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STABILIZED LOOSELY WOVEN GAUZE FABRIC

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2 Sheets-Sheet 1

Fig. 1

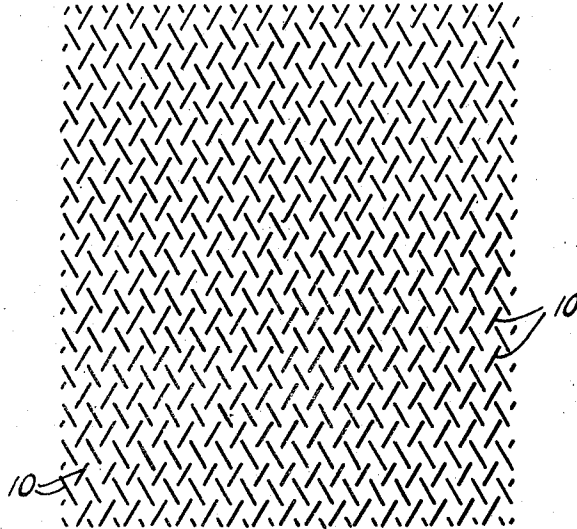
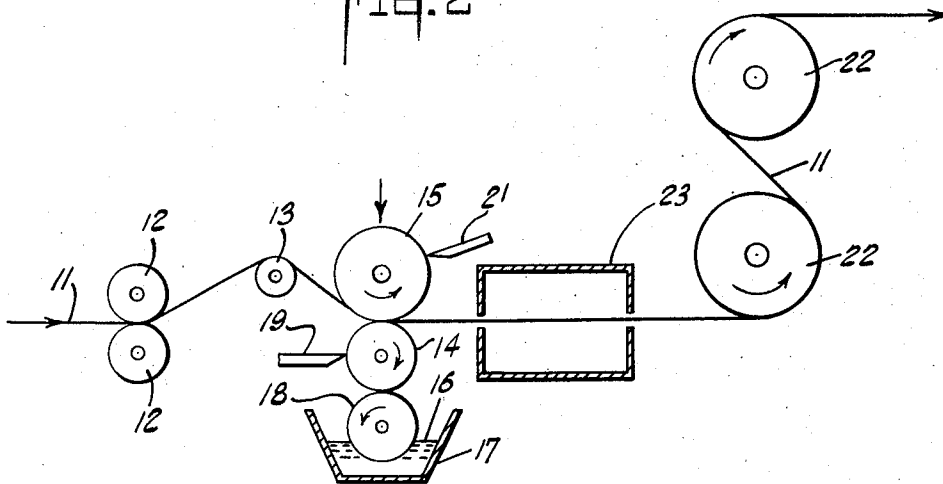


Fig. 2



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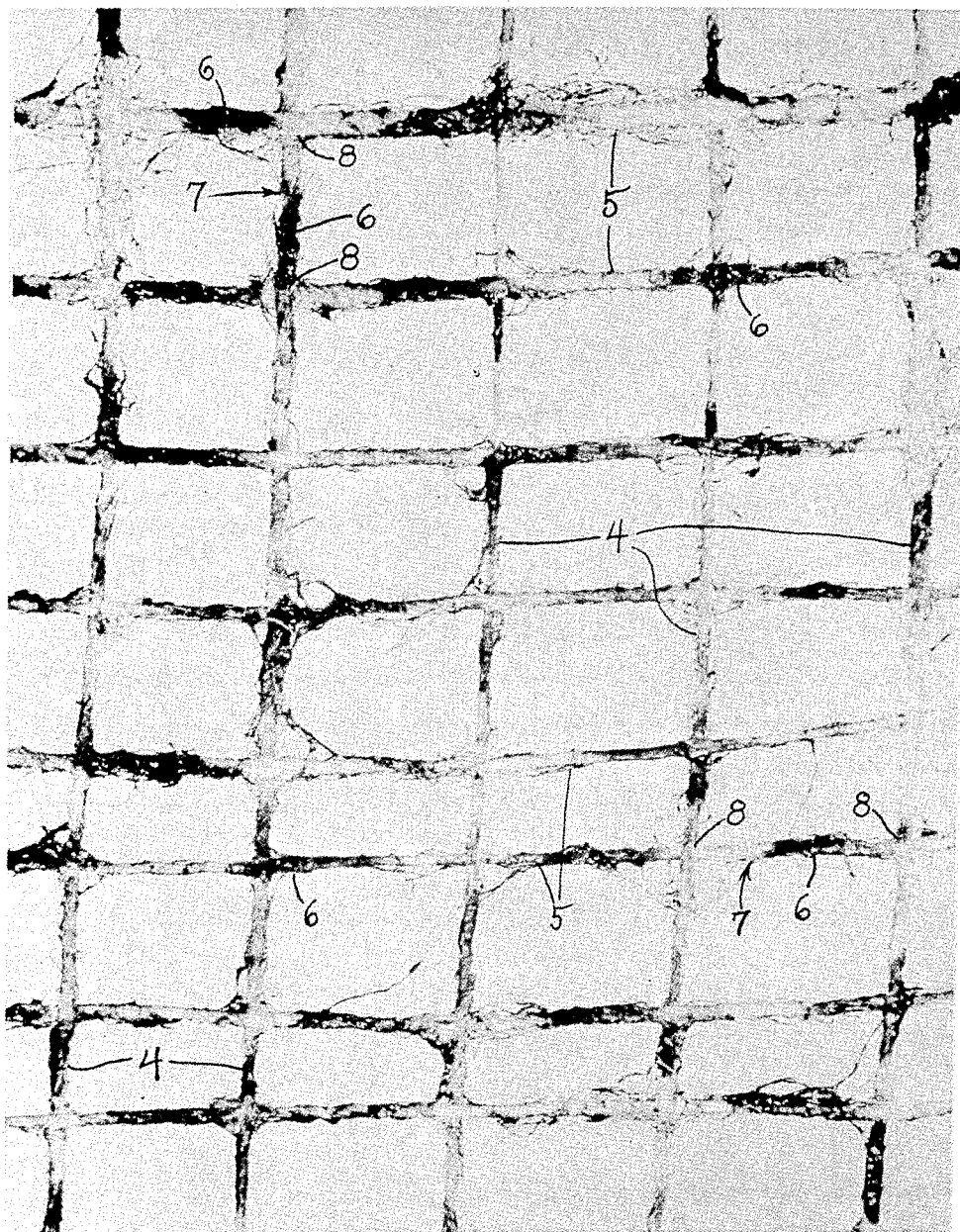
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Fig. 3.



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1 Claim. (Cl. 117—38)

The present invention relates to methods for stabilizing or eliminating the sleaziness in loosely woven fabrics and products resulting therefrom.

Most loosely woven fabrics may be described as sleazy or unstable in the sense that intersecting yarns may be moved easily with respect to one another. When such fabrics have been stabilized by impregnation or coating the yarns with an adhesive to the extent that they stick to one another where they intersect, the relatively continuous coating of adhesive after hardening has the effect of stiffening the fabric and seriously detracting from its soft handle such that it is unfit for many uses where softness and flexibility are important.

It is a principal object of this invention to provide a stabilized loosely woven fabric which possesses sufficient softness for a variety of uses, including application adjacent the wearing surface of sanitary napkins.

It is another object to provide such a fabric which is stabilized by an adhesive material deposited in a regular pattern defining spaced areas thereon.

It is a further object of the invention to provide a method of printing the adhesive onto the fabric in such a pattern, which method is simple and dependable and capable of operating at relatively high production speeds.

Other and further objects of the invention will be apparent from the following description and claims taken together with the drawings wherein:

Fig. 1 shows a typical pattern of grooves with which printing means, such as a roller, may be engraved to distribute binder on its surface in a corresponding pattern;

Fig. 2 is a schematic view of typical apparatus for stabilizing fabrics according to this invention;

Figure 3 is a photomicrograph of a stabilized gauze fabric according to this invention at an original enlargement of approximately 10 to 1.

Referring to Fig. 1 of the drawings, there is shown a pattern of discrete diagonal grooves 10 with which a printing member may be engraved for the distribution of adhesive binder on its surface. After the binder has been distributed in the grooves on the printing member in the pattern indicated, it may be transferred to a loosely woven fabric by bringing the fabric and the printing member into compressive contact with one another. Assuming that migration of the binder in the fabric after printing is controlled, the binder will be distributed on the fabric in a pattern which will correspond fairly closely with the pattern in which it was carried on the printing member. Therefore, the printing pattern must be carefully designed to provide the binder distribution required.

In Figure 3 of the drawings, there is shown a stabilized loosely woven gauze fabric having a soft hand. This fabric comprises intersecting warp and weft yarns 4 and 5, respectively, which in the absence of a binder, may be moved easily with respect to one another.

To avoid detracting seriously from the soft hand of the original fabric, or stiffening it beyond permissible limits, it is preferred to distribute the binder in relatively

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small spaced areas 6 of the fabric. Generally speaking, it is preferred that these areas 6 be shorter than the yarn segments 7 extending between adjacent yarn intersections 8 although they may be somewhat larger in size provided they extend between no more than two adjacent yarn intersections. Within this general size range, the binder areas 6 should be spaced in such a way that the binder covers no more than 50 percent of the fabric surface. On the other hand, the distribution pattern of the binder on the fabric must be sufficiently extensive to assure that at least about one out of five adjacent intersections 8 are bonded by the aforesaid binder areas, although it is preferred that one out of two to five are so bonded. In Figure 3, it appears that at least about one out of every three of the yarn intersections 8 extending in the warp and in the weft directions of the fabric is bonded. Due to the inherent difficulty in obtaining exact register between binder distributed in a particular pattern on a printing member, and the yarn intersections 8 themselves, it is not practical to use a printing pattern which is designed to deposit binder only at every fifth intersection, for instance. In order to assure that at least about every fifth intersection is bonded, the binder is distributed on the fabric in a pattern of relatively small spaced areas which extend over a good deal more of the fabric than would be necessary to bond only the minimum number of intersections. Thus, the pattern of binder distribution is only partly in register with the yarn intersections to be bonded. When the binder areas are individually less extensive or shorter than the yarn segments between adjacent intersections, it is preferred that the binder distribution pattern be out of phase with the weave of the fabric in order to assure that there is not a complete failure of registration between the binder areas and the yarn intersections in some areas of the fabric.

The narrow bars or lines of the pattern of Fig. 1 represent grooves 0.010 inch deep which may be engraved in the surface of a print roll of the type described hereinafter. These grooves may be approximately 0.25 inch long, 0.015 inch wide, spaced from one another by a minimum distance of approximately 0.0625 inch and inclined at approximately 33 degrees to the vertical and 57 degrees to the horizontal, as shown. This particular pattern has given particularly satisfactory results with both 14 x 8 and 14 x 10 plain woven bleached cotton gauzes, using a moderately plasticized polyvinyl acetate resin as the binder, with the 14 ends extending in the vertical direction with respect to the position of the print pattern in Fig. 1.

Referring to Fig. 2 of the drawings, there is shown typical apparatus for performing the method according to this invention. A loosely woven unstabilized fabric 11, which may be a conventional plain woven gauze, such as described above, is led between tensioning rolls 12 and thence fed under slight tension over guide roller 13 and into the nip between a printing roll 14 carrying an adhesive binder distributed in a pattern on its surface and a back up roll 15. The printing roll 14 may be of stainless steel or a suitable chromium plated steel which may be engraved with a pattern defining the desired binder distribution such as described above in connection with Fig. 1, while the back up roll 15 is preferably of hard rubber although there are many other suitable materials which may be used.

A suitable adhesive binder 16, such as a moderately plasticized polyvinyl acetate resin, is transferred from a binder pan 17 to the revolving surface of the printing roll 14 by a revolving pick up roller 18 partially immersed in the binder carried in the pan and in contact with the underside of the printing roll. Excess binder is scraped or wiped from the surface of the printing roll by a doctor blade 19 which may be adjusted against its

surface to assure that as the roll approaches the fabric the binder it carries will be distributed substantially in the grooves of the aforesaid engraved pattern. The peripheral speeds of the printing and back up rolls 14 and 15 are substantially the same as the linear speed of the fabric to minimize any wiping action between them. The back up roll 15 is adjusted, such as by spring loading, in such a way that the fabric is moved under pressure between the back up roll and the printing roll. The pressure loading of the back up roll may be adjusted for maximum efficiency of binder transfer from the printing roll to the fabric. A hard rubber back up roll is preferred to provide a relatively hard surfaced roll which also is capable of a certain amount of self-adjustment to fit closely with the printing roll. It is also preferred that a doctor blade or wiper 21 be employed to scrape or wipe off any binder which may print through the fabric onto the surface of the back up roll.

The fabric 12 may be dried by passing it over conventional steam drying cans 22, although it is advisable to keep the printed side of the fabric as much out of contact with any surface as possible, until it has dried to a certain extent. For this reason and because it is advantageous to dry the binder deposited on the fabric as rapidly as possible to prevent excess migration of binder along its yarns, the fabric may be passed through a suitable drying oven 23 in the area between the print roll and the drying cans.

Having now described the invention in specific detail and exemplified the preferred manner in which it may be carried into practice, it will readily be apparent to those skilled in the art that innumerable variations, applications, modifications, and extensions of the basic principles involved may be made without departing from its spirit or scope. For instance, although I have described the printing roll as intaglio or grooved, it is possible that it may be prepared in such a way that it will comprise raised portions for carrying the binder in the pattern

desired in lieu of the aforementioned grooves. It also will be apparent to one skilled in the art that there are many varieties of print patterns which may be used to distribute the binder on the fabric in the manner desired.

The invention claimed is:

A stabilized loosely woven gauze fabric having a soft hand and which comprises intersecting warp and weft yarns which in the absence of a binder may be moved easily with respect to one another, and an adhesive binder distributed in a regular pattern throughout the fabric in relatively small longitudinally and transversely spaced portions of the yarns thereof, each of said binder portions generally being shorter than the yarn segments extending between adjacent yarn intersections, the binder in said portions covering no more than about 50 percent of the fabric surface and bonding at least about one out of every five adjacent yarn intersections in the warp and in the weft direction of the fabric, thereby stabilizing the fabric against the aforesaid movement of the warp and weft yarns, said pattern being partly out of register with the general arrangement of said yarn intersections and said longitudinally and transversely spaced binder portions extending over a good deal more of the surface of the fabric than would be necessary to bond only the minimum of yarn intersections if said pattern was in register with the arrangement of yarn intersections, said fabric possessing the high degree of softness necessary for use adjacent the wearing surface of a sanitary napkin.

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