface of each plate is provided with small holes **12** arranged in parallel and equidistant rows extending longitudinally and transversely of the plate. The edges of the plates may be covered with metal strips **13** of U-shaped for example, which are properly fixed and designed to reinforce and protect said edges.

Between the plates **10** and **11** there is provided a backing structure formed by a plurality of inflexible support members, such as the poles or posts **14** arranged perpendicularly to the internal opposite faces of the plates, to which they are fixed by means of joints. Such poles are distributed in longitudinal and transverse rows, parallel to and equidistant from each other, in accordance with the above mentioned openings **12** as shown in FIG. 1.

Although such poles or posts may vary from the simplest cubic bodies to elements of the most complex design, one of the preferred embodiments is that shown in the drawings, specially in FIG. 3, where said posts or poles **14** are formed of an element having a shape similar to a spool, so as to provide an elongated, preferably cylindrical body **15**, the ends of which are provided with slightly convex support flanges **16**, whose external, somewhat bulged faces are disposed in such a manner that they enter in direct contact with the internal faces of the plates **10** and **11**, either by means of disks or perforated washers **17** of a resilient elastic material, which are disposed around said openings **12**.

In this preferred embodiment of the support poles, they have an axial hole **18** which receives in each end a locking pen **19** which passes through the openings **12** in the plates and through the opening in washer **17** into the axial hole **18**. The pin **19** is provided with a head **20** which limits the depth of its penetration into hole **18**. As seen in detail in FIG. 3 said locking pin **19** is in the form of an elongated cylindrical stopper, one of its ends being provided with a ring-shaped flange or head and the other end being rounded, and it is adapted to be inserted under pressure into the corresponding holes **12** provided in the plates **10** and **11** through the washers or support disks **17** and into the poles **14**. In order to guarantee the necessary linkage of the thus brought about fastening, said locking pins **19** are preferably made of a resilient material which must have a certain elasticity, as, for instance, rubber, or relatively flexible plastic or other proper material. Completing the system of support elements disposed between the parallel plates **10** and **11** the structure further comprises backing members or angle bars **21** provided in the four corners of plates and fastened to the internal faces of same by means of joints, in order to prevent possible displacements of the structure of the mattress when it is submitted to the lateral pressures resulting from the lifting of part thereof, as shown in FIGS. 4 and 5.

Arranged between the internal opposite faces of the plates and properly distributed among the posts or poles of the structure are provided fastening means perpendicular to the plates and preferably consisting of small spiral draw springs **22** which remain in a drawn position with some degree of tension between said plates. Said springs are fastened to the respective plates by pins **23** fixed therein. Naturally said fastening means, above referred-to as draw springs, may be of any type provided it affords sufficient tension capable of preventing the mutual separation of the plates **10** and **11** and guaranteeing the harmonious flexibility of the structure in conformity with the invention.

From the above we see that the structure described above not only provides a highly pressure resistant mattress surface but also provides an extraordinarily light mattress considering that the pair of plates as well as the poles, angle bars and fastening means represent, as a whole, a total weight which is much less than to the total weight of any known mattress, either of hard or soft surfaces, which are provided with internal structures. An additional advantage of the structure, according to the present invention is the degree of internal ventilation it gives the mattress, since the space between the plates remains entirely free, thus affording a large area for air circulation in the inside of the mattress. In the body of the lining or occasionally in said lower and upper plates, conventional orifices or air vents may be provided to permit the circulation of outside air throughout the mattress.

In the mattress structure described above, the outer faces of the plates are coated with a layer of suitable material such as rubber foam, of sufficient thickness to offset the rigidity of the plates and to prevent the mattress from adversely affecting the circulation of the blood flow in the part of the body resting on them.

What is claimed is:

1. A non-compressible mattress having non-deformable, flexible body supporting surfaces comprising a pair of parallel, non-deformable, spaced apart, body supporting, flexible plates, a plurality of rigid, inflexible spacer posts disposed perpendicularly between said plates, articulated connection means joining said posts to each of said plates, and fastening means connected to each of said plates urging said plates toward each other, whereby the mattress sides and corners can be flexed and raised sufficiently to conveniently permit placing the marginal edges of bed coverings beneath the lower surface of said mattress.

2. A mattress according to claim **1** wherein each of said plates are provided with a plurality of similarly spaced openings, each of said posts are tubular and are provided at each end with a convex flange, and the means connecting said posts to said plates comprises locking pins passing through said openings in said plates and into the tubular posts.

3. A mattress according to claim **1** wherein the fastening means connected to each of said plates comprises a plurality of springs under tension.

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