Oct. 19, 1943. G. A. NEVILLE 2,332,393

FELT BELT

Filed June 24, 1942

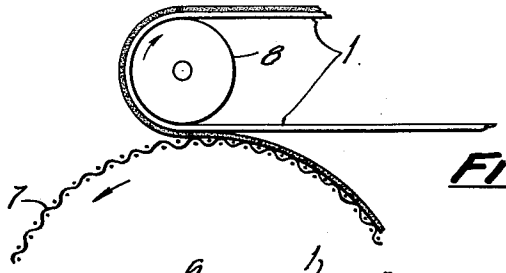


FIG. 1

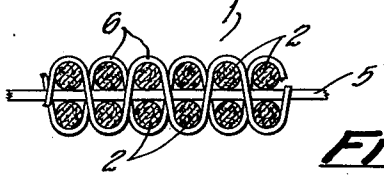


FIG. 2

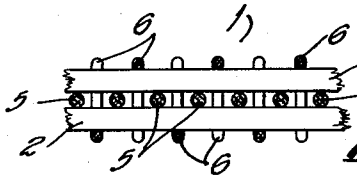


FIG. 3

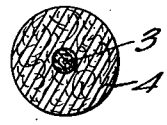


FIG. 6

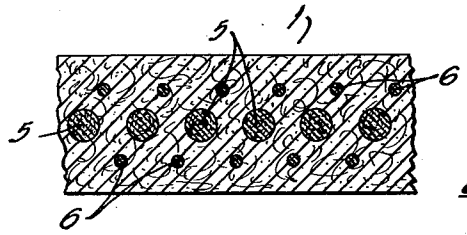


FIG. 4

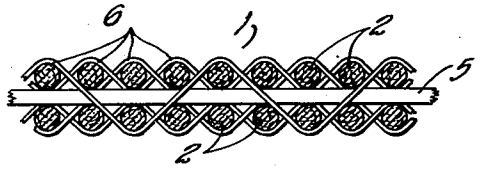


FIG. 5

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FELT BELT

George A. Neville, Albany, N. Y., assignor to Albany Felt Company, Albany, N. Y., a corporation of New York

Application June 24, 1942, Serial No. 448,269

8 Claims. (Cl. 139—415)

My invention relates to belts and particularly to improvements in so-called "asbestos-cement felts" or belts used in the manufacture of asbestos-cement shingles and the like.

In the manufacture of such products a wet web of cement and fiber is first formed on a cylinder mold which is rotatably mounted on a horizontal axis and runs partially submerged in a vat containing a fluent mixture of fibers and other materials from which the products are to be formed. This web is removed from the mold by means of a felt belt which is held in contact with the upper surface thereof by means of a weighted roll and which drives the mold by friction. The felt with the wet web thereon passes between driven press rolls which squeeze a considerable quantity of water out of the web and also exert a pull on the felt which drives the cylinder mold. Because the web is soft and plastic, any surface irregularities on the belt are impressed in the surface of the web, and because it is desirable to maintain the finished product as free as possible from any such impressions or imprints a smooth surfaced belt is preferred.

While belts having weaves in which the warp yarns run alternately over and under the filler yarns are commonly used, it has heretofore been impossible to produce a highly durable woven belt with a surface which can be maintained smooth in operation. The warp yarns of course run lengthwise of the belt and thus, when the belt is in operation, are subjected to considerable tension. This tension naturally tends to straighten the warp yarns with the result that those portions of the filler yarns which directly underlie and/or overlie the warp yarns are compressed to a much greater degree than those portions of the filler yarns which are exposed on the surfaces of the fabric between the warp yarns. Thus, the surface of the felt soon develops a multiplicity of regularly disposed high and low spots forming a definite pattern which is imprinted in the plastic products. Moreover, the stock from which the products are formed contains gritty substances, and the filler yarns wear very rapidly in the high spots because the effects of friction and abrasion are substantially concentrated thereon.

The principal objects of my invention are to provide a woven felt belt which will have a fairly and inherently smooth surface which will be long maintained; which will retain its absorptive properties and its structural strength and integrity for prolonged periods despite the disintegrating effect of the alkalies present in the products handled thereby; and which will be highly resistant to stretching.

I accomplish these results by means of the structure described below and diagrammatically illustrated in the accompanying drawing, in which—

Fig. 1 is a fragmentary side elevation view of my belt and a cylinder mold driven thereby;

Fig. 2 is a longitudinal section of my belt drawn to an enlarged scale;

Fig. 3 is a transverse section of the belt;

Fig. 4 is a transverse section of the belt after it has been fulled and felted;

Fig. 5 is a longitudinal section similar to that shown in Fig. 2 but illustrating a slightly different weave; and

Fig. 6 is a magnified cross section of a cored filler yarn.

In general, my desirable ends are attained by providing a fabric having a filler, and two independent warps which, for convenience, I have designated as primary and secondary.

The filler yarns which are disposed on both sides of the primary warp are so arranged that those on either side of the primary warp extend entirely across the belt without passing to the other side of the primary warp.

The primary warp yarns are substantially free of kinks and lie wholly between two or more layers of filler on each side thereof which are held together, with the primary warp therebetween, by means of comparatively fine secondary warp yarns interwoven therewith.

Referring to the drawing, my belt is represented generally by the numeral 1 and, in operation, is held in contact with the cylinder mold 7 by means of the weighted roll 8. The filler yarns 2 are formed substantially of wool fibers but may have some cotton or other fibers mixed therewith to form a composite yarn, or may comprise wool fibers twisted about a cotton or other core. In Fig. 6 I have shown a magnified cross section of a filler yarn of the type having a core 3 of cotton, linen, "nylon" or the like with a wool covering 4.

The primary warp yarns are designated by the numeral 5 and are preferably but not necessarily formed of cotton which is cheap, strong and not deleteriously affected by alkalies. The primary warp yarns, however, may be formed of linen or "nylon" which are very strong but more costly, or even in whole or in part of wool. The primary warp yarns 5 are designed to provide the belt with the necessary tensile strength and resist-

ance to stretching and are therefore comparatively coarse as compared to the secondary warp yarns 6 which sustain substantially no tensile stress when the belt is in operation. The secondary warp yarns 6 are preferably of cotton but may be of other suitable materials, such as those above mentioned, because they serve merely to secure together the layers of filler disposed on either side of the primary warp yarns. They are preferably quite fine so as to provide a belt having a high degree of surface smoothness.

After the belt is woven it is given the usual fulling and felting treatment to produce a fabric having the general appearance in cross section of that shown in Fig. 4.

From the foregoing it will be apparent that substantially all of the tensile stress on the belt is taken by the primary warp yarns 5, and since these yarns are initially substantially free of kinks the belt does not stretch materially due to subsequent straightening of the yarns when stressed in tension; and since they do not run over and under the filler as in ordinary weaves, tension thereon does not tend to produce any deformation of the filler yarns. The secondary warp yarns are long as compared with the primary warp yarns and therefore there is very little tendency for them to straighten due to any stretching of the belt. Because of the fact that tensile stresses on the belt do not tend to straighten the secondary warp yarns 6 to any appreciable degree these yarns do not tend appreciably to compress the filler yarns where they cross and thus to produce high and low spots in the surface of the belt.

It will be apparent that the secondary warp yarns in the weave shown in Fig. 2 are substantially longer than those shown in Fig. 5 and, hence, any tendency of the secondary warp yarns to straighten under normal operating stresses is less, in some degree, in the weave of Fig. 2 than in the weave shown in Fig. 5. Hence, my preferred construction is that shown in Fig. 2.

What I claim is:

1. A comparatively smooth-surfaced belt adapted to convey cement products in a formative state and comprising an endless, woven and fulled fabric having filler yarns on both surfaces thereof running transversely of said belt, and primary and secondary warp yarns running longitudinally thereof; said filler yarns being formed largely of wool fibers and lying substantially straight across said primary warp yarns but being interwoven with said secondary warp yarns, and said primary warp yarns being substantially free of kinks and lying substantially wholly between those filler yarns forming one surface of said fabric and those filler yarns forming the opposite surface thereof; whereby, substantially the entire tensile stress on said belt, when in operation, is sustained by said primary warp yarns and comparatively little tensile stress is sustained by said secondary warp yarns tending to straighten the same and thereby to compress said filler yarns which are interwoven therewith and impair the surface smoothness of said belt.

2. A comparatively smooth-surfaced belt adapted to convey cement products in the formative state and comprising an endless, woven and fulled fabric having filler yarns and primary and secondary warp yarns said primary warp yarns being substantially free of kinks and running longitudinally of said belt and said filler yarns being composed largely of wool fibers and running transversely of said belt to form at least one layer of filler on each side of said primary warp yarns; said filler yarns on the outer surface of said belt extending from edge to edge thereof without passing to the other side of said primary warp yarns, and the filler yarns on each side of said belt being interwoven with said secondary warp yarns to secure said layers of filler in place; whereby, substantially the entire tensile stress on said belt, when in operation, is sustained by said primary warp yarns and said belt is made highly resistant to stretching; and comparatively little tensile stress is sustained by said secondary warp yarns tending to straighten the same and thereby to compress said filler yarns which are interwoven therewith and impair the surface smoothness of the outside of said belt.

3. The structure set forth in claim 1 in which the warp yarns are formed in substantial part of vegetable fibers.

4. The structure set forth in claim 1 in which the warp yarns are formed in substantial part of cotton.

5. The structure set forth in claim 1 in which the primary warp yarns are comparatively coarse and the secondary warp yarns comparatively fine.

6. The structure set forth in claim 1 in which the primary warp yarns are formed in substantial part of vegetable fiber and comparatively coarse as compared to the secondary warp yarns.

7. The structure set forth in claim 1 in which the primary and secondary warp yarns are formed in substantial part of vegetable fiber with the primary yarns substantially coarser than the secondary.

8. A comparatively smooth-surfaced belt adapted to convey cement products in a formative state with a minimum of marking and comprising an endless, woven and fulled fabric having primary warp yarns, secondary warp yarns, and filler yarns; said filler yarns being composed largely of wool fibers and forming two distinct layers of filler with the yarns in one layer lying substantially entirely on one side of said primary warp yarns and the filler yarns in the other layer lying substantially entirely on the opposite side of said primary warp yarns; said primary warp yarns being substantially free of kinks and running longitudinally of said belt, and said secondary warp yarns being interwoven with filler yarns in each layer of filler to secure said layers together with the primary warp yarns therebetween; whereby, substantially the entire tensile stress on said belt, when in operation, is sustained by said primary warp yarns and said belt is made highly resistant to stretching and comparatively little tensile stress is sustained by said secondary warp yarns tending to straighten the same and thereby to compress said filler yarns interwoven therewith and impair the surface smoothness of said belt.

GEORGE A. NEVILLE.