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T. HINDLE

1,994,280

DRIER FELT FOR USE ON PAPER MAKING MACHINES

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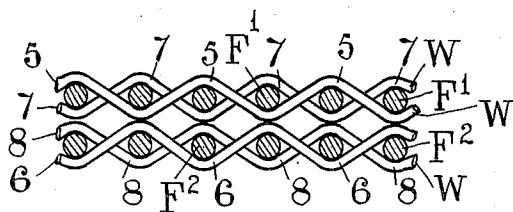


Fig. 1.

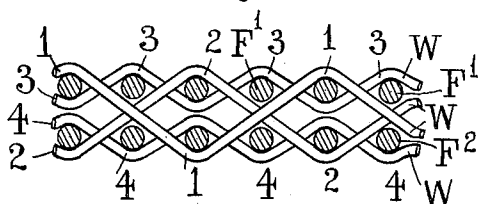


Fig. 2.

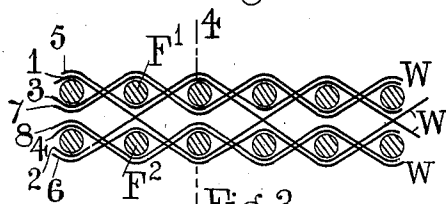


Fig. 3.

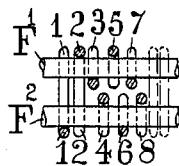


Fig. 4.

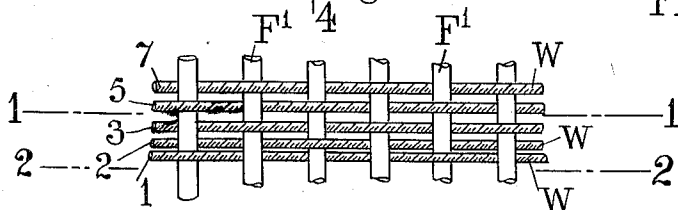


Fig. 5.

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DRIER FELT FOR USE ON PAPER
MAKING MACHINES

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Application April 21, 1932, Serial No. 606,656

2 Claims. (Cl. 139—410)

My invention comprises a double or two-layer fabric intended for use as a drier felt on paper making machines, which fabric is specially adapted to be woven on a loom to which the warp threads are supplied from a creel, in which system all the warp threads pass from the creel around rollers fixed in bearings immediately behind the loom, such rollers serving to regulate and to equalize the tension in the warp threads and thereby ensure that all the warp threads are drawn or fed forward equally by the rotation of said rollers.

A drier felt on a paper making machine serves to press the moist web of paper successively against the periphery of each steam-heated cylinder, and it is important that the pressure exerted by the felt in pressing the paper against the cylinders should be perfectly uniform, because the heat transmission from cylinders to paper is proportional to the applied pressure. The fabric used as a drier felt must be woven, therefore, with due precaution to ensure equal tension in the warp threads across the entire width of the fabric, which may be 300 inches or more in width. The use of the equalizing rollers, which are an essential part of the creel system, provides perfect equalization of warp tension during weaving and consequently in the woven fabric, assuming this to be of a suitable construction.

It is a characteristic of a fabric to be woven by the aforesaid creel system that the "take-up" or weaving contraction of the several warp threads forming the weave should be identical, otherwise some of the warp threads in the woven fabric would be unduly tight, and others would be unduly slack.

It has previously been proposed to weave double or two-layer fabrics for use as drier felts. For instance U. S. Patent No. 22,528/1859 (Cooke) and U. S. Patent 636,482/1899 (Barrell) both describe a double fabric consisting of two layers of plain fabric woven with coarse warps, the two layers being bound together during weaving by additional fine warps, the latter being submerged or hidden by the coarse warps forming the faces of the complete fabric.

To those skilled in the art of weaving, it is apparent that the weaving contraction of the fine binder warps is considerably in excess of the contraction of the coarse warps. It follows, therefore, that the fabrics described in the U. S. patents referred to above are not suitable to be woven in a loom in combination with the creel system, in which the whole of the warp

threads pass from the creel around a series of rollers and thence to the loom.

In manufacture, difficulties arise due to the problem of regulating with the necessary precision the relative tensions of the coarse and the fine warps, while frequent breakages of the fine warp threads retard production.

In practice with such fabrics in use on a paper making machine, the fine binder warps frequently break, the two layers becoming separate, and the beneficial effect of interbinding the two layers into one firm fabric is lost completely. Even when newly woven, these fabrics are liable to cause uneven drying of the paper, owing to irregular tension in the two kinds of warp threads.

My invention comprises a new construction of double or two-layer fabric, which is specially suitable for use as a drier felt on paper making machines. This double fabric is interbound in the weaving by a small proportion of the warp threads, which are all coarse and of similar diameter, and it is a feature of the said construction that the several warp threads forming the weave have equal weaving contraction, so rendering the fabric eminently suitable for weaving in combination with the creel system, with the resulting advantage that the woven fabric possesses all the desirable properties for use as a papermakers' drier felt.

The invention will be fully described with reference to the accompanying drawing in which the weave is diagrammatically shown.

Fig. 1 is a section on line 1—1 longitudinal of the fabric.

Fig. 2 is a section on line 2—2 longitudinal of the fabric.

Fig. 3 is a combined section showing both sets of warps.

Fig. 4 is a section on line 4—4 transverse of the fabric.

Fig. 5 is a plan.

One form of my new and improved double fabric may be woven on eight shafts, with the weave repeating on eight picks to the round. Although half of the weave is shown in Fig. 1, and the other half in Fig. 2, for the purpose of simplification, it will be understood that Fig. 2 is to be considered superimposed on Fig. 1, thus providing the complete weave, as shown in the line diagram Fig. 3. In Figs. 1, 2 and 3, the filling, or weft threads, are shown in cross-section, F¹ being the top layer of filling and F² the bottom layer. W represents the warp threads which are

numbered 1 to 8, since eight threads constitute the pattern or weave in this form.

Fig. 1 shows four warp threads forming two layers of plain weave, 5 and 7 making the top layer about filling threads F^1 and 6 and 8 making the bottom layer about filling threads F^2 . In this portion of the weave the two layers are entirely independent.

Fig. 2 shows the other four warp threads, two of which 1 and 2, act as binders, interlacing with both layers of filling F^1 and F^2 . Each binder thread passes from one face of the fabric to the other, engaging alternate vertical pairs of filling in the manner shown, so that one binder thread balances the other. The said binder threads 1 and 2, arranged in this manner, present on each face of the fabric the appearance of one thread weaving plain, and the other two warp threads 3 and 4, are arranged to complete the plain weave appearance on each face respectively.

Fig. 3 is a line diagram showing the complete weave, resulting from the combination of the two parts of Figs. 1 and 2, and it will be seen that the eight warp threads are disposed so that three threads 3, 5 and 7 form the top layer, other three 4, 6 and 8 form the bottom layer, while the remaining two threads, 1 and 2 serve to bind the two layers together and also to complete the top and bottom faces of the fabric.

Fig. 4 is a line diagram representing a transverse section of the fabric woven in accordance with Fig. 3. F^1 and F^2 are respectively the top and bottom layers of filling, and the positions

of the warp threads, which are numbered to correspond with Fig. 3 are also shown.

The particular method of interlacing described for the binder warp threads is chosen because the lengths of the warp threads are then all alike, and as the weaving contraction of all the warp threads is identical, the double fabric as specified may be woven in a loom having the whole of the warp supplied on the creel system as aforesaid.

What I claim as my invention and desire to protect by Letters Patent is:—

1. A two layer drier felt for paper making machines in which the weave is composed of eight warp threads and two layers of filling thread, three of the warps, being woven in to form one layer with each pick of one filler thread, three of the warps being woven in to form the second layer with each pick of the second filler thread and two warps being woven in each alternate pick by both filler threads to bind the two layers together whereby all the eight warp threads are of the same length and under the same tension in the felt.

2. A papermakers' drier felt comprising two layers of fabric each repeat composed of two layers of filling threads and eight coarse warp threads all of the same diameter and length, three of the warps forming the top layer, three warps forming the bottom layer and two warps serving to bind the two layers together and also to complete the top and bottom faces of the fabric the two binding warps being woven in by the filling threads each alternate pick.

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