

March 23, 1943.

W. DE FRIES

2,314,482

MATTRESS AND THE LIKE

Filed March 27, 1940

2 Sheets-Sheet 1

Fig. 1.

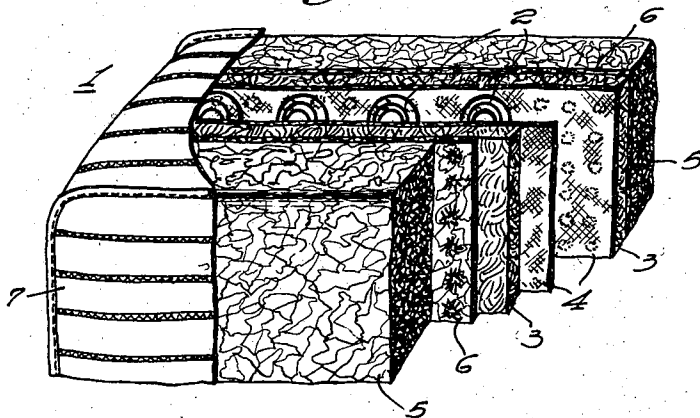


Fig. 2.

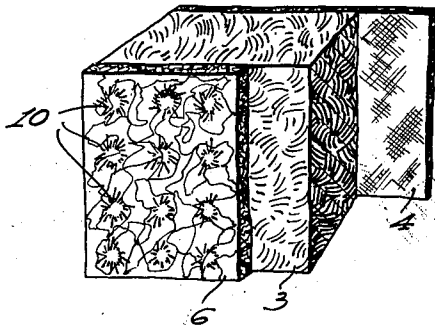


Fig. 3.

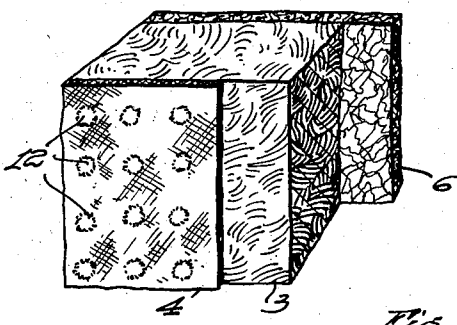


Fig. 4.

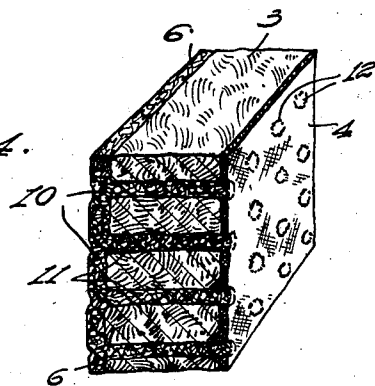
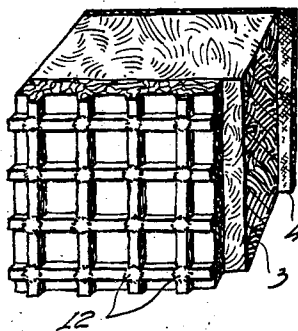


Fig. 5.



WITNESSES:

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Fig. 6.

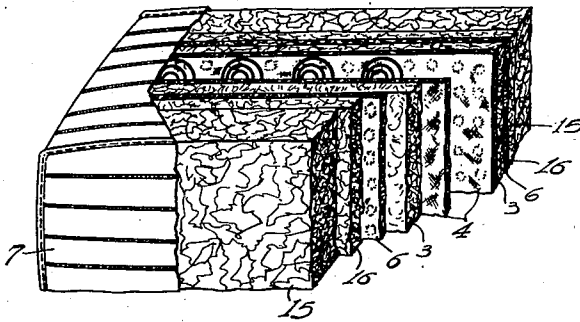


Fig. 7.

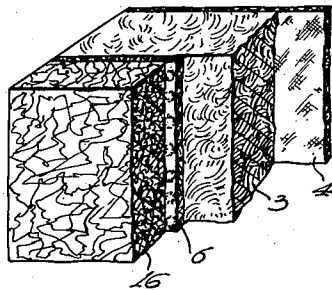
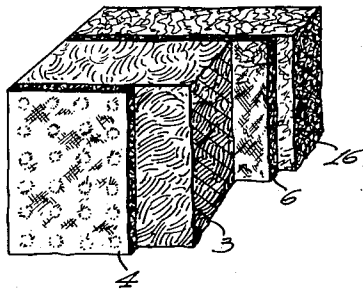


Fig. 8.



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2,314,482

MATTRESS AND THE LIKE

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Application March 27, 1940, Serial No. 326,202

3 Claims. (Cl. 28—79)

This invention relates to the manufacture of mattresses and other upholstered articles and particularly the preferred type of such articles having a smooth exterior finish.

This application is a continuation-in-part of my copending application Serial No. 213,576, filed June 14, 1938.

It is customary to use various types of pads and filling in the manufacture of this merchandise, usually assembled with individual steel springs or prebuilt spring units, the padding and filling being spread over the surface formed by the spring assembly and being secured thereto by some manner of stitching or tufting either inside of the outer cover or even through the latter, to prevent shifting and dislocation of the different paddings or upholstery materials from their desired positions relative to each other. Such assembly methods usually leave some lines or points of indentations, such as tufts, the elimination of which is desirable in the interest of better appearance and easier cleaning, particularly on merchandise styled in the modern manner featuring designs of relatively large unbroken areas.

One object of the present invention, therefore, is to eliminate the familiar tufting practice and replace it with other means for prevention of relative shifting of the paddings.

Felt prepared from staple cotton or cotton linters is one of the most common types of padding utilized in goods of the nature referred to. Where used in connection with cushion spring assemblies, it is normally underlaid with a sheet of woven material, such as burlap and jute or a pad prepared from longer vegetable fibers, such as sisal and the like, which "bridges" the open surface area of the spring assembly and thus prevents the felt from working down into them.

No methods other than sewing, stitching, or tufting have been found commercially successful prior to my present invention for securing the majority of domestic cotton felts to a backing of woven sheeting or carded unspun fibers. Attempts to "punch" or "needle" the comparatively short fibers of such cotton felt batting in its usual thickness to an underlying fabric or fiber base have failed to yield useful results. Other efforts to secure a bond between two such layers by means of an adhesive, such as, for instance, silicate of soda or latex, have proved too costly, as the open or rough surface of each of the materials did not lend itself to an economic or effective application of any adhesive compound.

Searching for an explanation of the known difficulties of effecting such bond by "needling" or "punching" the shorter cotton or linter fibers into the carded base of longer fibers, I found that the majority of domestic staple cotton or linter clings to its adjacent fibers with more tenacity than to the punching needle, so that the latter

cannot punch a number of these fibers from a felt batt of average thickness into the underlying base. By reducing the thickness of such batts, more favorable results were obtained, particularly after the cotton felt was prepared from a cotton characterized by the "harshness" of its fiber. Such material may comprise certain imported staple cottons or bleached domestic linters, for example. Again the surface characteristics of the base fiber are of importance as causing the cotton fiber adhering to the needle to strip readily therefrom and to cling to the base fiber. I find that coir (cocoanut husk) fiber, with its rougher surface, is preferable for my purpose, although sisal, manila, palm or other long fibers may be employed in achieving certain of the advantages of my present invention.

Thus, by covering a carded coir fiber base pad, inherently having relatively long, harsh, unspun fibers, with a rather thin layer (or series of layers) of harsh staple cotton felt (the fibers being less harsh than those of the coir base), I have been able to produce a mechanical bond between these two materials by means of needling or punching.

If only one thin layer of harsh staple cotton felt is applied, the described combination, by itself, is not suited as a filler for upholstered merchandise for the reason that the structural firmness of the web-like cotton felt topping has inadequate body to hold together properly and needs reinforcing to meet satisfactory service requirements. I therefore press additional layers of standard staple cotton or linter felt into the base layer, again securing a satisfactory bond by the well-known knitting action of felted cotton fibers with each other. Should this accumulation of felted cotton pads on top of each other produce a fluffiness of a degree which would cause permanent compression under repeated load or use—known in the trade as a body impression and appearing eventually on most all mattresses which are filled with blown or felted staple cotton, or cotton linter exclusively—I prefer to punch one or more additional layers of harsh cotton felt onto the base layer, building up by such action a punched felt foundation, which has adequate compressive strength to yield under normal loads without taking a permanent set. The number and thickness of the top felt pads pressed onto this foundation may then be reduced to no more than required to smooth out the punching indentations and thus obtain the desired smooth surface. Thus, cotton felt padding of any composition and in any desired thickness may be joined to a carded long fiber base by the use of an intermediate layer or layers of preferably harsh cotton felt, needled to the base.

Whereas under present economic conditions in the world cotton markets, a greater length of

such harsh fibers with respect to the felt batt fibers may prevail, such a condition is not essential to my present invention. The essential difference is that the thin intermediate layer of cotton must have harsh and stiff fibers, which adhere to the punching needle on its down stroke, yet strip readily therefrom on the pull-out stroke of the needle.

A further object of my invention is, therefore, to provide an upholstery material suitable for use as a spring insulator as well as a resilient padding, comprising a base layer of relatively long and firm garnetted fibers and a top layer of relatively short and soft fibers likewise garnetted or felted, with a resultant surface which will not knit with or adhere to that of the base layer, and to join these two through the medium of an intermediate layer composed of garnetted or felted fibers, whose harshness permits some of their strands to be punched into the base layer, so as to form a mechanical connection therewith, and whose free surface offers, through the interlacing action of its fibers, adequate adhesion for the top layer to prevent its sliding or shifting relative to the lower layers.

As an added feature of my invention, I have found that the bonding or knitting action between the top and intermediate layer of the cotton felt may be increased by forming one or both of the contacting surfaces with frequent indentations placed at random or in keeping with a certain pattern, as, for instance, the familiar waffle design. Such unevenness of one surface requires the contacting material to conform thereto, when it is pressed on and thereby aids further in preventing any shifting or sliding action along the line of cleavage between any two sections.

A further object of my invention is to provide upholstery material of the combined character set forth above, in which the long unspun fibers are preferably coir fibers.

Still other objects of my invention will become evident from the following detailed description, taken in conjunction with the accompanying drawings:

Figure 1 of which is a view, partially in perspective and mainly in section with parts broken away, of a mattress or the like constructed in accordance with my present invention;

Figs. 2, 3 and 4 are fragmentary views showing on a magnified scale portions of the layers of material shown in Fig. 1;

Fig. 5 is a fragmentary view of a modified form of the invention; and

Figs. 6, 7 and 8 are views similar to Figs. 1, 2 and 3, respectively, of a modified form of my invention.

Referring to the drawings, I show therein a mattress 1 or the like, which may be provided with the usual series of individual coiled springs 2, braced or secured together in any familiar manner, which does not concern my present invention. On each side of the springs a pad 3 of felted long fibers, preferably coir fibers, is provided, being preferably backed on the face next to the spring ends by burlap or jute sheets 4, although these are not necessary in order to obtain the advantages of my present invention.

Top and bottom relatively thick layers 5 of cotton batts or felt made from short fibers of staple cotton or cotton linters are provided for affording the softness and depth required in a comfortable mattress or the like, and these outer layers 5 are maintained in position by reason of the interposition of a relatively thin layer 6 of harsh

fiber cotton felt or the like, which is disposed between the outer layer 5 of short fibers and the inner or base layer 3 of coir fibers.

The fibers of layer 6 are preferably of vegetable origin or their synthetic substitutes such as scrap rayon or "Nylon" fiber, which materials are materially cheaper and more readily available than long fibers of animal origin, such as horse, cow or pig hair.

The layers 3, preferably of coir fiber, may, as noted above, comprise other long unspun fibers, such as sisal, manila or palm fibers, although I have found that coir or cocoanut husk fibers are best suited for my purpose. The intermediate binding layers 6 are formed of some cotton felt characterized by the harshness of its fiber, such as certain imported staple cottons or bleached domestic linters, for example, or their synthetic substitutes. The harshness of such fibers permits the punching of their strands into the underlying coir fiber base, and this operation provides a relatively irregular or rough surface which causes the softer fibers of the ordinary cotton batts 5 to conform thereto and interlace with the intermediate felt layer to such an extent that the cotton batts or outer layers 5 do not shift or bunch with respect to the underlying layers.

Preferably the layers of long unspun fibers 3 and harsh cotton fiber 6 are needed to a reinforcing burlap base 4 with layers 4 and 6 on opposite sides of layer 3, as explained in more detail in connection with Figs. 2, 3 and 4. After this needed pad has been prepared, however, there is no needling, sewing or use of adhesives, as taught by the prior art, necessary in order to bond the outer layers of cotton batts 5 firmly in position.

The entire layer structure, as shown in Fig. 1, is covered by a suitable upholstery cover or ticking 7 bound at the edges in accordance with familiar practice.

Referring to Figs. 2, 3 and 4, the layer 3 of coir fibers is shown as backed by a burlap layer 4 and topped by a thin layer 6 of the above-mentioned harsh fiber cotton. The depressions or indentations 10 on the outer surface of the layer 6 indicate the entry points of a needle or punch of a familiar type which carries some of the fibers from the layer 6 through the coir fiber layer 3 and into and beyond the backing layer 4 of burlap or the like, the fibers of the layer 6 that intermingle with the coir fibers 3 being indicated by the reference character 11 and the reference numeral 12 indicating the spots where cotton fibers are forced by the punch or needle into or through the burlap backing.

However, if desired, in lieu of the use of such indentations for increasing the bonding or knitting action between the top and intermediate layers of the cotton felt, a certain indented pattern such as the familiar waffle design shown in Fig. 5 may be employed, as will be understood.

If desired, the coir fiber base may be separately punched to the burlap, and the harsh fiber cotton layer separately punched to the coir base, although preferably the three layers may be punched together in one operation, as described, assuming that the burlap is actually used.

In this way, a stable, readily handled pad comprising the three layers 6, 3 and 4 is provided for placement on the coil spring assembly at one or both surfaces thereof, and the outer layers 5 of short fiber cotton or linter batts are then pressed onto the irregular outer surfaces of the layer 6

of harsh fiber cotton, the fibers at the junction planes matting or being pressed into intimate engagement to anchor the cotton batts in position without any other form of anchoring or retaining means being required, the surface irregularities of the thin layer 6 resulting from the punching operations being thus smoothed out to create an even and smooth unbroken surface for the application of the cover cloth.

In some instances, the use of a thick or relatively fluffy outer layer 5 of cotton batts may lend itself to undesirable "body impressions," which will mar the appearance of a made-up bed.

To eliminate any such undesirable feature, in lieu of the relatively thin layer 6 of harsh fiber cotton felt or the like shown in Figs. 1, 2, 3 and 4, one or more layers 16 of such material are superimposed upon each other, and upon layer 6, as shown in Figs. 6, 7 and 8, being needled or punched to the coir fiber layer 3 or, if desired, the inner layer 6 being needled to the coir layer 3 and the outer layer to the inner layer, as the plural layer pad is built up. In practice, it has been found that one layer 16, thicker than layer 6, both of harsh fiber cotton felt or the like, is fully satisfactory, being thus directly or indirectly needled or punched to the coir layer 3. The total preferred thickness of layers 6 and 16 is about $\frac{3}{4}$ of the thickness of coir fiber layer 3.

The total thickness of the outer or top pad 15, of cotton batts or felt made from short fibers of staple cotton or cotton linters, may be made thinner than outer layer 5 of the mattress shown in Fig. 1, dependent upon the increased total thickness of the layers 6 and 16, to produce a mattress having the usual overall thickness. The intermediate pad constituted of the built-up layers 6 and 16 is matted to the outer layer 15, as in the case of layers 6 and 5 of Fig. 1.

By the use of the plural layers 6 and 16, a punched felt foundation is provided which has adequate compressive strength to yield under normal loads without taking a permanent set, while the outer layers 15 are employed primarily to smooth out the punching indentations and thus obtain the desired smooth outer surfaces on the mattress.

The burlap reinforced construction of the pads is particularly desirable where the surface of the supporting spring construction is rather "open," that is, built up from coils with large top diameters, as shown. For spring assemblies manufactured from cloth pocketed coils, as in the familiar "Marshall" construction, or from a relatively large number of small diameter springs, assembled in an all steel construction by means of helical ties, the reinforcing backing may be conveniently omitted, the pad then being formed only from layers 3 and 6, punched together. I desire it to be understood, therefore, that the use of such burlap or jute backing is dictated by conditions which are not an essential part of the present invention.

In building up a mattress or other spring-cushioned article within the scope of my invention, a prefabricated insulating pad of the character shown in Figs. 2, 3 and 4, or Figs. 6, 7 and 8, with or without a woven backing, is placed on one or more surfaces of the spring assembly, and sufficient cotton or linter felt in the form of batts 5 added to provide the desired thickness. The entire set of layers, as illustrated in Fig. 1 or Fig. 6, is then attached to the spring

assembly in a conventional manner by fastening around the edges, after which the indentations left from this operation are filled in with additional portions of felt to obtain a smooth surface. The assembly is then covered with the desired surface material or ticking 7 tailored to requirements.

Tightening or stretching of this outside cover or material during such tailoring process exerts adequate pressure on the cotton batts 5 to cause a natural intimate bond or matting between each of them and the adjacent layer of harsh fiber cotton needled to the coir fiber base. As a result, there is no tendency of the outer cotton batts 5 to shift with respect to the lower layers, and continued pressure on the mattress or other article caused by the use thereof will simply cause this natural bond to become firmer and firmer, thereby continually counteracting any tendency for the cotton batts to shift or "ball up."

It will be seen that I have thus provided a comfortable, readily manufactured mattress or the like, having the desired smooth unbroken top and bottom surfaces, without resort to tufting, sewing or even adhesives as means for securing the different layers of filling material in their relative positions to each other, the only needling or punching being employed underneath the entire depth of the outer cotton batts 5 as binder for the long unspun fibers of the base pad, such as coir, and a thin ply (or a series of layers) of harsh fiber cotton, with or without a backing of burlap or the like for the coir fibers.

I do not wish to be restricted to the specific materials, structural details or arrangement of parts herein set forth, as various modifications thereof may be effected within the spirit and scope of my invention. I desire, therefore, that only such limitations shall be imposed thereon as are indicated in the appended claims.

I claim as my invention:

1. An upholstery pad comprising a first layer of relatively long, harsh, unspun coir fibers, a second layer of relatively soft cotton fibers, and an intermediate thin layer of harsh cotton felt fibers the latter being interentangled with the fibers of said first layer at, at least, the surface thereof and matted to said second layer for frictionally bonding all three layers together into a coherent integral unit, all of said layers being garnetted.

2. An upholstery pad comprising outer layers respectively of garnetted coir-fiber felt and cotton-fiber felt, a plurality of thin built-up garnetted layers of fibers of a degree of harshness intermediate that of said outer layers, said built-up layers as a unit being disposed intermediate said outer layers and being needled to the coir-fiber felt layer and matted with the layer of cotton-fiber felt for bonding all of said layers into a coherent unit.

3. An upholstery pad comprising outer layers respectively of garnetted coir-fiber felt and cotton-fiber felt, and an intermediate thin garnetted layer of felted cotton fibers of a degree of harshness intermediate that of said outer layers, said intermediate layer being needled through the fibers of said coir-fiber felt layer and being matted to said cotton-fiber felt layer for frictionally bonding all three layers together into a coherent integral unit.

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