

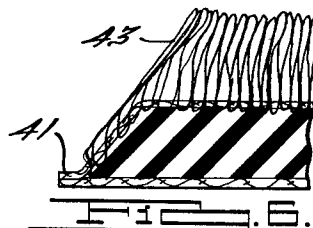
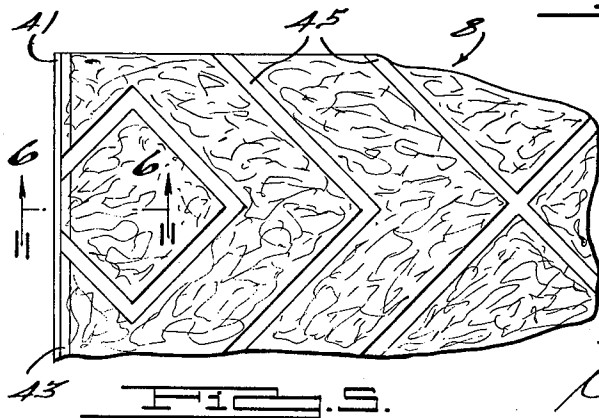
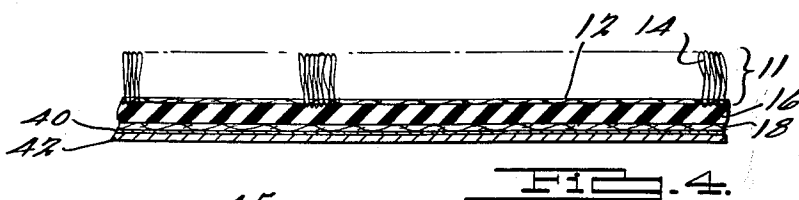
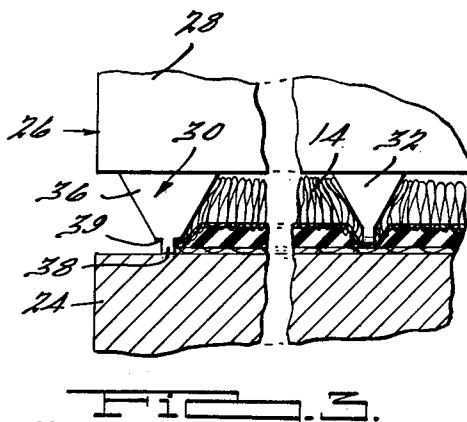
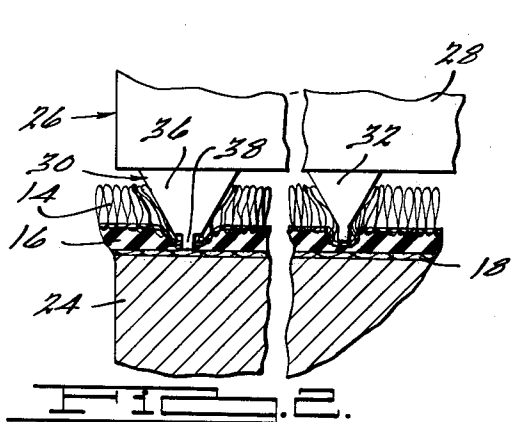
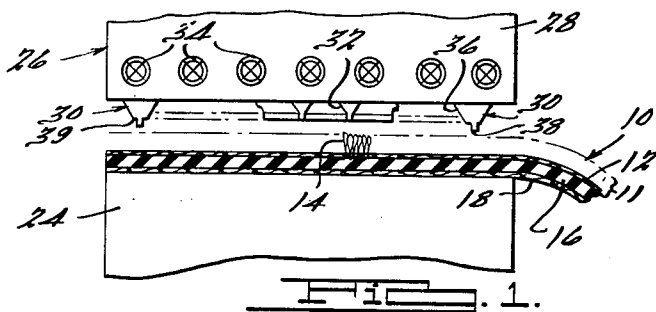
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3,074,835

CARPET TILE

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3,074,835

CARPET TILE

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1 Claim. (Cl. 154-49)

This invention pertains to an improved method of making carpet tiles and to improved articles made thereby.

Many desirable decorative effects can be obtained by the use of small pieces of carpet having cut edges without selvages or bindings thereon, and such pieces have heretofore been commercially available. However, they have not found ready acceptance in the market primarily because it has heretofore not been practicable to trim the edges of the carpet pieces satisfactorily and to bind the carpet pile at the edges to minimize its tendency to ravel and to become frayed. Also, when the carpet pieces are backed up by a cushioning material such as foam rubber or an elastomeric plastic in the customary manner, the commercially available cushioning material is found to be of varying thickness so that the edges of abutting pieces of carpet do not meet properly and accurately to form a smooth surface.

These problems are effectively overcome in the practice of the present invention, one important object of which is to overcome the disadvantages of previous carpet tiles and to provide an improved carpet tile having smooth, ravel-free edges of uniform thickness.

Another object is to provide an improved method of making carpet tiles backed with a fusible cushioning material and having stabilized edges which do not tend to ravel, fray or to become ragged in appearance.

Another object is to provide an improved method of cutting carpet tiles from large pieces of carpet including the step of impregnating a resilient bonding material into the carpet pile along the edges of the tiles so that the pile will not tend to ravel or fray, but will be effectively locked in place.

Another object is to provide an improved method of cutting carpet tiles from large pieces of carpet having resilient cushioning material secured to its reverse surface including the step of crush-cutting the tiles under heat so that the resilient cushioning material is permanently reduced to a controlled minimum thickness along the edges of the tiles whereby all of the edges of all of the tiles produced under like conditions will be substantially uniform in thickness.

These and other objects are achieved in the practice of the present invention according to one embodiment of which a carpet tile is cut from a large piece of carpet having a cushioning material bonded to the reverse surface thereof by first pressing and heating the carpet along a line defining the carpet tile outline, thereby fusing the cushioning material and squeezing it upwardly so that it flows into and impregnates the pile of the carpet along the edges of the tile, thus resiliently bonding the pile in place. After the completion of this step, the tile is cut out from the piece of carpet along the outline line by pressure-, or crush-cutting, and the cushioning material along the tile edges is reduced to a standard minimum thickness so that the edges of the individual tiles are of substantially uniform thickness throughout. The manufacture of carpet tiles according to the method of the present invention is rapid and efficient, and the method is readily adaptable to the production of various novelty effects in the carpet tiles themselves such as, for example, carved or sheared effects.

The invention will now be described in greater detail

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in connection with the accompanying drawing wherein:

FIGURE 1 is a schematic cross-sectional view of a die assembly as used in the manufacture of carpet tiles according to the present invention, showing the die assembly in its open, or retracted position;

FIG. 2 is an enlarged, fragmentary view of the die assembly shown in FIG. 1 illustrating the first pressure step in the method of the invention and showing the die assembly in a first operative position;

FIG. 3 is a fragmentary, partly diagrammatic view of the die assembly shown in FIG. 1, illustrating the die in its fully closed, or cut-off position;

FIG. 4 is a partly schematic, cross-sectional view of a carpet tile according to the invention illustrating the arrangement of the cushioning, adhesive, and backing layers secured to the tile;

FIG. 5 is a fragmentary plan view of a carpet tile according to the invention illustrating a carved effect, which is one of the decorative effects obtainable in the practice of the invention; and

FIG. 6 is an enlarged fragmentary view of a portion of the carpet tile shown in FIG. 5, taken generally along the section line 6-6 thereof.

As hereinabove noted, one of the marketing problems with carpet tiles, or squares heretofore commercially available was the tendency of the carpet pile to become ragged, and to fray or unravel along the edges of the individual tiles, producing an unsatisfactory appearance after a relatively short service life. This effect was aggravated by the lack of uniformity in carpet thickness along the edges, so that when several of the carpet tiles were juxtaposed upon a surface such as floor, wall, or stair tread, the difference in thickness would produce a slight step, which would tend to catch a shoe or other article moving across the surface, and thereby loosen the thicker tile along its edge, and cause a further deterioration in the appearance and surface of the carpet tiles. The variation in thickness, it has now been found, has been due largely to variations in the thickness of the cushioning material such as sheet foam rubber, which is ordinarily secured to the reverse surface of the carpet tiles, and which appears not to be commercially available in sheets of accurately controlled, uniform thickness. One important advantage of the practice of the present invention is the achievement of a uniform thickness along the edges of the carpet tiles, so that the abutting edges of juxtaposed tiles present a smooth and uniform appearance.

In the illustrated form of the invention, a carpet tile 8 is formed from a laminated carpet structure 10 including a carpet material 11, which as shown is of the type having a relatively lightweight and flexible canvas backing 12 and a looped pile 14. A foam rubber or similar cushioning material 16 is adhesively secured to the reverse surface of the backing 12 to increase the resilience of the carpet. The cushioning material 16 is preferably bonded to and reinforced by a thin muslin sheet 18 or the like to strengthen the cushioning material against lateral displacement.

A large piece of the carpet structure 10 having rubber cushioning material 16 secured to its reverse surface is laid upon a flat table or anvil 24 beneath a die assembly 26, which is then actuated according to the invention to cut out the carpet tiles 8. The die assembly 26 includes a holder, or base member 28, upon which are mounted a plurality of downwardly facing die members 30 and 32, and which includes means such as the electrical heating elements 34 illustrated for controllably heating the die members 30 and 32.

The die members 30 and 32 are arranged according to the outline of the carpet tiles to be cut from the large piece of carpet, and according to the pattern, such as the

carved effect pattern illustrated in FIG. 5, to be formed thereon. Selected ones 30 of the die members are arranged to crush-cut the carpet, and, therefore, are arranged in the form of an enclosed pattern of square, rectangular, triangular, circular, or other shape as desired to define the outline of the carpet tiles to be produced. The other die members 32 define the pattern to be impressed upon the carpet tiles, within the outlines thereof, and are shorter in height than the first die members 30, since they do not crush-cut the carpet during operation of the die. The cutting die members 30 are shaped in cross section as illustrated and have an upper, trapezoidally shaped portion 36 secured to the base 28, and a squared nose portion 38. Preferably, the bottom edge of the upper portion 36 is somewhat wider than the nose portion 38 in order to provide downwardly facing shoulders 39 for engaging the carpet pile 14 and compressing a narrow portion thereof along the margins of the tile as described in greater detail hereinafter. The pattern forming die members 32 may be generally similar in cross-sectional shape to, but shorter than the cutting die members 30. In most cases, however, the shoulders 39 may be omitted from the pattern forming die members 32 unless they are desired for special pattern effects.

In operation, the die assembly 26 is heated to a temperature above the melting point of the cushioning layer 16, and when the carpet structure 10 is positioned upon the table 24, the die assembly is lowered and pressed upon the carpet as illustrated in FIG. 2. The die members 30 and 32 compress the carpet and the cushioning material upon the table 24, heating the cushioning material 16 locally to a temperature above its melting point so that it melts and flows upwardly into and impregnates the portions of the pile 14 adjacent to the die members 30 and 32. The shoulders 39 of the cut-out die members 30 compress a narrow marginal portion of the pile relatively tightly, and the upper portions 36 force the pile loops immediately adjacent to the compressed marginal portions into an angular, or bevelled position. Capillary attraction and the die pressure both contribute to the flow of the melted cushioning material into the carpet pile.

The decorative design forming die members 32 are also similarly shaped to the die members 30 in vertical section, except that they are not quite so long and do not extend quite so deeply down into the carpeting. Nevertheless, they exert a compressive force upon the carpet 10 and upon the cushioning material 16, locally melting the cushioning material and forcing it upwardly into the pile 14 immediately beneath and along both sides of the die members 32 to impregnate the pile, so that later when the heat is removed and the cushioning material 16 allowed to solidify, the impregnated pile will be resiliently locked in place, thereby forming a textured design in the carpet tile.

After a period of a few seconds, as required for the cushioning material 16 to melt and to infuse into the desired portions of the pile 14 and before it flows into other portions of the pile, the die assembly 26 is advanced further downwardly with a relatively great force, which is sufficient to cause the cut-out die members 30 to crush-cut the carpet structure 10, and thus to complete the tile 8. During the cutting stroke, the shoulders 39 of the upper die portion 36 engage narrow edge portions of the carpet structure and reduce them to a predetermined uniform thickness. Thereupon, the die assembly 26 is immediately retracted, and the carpet tile 8 is removed from the table 24 and prepared for shipment.

As many tiles as the size and shape of the die assembly 26 will permit may be cut simultaneously. The over-all height of the cut-out die members 30 is preferably at least equal to the total thickness of the laminated carpet structure 10 in order to avoid crushing or compacting of the pile 14 during the forming process, except, of course, along the edges of the tile 8 and in the crushed, decoratively molded portions thereof. This construction also

minimizes the possibility of melting portions of the cushioning material 16 extending between the die members 30 and 32, and insures that these portions will remain resilient and substantially unaffected.

Immediately upon release of the die assembly 26, the material of the cushioning layer 16, which has infused itself into and impregnated the pile 14 along the edges and in the formed portions of the tile, freezes and resiliently bonds the impregnated pile in place so that it does not tend to fray or to become ragged or ravel. The taper of the upper portions 36 of the die members 30 is preferably made relatively gradual, and as near to the vertical line as possible to minimize the spreading effect of the die members upon the carpet pile 14, and to avoid an excessively flat bevel along the edges of the tile 8, but the taper must be sufficient so that the die members 30 and 32 will draw down the pile and hold it in place firmly and securely during the impregnation thereof by the cushioning material 16.

When it is prepared for shipment or sale, an adhesive is preferably applied to the bottom of the tile 8 so that the tile will adhere to a surface such as a floor or wall upon which it is placed. The adhesive, indicated at 40 (FIG. 4), may be of the pressure sensitive, rubber based type, in which case the reinforcing sheet 18 is preferably sealed by the application of a suitable sealer to prevent the adhesive solvent from penetrating into the cushioning material and softening it. A release sheet 42 is preferably placed upon the adhesive to enable the tiles to be stacked without sticking to each other. These variations are conventional and form no part of the present invention. They are mentioned herein, however, because the practice of the invention also contemplates cutting out carpet tiles from carpet that has been previously prepared for shipment in this manner. The presence of the adhesive 40 and the release sheet 42 will not affect the operation of the die members 30 and 32 in the practice of the invention.

The impregnation of the edge portions of the pile 14 with a resilient bonding material in liquid form, which is solidified in situ while the edge portions are held in a desired position conforming to a desired configuration enables the efficient production of improved carpet tiles, substantially completely overcoming the disadvantages of previous carpet tiles. Narrow edge portions 41 of the tiles 8 are densely compacted, and thus reduced to a substantially uniform thickness by the action of the shoulders 39 of the cut-out die members so that the abutting edges of tiles laid side by side on a surface form a smooth and even line of juncture without unevenness or mismatching portions. The cushioning material that has impregnated into the sloping or beveled edge portions 43 and has solidified therein effectively locks the carpet pile in place, rigidifying it slightly so that it does not ravel, fray or tend to become ragged in appearance. Similarly, in the "curved" portions 45, the pile loops are impregnated and locked in place by the cushioning material, forming a carpet tile 8 of improved appearance, usefulness, and durability.

What is claimed is:

A generally planar laminar carpet tile comprising a piece of fusible resilient sheet cushioning material of predetermined shape, a piece of carpet having an upstanding pile of similar shape superimposed upon and bonded to said cushioning material, the pile at the edge portions of said carpet being impregnated with fused edge portions of said cushioning material so as to preclude fraying of the carpet pile along the edges of said tile, the pile of said carpet extending angularly upwardly and inwardly relative to the plane of said carpet tile and retained in the angularly upwardly and inwardly extending condition by said fused edge portions of the cushioning material, a relatively narrow portion of said cushioning material extending around the edges of said tile being of a substantially uniform predetermined thickness less than the thickness of other portions of said cushioning mate-

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rial to facilitate placement of said tile in edge to edge relationship with a similar tile.

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