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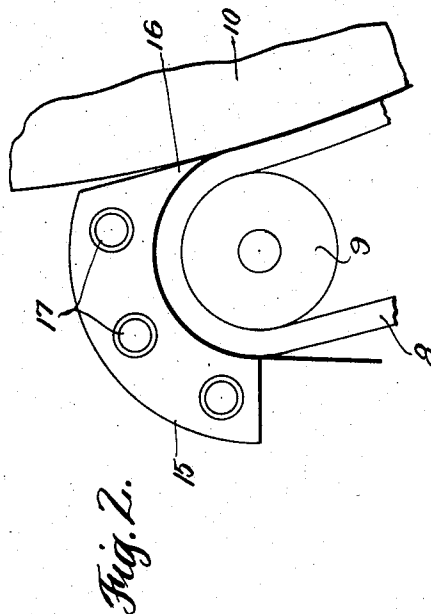
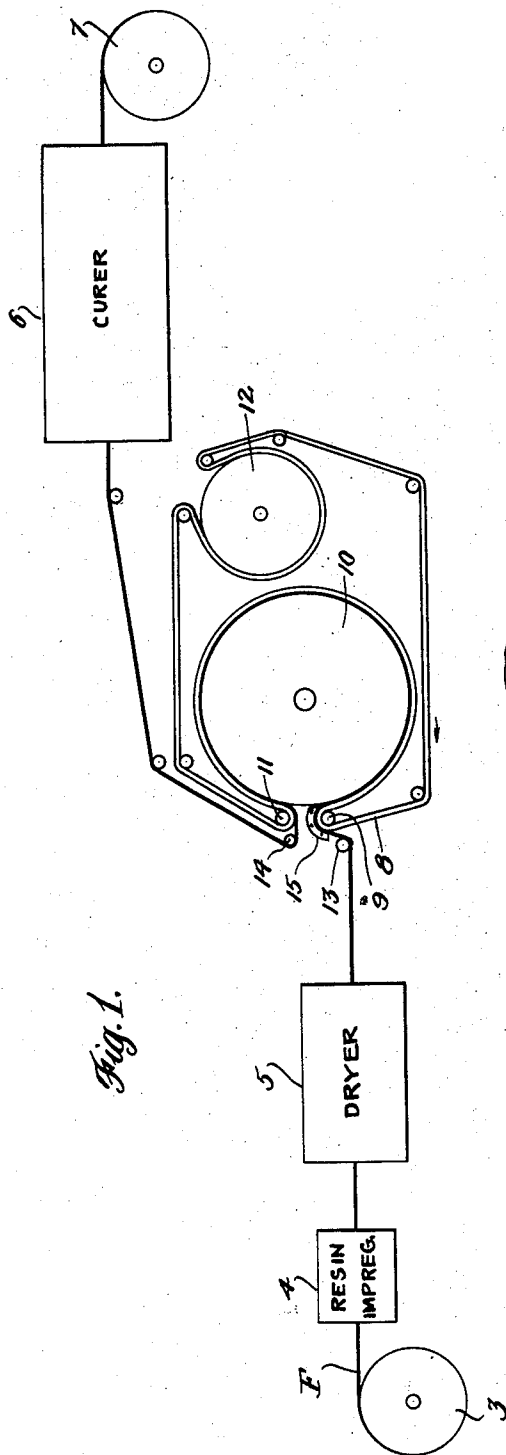
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METHOD FOR IMPARTING DURABLE LUSTERIZED FINISH TO FABRIC

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2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3.

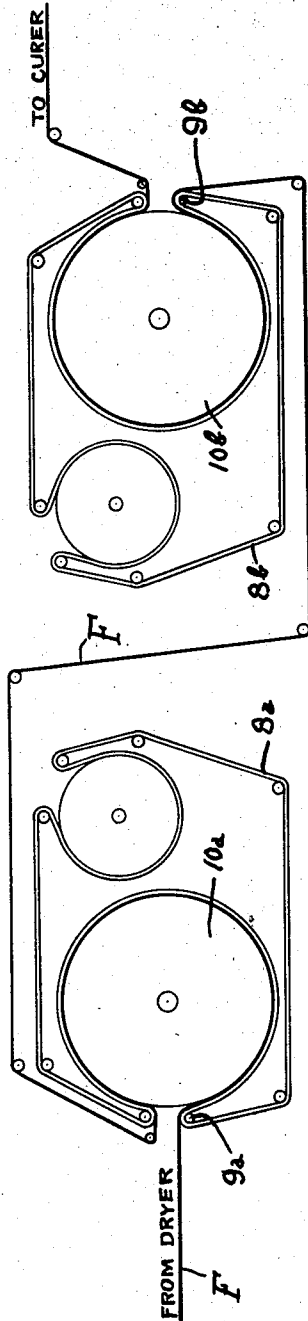
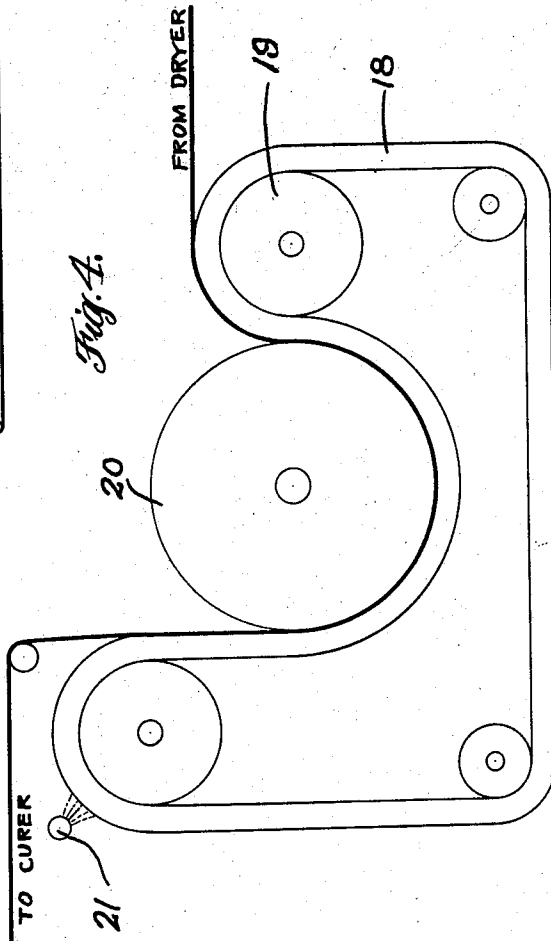


Fig. 4.



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1

2,870,038

METHOD FOR IMPARTING DURABLE LUSTERIZED FINISH TO FABRIC

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4 Claims. (Cl. 117—11)

This invention relates to fabric finishings and is concerned with a novel method for imparting what may be termed a subdued or subtle luster finish effect to one or both surfaces of a textile fabric.

Briefly described, the method of the invention comprises the steps of applying to the fabric an aqueous solution of an impregnant capable of fixing the finish effect to be imparted thereto upon heating of the impregnated fabric, drying the impregnated fabric to a moist condition, imparting the lusterized surface finish effect to the moist fabric in a special manner described more fully hereinafter, and thereafter heating the fabric to fix the finish effect.

According to the present invention, the finish effect is imparted to the fabric by feeding the fabric to a carrier blanket which serves to carry the fabric to and in contact with the external surface of a drying drum. Various forms of equipment of this general kind incorporating a carrier blanket are known and used in the textile industry for purposes of effecting compressive shrinkage. However, for the purposes of the present invention it is important that certain operating conditions be established within certain ranges, notably the pressure exerted by the blanket against the drying drum (which also determines the pressure of engagement of the fabric with the drum surface), and the temperature of the drying drum.

I have found that when observing the operating conditions referred to above and by subsequently heating the fabric to set or cure the impregnant, a subtle or subdued luster finish effect is imparted to the fabric and such effect is rendered highly durable.

Several embodiments of apparatus and variations of the method are described more specifically hereinafter with reference to the accompanying drawings, in which—

Figure 1 is a diagrammatic view illustrating one form of equipment usable in the practice of the invention and further illustrating in a schematic manner the several steps of treatment contemplated according to the invention;

Figure 2 is an enlarged detail view of certain portions of the equipment incorporated in the embodiment of Figure 1;

Figure 3 is a diagrammatic view of a second embodiment of equipment for practicing the invention; and

Figure 4 is a diagrammatic view of a third embodiment of equipment for practicing the invention.

In connection with all three embodiments, it is mentioned that the forms of equipment diagrammatically illustrated in the several figures are representative of types of equipment incorporating carrier blankets commonly used for the purpose of effecting compressive shrinkage of fabrics. It is possible according to the invention to concurrently effect at least some shrinkage while at the same time imparting the durable lusterized effect herein contemplated. However, the preferred extent of lusterization is achieved with operating conditions, adjustments, and variations of the equipment itself which will result in little, if any, compressive shrinkage; and, in

2

accordance with another aspect of the invention, it is contemplated that the fabric first be passed through the equipment under the operating conditions and adjustments effecting little, if any, shrinkage, and after curing of the fabric the fabric be passed again through the same or similar equipment under operating conditions and adjustments adapted to effect appreciable compressive shrinkage.

With the foregoing in mind, reference is first made to the embodiment illustrated in Figures 1 and 2.

As indicated in Figure 1, the fabric F is delivered from the supply roll 3 to a mechanism 4 adapted to apply an impregnant to the fabric, for instance, a thermosetting resin precondensate. Here the fabric picks up the resin or other impregnant, preferably in aqueous solution, and the fabric is then passed to a dryer 5 in which it is dried to a moist condition. The fabric is then delivered to the carrier blanket and the associated equipment for imparting the luster, after which it passes through a curer 6 being ultimately rolled up as indicated at 7.

Since the equipment here used for imparting the luster may be of a type known per se, it is not illustrated in detail herein. However, it is pointed out that a typical machine of this kind includes a carrier blanket 8 traveling in a closed circuit and having a sharply curved run established by a supporting roll 9, from which the blanket passes around the periphery of a large diameter drying drum 10. The blanket is delivered from the drum over the roll 11 and then passes over a blanket drying drum 12, from which it returns over suitable guides to the supporting roll 9. For the purpose of maintaining tension in the blanket one of the guide rolls therefor, for instance one of the rolls immediately adjacent the drum 12, is adjustably mounted and preferably biased by weights, so as to tighten the blanket. In this way tension is set up in the blanket and blanket pressure against the drum 10 is established.

A guide 13 serves to deliver the fabric to the blanket at the start of the curved run around the blanket supporting roll 9, from which the fabric passes around the drum with the blanket 8 in a position interposed between the drum and the blanket. A guide 14 provides for delivery of the fabric away from the blanket and drum, for independent travel to the fabric curer 6.

In the embodiment of Figures 1 and 2 one or more pressure shoes 15 are arranged to engage the fabric as it passes with the blanket in the sharply curved run established by the roll 9. While such shoes need not necessarily be used, as will appear from the description of the embodiment of Figure 3, where the shoes are used, they are preferably arranged so that the toe of such shoe or shoes, as indicated at 16 in Figure 2, extends around the run of the blanket over the roll 9 substantially all the way to the point of delivery of the blanket (and thus of the fabric) to the exterior surface of the drum 10. Appropriate yielding mounts for pressure shoes of the kind just mentioned are known and, therefore, need not be described in detail herein. Heater elements 17 may also be provided in the pressure shoes and are preferably employed to heat the shoes to a substantial temperature, say from about 300° F. to about 400° F.

I have found that by the above treatment a desirable type of subtle luster effect is imparted to one surface of the fabric, provided certain conditions of temperature of the drying drum and of pressure against the drying drum be observed. Thus the pressure of the blanket against the drum should be of the order of from 3.5 ounces to 3 lbs. per square inch, and the drying drum temperature should be of the order of 230° F. to 300° F. The desired pressure may be established by appropriate weight of the adjustable blanket guide roll above

mentioned, and the desired drum temperature may be established by regulating the pressure of heating steam supplied to the drum. Some variation of the extent of lusterization may be effected by varying the pressure and temperature within the limits just referred to; and the pressure and temperature selected may also vary somewhat according to the nature of the fabric and also the nature of the impregnant applied to the fabric.

It will be understood that the heating effect resulting from passage of the fabric in contact with the drying drum will ordinarily result in little, if any, actual curing, the curing of the impregnated fabric being effected subsequently in order to fix the luster effect, as by heating in a curer or oven, in which the temperature of the fabric may be raised to from about 260° F. to 400° F. for a period of about 1 minute to about 100 minutes. The higher temperatures, of course, require the shorter time.

Fabrics of a variety of types may be treated according to the method of the present invention, including both natural and synthetic cellulosic fabrics, and also fabrics made of synthetic linear polyamides or resin type materials.

The impregnant applied to the fabric may either be of the thermosetting type or may be of a type adapted to react with the material of which the fabric is formed so long as it is capable of fixing the finishing effect after delivery of the fabric from the carrier blanket, for instance, by passage thereof through the oven or curer, such as indicated at 6.

The specific form of impregnation equipment employed is not here of concern, but it is desirable that following impregnation the fabric be dried to a moist condition, for instance, to a condition containing from about 2% to about 18% water, as compared with the bone dry fabric. Excessive moisture in the fabric delivered to the carrier blanket is to be avoided, so as to minimize transfer of impregnant to the blanket.

In the embodiment illustrated in Figure 3, the fabric F is fed to a carrier blanket 8a in the region of the supporting roller 9a and passes thence in contact with the surface of the drying drum 10a in a manner similar to that described above with reference to Figure 1. Here, however, the shoes 15 referred to in the description of Figures 1 and 2 are not employed and the diameter of the blanket supporting roller 9a and/or the thickness of the blanket 8a are so selected as to provide some spacing between the blanket and the surface of the drying drum in the region where the blanket passes from the supporting roller 9a to the drying drum 10a.

In the embodiment of Figure 3, after delivery of the fabric from the first drying drum (10a), the fabric may be delivered to the blanket 8b of a second unit incorporating drying drum 10b. The blanket supporting roller 9b of the second unit and/or the thickness of the blanket 8b thereof is also selected to provide the spacing from the surface of the drying drum aforementioned.

It will be observed from inspection of Figure 3 that the threading path of the fabric through the two drying drum units is such as to bring one face of the fabric into contact with drying drum 10a and the opposite face of the fabric into contact with drying drum 10b. Thus the arrangement of Figure 3 provides for the imparting of the luster effect to both surfaces of the fabric. If the finish effect is desired on only one surface of the fabric, only one finishing machine of the kind shown in Figure 3 need be used.

It will be understood that as in the arrangement of Figure 1, the fabric is preliminarily impregnated with the desired impregnant, dried, and then delivered to the first blanket-and-drum-unit, and also that following delivery of the fabric from the second blanket-and-drum-unit, the fabric is passed through a suitable curer in order to heat the impregnated and lusterized fabric and thereby fix the lusterized effect. In addition, it will

also be understood that, as in the arrangement of Figure 1, the desired blanket pressure against the drums 10a and 10b may be established by appropriate adjustment of the blanket tension.

In comparing Figures 1 and 3 it should be observed that there is a difference with respect to the use of the pressure shoes 15, such shoes being present in Figure 1 but absent in Figure 3. The pressure shoes are frequently employed in compressive shrinkage operations and when operating in accordance with Figure 1, some compressive shrinkage may occur, although, as above indicated, the adjustments of shoe pressure, fabric feed speed, drum speed, etc. are preferably such as to impart little, if any, compressive shrinkage even in the case of use of such shoes, as in Figure 1. In the arrangement of Figure 3 still less tendency toward compressive shrinkage is present because of the spacing of the blanket supporting rolls 9a and 9b so as to leave at least some free run of the blankets as they approach the surfaces of the drying drums.

Turning now to the embodiment of Figure 4, there is here shown a machine of the type incorporating a carrier blanket 18 of substantial thickness, say of the order of 2", constructed, for example, of soft rubber. This blanket passes over a supporting roller 19 and from there to the surface of the drying drum 20, and thence over suitable rollers to complete the circuit back to the supporting roller 19. In this instance the exterior surface of the blanket may be cooled as by the spray device 21 located at a point beyond the point where the fabric web leaves the blanket. In common with the arrangement of Figure 1, the arrangement of Figure 4 also provides for the imparting of the finish effect to one surface only of the fabric web.

The rubber blanket type of machine may be used in combination with one or more fabric type of blanket unit, such as those shown in Figures 1 and 3, the fabric being passed sequentially through the rubber blanket machine and then through the other units. In this way modified effects as to both luster and also shrinkage are obtainable.

As to both of the arrangements of Figures 3 and 4, it should be understood that similar conditions of blanket pressure and drying drum temperature should be employed. With regard to the matter of pressure it is to be noted that ordinarily the type of blanket machine illustrated in Figures 1 and 3 would be operated to provide a blanket pressure against the drying drum of the order of from a few ounces per square inch up to about 1 lb. per square inch. Where higher per square inch pressures are desired, running for example, up to about 3 lbs. per square inch, these pressures may be obtained by the employment of the rubber blanket type of unit generally illustrated in Figure 4.

Subsequent to the final curing step contemplated in accordance with all embodiments, the fabric may be passed through the same or a similar machine with adjustments adapted to effect compressive shrinkage.

According to the foregoing, an attractive, durable, subtle or subdued luster effect may readily be applied to a fabric by the use of known and commonly available equipment. Moreover, the invention not only provides for the imparting of a durable lusterized finish but further provides for the production of such a finished fabric having good shrinkage characteristics, as by the subsequent passage of the surface finished and cured fabric through a compressive shrinkage machine, which may even be the same machine as employed to impart the luster.

The method of the invention may also be applied to fabrics which have received a pressure mechanical finish treatment after the impregnation and partial drying steps. The pressure mechanical treatment may consist of glazing, embossing, or the like, and in this event the subtle

5

luster effect is superimposed upon the mechanical finish effect.

I claim:

1. A method for imparting a durable lusterized surface finish effect to fabric comprising impregnating the fabric with an aqueous solution of an impregnant capable of setting to fix the finish effect upon heating of the impregnated fabric, drying the fabric to a moisture content of from 2% to 18% feeding the thus dried moist fabric to a carrier blanket, while carrying from 2% to 18% moisture, and with the blanket acting to maintain the fabric in pressure contact with a drying drum, the contact pressure being from 3.5 ounces to 3 pounds per square inch and the drum temperature being from 230° F. to 300° F., to thereby impart a lusterized surface finish effect without substantial setting of the impregnant, and thereafter heating the fabric to set the impregnant and thereby fix the lusterized surface finish effect.

2. A method according to claim 1 and further including subjecting the fabric, after the heating to fix the lusterized effect, to compressive shrinkage.

3. A method for imparting a durable lusterized surface finish effect to fabric comprising impregnating the fabric with an aqueous solution of an impregnant capable of setting to fix the finish effect upon heating of the impregnated fabric, drying the fabric to a moisture content of from 2% to 18%, feeding the thus dried moist fabric to a carrier blanket, while carrying from 2% to 18% moisture, said blanket having a path of travel including a

6

curved run established by a blanket supporting roll and having an immediately following reversely curved run established by a drying drum, the fabric being fed to the outside surface of the carrier blanket adjacent the start of said first curved run and being fed with the blanket through said first curved run and therebeyond between the blanket and said drum, applying pressure to the fabric to maintain it in intimate engagement with the blanket in said first curved run substantially up to the point of delivery of the fabric to said drum, said drum being heated to a temperature between 230° F. and 300° F. and said blanket acting to maintain the fabric in contact with the drum under pressures of from 3.5 ounces to 3 pounds per square inch, drying the fabric by heat transfer from said drum, to thereby impart a lusterized surface finish effect without substantial setting of the impregnant, and thereafter heating the fabric to set the impregnant and thereby fix the lusterized surface finish effect.

4. A method according to claim 3 and further including heating the fabric during application of pressure in said first curved run.

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