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H. W. MERRICK

METHOD OF MAKING A FELTED AND WOVEN FABRIC

Filed March 2, 1922

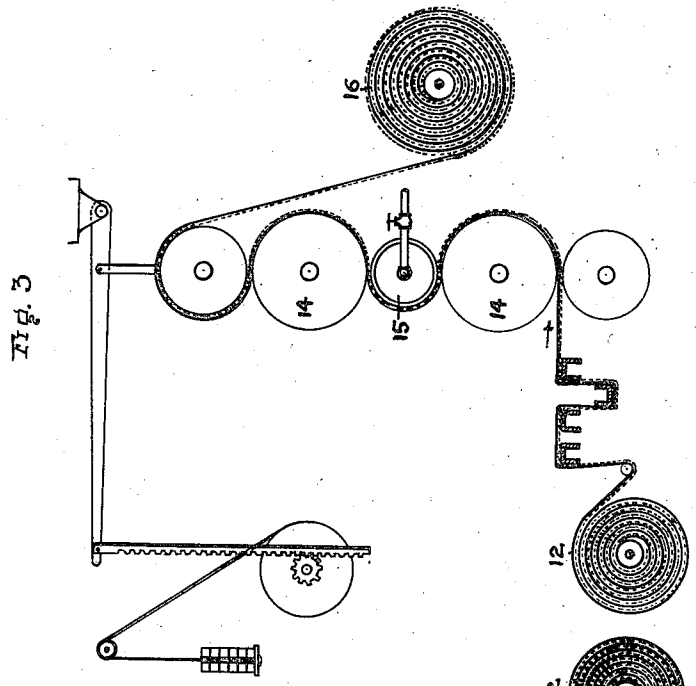


Fig. 3

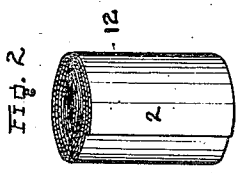


Fig. 2

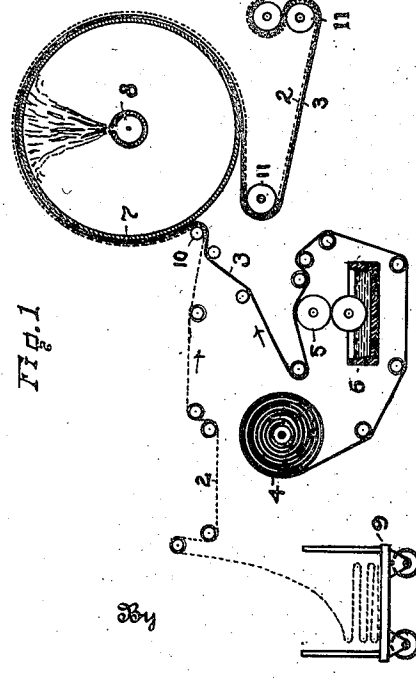


Fig. 1

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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING A FELTED AND WOVEN FABRIC.

Application filed March 2, 1922. Serial No. 540,556.

To all whom it may concern:

Be it known that I, HOWARD W. MERRICK, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Methods of Making a Felted and Woven Fabric, of which the following is a specification.

The primary object of this invention is to produce an exceptionally tough and durable felted and woven fabric in a simple and efficient way, and the steps taken form a continuous strip or sheet of such fabric wound tightly in a large roll from which strips of any length may be cut and used for many purposes. Thus the product is of especial value and utility in making sacks and bags for storing and shipping cement, flour and other commodities, being composed of tough textile fibers woven togther to provide a pliable body capable of withstanding hard usage and strongly resistant to tearing strains and including tough felted fibers applied as a sheet to one side of said woven fibers and pressed into practically inseparable union therewith upon and between the woven fibers to completely fill and close the interstices and compactly and firmly unite the woven fibers so that this woven body will not readily stretch especially diagonally or on the bias and so that the felted fibers will not easily crack or peel or disintegrate and separate from the woven fibers under bending and buckling and pulling strains.

In practicing this method the first step is to pass a strip 2 of loosely woven fabric made of jute, hemp or other fibers through and between calendering cylinders to make the fabric flat and smooth.

A thin strip 3 of felted fabric made of jute, hemp or other fibers, such as a tough manila paper, is then united to one side of woven strip 2, see Fig. 1, which is a diagrammatic view showing the separate strips being fed into facial contact and united together.

Fig. 2 shows the roll in semi-humid condition.

Fig. 3 is a diagrammatic view showing the pressing and heating of the damp softened product.

Thus, paper strip 3 passes from a roll 4 around and into contact with a paste-applying roller 5 above a paste-pot 6 and thence around idlers to a relatively large hollow rotatable cylinder 7 in which a gas heater 8 is stationed.

Woven strip 2 is also fed to cylinder 7, being taken from a folded pile on a truck 9 and passing around an idler 10 into contact with the wet pasted side of paper strip 3, which is wrapped around and directly engages the heated surface of cylinder 7. In this way the paper and woven strip travel together around with the cylinder with the woven fabric uppermost or on the outside, and the amount of heat applied is regulated to only partially dry this two ply product or only sufficiently to unite the plies together.

The paste used is a very wet paste, that is it has an excess of water, which penetrates the paper and is absorbed by the woven fibers as the two strips pass together around with the drying cylinder. The steam which is generated in this heating step passes through the woven fabric and a certain per cent of moisture is retained in the strips say approximately fifty per cent, as this composite sheet passes around other idlers 11 and is wound tightly in a roll 12 which is enlarged to about twenty inches in diameter before it is removed for the next step.

The composite sheet being only partly dried and the roll being tightly wound further drying is arrested and the sizing and moisture in the roll is distributed and absorbed by the felted fibers which become pulpous or soft if the roll is allowed to stand in this semi-humid condition for an interval of time. In practice, roll 12 (see Fig. 2) is stored in a damp place, or where it is not too dry, for twenty-four hours or longer, dependent upon the amount of dampness present in the roll and the grade or kind of fibers used, the object being to allow the moisture to impregnate and soften and reduce the felted fibers or paper to a moist mass and to prevent the sizing or adhesive from becoming permanently fixed.

Now assuming that the composite strip is in the desired state or condition, roll 12 is placed in a calendering machine, such as shown in diagram in Fig. 3, and the damp softened product is subject to a very heavy pressure and heat is also applied. Thus as the treated strip is unwound from roll 12 it passes around and between a series

of heavy calendering cylinders 14 having pressure regulating means associated therewith and including a cylinder 15 heated by steam. A pressure as high as eighty tons may be applied to the composite strip, first while it is damp and soft and then while it is drying and passing around the steam heated cylinder and then while dry and passing around the upper cylinders from which it is drawn and wound into a roll 16. In this step the pulpous material is pressed into the interstices between the woven fibers and also pressed between the fibers composing the strands of the woven fabric and the sizing permanently fixes the fibers in that state of union, making an exceptionally tough and dependable composite sheet which may be used as a covering and in the manufacture of heavy sacks, bags etc. The appearance of this product on one side is similar to a closely woven piece of cloth, and on the other side it is irregularly checkered and embossed and resembles a filled woven fabric. It possesses very little if any stretch, is pliable but tough, not easily penetrated or torn, sheds water readily, and is difficult to break, crack, peel or disintegrate.

What I claim, is:

1. A method of making a felted and woven fabric, consisting in uniting woven and felted strips together with a wet paste; in applying heat and partially drying the composite strip; in wrapping the partially dried strip in tight folds to permit the moisture contained therein to permeate the fibers; and in applying pressure and heat until the fibers are intimately compressed together.

2. A method of making a felted and woven fabric, consisting in passing superposed felted and woven strips around a heating cylinder subsequent to the application of paste to one of said strips; in retaining a part of the moisture in the strips and winding the moist composite strip in a roll; in permitting the moisture within the roll to permeate through the composite strip for a predetermined interval; and finally passing the damp product through a calendering machine under heavy pressure.

3. A method of making a composite felted and woven fabric, consisting in uniting separate felted and woven strips together with a paste containing an excess of water; in applying heat to the pasted strips; in retaining a portion of the moisture within the strips; in winding the damp strips tightly in a roll; in permitting the roll to stand until the moisture is distributed and absorbed by the felted fibers; and in passing the moist strips through a calendering machine under heavy pressure.

4. A method of making a felted and woven fabric consisting in uniting woven and felted strips facially together by applying paste having an excess of moisture, in partially drying the united product and subsequently reducing the felted fibers to a soft and damp state by permitting the retained moisture to permeate through layers thereof; and then applying heat and pressure to unite the felted and woven fibers more intimately together until the felted fibers are pressed into the interstices between the woven fibers and upon and into the woven fibers and one side is irregularly checkered and embossed and resembles a filled woven fabric and the woven side is smoothly flattened.

In testimony whereof, I have signed my name this 31st day of January 1922.

HOWARD W. MERRICK.