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B. L. WHITTIER

2,208,090

DRIER FELT

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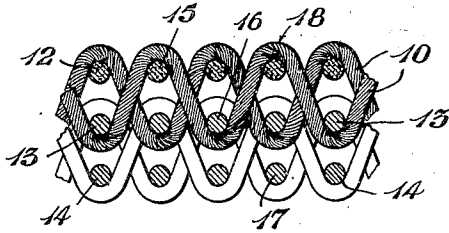


Fig. 1.

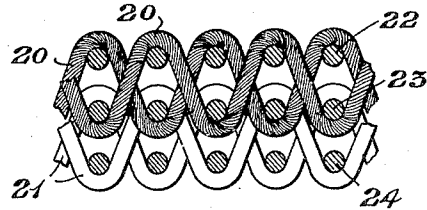


Fig. 2.

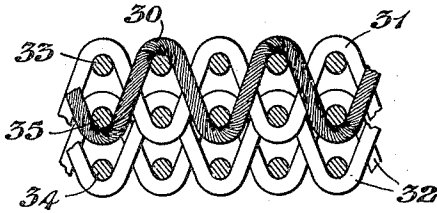


Fig. 3.

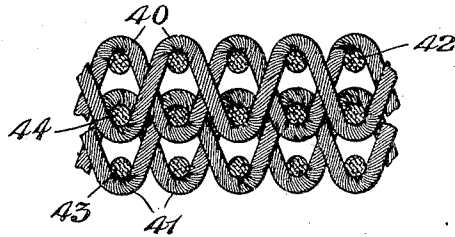


Fig. 5.

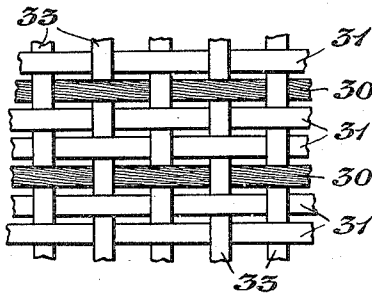


Fig. 4.

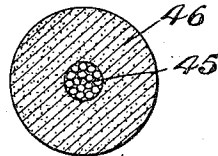


Fig. 6.

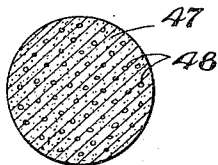


Fig. 7.

Inventor
B. L. Whittier

By *A. Yates Dorell*
Attorney

UNITED STATES PATENT OFFICE

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DRIER FELT

Benjamin L. Whittier, Ruxton, Md., assignor to
Mt. Vernon-Woodberry Mills, Inc., Baltimore,
Md., a corporation of Maryland

Application April 25, 1938, Serial No. 204,222

5 Claims. (Cl. 139-408)

This invention relates to fabrics in general and more particularly to drier felts and also to fabrics for use as belting, webbing, or the like, acting as conveyors or guides where strong flexible fabrics are required. This invention particularly relates to a belting, webbing, or the like, to be used in paper manufacturing plants, or the like, as a guide or conveyor belt, commonly called a drier felt, for use with wet newly formed paper passing through the drier machines coming in contact with a series of heated drying drums.

Drier felts have been manufactured of woven multi-ply construction composed entirely of cotton or similar material. These felts have been found to be relatively short lived and not sufficiently durable.

In order to provide a drier felt of greater durability multi-ply fabrics with a complete asbestos surface or facing have been manufactured. Such asbestos faced fabrics have been woven to provide a solid asbestos paper supporting and engaging surface. This type of construction was found to be more durable, but at the same time much heavier and more expensive.

In addition, such prior fabrics had several objectionable features caused by the natural characteristics inherent in the asbestos forming such solid facing. Some of those characteristics are roughness, low tensile strength, excessive retention of moisture, chafing and others.

The present invention has for its object the overcoming of the above objectionable features and the provision of a drier felt possessing substantially the advantageous characteristics of a multi-ply cotton fabric as to strength, weight, cost, surface finish, moisture retention and the like but of considerably improved durability.

The invention contemplates the provision of a drier felt of a multi-ply construction including more or less cotton or other vegetable fiber but with glass strands interspersed periodically between other strands to withstand heat and to form a binder for the other strands or fibers.

The invention will be hereinafter more particularly described with reference to the drawing forming a part hereof, and later pointed out in the claims at the end of the description.

In the drawing:

Fig. 1 is a longitudinal section view on an enlarged scale of a drier felt illustrating one application of the invention;

Fig. 2 is a further longitudinal section of a variation;

Fig. 3, another longitudinal section showing an additional variation;

Fig. 4, an expanded plan view illustrating more in detail the construction of the top or surface layer of the fabric shown in Fig. 3;

Fig. 5 is a longitudinal section showing a drier felt woven entirely of glass strands;

Fig. 6 is an enlarged cross section of a strand having a central core; and,

Fig. 7 is an enlarged cross section of a strand partly of glass and some other filaments.

Referring to the drawing in greater detail, the improved drier felt comprises a multi-ply fabric of woven construction, which for the purpose of illustration is shown formed of three plies.

In Fig. 1, the preferred embodiment is shown as a surface ply of woven glass. This fabric includes upper warp threads or strands 10 and lower warp threads or strands 11. The lower strands 11 are of cotton, like material, or of material having substantially the characteristics of cotton. The fabric is woven with upper, lower and intermediate weft strands, or picks of filling, indicated at 12, 13 and 14, respectively, the upper filling 12 being of spun glass, or principally so, while the other picks of filling are preferably comprised of cotton or material having characteristics of cotton. The warp threads in the preferred construction are passed about alternate picks of filling 15 and 16, or 16 and 17 in adjacent plies. In this construction all of the strands of filling and all of the loops 18 forming the surface layer of the fabric are made partly or wholly of spun glass, thereby forming a drier felt fabric having an outer ply of glass.

The fabric as just described provides a marked improvement upon the constructions available in the prior art by providing a fabric of greater strength, greater heat resistance, smoother surface, improved absorptive qualities, and more economic in use. The felt has the desirable properties of the cotton felts while at the same time obtaining the desirable properties of asbestos surface felts without embodying their disadvantages.

In Fig. 2, a further variation in construction of the felt is illustrated wherein the upper warp strands 20 are of glass and the lower warp strands 21 are preferably of cotton. All of the weft or filler strands in this construction, comprising the upper 22, intermediate 23 and lower 24, being of cotton or materials having the desirable properties of cotton. In this variation the upper row of filler strands are composed of material similar to that in the lower filler and lower warp strands as distinguished from the arrangement in Fig. 1 wherein the entire surface ply is composed of glass.

Practical experience has demonstrated that the relative number of glass strands in the surface ply can be varied while still obtaining the markedly improved properties in the drier felt. In Figs. 3 and 4, such a variation is illustrated wherein every third warp strand 30 of the surface ply is composed of spun glass with the remainder of the warp strands 31 in the surface ply being of cotton. The lower warp strands 32

are also made of cotton or like material. In this construction, cotton may be used for the upper, lower and intermediate weft strands 33, 34 and 35, respectively. The warps are preferably each looped or passed about alternate wefts or picks of filling in each of two adjacent plies as illustrated. It will be also observed that the interspersed strands 30 are located between strands 31. The loops in adjacent strands 30 pass over and under alternate picks of filling in the surface ply, thereby providing a staggered arrangement of the strands across the width of the fabric.

By way of further variation, a drier felt is shown in Fig. 5 which is made entirely of woven glass. In this construction the upper and lower warp strands 40 and 41 are of glass being looped about picks of filler or weft strands of similar material, the weft strands being the upper 42, lower 43 and intermediate 44 as indicated in the particular figure.

In Figs. 6 and 7 enlarged cross-sections of glass strands are illustrated. In Fig. 6 the strand comprises a core 45 of cotton or like material and a sheath 46 of glass or a material having the characteristics of glass. Although this manner of spinning the warp and weft strands is preferred for certain uses, the strand may be composed entirely of fiber glass. In Fig. 7 the strand is composed partly of glass 47 and partly of some other material 48. In this arrangement, the materials are spun together into the strand in a mixed form instead of having the two materials segregated as in Fig. 6.

It will be readily understood that wherein the term "glass" has been used in the description of the various figures, that it is contemplated that such strands may be principally or partly of glass and may also incorporate other materials having the characteristics of the glass which make the latter so highly desirable for use in a fabric as herein contemplated. It will also be understood that wherein the term "cotton" has been used, it is equally contemplated that other materials having the desirable characteristics of cotton may be substituted.

The type of fabric construction, herein described, provides a drier felt having substantially the same advantageous characteristics of cotton drier felts or of felts made up completely of strands of cotton or analogous material, and yet at the same time the felt has much greater durability than a cotton felt and its life will be materially longer because of the heat resisting properties of the interspersed glass binder strands 30.

The construction and arrangement of the weave as well as the relative number of glass and cotton strands may be varied within certain limits. For example, a certain number of the weft strands may be of glass as well as a percentage of the lower warp threads and the interspersed arrangement of the glass binding threads may be provided in both of the outer plies of a multi-ply fabric.

The spun glass provides a thread of great capillarity, thereby giving high absorptive properties while at the same time giving a material which does not absorb into its own body the moisture to which it is subjected. That ab-

sorbed moisture is only on its surface. Cotton, wool and other materials although having the ability to absorb moisture do so by absorbing the moisture into the structure of the strand as well as into the structure of the filaments composing the strand. In the fabric as herein contemplated the absorption is into the structure of the strand but not into the body of the filaments themselves. The fabric provides a much smoother surface to the paper or like material being treated and also gives very rapid drying properties, thereby enabling the drier felt to be used for a new body of the plastic pulp with the original absorption properties of the fabric restored. The process of treating the paper may be continuous and rapid. The improved drying properties of the felt thereby enables a greater mass of paper to be treated in a given time. Furthermore, the filaments of the glass are not brittle and weak as are the filaments of asbestos. A fabric is thereby provided which is stronger, less brittle, less subject to wear and of greater efficiency in use.

While the preferred embodiment of this invention is illustrated and described, variations within the true spirit and scope of the same are to be determined by the appended claims.

I claim:

1. A multi-ply woven drier felt comprising filling having the characteristics of cotton, and warp threads each passed about alternate picks of filling in each of two adjacent plies, and at least two-thirds of the number of warps in the surface ply having the characteristics of cotton and the remaining warps thereof being composed of glass, the latter being uniformly distributed across the surface ply, with the interweaving of the adjacent glass warps with the filling being staggered.

2. A multi-ply woven drier felt comprising filling having the characteristics of cotton, and warp threads each passed about alternate picks of filling in each of two adjacent plies, and at least two-thirds of the number of warp threads in the surface ply having the characteristics of cotton and the remainder being threads composed of glass, the latter being uniformly distributed across the surface ply.

3. A multi-ply woven drier felt comprising cotton filling, and warp threads each passed about alternate picks of filling in each of two adjacent plies, and at least two-thirds of the number of warp threads in the surface ply being of cotton and the remainder being of glass, the latter being uniformly distributed across the surface ply.

4. A multi-ply woven drier felt comprising cotton filling, and warp threads each passed about alternate picks of filling in each of two adjacent plies, and every third warp thread in the surface ply being a glass thread with the remaining warp threads being of cotton.

5. A multi-ply woven drier felt comprising cotton filling, and warp threads each looped about alternate picks of filling in each of two adjacent plies, and every third warp in the surface ply being of glass and the remaining warps being of material having the characteristics of cotton.

BENJAMIN L. WHITTIER.