

May 18, 1954

W. M. SCHULZ

2,678,686

PADDING FOR UPHOLSTERY AND THE LIKE

Filed Dec. 22, 1947

2 Sheets-Sheet 1

Fig. 1.

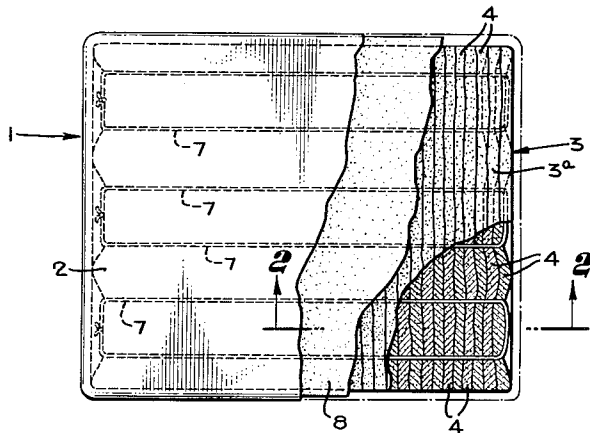


Fig. 2.

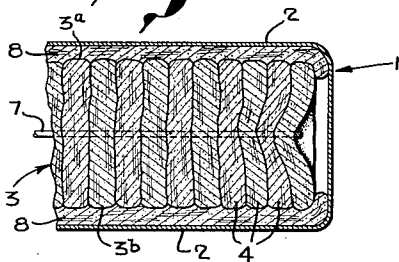


Fig. 4.

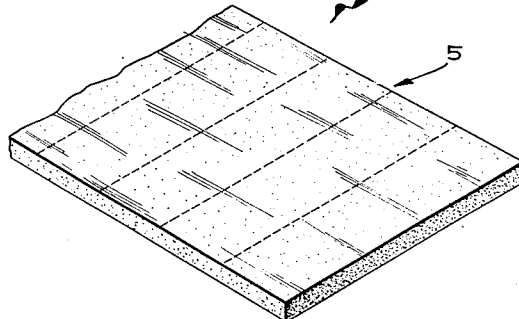


Fig. 3.

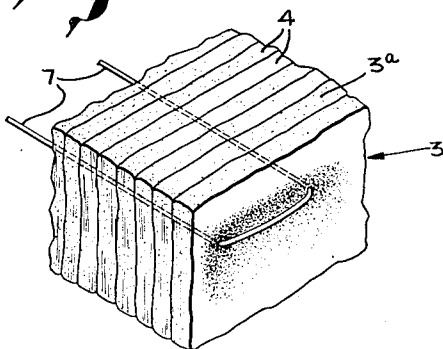
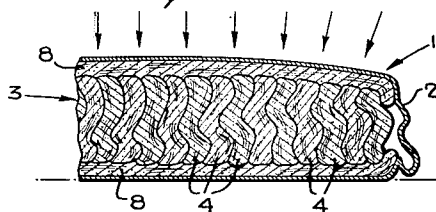


Fig. 5.



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Fig. 9.

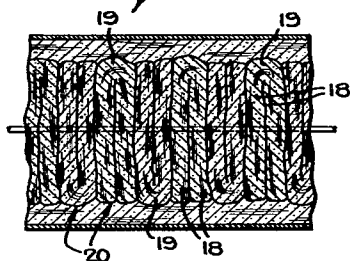


Fig. 6.

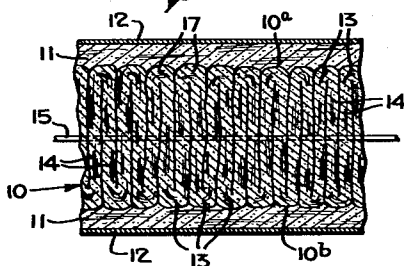


Fig. 7.

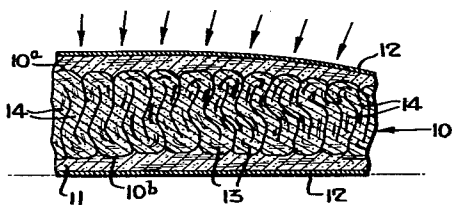


Fig. 11.

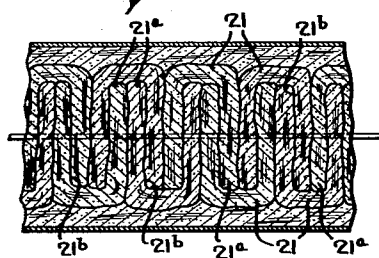


Fig. 8.

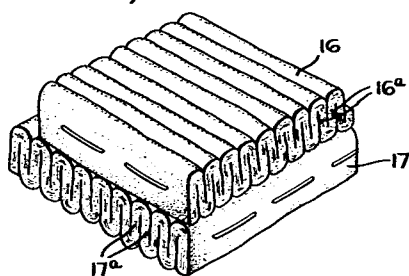
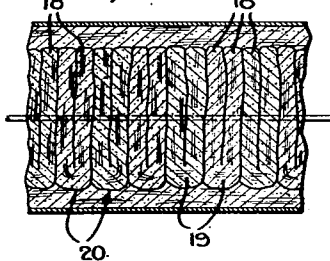


Fig. 10.



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PADDING FOR UPHOLSTERY AND THE LIKE

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12 Claims. (Cl. 155—184)

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This invention relates to upholstery padding; more particularly it relates to a pack or padding for upholstered parts, cushions, mattresses and the like, comprising fibrous glass.

Such material has important advantages which render its use for such purposes desirable. Thus, it is light, soft and resilient; it is non-combustible, will not absorb moisture, and is to a large extent acid resistant. As against these advantages, fibrous glass padding as heretofore arranged, frequently breaks down and packs under repeated loadings in use so that its resilience is soon reduced to such an extent that the utility of the padding is seriously impaired.

It is an object of this invention to provide fibrous glass material of increased strength and resistance to abrasion.

It is another object of this invention to provide fibrous glass padding for use in upholstery, cushions, and the like, so arranged as to preserve its initial resilience, thus prolonging its life.

It is another object of this invention to provide a fibrous glass pack which will have increased resistance to abrasion, distortion and other injurious results due to loading of the pack in use.

It is another object of this invention to provide upholstery padding or the like, comprising fibrous glass material, wherein the initial density of the padding may be readily altered so as to vary the resilience of the padding.

It is another object of this invention to provide upholstery padding formed of fibrous glass material wherein the material is arranged to position the fibers in a manner to provide increased resistance to distortion, displacement and the like, due to the compression of the material in use.

In glass wool as commonly fabricated, glass fibers are deposited so that an elongated sheet of predetermined width and of a definite thickness or density is formed, the majority of the fibers being directed lengthwise of the sheet as an incident of the method of fabrication. Furthermore, these fibers tend to join or become connected with each other so as to be of substantially greater length than those extending crosswise of the sheet. Thus, the sheet has substantially greater strength in a lengthwise direction.

It is thus another object to provide padding employing glass wool, so arranged that the longitudinally extending fibers are in compression with respect to the load.

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It is another object of this invention to provide such padding wherein the longitudinal fibers extend continuously as formed and are not severed when the padding is made.

It is another object of this invention to provide a method of treating fibrous glass material to increase its strength.

It is still another object of this invention to provide an improved method of forming upholstery padding mattress packs and the like comprising fibrous glass material.

This invention possesses many other advantages and has other objects which may be made more easily apparent from a consideration of several embodiments of the invention. For this purpose there are shown several forms in the drawings accompanying and forming part of the present specification. These forms will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

In the accompanying drawings:

Figure 1 is a top plan view, partly in section, of a cushion with a pack incorporating features of the invention;

Figure 2 is a fragmentary cross section, on an enlarged scale, taken substantially as indicated by lines 2—2 on Figure 1;

Figure 3 is an isometric view of a fragment of the pack shown in Figure 1;

Figure 4 is an isometric view showing the material utilized in forming the pack;

Figure 5 is a fragmentary cross section, similar to Figure 2, but showing the pack under load;

Figure 6 is a fragmentary cross section, similar to Figure 2, but showing a modified form of the invention;

Figure 7 is a fragmentary cross section showing the pack of Figure 6 under load;

Figure 8 is an isometric view, showing a fragment of another modified form of pack; and

Figures 9, 10 and 11 are fragmentary cross sections similar to Figure 2, but showing other modified forms of the invention.

Referring to Figure 1, a cushion 1 is shown, with the covering material or ticking 2 thereof broken away to disclose a portion of the padding or pack 3. As clearly shown (see also Figures 2 and 3), the padding 3 comprises a plurality of substantially rectangular layers 4 secured in side by side relation so that the layers are disposed on edge with respect to the load on the cushion,

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the short dimension of the rectangle extending in a direction substantially normal to the upper and lower sides of the cushion 1. The layers 4 are formed of a fibrous material so arranged as to provide fibers extending substantially in the direction in which the load on the cushion acts, or in end-on relation thereto.

More particularly, it is contemplated to use glass wool for the layers 4. As hereinbefore pointed out, commercially available glass wool usually comprises fibrous glass arranged to form elongated sheets of various widths and thicknesses or densities, as well as other characteristics, a portion of such a sheet 5 being shown in Figure 4. As used in this connection, the term density refers to the weight of one cubic foot of the material as formed. Such sheets are commercially available, an example of a suitable material in sheet form being that known as superfine glass "B" fiber A-44-L12, made by Owens-Corning Fiberglas Corp. Another suitable material is that known as reprocessed glass textile fiber XMPP. As an initial step in forming the pack 3, a resilient, adhesive layer is applied to the opposite sides and edges of the sheet 5, as by spraying thereon a very thin film of a rubber-like material, such as any of the synthetic latices that will withstand oxidation. This material is applied as a solution about 50% solids and at such a rate that one pint covers approximately two hundred and fifty square feet. The material is cured after application to the sheet by air drying, or by heat, and after curing, is non-combustible and of a tacky character.

As previously discussed, a sheet such as 5 has substantially greater strength in a longitudinal direction than in other directions, since more and longer fibers extend lengthwise of the sheet. Such fibers may be conveniently termed "long" fibers.

Advantage is taken of this characteristic by arranging the juxtaposed layers 4 so that the "long" fibers are in end-on or load supporting position. Thus, as indicated by the broken lines in Figure 4, the layers 4 are formed by cutting the sheet 5 transversely to provide rectangular sections of appropriate width. The sheet 5 may be of such size that the layers 4 will form a pack 3 of the required width, or two or more packs such as 3 may be placed side by side to provide the required size.

The density of such material is quite low, and to increase the load carrying capacity of the pack, it is desirable to increase the density of the material by compressing the layers 4 to reduce their thickness. This may be done readily by providing a ticking 2 with a length appropriately less than that of the padding 3 when initially formed. To facilitate placement of the padding 3 in the ticking 2, the layers 4 are compressed to about the desired extent by cords which extend through the layers 4 to form confining loops 7. These loops 7 preferably compress the pad 3 to a somewhat greater extent than the ticking 2. Obviously, the amount of compression applied by the loops 7 is a function of the spacing of the cords as well as of the length of the loops 7. Thus, by spacing the cords more closely, increased compression can be exerted.

An important advantage resulting from the resilient protective film on the opposite sides of the layers 4 is that the cords forming the loops 7 are in part supported by the pair of films between adjacent layers reducing the tendency of

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the cords to tear the fibrous material and become displaced in the layers.

Furthermore, to prevent fraying of the edges of the layers 4 and to reduce separation of the end-on load carrying fibers, the opposite faces 3-a and 3-b of the pack 3 after forming, are sprayed with the rubber-like cement, previously discussed, to form a resilient covering on the faces 3-a and 3-b.

To provide a softer and more even surface on the cushion 1 than would be formed by placing the ticking 2 directly on the edges of the layers 4, one or more smoothing layers 6 of glass wool of appropriate characteristics, such for example as superfine glass "B" fiber, previously noted, are interposed between the opposite faces of the padding 3 and the ticking 2.

Padding such as that disclosed employing the fibers in an "end-on" load carrying arrangement, particularly the "long" fibers, has important advantages, such as greater resilience and load carrying capacity, and increased abrasion resistance, all of which result in longer useful life of the padding.

The greater resilience and load carrying capacity are believed to be the result of using the strongest fibers in an "end-on" load supporting position, so that they act in a manner somewhat analogous to columns, and supporting or stiffening them laterally by compressing the other fibers against them, by increasing the density of the material.

Further, this increased density reduces the compression and relative movement of the fibers under a given load which together with the increased areas in contact between the fibers provided by the lateral compression, reduces the abrasion or wear of the material. Another factor in reducing the abrasion between the adjacent layers 4 is the resilient adhesive film applied to the opposite sides of the sheet 5 before forming the pack which, by causing the contacting surfaces to adhere, prevents or substantially reduces relative movement therebetween.

Figure 5 illustrates generally the action of layers such as 4 in the padding 3 under non-uniform loading, as determined by observation. Under light loads producing a small amount of compression in the pack 3, the layers 4 of a given depth usually bend in a common direction, forming a simple curve (not shown). Under somewhat greater loading, the layers 4 will usually bend consistently to form a pair of reverse curves of lesser radius than the single curve, such reverse curves persisting but being of decreasing radius as the loading is further increased.

To further increase the resilience and life of such padding, the ends of the layers may be formed in various ways, so that adjacent layers are joined integrally along a corresponding edge, in pairs or otherwise.

Thus, referring to Figure 6, a fragment of a cushion generally quite similar to the cushion just discussed, is shown having padding 10 with upper and lower cushioning layers 11 on its opposite faces and a confining ticking 12. The pack 10 is formed of a series of convolutions or folds providing a plurality of layers 14, each layer being joined along its upper edge to the layer next adjacent on one side and along its lower edge to the next layer on the opposite side, by a bent portion 13 of the material. The layers 14 may be initially compressed as before, by loops 15 extending through the layers 14.

The "long" fibers in the layers 14 are in

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"end-on" relation to the load as discussed in connection with the first described form of the invention. For this purpose, a sheet 5 (Figure 4) may be utilized, but instead of being severed along the broken lines to form separate pieces, the sheet 5 is folded or bent to form the convolutions 13.

In addition to the previously discussed advantages of the "end-on" fiber arrangement, the connection 13 between the successive layers 14, distributes any load over at least two adjacent layers, reducing excessive compression or distortion of either layer, and also eliminating transverse separation and/or distortion of the edge portions of the layers. As in the previously discussed form of the invention, the opposite faces 13-a and 13-b of the pack 10 are coated with a thin film of resilient material to assist in binding the layers 14 together.

An important advantage in connection with forming the convolutions or folds 13 is obtained by the resilient layer initially applied to the opposite sides of the sheet 5. This layer increased the tensile strength of the sheet 5, so that those fibers on the outside of the bend more effectively resist separation and tearing.

Figure 7 shows in a general way the action of the pack 10 under a non-uniform load, as determined by observation. It is quite similar to that of the previously discussed padding 3, except that the portions 13 connecting the layers 14 yield quite readily to compression by the load, providing added resilience to the padding while increasing the life and resistance to wear due to substantially transverse distortion and displacement of the layers.

Figure 8 shows a pack comprising superposed upper and lower sections 16 and 17 each quite similar to padding 10 of Figure 6, the layers 16-a of one section extending at right angles to the layers 17-a of the other section. Such an arrangement may be desirable where unusually thick padding is required.

In Figures 9 and 10, packs are shown wherein the layers 13 are joined in pairs respectively along adjacent edges by bent portions 19, forming flattened U-shaped elements 20, adapted to be assembled in stacked relation under transverse compression, as before. The elements 20 may be formed from a sheet 5, by cutting the sheet along every other broken line (Figure 4) and folding along the intermediate lines. Thus the "long" fibers in the padding extend in end-on relation to the load on the cushion, as in the other forms. Tearing of the bent connecting portions 19 is substantially prevented by the resilient films on sheet 5, as before pointed out.

The elements 20 may be assembled with the connecting portions 19 of adjacent elements oppositely disposed (Figure 9) or on the same face of the padding (Figure 10).

In Figure 11, padding is shown comprising oppositely directed U-shaped elements 21, the adjacent legs 21-a of those elements extending in one direction being accommodated in the spaces 21-b between the legs of the elements extending in the opposite direction.

I claim:

1. In an upholstery pack: a plurality of layers of fibrous glass having fibers predominantly extending in a common direction, said layers being disposed in side-by-side relation, with said fibers directed in load supporting direction, a layer of fibrous glass overlying said side-by-side layers, and a film of resilient adhesive material

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directly applied to and covering each of the layers of said pack.

2. An upholstery pack comprising a sheet of resilient fibrous material having a resilient protective film in direct application to opposite sides thereof, said sheet being folded to provide a plurality of layers disposed in side by side relation in on-edge load supporting relation with opposed portions of said protective film in contact with one another between adjacent layers; means extending transversely of said layers securing said layers under predetermined compression; and a resilient protective film applied directly to and covering the opposite faces of the pack.

3. In an upholstery pack: a sheet of resilient fibrous material having long as well as cross fibers, said sheet being arranged in convolutions extending transversely of the sheet to provide a plurality of adjacent layers with the long fibers of the material extending in load supporting direction; and cords extending through and securing said layers under predetermined compression in a direction transverse to the fibers of the material.

4. An upholstery pack comprising: a plurality of layers formed by folding resilient fibrous material having long as well as cross fibers, to extend in a direction transverse to said long fibers, said layers being joined at least in pairs along corresponding edges by the folded material and being disposed in side-by-side relation with the long fibers extending in load supporting direction; and means extending transversely of said layers below the upper ends thereof and engaged therewith for holding the layers under compression in a direction transversely thereof.

5. In an upholstery pack: a sheet of resilient fibrous material, said sheet being arranged in convolutions extending transversely of the sheet to provide a plurality of layers in side-by-side, on-edge, load-supporting relation, and means extending through the layers of said pack securing said plurality of layers under compression in a direction other than the load supporting direction thereof.

6. In an upholstery pack: a plurality of layers of resilient fibrous material arranged in side-by-side, on-edge, load-supporting relation, and means extending through the layers securing said plurality of layers together under compression in a direction other than the load-supporting direction of said layers.

7. In an upholstery pack: a plurality of layers of resilient fibrous material arranged in side-by-side, on-edge, load-supporting relation, and cords extending through the layers securing said plurality of layers together under compression in a direction other than the load-supporting direction of said layers.

8. In an upholstery pack; a plurality of layers of resilient fibrous material arranged in side-by-side, on-edge, load-supporting relation, and means extending through the layers securing said plurality of layers together under compression in a direction other than the load-supporting direction of said layers, and a layer of fibrous material overlying edges of the layers on one side of the pack.

9. In an upholstery pack: a plurality of layers of fibrous glass having fibers predominantly extending in a common direction; said layers being joined in side-by-side relation by means of a flexible adhesive applied to surfaces thereof; said layers being disposed with the fibers in load-sup-

porting direction; and a smoothing layer of fibrous glass covering edges of said layers.

10. An upholstery pack including: a plurality of layers of fibrous glass having fibers predominantly extending in a common direction; said layers being joined in side-by-side relation by means of a flexible adhesive applied to the confronting surfaces thereof, said layers being disposed with said fibers in load-supporting direction; and a smoothing layer of cushioning material covering edges of said layers.

11. In an upholstery pack: a plurality of layers of resilient fibrous material arranged in side-by-side, on-edge, load-supporting relation; flexible adhesive material disposed between and joining said layers; means extending through said layers securing them together under compression in a direction other than said load-supporting direction; and a layer of fibrous material covering edges of said layers.

12. In an upholstery pack: a plurality of layers of resilient fibrous glass arranged in side-by-side, on-edge, load-supporting relation, flexible adhesive material disposed between and joining said layers; means extending across said lay-

ers placing them under compression in a direction other than said load-supporting direction; and a layer of cushioning material overlying edges of said layers.

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