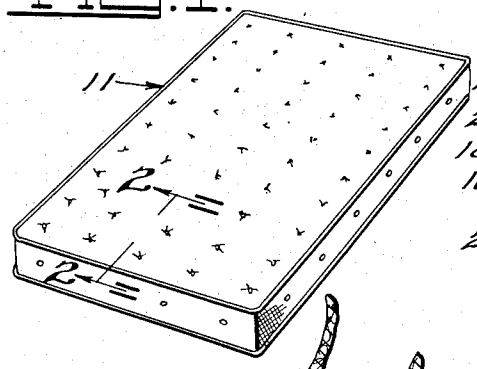
Nov. 10, 1942. H. E. WELLS 2,301,596

MATTRESS OR THE LIKE

Filed Dec. 14, 1939

Fig. 1.



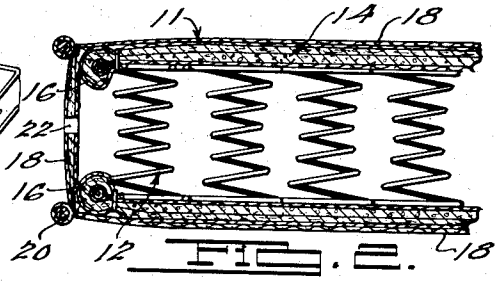


Fig. 2.

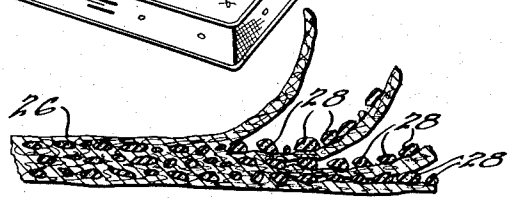


Fig. 4.

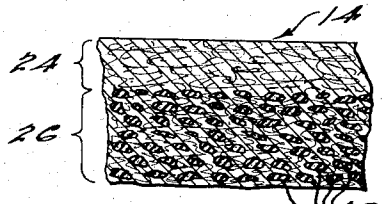


Fig. 3.

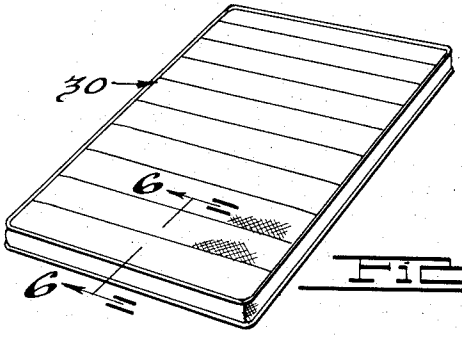


Fig. 5.

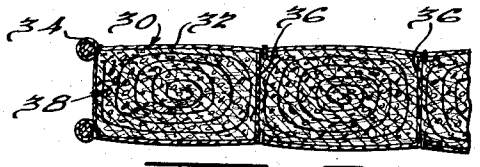


Fig. 6.

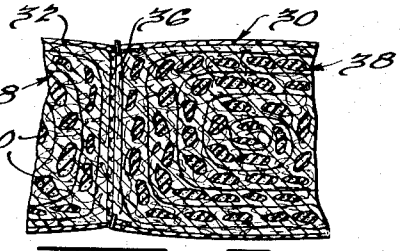
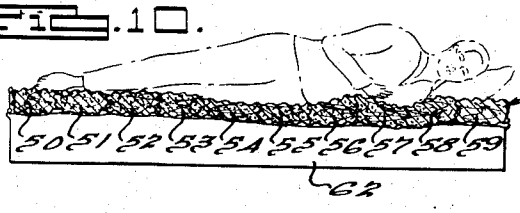


Fig. 7.

Fig. 10.



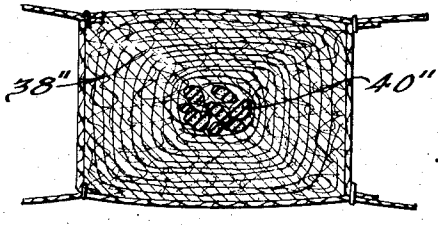


Fig. 9.

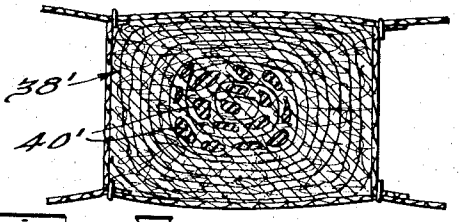


Fig. 8.

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UNITED STATES PATENT OFFICE

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MATTRESS OR THE LIKE

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Application December 14, 1939, Serial No. 309,181

1 Claim. (Cl. 5—361)

This invention relates to mattresses or other padded articles such as upholstery or the like and has for its principal object the provision of a device of this type including fibrous padding elements so constructed and arranged that they will retain their resiliency over a relatively long period of time without becoming permanently packed.

While for the purpose of simplicity of description herein reference will be made primarily to the use of the present invention in connection with mattresses, it will be understood that the present invention is applicable to any padded article in which the padding is made up of cotton or other similarly loosely associated fibers including, for instance, pads or padding of various kinds and descriptions, upholstery units for mattresses, automobile seat cushions or the like, and in its broader use the term "mattress" is to be considered, both in the specification and claims hereof, as including such other articles.

Mattresses, whether they be of the so-called inner spring type or of the solid type as conventionally constructed, are made up from or include cotton fibers usually in the form of bats. These cotton fibers become compacted or compressed under the application of a constant weight as, for instance, the weight of a person resting upon the same, with the result that in time and usually altogether too quickly the mattress loses its softness and becomes permanently hard and uncomfortable to the average person.

Objects of the present invention include the provision of a mattress or the like including a mass of cotton or other fibers which mass is so constructed and arranged as to largely eliminate permanent compression or packing of the same; the provision of a mattress or padding for the same or related objects including a mass of fibrous material with readily compressible means cooperating therewith materially more resistive to permanent packing than the fibers themselves, and operating to relieve the fibers of a packing effect thereon upon relieving of the weight tending to cause such packing; the provision of a mattress or related padded element including a mass of fibers in which readily compressible means more resistant to packing than the fibers is interspersed uniformly or otherwise through the mass of fibers whereby to be subjected to compression simultaneously with compression of the fibers, but acting after the compressive force has been relieved to return to its normal size and, therefore, aid in returning the mass of fibers to its original size and condition; the provision of a mattress or related padded element including a mass of fibers in which readily compressible means particularly resistant to becoming set under deformation is associated with the fibers in a predetermined manner whereby to effect a loosening of the fibers upon relieving of any stress thereon tending to cause the fibers to become packed; the provision of a mattress or related padded element including a mass of loosely associated fibers in which particles of rubber, and preferably sponge rubber, are cooperatively associated with the fibrous mass in such a manner to aid the fibrous mass in resisting a packing effect upon it upon being relieved of a packing force; and the provision of a mattress or related padded element including a mass of relatively loose action or other fibers having a plurality of relatively small particles of sponge rubber uniformly or otherwise dispersed through the mass of fibers.

Other objects of the invention include the provision of a method of making a mattress or other related padded element including a mass of fibrous material whereby to condition the mass of fibrous material against packing in service; and the method of manufacturing a mattress or other related padded article including a mass of fibrous material so as to provide such mass of fibrous material with relatively small particles of sponge rubber arranged therein in a predetermined manner.

The above being among the objects of the present invention, the same consists in certain novel features of construction, combination of parts, and steps of operation to be hereinafter described with reference to the accompanying drawing, and then claimed, having the above and other objects in view.

In the accompanying drawing which illustrates suitable embodiments of the present invention and in which like numerals refer to like parts throughout the several different views,

Fig. 1 is a perspective view of a mattress constructed in accordance with the present invention;

Fig. 2 is an enlarged fragmentary sectional view, taken on the line 2—2 of Fig. 1; the same being a partial section through the mattress shown in Fig. 1;

Fig. 3 is an enlarged fragment of a portion of the padding employed in the construction shown in Fig. 2;

Fig. 4 is a more or less diagrammatic view illustrating the manner in which the padding illustrated in Fig. 3 may be manufactured;

Fig. 5 is a perspective view of a different form of mattress constructed in accordance with the present invention;

Fig. 6 is an enlarged fragmentary sectional view taken transversely through the mattress shown in Fig. 5 as on the line 6—6 thereof;

Fig. 7 is an enlarged fragment of the view shown in Fig. 6;

Figs. 8 and 9 are views similar to Fig. 7, but illustrating modified forms of construction;

Fig. 10 is a transverse sectional view taken longitudinally through a mattress of the same general type as shown in Fig. 5, but constructed in a modified manner and illustrating its action in response to the effects of the weight of a person lying upon the same.

The public generally demands that a padded article be relatively soft to the touch. The padding of such article is generally constructed from relatively loose cotton or other fibers, but cotton is almost universally used because of its relative cheapness and unlimited supply. While such cotton, usually in the form of a bat, may be originally arranged in the padding so as to impart to it the desired softness to touch, its characteristics are such that under a prolonged compressive stress, as under the weight of a person, it is compacted or compressed and gradually takes a set in its compressed state, which destroys its softness to touch and therefore its desirability. This is true even though such padding is associated with an upholstery or other spring units designed to enhance the yieldability of the structure as a whole, for in cases where a mattress, automobile seat cushion, or other upholstery unit, or the like, including such spring units, is designed to support the weight of a person, the springs must necessarily be of such strength and therefore rigidity as to form a sufficient support for the weight of a person, and such rigidity is too great to particularly enhance the softness of the structure to the touch. The padding in such cases is employed to give the necessary softness of touch to the structure and, accordingly, in constructions as heretofore produced, is subject to the same disadvantageous effects of permanent packing or set as in the structures formed solidly from such fibres.

It is the principal object of the present invention to so construct the padding of the type described as to substantially prevent any permanent packing or set of the same from occurring, thereby enabling such padding to be provided which will substantially retain its original softness to the touch throughout its life. This is accomplished by enclosing within the mass of fibers of the packing, interspersing throughout the mass of fibers of the packing, or otherwise distributing or arranging in the mass of fibers a mass of material preferably having a degree of yieldability approaching that of the mass of fibers as originally presented, but of a character such that it is particularly resistant to becoming set even under a prolonged compressive stress. Being included in the mass of fibrous material and therefore being subject to compression simultaneously with it, it will be appreciated that upon relieving of the compressive stress, it will return to its originally uncompressed condition and in doing so will serve to loosen up the fibers of the mass and aid them to return to their originally uncompressed condition or to a condition closely approaching the same.

Preferably, such readily compressible material resistant to permanent deformation or set comprises a mass of relatively small particles of soft rubber and, in the broader aspects of the invention, uniformly or otherwise dispersed through the mass of fibrous material. Preferably, such mass of relatively small particles is composed of what is commercially known as sponge rubber (that is a rubber material having a multitude of small gas bubbles entrapped therein), preferably in a macerated or shredded condition exposing on the various surfaces thereof the interstices in the sponge rubber at the boundary layer thereof, and which therefore imbues such particles with a particular affinity to the various individual fibers of the mass, which thereby act to hold and retain such particles in a predetermined or otherwise distributed condition in the mass of fibers. It will be appreciated that when a mass of cotton or other fibers having a mass of relatively small particles of sponge rubber interspersed therethrough is employed as a padding, such padding will have a softness of touch closely approaching the original softness of touch of a padding made up of a loosely associated mass of the fibers alone. It will have this difference, however, that when any force which has compressed the padding is relieved, the particles of sponge rubber will instantly tend to expand to their originally free condition and in doing so will act to separate the various fibers of the mass and return it to its originally loose condition. Thus, a padding may be constructed in accordance with the present invention that will have the characteristic of having a softness of touch that will be retained in substantially unvaried condition throughout its life under ordinary usage.

In order to more clearly understand the present invention, reference may be had to the accompanying drawing and particularly to the construction illustrated in Figs. 1 to 4 thereof. The mattress, indicated generally at 11 in Fig. 1, is of conventional appearance and, except for the particular construction of the padding hereinafter more clearly described, may be of any suitable or conventional construction. For instance, referring to Fig. 2, it will be noted that the mattress 11 is of the so-called inner-spring type, in which a spring assembly, indicated generally at 12, is positioned interiorly of the mattress and forms a core upon which the padding or covering elements are built up. A padding element, indicated generally at 14, overlies both the top and bottom surfaces of the spring unit 12 and the marginal edge portions of such padding are preferably turned around the marginal edge portions of the spring unit 12, as indicated at 16, and suitably secured thereto. A covering 18 envelopes the whole and is preferably provided with welts or beads 20 around the outer margins of the top and bottom panels of the covering. This covering is also preferably provided with openings such as 22 in the side portions thereof between the layers of padding 14 so as to permit relatively free circulation of air through the central portion of the mattress not only to permit any moisture that may be absorbed by the padding to be readily dispersed, but also to better maintain the mattress in a sanitary condition by permitting a more or less constant airing of the same.

In the particular construction illustrated in Figs. 1 to 4, inclusive, it is the particular construction of the padding 14 with which the present invention is concerned. Referring now to Fig. 3 it will be noted that the padding 14 comprises two main layers 24 and 26, respectively,

the layer 24 being positioned outwardly of the layer 26, but in actual practice it will be understood that both layers 24 and 26 combine to form a single layer 14. In the construction illustrated in Fig. 3 the outer layer 24, which may be made of any suitable loosely associated fibers but will ordinarily be formed of cotton in the form of bats, is entirely free of any foreign inclusion. The layer 26, however, which may be and usually will be formed of the same kind of fibers as the layer 24, has interspersed therethrough a plurality of relatively small particles 28 of a material that is readily yieldable but particularly resistant to taking a permanent set under prolonged compressive stresses. While in the broader aspect of the present invention these particles 28 may be formed of any suitable material having a resiliency preferably approaching that of a cotton bat in which the fibers are in a relatively free state, and materially more resistant to becoming set under prolonged compressive stresses than the cotton bat itself, such particles are preferably formed from soft rubber or compounds thereof, but in accordance with a more limited phase of the present invention these particles are formed from sponge rubber.

In the broader aspects of the invention these particles 28 may be interspersed throughout the mass of fibers in the layer 26 uniformly or otherwise and by any desired method. However, it will ordinarily be found most convenient to introduce the particles 28 into the layer 26 by interposing such particles between the various layers of a cotton bat as illustrated more or less diagrammatically in Fig. 4. This introduction of the particles 28 between the various layers of a bat may be accomplished after the bat has been formed and even cut to size by separating the various layers thereof or combinations of layers thereof and simply sprinkling or otherwise distributing the particles 28 over the surface of such layer or combination of layers. On the other hand these particles 28 may be introduced into the bat during the process of building it up out of relatively thin individual layers in accordance with conventional practice in a garnetting machine.

In the construction illustrated in Figs. 1 to 4, inclusive, the particles 28 are not provided in the layer 24 for the reason that under some conditions the particles 28 may create a certain amount of unevenness to the surface of the bat containing them and, accordingly, the layer 24 is provided for the exterior surface of the padding 14 so as to eliminate the possibility of such unevenness and to enhance the appearance of the mattress. The layer 26 of the padding 14, however, is relied upon for maintaining the softness of the padding 14 to the touch.

As previously mentioned, the particles 28 are preferably formed from sponge rubber and preferably formed by mascerating or otherwise separating a larger piece of sponge rubber into relatively small particles. By following out this procedure, it will be appreciated that substantially all of the exposed surfaces of such particles present a multitude of relatively small openings or interstices therein, formed by the air bubbles trapped within the rubber during its process of manufacture. It has been found that when a particle of sponge rubber of the character described is introduced into a loose mass of cotton or similar fibers, the ends of a great number of such fibers find their way into a great many of the small openings in the surface of the particles and tend to hold themselves therein. Thus such particles have a peculiar affinity to the fibers which, without the aid of any other means, serve to adhere one to the other and thus serve to maintain the position of the individual particles throughout the mass. Thus once the particles are distributed through the mass of fibers they invariably retain the relative position in the mass without material displacement.

It will be understood that when a person rests upon the mattress illustrated in Figs. 1 to 4, inclusive, the padding layer 14 is compressed by the weight of such person over the area through which the weight of the person is transmitted to the mattress to a degree depending upon the distribution of the weight of such person. The layers 24 and 26 are both compressed under the application of such weight and both the particles 28 and the mass of fibers in the layer 26 are compressed. As soon as such person arises from the mattress and the mattress is therefore relieved of the person's weight, the fibers of the layers 24 and 26 will, of course, tend to return to their original condition, as will be particles 28. However, because of the inherent characteristics of such fibers and particularly cotton fibers as conventionally employed in such instances, constant recurrence or prolonged application of such compressive stresses tends to cause a permanent set in the condition of the fibers which, unless corrected, would finally cause the padding to be permanently packed or set and thus rendered less soft to the touch. However, the particles 28 being materially more resistant to taking a permanent set under such conditions, tend to immediately return to their original free condition and in doing so separates the various fibers and layers of fibers in the layer 26 and thus bring the various fibers thereof to their original condition of looseness. This action on the part of the particles 28 in returning the fibers to their original condition of looseness obviously eliminates the possibility of the fibers taking a permanent set and maintains such mass of fibers substantially in its original loose state and thereby prevents a loss of the softness to touch thereof. It may be noted that the inclusion of the rubber particles in the manner described does not detract from the ability of the padding to allow air to seep or circulate through it, and consequently its characteristics in this respect are not impaired.

In Figs. 5, 6 and 7, a modified form of construction is illustrated. The mattress indicated generally at 30 in these figures is also conventional in appearance and, as in the previously described case, except for the construction of the padding material itself, is built in a conventional manner. For instance, as best illustrated in Figs. 6 and 7, an external covering indicated at 32 is provided and preferably with beads or welts 34 at the marginal edges thereof corresponding to the beads of welts 20 previously described. In this case, however, no inner spring is used. Instead, transversely extending walls or webs 36 of a height equal to the desired thickness of the mattress, are interposed between and connected to the top and bottom panels of the cover at more or less regular intervals over the length of the mattress and preferably extend the full width thereof. In each of the pockets thus formed between the top and bottom panels of the covering 32 and between each adjacent pair of walls 36, and between the end walls 36 and the corresponding end walls of the covering, a mass of padding indicated generally at 38 is inserted. While such

mass may be in the form of simple superposed layers of cotton or other fibrous material in bat or other form, or may be formed by rolling up a bat of such material, the latter is shown by way of illustration and accordingly, each mass 38 is made up by taking a suitable length and width of cotton bat and simply rolling it up. However, in accordance with the present invention the bats from which the rolls 38 are formed are interspersed with small particles 40 of material corresponding in all respects to the particles 28 previously described, and which may be inserted in or distributed through the bat in exactly the same manner as previously described.

It will be appreciated that the type of mattress illustrated in Figs. 5, 6 and 7 is considerably more susceptible to losing its overall softness or resiliency over a protracted period of use inasmuch as the inner springs employed in the first described construction will retain their resiliency in substantially unaltered condition throughout its life regardless of the fact that the padding 14 may lose its softness to touch. Accordingly, it is much more important in connection with a mattress or other padding of the general type illustrated in Figs. 5, 6 and 7 that some means be provided to prevent the fibrous material from taking a permanent set under compression and it will also be appreciated that the means provided in accordance with the present invention will effectively accomplish this purpose and that whenever a compressive force on the mattress illustrated in Figs. 5, 6 and 7 is relieved, the particles 40 in tending to instantly expand and reassume their originally free condition, will tend to loosen up and separate the various fibers in the rolls 38 and thus return the fibers to their originally loose condition.

It is not essential that the particles 28 or 40, as the case may be, to be uniformly dispersed through their corresponding layer or mass of fibers as illustrated in Figs. 1 to 7, inclusive, as it will be apparent that under some conditions a variation in the concentration of such particles may be desirable and may readily be provided. For instance, referring to Fig. 8 which illustrates a construction of the same general character as illustrated in Figs. 5, 6 and 7, and in which equivalent parts are illustrated by the same numerals except that such numerals bear a prime mark, the particles 40' are provided in a condition of greater concentration in the central portion of the roll 38' than in the outer portion thereof, the concentration gradually becoming less from the center outwardly. This may be accomplished by application of the particles 40' to one end portion only of the bat before it is rolled up into roll form and in such case it will be appreciated that a condition similar to that provided in the padding layer 14 in the construction illustrated in Figs. 1 to 4, inclusive, will result.

On the other hand, and as illustrated in Fig. 9 which also shows a construction similar to that shown in Fig. 7 and in which, accordingly, equivalent parts are indicated by the same numerals except that such numerals bear a double prime mark, no particular attempt is made to intersperse the particles 40'' throughout the fibers of the roll. Instead, such particles are concentrated in the central portion of the roll 38'' substantially to the exclusion of the remaining portion of the roll 38''. This type of construction may be readily obtained by simply applying the entire mass of rubber particles to be included in the roll 38'' to that end of the bat at which the rolling is initiated in rolling up the bat to form the roll 38. It will also be appreciated that in the construction illustrated in Fig. 9 the relative size of the particles 40'' does not bear the same importance as in the previously described constructions but in this case may be substantially larger.

In accordance with a further phase of the present invention, the type of construction illustrated generally in Figs. 5 to 9, inclusive, may be employed to obtain still other characteristics in a mattress or other padding of the type under discussion. For instance, referring to Fig. 10, a mattress of the general type illustrated in the preceding figures is shown in longitudinal section and with a person resting upon the same. The individual rolls of such mattress corresponding with the rolls 38 and/or 40 previously described are illustrated at 58 to 59, inclusive. The mattress which is indicated generally at 60 in Fig. 10 is shown as resting upon a conventional spring unit 62 in a conventional manner. Now the weight of a person's body is generally concentrated to a greater extent in the area of his hips and to a lesser extent in the area of the shoulders and, accordingly, the rolls 54 and 55 which receive the hips are compressed to the greatest extent by the weight of the person, the rolls 57 and 58 supporting the shoulders to a lesser extent, and the remaining rolls a still lesser extent. The fibrous materials composing the rolls 54 and 55 will thus be subjected to a greater tendency toward taking a permanent set than the rest of the rolls, and the material of the rolls 57 and 58 than the remaining rolls. Accordingly, in order to render such mattress 60 more or less equally responsive throughout its length in its tendency to offset any permanent packing effects thereon, the concentration of the rubber particles in the rolls 54 and 55 is illustrated as being greater than the concentration of such particles in the rolls 57 and 58, and the concentration of these particles in the latter rolls as being greater than in the remaining rolls, and in some cases it may be desirable to even entirely eliminate such particles from the end rolls 59 and 59 which seldom, if ever, are subjected to any great compressive stresses. Obviously, this variation in the concentration of the rubber particles in the rolls or layers of the fibrous material may be varied throughout any layer of padding, whether made up of rolls or otherwise to obtain any desired condition or effect.

Other specific adaptations of the principles of the present invention will, of course, be apparent to those skilled in the art once the teachings of the present invention are made known to them, and accordingly it will be understood that formal changes may be made in the specific embodiment of the present invention described without departing from the spirit and substance of the broad invention, the scope of which is commensurate with the appended claim.

What is claimed is:

A mattress or other upholstered device comprising a spring unit and padding overlying the face of said unit and including a layer of relatively loose fibers, a plurality of relatively small particles of sponge rubber interspersed through that portion of said layer nearest said spring unit, and that portion of said layer most remote from said spring unit being substantially devoid of material amounts of said sponge rubber.

HARRY E. WELLS.