

Feb. 6, 1940.

C. S. HYATT ET AL

2,188,901

METHOD OF MAKING WATERPROOF CLOTH

Filed Feb. 9, 1938

3 Sheets-Sheet 1

FIG. 1.



FIG. 2.



FIG. 3.

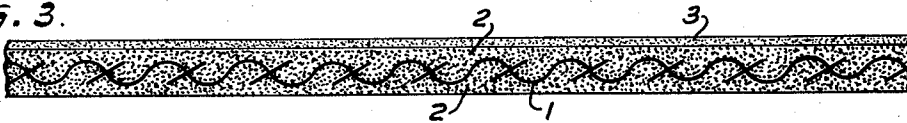


FIG. 4.

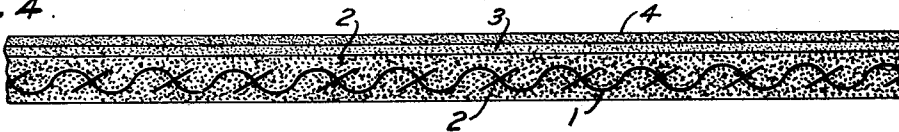


FIG. 5.

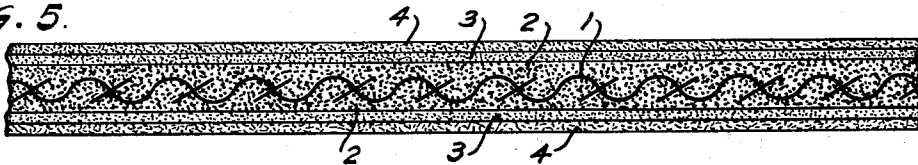


FIG. 6.

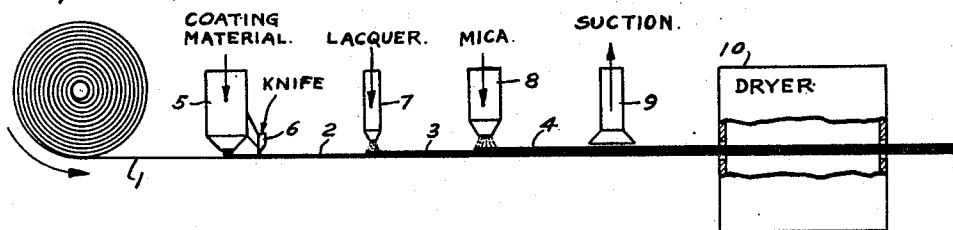
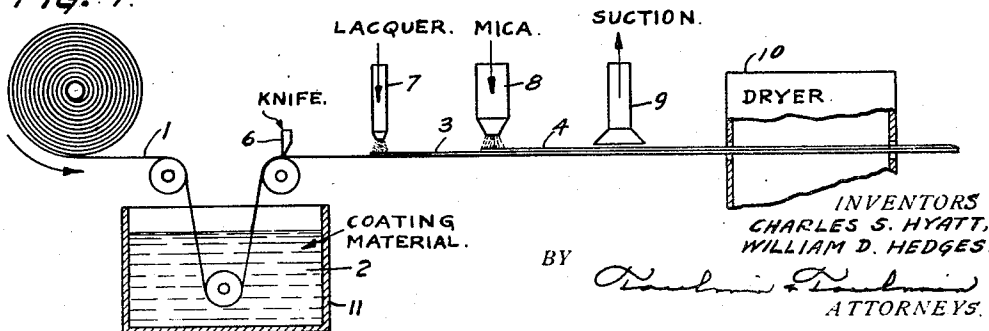


FIG. 7.



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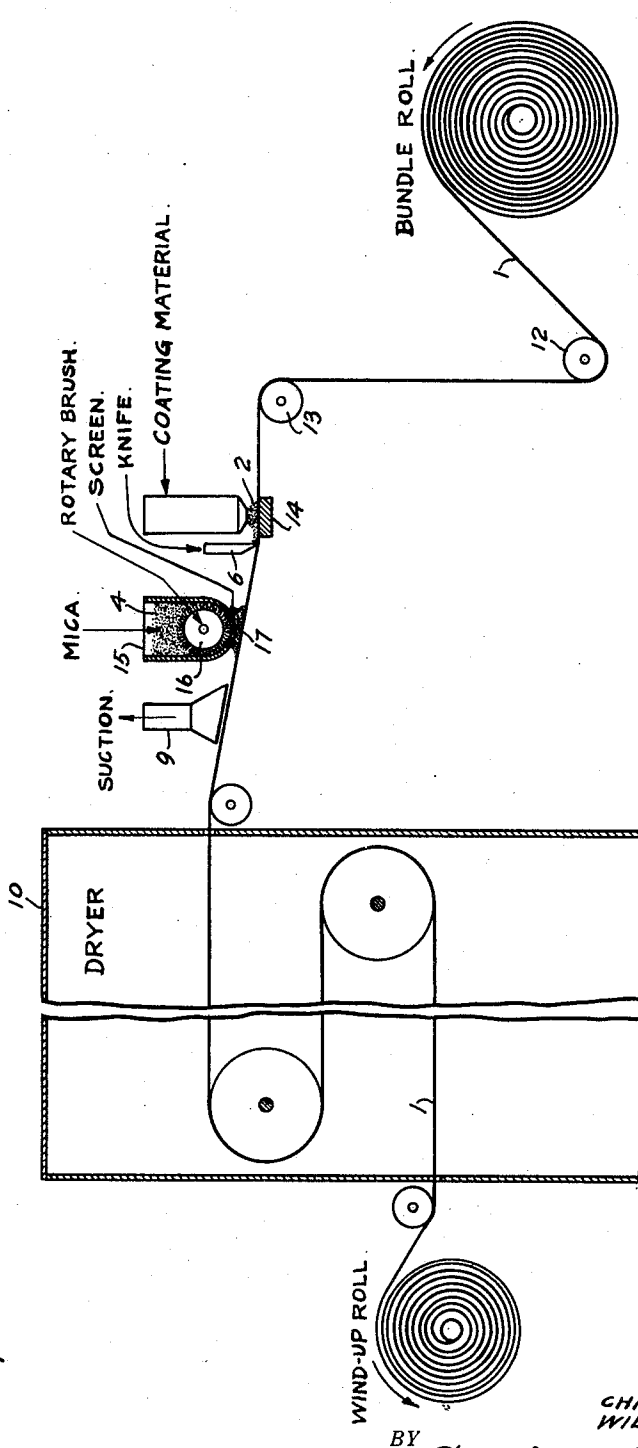
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FIG. 8.



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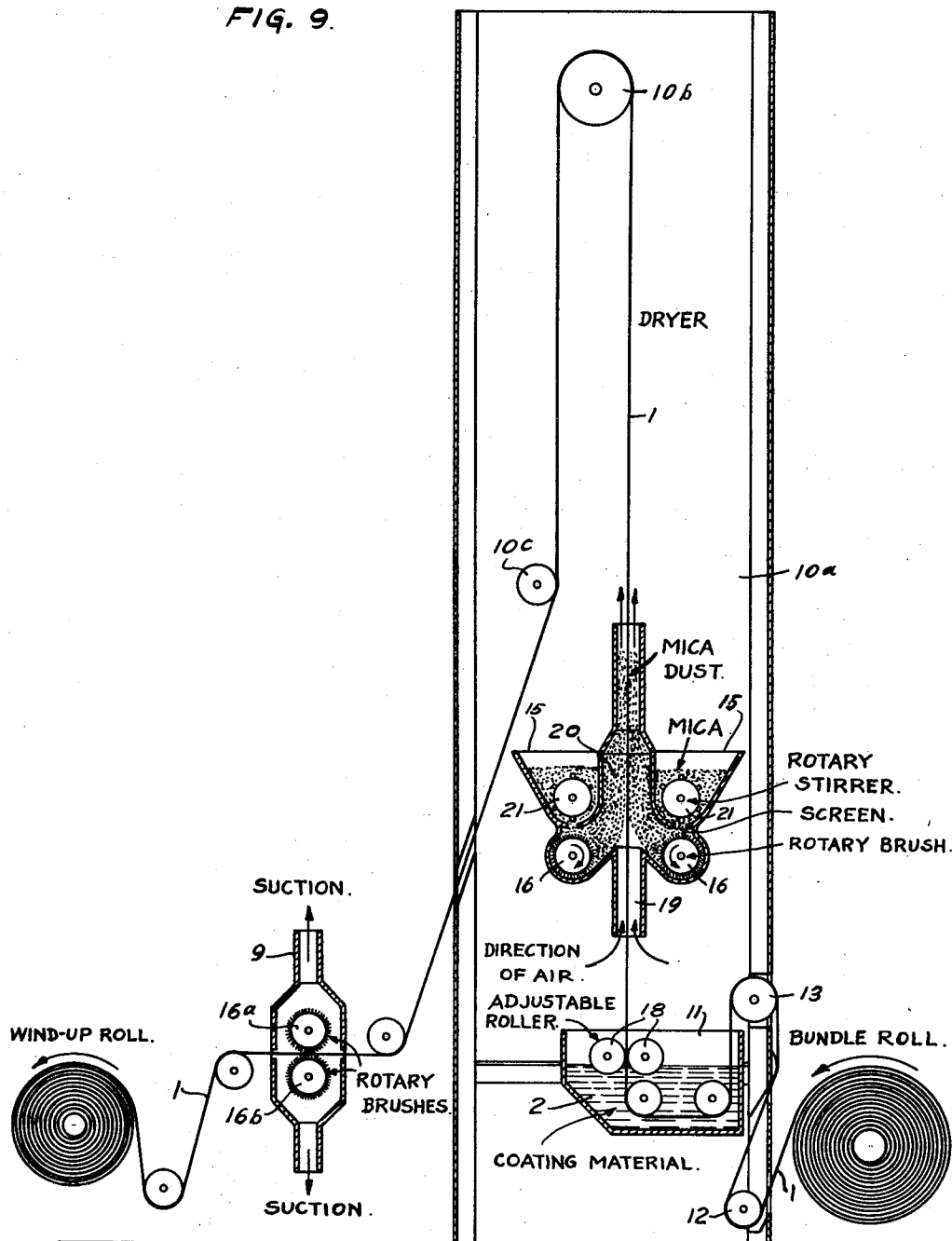
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METHOD OF MAKING WATERPROOF CLOTH

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FIG. 9.



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METHOD OF MAKING WATERPROOF CLOTH

Charles S. Hyatt and William D. Hedges, Columbus, Ohio, assignors to Columbus Coated Fabrics Corporation, Columbus, Ohio, a corporation of Ohio

Application February 9, 1938, Serial No. 189,637

2 Claims. (Cl. 91-68)

This invention relates to waterproof materials and a method of making them.

It is the particular object of this invention to provide a waterproofed silk.

5 It is the object of this invention to provide a waterproof coating and a method of applying the coating so as to produce waterproofed textile materials.

10 It is an object of this invention to provide such a waterproofed textile material that it will remain substantially indefinitely waterproofed, flexible and non-adherent so that the surface of the treated materials will be smooth without tacking or tackiness.

15 It is an object of this invention to provide a coating lacquer having a nitrocellulose body, a resinous plasticizer that is light resistant and a softener to impart flexibility. Upon this lacquer is applied mica, a pigment or a cellulose flock so
20 that the surface is non-adherent and presents an attractive appearance of any desired sheen or color.

Referring to the drawings:

Figure 1 is a section through a textile material
25 with the lacquer applied on one side.

Figure 2 is a similar view with the lacquer applied on both sides.

Figure 3 is a similar view with the lacquer applied on both sides of the textile material and a
30 supplementary coating of lacquer.

Figure 4 is a similar view to Figure 3 with the layer of mica, pigment or cellulose flock mounted in and upon the lacquer.

Figure 5 is a similar view to Figure 4 showing
35 the same construction on both sides of the fabric.

Figure 6 is a diagrammatic illustration of the several steps of the process of applying the successive coatings to one side of the textile material.

40 Figure 7 is a similar view showing the method of applying the coating to both sides of the material.

Figure 8 is a modified form of a horizontal coating machine.

45 Figure 9 illustrates a vertical coating machine.

Referring to the drawings in detail, 1 designates the textile material. There is comprehended within the term "textile material" fabrics, papers and other woven or fibrous materials of cotton, rayon and the like.
50

The lacquer hereinafter described is applied to the surface, or surfaces, of the textile material, such lacquer being designated 2. Thereafter there is applied a layer of mica, pigment or cellulose flock, either with a second coating or

lacquer 3, or upon that coating. This layer of mica, pigment or cellulose flock is designated 4. Before the lacquer dries, the mica having been sifted on or blown on in excess, any excess is removed by suction before the product is completely dry. Under some circumstances, the excess is removed after the product is dried.

Referring to Figures 6, 7, 8 and 9, the roll of textile material is passed beneath a coater 5, which has a scraping knife 6 to regulate the depth of the coating 2 on the textile material 1. Thereafter a second coating 3 may be applied by the lacquer spray 7. Then the mica coating 4 is applied by the mica dusting apparatus 8. Thereupon the composite product passes beneath the suction device 9 for the removal of the excess mica. It then passes through a drier 10 which may be provided with air circulation apparatus, heaters and the like.

In Figure 7 is shown a tank 11 containing the lacquer 2 so that the textile material can be impregnated and coated on both sides as it passes through the lacquer 2 in the tank 11.

Referring to Figure 8, when the roll of textile material 1 passes beneath the guide roller 12 and over the second guide roller 13 and thence over a support 14 where it receives the supply of coating material, which is the lacquer 2. The depth of the coating is regulated by the knife 6. The coated product then passes beneath the hopper 15 containing the mica 4, which is applied by a rotary brush 16, which brushes it through a screen 17. Thence the mica coated sheet passes beneath the suction apparatus 9 and into the drier 10.
35

Referring to Figure 9, it will be seen that the roll of textile material 1 passes beneath the guide roller 12 over the guide roller 13 and thence passes into the immersion tank 11 containing the lacquer 2. As it leaves this tank, it passes beneath adjustable squeeze rollers 18. It then passes through a passageway 19 on either side of which are located brushes 16 which direct a stream 20 of mica dust on either side of the coated sheet, such dust being secured from the hoppers 15, which have rotary stirrers 21 in the bottom thereof for supplying the mica to the brushes 16. The mica coated sheet then passes upwardly in the vertical drier chamber 10a over the guide roll 10b and thence downwardly over the roll 10c, between rotary brushes 16a and 16b for cleaning off excess mica. These brushes are located in the suction housing 9 which facilitates the removal of the surplus mica. The completed
55

sheet then passes to the wind up roll as indicated.

The goods are passed through four times. The first coat is applied on the face and on the back without mica, and the succeeding coats are applied with mica.

In Figure 9, the textile material is impregnated in a bath of the coating lacquer so that the entire coating is applied to both sides in one operation, and the mica is dusted on the goods before it is dried.

The temperature in the driers is approximately 180° Fahrenheit. There is considerable air circulation. About 1400 cubic feet of air is withdrawn from each machine per minute, and an equivalent amount of fresh air is supplied so it can come in and mingle with the air currents on the inside of the drier.

LACQUER

The formulas may be varied for the lacquer while following the principle of this invention. Broadly speaking, the lacquer consists of a nitrocellulose body associated with suitable solvents, thinners and diluents; a resinous plasticizer, preferably of the alkyd type, and finally, a softener. The following are some typical examples of such lacquers.

Example 1

	Parts by weight
Cellulose nitrate.....	12.7
Butyl acetyl ricinoleate.....	15.3
"Paraplex".....	12.7
Ethyl acetate.....	22.9
Alcohol.....	17.8
"Troluol".....	10.2
Toluol.....	8.4

The material "Paraplex" is a plasticizing resin of the alkyl type. "Troluol" is a petroleum hydrocarbon solvent having approximately the same boiling range as toluol. If desired, toluol may be used in place of "Troluol" as a diluent. The nitrocellulose gives body to the lacquer; the plasticizing resin of the alkyl type gives not only plasticity, but light resistance. Butyl acetyl ricinoleate is used to give softness and flexibility to the resulting product.

Another satisfactory example is as follows:

	Parts by weight
Nitrocellulose.....	12.5
Maleic acid, ethylene glycol, castor oil, resin.....	17.5
Methyl ricinoleate.....	15.0
Toluol.....	5.0
Ethyl acetate.....	22.5
Alcohol.....	15.0
Petroleum thinner.....	12.5
	100.0

PROCESS

The process consists of impregnating and coating the textile material, then applying the mica either directly or with another coating of lacquer, or upon a second coating of lacquer and thereafter removing the surplus mica before the coatings dry, or optionally after they dry. After the removal of the mica, the resulting product

is thoroughly dried by the means and the temperatures heretofore indicated.

The preferable procedure is to apply the mica after the coating. It will be understood that in place of mica any pigment, cellulose flock, or other material of equivalent character may be used. The use of the mica permits a softer formula than would be possible if it were not present, since it absorbs the slight tackiness right on the surface of the coating. The mica also protects the fabric from the light. Any plasticizer which will remain in the nitrocellulose and not tend to exude from the film at a slightly elevated temperature can be employed. The solvents can be adjusted and changed to varying formulas as in other lacquer mixtures. It should be emphasized that one of the principal features of the invention is to provide a thoroughly worked in mica coating, evenly distributed, with the surplus removed to form a non-adherent smooth surface of pleasing appearance, without interfering with the plasticity or flexibility or life of the underlying coating and fabric.

It will be understood that we desire to comprehend within our invention such modifications as may be necessary to adapt it to varying conditions and uses.

It will be understood that by cellulose as the body medium for lacquer, we include ethyl cellulose or any other equivalent body materials.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. The method of making a waterproof, light resistant flexible, non-tacky fabric comprising a step of impregnating and coating the fabric with a lacquer comprising cellulose nitrate, butyl acetyl ricinoleate, an alkyd resin, ethyl acetate and the necessary solvents and diluents to render the composition lacquer sufficiently fluid for application to the fabric, thereafter dusting mica on the wet surface of the fabric and brushing the mica into the surface coating to evenly distribute the mica coating, removing the excess mica and subsequently drying the impregnated fabric at an elevated temperature of 180° F.

2. A method of making a waterproof light resistant flexible, non-tacky fabric consisting of passing the fabric through a coating lacquer consisting of:

	Parts by weight
Cellulose nitrate.....	12.7
Butyl acetyl ricinoleate.....	15.3
Sebacic acid glycerol resin.....	12.7
Ethyl acetate.....	22.9
Alcohol.....	17.8
"Troluol".....	10.2
Toluol.....	8.4

thereafter dusting mica on the wet surface and brushing the mica into the surface coating to obtain an evenly distributed light resistant mica coating, removing the excess mica, and subsequently drying at an elevated temperature at approximately 180° F.

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