Feb. 9, 1971 A. I KANTOR 3,562,086

NONSLIP CARPET RUNNER

Filed Jan. 15, 1968

FIG. 1.

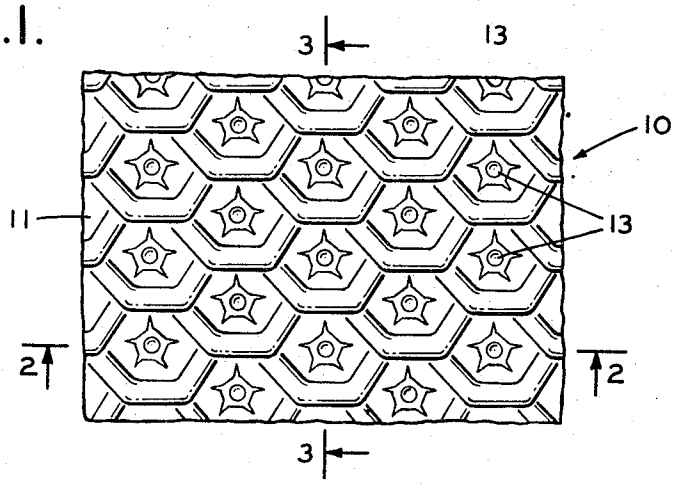


FIG. 2.

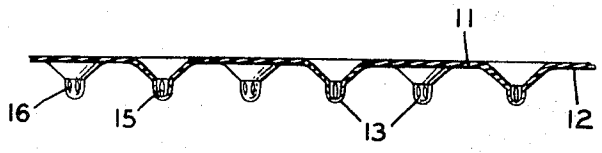


FIG. 3.

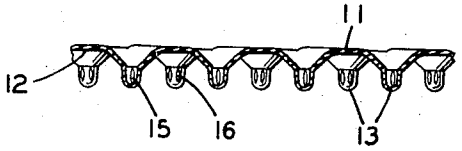


FIG. 4.

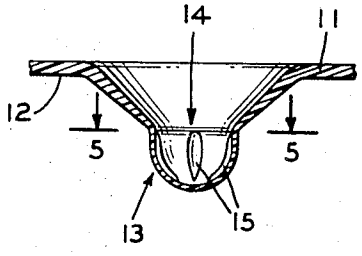
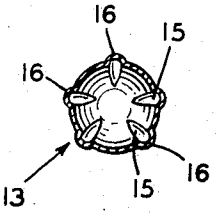


FIG. 5.



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3,562,086

NONSLIP CARPET RUNNER

Abraham I. Kantor, Bloomfield, N.J. (6 Fredon Drive, Box Section No. 185, Livingston, N.J. 07039)

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Int. Cl. A47l 23/22; D06n 7/00
U.S. Cl. 161—125 1 Claim

ABSTRACT OF THE DISCLOSURE

A nonslip carpet runner comprising a sheet of flexible thermoplastic material with a large number of nipple-like hollow projections along its under surface. Each projection is rigidified by means of a plurality of embossed channels and complementary ribs extending vertically along the projection.

My present invention relates to a carpet runner of the type that is suited for use in protecting carpet from uneven wear or the effects of inclement weather such as may occur adjacent doorways or along passageways. More particularly this invention relates to such a runner which not only is decorative but which, to a unique degree, combines therewith the important and highly desired characteristics of substantially immovable, nonslip engagement with the carpet on which it is laid, while being durable and susceptible of ready manufacture by high speed techniques.

In my design Patent No. 191,435 granted on Oct. 3, 1961, there is shown a floor mat embodying a three-dimensional design formed by embossing a suitable thermoplastic sheet material. While such a floor mat is decorative and, in use, performs well the function of protecting the surface of the underlying carpet, it leaves much to be desired in that it has a tendency to slip relative to the surface of the carpet even though formed with a large number of recesses or indentations in its undersurface, that are presented to the carpet.

It is, therefore a principal object of this invention to provide a carpet runner which is so constructed that it positively engages the carpet on which it is laid, is durable in use, and can readily be manufactured by modern, high speed techniques.

It is also an important object to provide such a carpet runner which remains in place while it is being walked over and does not tend to slip whether it is laid on carpet having a thick pile or a thin pile.

In accordance with the present invention, the runner comprises a one-piece, integral sheet of flexible thermoplastic material having any convenient length and width and shaped so as to form a large number of nipple-like, hollow projections along its under surface. The upper surface of the runner may be provided with a decorative pattern designed to reduce the likelihood that a person walking on the runner may slip. The hollow projections may be arcurate in cross section and tapered, so as to penetrate readily into the carpet pile to anchor the runner.

Such runners are best made by embossing the thermoplastic material while it is at a suitable elevated temperature. In making the preferred embodiment shown and described herein as illustrative of the present invention, suction embossing apparatus of the type set forth in G. Gilbert and W. L. Prendergast U.S. Patent No. 2,905,969 is preferably utilized, the thermoplastic sheet or film being fed directly from an extruder, which is also of hitherto known construction, onto the suction embossing drum of the embossing apparatus where it is impressed with the desired three dimensional pattern, and then cooled before removal from the drum.

When the plastic material is thus embossed to form the projections which grip the carpet, the thickness of the material is more or less attenuated depending upon the length of the projection, that is, the extent to which they protrude below the plane of the under surface of the plastic material. Because of this reduction in the thickness of the wall of the nipple-like projections which increases toward their outer ends, the length of the nipples, unless they are rigidified as will be described hereinbelow, must be kept relatively short or they will too readily deform in use under load as when a person walks on the carpet runner.

I have discovered that the objectionable effect caused by the more or less progressive thinning of the wall of the nipples with their length can be largely avoided by providing the nipples with rigidifying means. An important feature of the present invention thus resides in shaping the nipple-like projections at the time the embossing is carried out so that each nipple incorporates its own rigidifying means. As will be described in connection with the preferred embodiment of the present invention, I preferably provide each nipple-like projection with a plurality of circumferentially spaced, vertically extending channels or ribs which so rigidify them that the projections may extend and have a depth many times greater than the thickness of the base material.

Further objects as well as advantages of the present invention will be apparent from the following detailed description of a preferred embodiment thereof and the accompanying drawing in which

FIG. 1 is a top plan view on an enlarged scale of a segment of carpet runner constructed in accordance with present invention;

FIGS. 2 and 3 are cross sectional views taken respectively along the lines **2**—**2** and **3**—**3** of FIG. 1;

FIG. 4 is a fragmentary cross sectional view showing one of the nipple-like projections of FIG. 2 on a further enlarged scale; and

FIG. 5 is a cross sectional view taken along the line **5**—**5** of FIG. 4.

Referring now to the drawing, carpet runner **10** comprises a base material **11** formed preferably of polyethylene although other suitable thermoplastic materials such as polyvinylchloride or polypropylene can also be used. The upper surface of the carpet runner **10** is embossde to provide a desired pattern and in this instance the pattern is like that formed when a metal sheet is slit in a regular pattern and expanded. Any desired upper surface pattern may be utilized. For example, if it is desired that the upper surface be textured like that of the underlying carpet, then the base material **11** can be embossed on an embossing apparatus made in accordance with G. Gilbert U.S. Pat. No. 3,205,112 and suitably modified to form carpet runner **10** as will be more fully described hereinafter.

Depending from the bottom surface **12** of the carpet runner **10** is a large number of nipple-like projections **13** forming gripping means which engage the pile of the carpet on which the runner is laid and prevents the runner from slipping on the carpet. The number of the nipple-like projections **13** is not critical. Good results are achieved when, as in the present embodiment, there are about four projections **13** to the square inch. The size of the nipple-like projections may also vary, however, it is important that the projections **13** be sufficiently long so as to penetrate deeply enough into the carpet pile to anchor the runner to the carpet securely. In the present instance, base material **11** is about 0.03 inch thick and projections **13** are about 10 times as long as that thickness.

It is also important that the base of each projection **13** be large enough so that when the plastic material is sucked down during embossing, ample material is available for each projection taking into account the amount by which it extends out of the plane of the original, un-

embossed material, thereby to prevent excessive attenuation of the wall thickness of the material forming each projection **13**. By the base of a projection **13** it is intended to refer to the area subtended by the projection **13** in the plane of the upper surface of the carpet runner. Excellent results have been attained with the aforementioned spacing of four projections to the square inch, with the center of each projection about one half inch from that of each adjacent projection, and with the projections somewhat over one quarter inch long.

As is most clearly shown in FIG. 4, the drawing down of the plastic material to form the projections **13** causes some reduction in the thickness of the material forming the projections which decreases toward and is at its minimum about the closed end of each projection **13**. To prevent collapse of the projections **13** under load when the carpet runner is walked upon in normal use, each projection **13** is formed with a plurality of rigidifying means **14** preferably forming vertically extending channels **15** in the interior surface and ribs **16** in the exterior surface of the projection **13**. While each projection **13** is shown with five rigidifying means **14** arranged to form a star shaped pattern, it is to be noted that a smaller or larger number of such rigidifying means can be used. For example, in certain instances of relatively light use, as when small pieces of the carpet runner are utilized as mats to protect the carpet in an automobile, as few as three rigidifying means **14** may be used.

The embosed carpet runner **10** is readily produced at high speed, production rates higher than 1000 linear feet per hour being readily attained, on apparatus of the type described in said U.S. Pat. No. 2,905,969. The embossing sleeve or shell is constructed to provide the desired pattern on the upper surface as is well known in the art. In addition, the desired arrangement and size of openings is formed in the embossing sleeve so that when suction is applied through the sleeve to the under surface of the thermoplastic material, it is pulled down to form the surface pattern and, simultaneously, the projections **13**. The holes through which the plastic material is sucked to form each of the projections **13** is notched or grooved at each place where one of the rigidifying channels **15** and its complementary rib **16** are desired. The radius of curvature of each notch is small compared to the radius of curvature of the holes through which the projections **13** are drawn so that, as most clearly shown in FIGS. 4 and 5, the radius of curvature of each channel **15** and its rib **16** is small compared to the radius of curvature of the projection **13**.

In use, with the runner in place on top of a carpet, the projections **13** penetrate deeply into the carpet pile and serve to anchor the runner so that it does not move along or slip relative to the surface of the carpet. The large number of hollow nipple-like projections **13** serve to collect and trap water and dirt which might otherwise be tracked onto the carpet. The runner may be readily cleaned and reused.

While this application is entitled "Carpet Runner" and the present invention has been described in detail in connection with such use thereof, it is to be understood that it also is well suited for use in relatively short lengths and widths in the form of a mat. Therefore, all uses of

the present invention including the use thereof in the form of a mat is to be taken as included in the designation "carpet runner" throughout this specification and the claims.

Instead of providing rigidifying means on the projections **13** in the form of regularly spaced, vertically extending complementary channels **15** and ribs **16**, I may interrupt each channel in a number of places along its length so as to provide a series of aligned indentations. Such indentations, like channels **15**, can have a depth about equal to the thickness of the plastic material. I may also provide for such indentations in a more or less random pattern over the surface of each projection **13** instead of in lines. However, in both instances, there is the disadvantage that the embossing sleeve required is somewhat more intricate and therefore more expensive than that required to form the rigidifying means as described in connection with the drawing.

The terms and expressions which have been employed are used as terms of description and not of limitation, and there is no intention in the use of such terms and expressions of excluding any equivalents of the features shown and described or portions thereof, but it is recognized that various modifications are possible within the scope of the invention claimed.

What I claim is:

1. A carpet runner constructed for substantially nonslip engagement with the carpet on which it is laid, comprising a sheet of flexible thermoplastic material having upper and lower surfaces, said sheet having embossed therein a large number of hollow nipple-like projections each having a length many times greater than the thickness of said thermoplastic material and extending from said lower surface, the cross-sectional thickness of the wall of each of said projections being progressively reduced therealong in the direction away from said lower surface, a plurality of rigidifying means embossed in the material forming each of said projections, each of said rigidifying means including a channel and a complementary rib extending along its projection from intermediate the ends of said projection to substantially the free end thereof, and said channels and complementary ribs each having a transverse radius of curvature that is small compared to the mean transverse radius of said projections.

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WILLIAM J. VAN BALEN, Primary Examiner

S. M. HOFFMAN, Assistant Examiner

U.S. Cl. X.R.

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