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Moggio

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[54] **CONDITIONED SLIDE SURFACE FOR CARPET PRINTER**

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[52] **U.S. Cl.**..... **101/407 BP,** 101/126, 198/190

[51] **Int. Cl.**..... **B41f 1/28,** B41f 15/18, B41f 21/08

[58] **Field of Search** ..... 156/289, 153; 198/190; 101/407 R, 407 BP, 126, 118, 114, 115

[56] **References Cited**

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Primary Examiner—J. Reed Fisher

Assistant Examiner—William Pieprz

[57] **ABSTRACT**

Flat-screen printers for placing a pattern on carpet are provided with a relatively flat stationary surface to support the carpet in place while printing. Herein the normally flat surface of a printer has been replaced by a roughened surface to eliminate the friction and suction drag which is normally encountered when a prewetted foam-back carpet is slid across the flat stationary surface of the printer.

1 Claim, 2 Drawing Figures

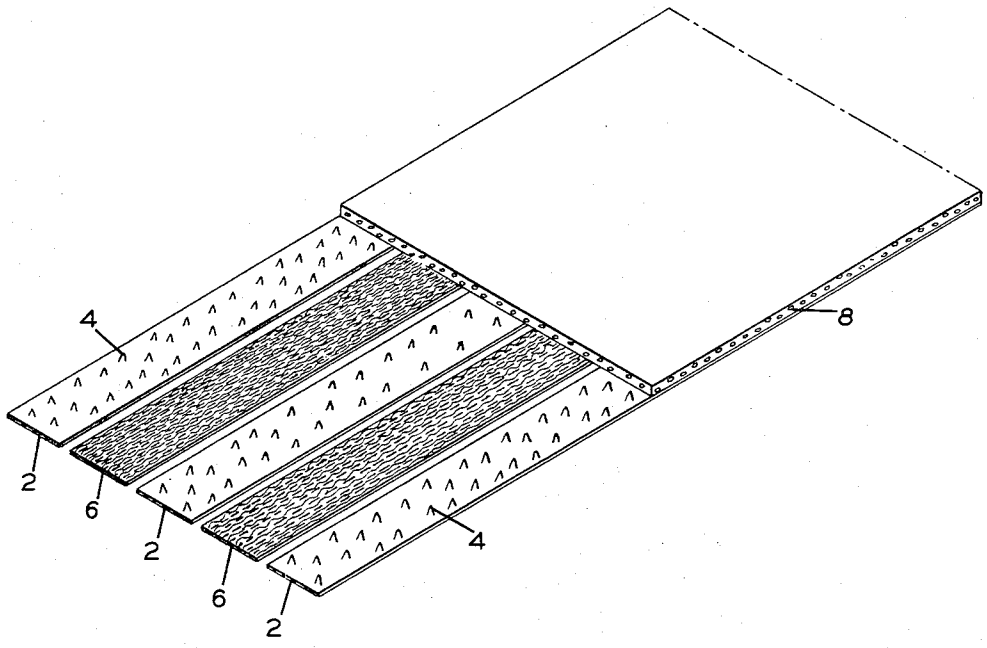


Fig. I

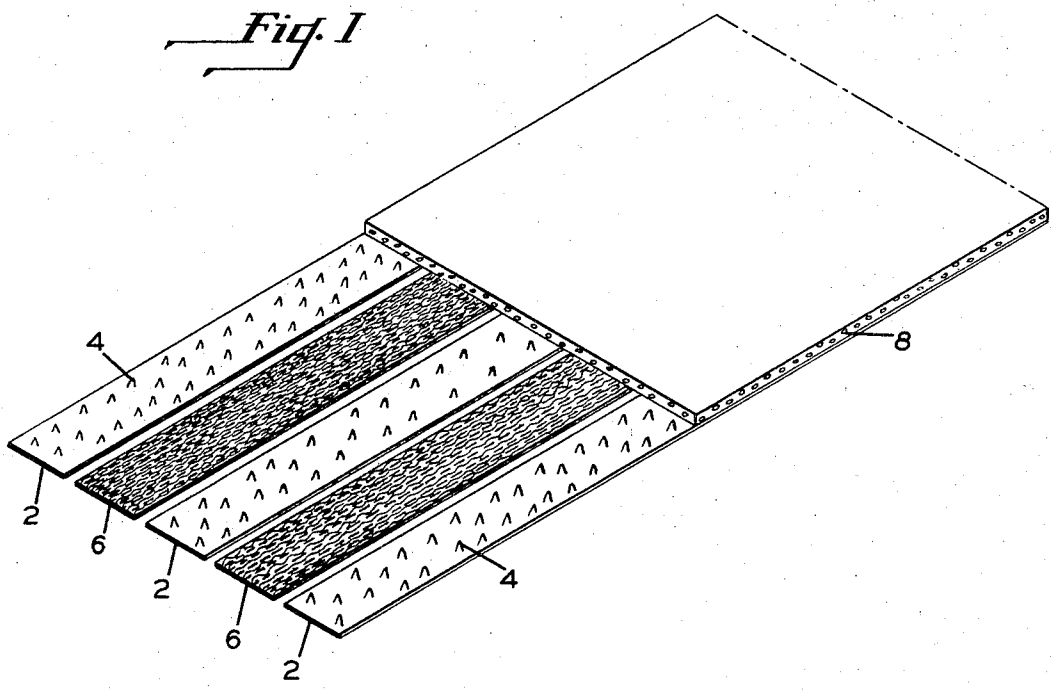
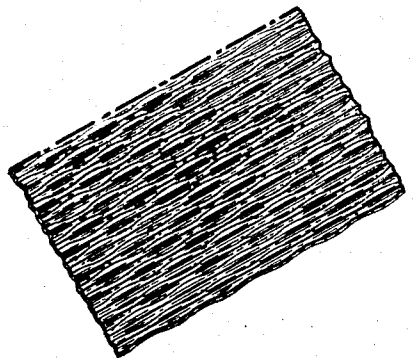


Fig. II



CONDITIONED SLIDE SURFACE FOR CARPET PRINTER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention herein is directed towards a screen printer and, more particularly, the support surface of the screen printer.

2. Description of the Prior Art

Screen printing machines for carpets are old in the art as shown in U.S. Pat. No. 3,196,784. Therein is shown a machine which is sold commercially on the open market as the Zimmer flat-screen printer. In that machine, a belt **1** is shown for carrying the material to be printed past the various printing stations. The commercially available machines now have a series of strip belts with projections thereon. These projections engage the back of a carpet structure and move the carpet structure along through the various printing stations. Flat metal plates are positioned between the strip belts to provide support for the carpet structure while it is being printed. It is necessary that the carpet have adequate support during the printing operation because the printing is carried out by pressing ink down through a screen onto the carpet. This naturally results in a pressure against the upper surface of the carpet. Consequently, the carpet needs rather firm and level support on its back surface to resist the downward pressure of printing and to avoid longitudinal belt or band marks in the printed pattern.

U.S. Pat. No. 2,914,809 discloses the use of a corrugated slide structure for the purpose of permitting water runoff from a wet material. The patent does teach the use of the corrugated structure for the purpose of permitting the wet material to move more freely.

SUMMARY OF THE INVENTION

Prewetted, foam-backed (open-cell latex foam) carpets are difficult to move, in proper registration, on flat-screen printers. This is because of the "suction cup" effect of the wet foam on the smooth-surfaced, stationary metal bands on the printer tables causing slippage on the movement of the carpet. When there is slippage on the movement of the carpet relative to the strip transfer belts, there is a loss of registration. The minimizing or elimination of this adhesion to the bands is necessary to permit proper print registration. This is accomplished by changing the surface characteristics of the smooth polished metal bands to an uneven, interrupted surface by the means of perforations or embossing. However, the bands still must maintain a relatively flat surface to support the carpet during the printing operation.

BRIEF DESCRIPTION OF THE DRAWING

FIG. I is a perspective view of the printer herein; and

FIG. II is an enlarged perspective view of part of an uneven, interrupted surface band.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The invention herein is directed to an improvement over a conventional flat-screen printer which is utilized to print a design on carpeting. The commercially available flat screen printer uses a series of strip belts **2** with projections **4** thereon. These projections engage the back surface of a carpet structure and move the carpet structure past a series of printing stations within the Zimmer printer. Spaced between the belt conveyors, there are a plurality of bands of metal **6** which function as supports for the carpet. During the printing operation, the carpet is actually supported by both the bands **6** and the conveyor belts **2.** Both structures are carefully adjusted relative to each other in height so that a composite relatively flat surface is provided to support the carpet. A relatively flat surface is necessary so that, when the screen of the printer is pressed down against the carpet and the squeegee forces ink through the carpet, the ink will be uniformly applied to the total carpet area. Should there be irregularities in the surface of the support for the carpet, then those areas which are raised above other areas will receive a different distribution vertically of ink. This then results in a blotched or striped effect in the carpet pattern.

Foam latex backing **8** is commonly used today on the back of carpets. This foam is an open-celled structure in that the surface of the foam which is resting upon the bands **6** has a plurality of cells which are opened in the area adjacent where the foam backing rests upon the bands **6.** These cells are less than one sixty-fourth of an inch in diameter. The carpet is normally prewetted with an appropriate wetting agent so that it will be more receptive to ink. Consequently, when the carpet is placed upon the printer, there is a certain amount of wetness in the carpet and foam. When the screens at each printing station are pressed down against the carpet and the squeegee forces the ink into the carpet, there is a certain amount of compression of the foam of the carpet backing. This compression tends to drive the air out of the cells which are adjacent to the bands **6.** In addition, a minor amount of liquid is squeezed out of the carpet. The liquid acts with the periphery of the cell structures and the partially collapsed cells to form miniature suction cups. Consequently, when the pressure is released from the carpet, the water barrier between the surface of the foam and the bands prevents air from moving back into the reestablished cell structures. Consequently, a vacuum is formed therein and a suction cup action is formed which tends to hold the foam backing in position on the bands **6.** Movement of the belts **2** is not always sufficient to overcome this suction action and, therefore, the belts **2** with their projections **4** will move relative to the foam backing. The belts are calibrated to move a certain distance to place the carpet in registry with the next printing station. Any slippage between the belts **2** and the carpet backing **8** will render an out-of-registry operation.

Consequently, it is necessary that the suction cup effect between the foam backing and the bands **6** be minimized or eliminated. This was accomplished by changing the surface characteristics of the normally smooth polished metal bands **6** to an uneven, interrupted surface by the means of perforations or embossing. However, the characteristic flatness of the bands **6** must be maintained so that the bands provide a relatively flat surface for the carpet. Should the bands be made as a series of corrugated metal structures or a series of thin support rods, the carpet would receive only minimal support in the areas of the bands. Consequently, the printing operation, which involves a downward pressure on the carpet, would result in a striped effect being

provided to the carpet. In those regions where the raised areas of the corrugation or the rods supported the carpet, there would be a different distribution vertically of the ink deposited. This would result in a tone difference in the ink color which would result in a striped effect in the carpet pattern. It was found that the only way to maintain the generally flat characteristic of the bands, but yet to break up the suction effect, was to provide the carpet with an irregular surface which has no more than 0.040 inch between the highest raised area of the interrupted surface and the lowest depressed area of the interrupted surface. In addition, the raised areas and depressed areas should be no more than ¼ inch in width so that the raised area itself would be no more than one-fourth inch wide and would be separated from an adjacent raised area by no more than ¼ inch of depressed area space. The actual surface configuration could be a checkerboard rib structure, a diamond embossed or square embossed structure, a wrinkle finish, or any other type of surface configuration which provides the bands with an uneven, interrupted surface. However, the interruptions must be within the limits above set forth so that, during the printing stage, the bands still function in effect as a relatively flat surface to provide overall support to the carpet so that there is a uniform application of ink to the carpet.

FIG. II is a showing of an embossed interrupted surface. This surface has been used in practice and is approximately a 0.0015 inch steel gauge with a 0.0015 inch textured depth or an overall thickness of 0.0030 inch. It has been provided with a random embossed pattern which gives it in effect a crinkled appearance.

What is claimed is:

1. In an apparatus for providing a printed pattern on a carpet material containing a foam backing wherein the bottom surface of the foam contains a plurality of open cells of less than 1/64 inch in diameter, a carpet printer which contains a plurality of transfer means engaging the backing of the carpet and moving the carpet, between the plurality of transfer means there is a plurality of relatively flat stationary support means contacting the surface of the backing containing the open-cell surface, and said carpet being wetted so that it contains some moisture, said printing operation being carried out in such a manner that pressure is applied to the carpet to partially compress the cell structure and to press it against the relatively flat stationary support surface, the improvement comprising: providing the relatively flat imperforated metal-like stationary support surface of the printer with an uneven embossed configuration wherein the uneven configuration is less than 0.040 inch between the highest point of the uneven configuration and the lowest point of the uneven configuration and the spacing between points on adjacent high areas is less than ¼ inch, whereby the uneven configuration will prevent a suction cup effect for the foam backing to the relatively flat stationary surface and permit the carpet to be moved by the transfer means without any relative movement between the transfer means and the carpet backing.

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