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PAPERMAKER'S FELT

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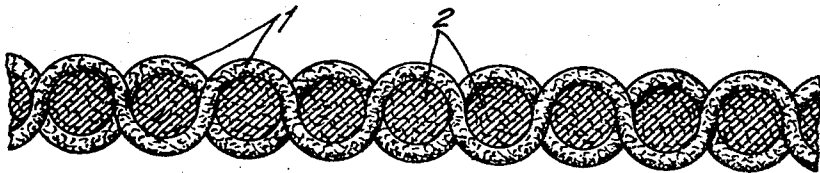


FIG. 1

*Fibers of a synthetic resin
in warp or filler yarns, or both,
exposed on the surface of the
fabric and constituting from
5% to 70%, by weight, of fabric.
Wool fibers in fabric in a
quantity sufficient for fulling.*

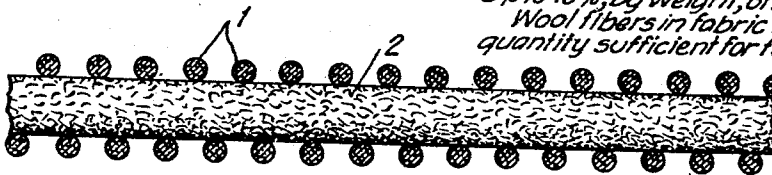


FIG. 2

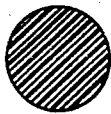


FIG. 3

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PAPERMAKER'S FELT

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14 Claims. (Cl. 139—384)

1

My invention relates to tubular or endless felts used in the manufacture of pulp, paper, paper board, asbestos-cement products, and various types of insulating board. In other words, my invention relates to fabrics which are used in the mechanical arts and which, in such use, are subjected to friction or abrasion which gradually destroys their integrity. Such fabrics may be woven in tubular form, or woven flat and the ends thereafter joined to form an endless structure, in the manner well known in the art.

In the drawing—

Fig. 1 is a more or less diagrammatic, longitudinal section of a felt showing one weave which may be employed;

Fig. 2 is a transverse section thereof; and

Fig. 3 is a highly magnified cross section of a synthetic resinous fiber.

Referring to the drawing, 1 represents the warp yarns and 2 the filler yarns both of which, in the weave illustrated, have portions thereof exposed on the surface of the felt.

Heretofore, these felts have ordinarily been manufactured entirely from wool yarns, or from a combination of cotton and wool yarns; the cotton yarns, when used, usually being incorporated in the warp, and the wool yarns in the filler. Since fabrics of this type are required to be full, wool in a quantity sufficient to provide a satisfactory fulling is always an essential element.

The principal object of my invention is to provide a fabric of the character described above which will have a very much greater resistance to abrasion and to destructive attack by chemical media than the all wool or part wool and part cotton fabrics now used, and hence will have a much longer useful life.

While fabrics formed entirely from "nylon" and similar synthetic resins will not felt, fibers and filaments of such resins which exhibit orientation along the fiber or filament axis not only have unusual tensile strength but also high resistance to abrasion, and I find that the strength and resistance of fabrics of this type to abrasive wear and also their resistance to the disintegrating effects of certain chemical media, such as the alkalies to which wool fibers are vulnerable, are materially enhanced by incorporating therein fibers or filaments of such resins but in quantities which will still allow satisfactory fulling, depending upon the weave, to produce a finished fabric having the required density or other characteristics desired for the particular use to which it is to be applied.

Fabrics of this type, depending upon the par-

2

ticular application, vary widely in structure insofar as the coarseness, fineness and degree of felting thereof are concerned; some being very coarse and loosely felted and others being very fine and firmly felted. Likewise, there are wide variations in weight, weave, fineness of the wool, type of finish, degree of nap and other factors.

For these reasons it is quite impossible definitely to specify the quantity of resinous fibers which may be incorporated in every fabric of this general class and yet produce a structure which will felt or full to the necessary degree for a specific application. However, some increased resistance to wear will be observed when resinous fibers or filaments of the character mentioned above constitute as little as 5%, by weight, of the fabric and, when the quantity of these fibers is increased so that they constitute as much as 20% by weight of the fabric, its resistance to abrasion and destructive attack by chemical media is very appreciably increased, and continues to increase with the synthetic fiber content. The maximum quantity which may be incorporated may, in some instances, be as high as 70% by weight of the fabric where the balance of the fabric is formed entirely of wool.

Depending somewhat upon the weave, and the comparative degree of exposure of the warp and filler yarns on the surfaces of the fabric the resinous fibers or filaments may be incorporated either in the warp or in the filler, and I prefer to card and spin the resinous fibers and the wool fibers together to form blended yarns although filaments or yarns formed of the synthetic resin may be twisted together with wool yarns to form a plied structure. In either case, the synthetic fibers will be exposed, or at least partially exposed, on the surfaces of the fabric where the yarns containing them are so exposed, and I therefore prefer to incorporate them at least in those yarns which form the substantial portion of the fabric surfaces in order to utilize their abrasion resisting characteristics to the greatest degree. However, where cotton is used in the warp the tensile strength of the fabric may be substantially increased, and the resistance of the warp yarns to abrasion where they are exposed on the surfaces of the fabric may be substantially increased by incorporating the synthetic fibers therewith.

However, it is to be understood that the quantity of synthetic fibers or the combined quantity of the synthetic fibers and the other fibers which will not felt is limited because of the necessity of incorporating wool fibers in a quantity sufficient

3
to produce a fabric which can be fulled to the desired degree.

What I claim is:

1. A papermaker's felt adapted for use in the manufacture of pulp, paper, paper board, asbestos-cement products, and insulating board, and comprising an endless woven and fulled structure having warp and filler yarns, one of said yarns forming a substantial portion of the felt surface and having fibers of wool and fibers of a synthetic resin exposed on the surface of the yarn; the synthetic fibers constituting substantially more than 5%, by weight, of the felt but less than will prevent appreciable fulling of said felt; whereby the useful life of said felt is materially increased.

2. A papermaker's felt adapted for use in the manufacture of pulp, paper, paper board, asbestos-cement products, and insulating board, and comprising an endless woven and fulled structure having warp yarns running lengthwise and filler yarns running transversely thereof; at least some of said yarns which are exposed on the surface of said felt comprising fibers of wool and fibers of a synthetic resin blended together; the synthetic fibers constituting substantially more than 5%, by weight, of the felt but less than will prevent appreciable fulling of said felt and being exposed on the surface of said felt; whereby the useful life of said felt is materially increased.

3. The structure set forth in claim 1 in which the synthetic resin fibers constitute between 5% and 70%, by weight, of the fabric.

4. The structure set forth in claim 2 in which the synthetic resin fibers constitute between 5% and 70%, by weight, of the fabric.

5. A papermaker's felt adapted for use in the manufacture of pulp, paper, paper board, asbestos-cement products, and insulating board, and comprising an endless woven and fulled structure having warp yarns running lengthwise and filler yarns having fibers of wool and fibers of a synthetic resin exposed on the surface thereof; said synthetic fibers constituting at least 5%, by weight, of said felt but less than will prevent appreciable fulling of said felt and being exposed on the surface of said felt; whereby the useful life of said fabric is materially increased.

6. A papermaker's felt adapted for use in the manufacture of pulp, paper, paper board, asbestos-cement products, and insulating board, and comprising an endless woven and fulled structure having warp and filler yarns exposed on the surface thereof; some of said yarns being formed

at least in part of fibers of a synthetic resin in a quantity sufficient to constitute substantially more than 5%, by weight, of said felt but less than will prevent appreciable fulling of said felt; said synthetic fibers being at least in part exposed on the surfaces of said yarns; whereby the resistance of said yarns to abrasive wear is materially enhanced and the useful life of said felt is substantially increased.

7. A papermaker's felt adapted for use in the manufacture of pulp, paper, paper board, asbestos-cement products, and insulating board, and comprising an endless woven and fulled structure having warp yarns running lengthwise and filler yarns running transversely thereof; said warp yarns being exposed on the surface of said felt and formed at least in part from fibers of synthetic resin exposed on the surface of said warp yarns; whereby the resistance of said yarns to abrasive wear is materially enhanced and the useful life of said felt is substantially increased; the synthetic fibers in said felt constituting substantially more than 5%, by weight, of said felt but less than will prevent an appreciable fulling thereof.

8. The structure set forth in claim 1 in which the synthetic resin is "nylon."

9. The structure set forth in claim 2 in which the synthetic resin is "nylon."

10. The structure set forth in claim 5 in which the synthetic resin is "nylon."

11. The structure set forth in claim 6 in which the synthetic resin is "nylon."

12. The structure set forth in claim 7 in which the synthetic resin is "nylon."

13. The structure set forth in claim 6 in which the synthetic resin fibers exhibit orientation along the fiber axes.

14. The structure set forth in claim 6 in which the synthetic resin fibers constitute between 5% and 70% by weight of the fabric, and exhibit orientation along the fiber axes.

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