

[54] **DRYING OF FABRICS TREATED WITH CHLORINATED HYDROCARBONS**

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[75] Inventor: **Manfred Schuieler**,
Erbach/Odenwald, Germany

Primary Examiner—William F. O’Dea
Assistant Examiner—William C. Anderson
Attorney—Learman & McCulloch

[73] Assignee: **Bruckner-Apparatebau GmbH**,
Erbach/Odenwald, Germany

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[57] **ABSTRACT**

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A fabric treated with chlorinated hydrocarbons is dried initially by circulating hot air at a temperature not greater than about 80°C. until the moisture content of the fabric is less than the capacity of the fabric to contain moisture, following which the fabric is exposed to water vapour. A final drying stage comprises exposing the fabric to circulating hot air at a temperature of about 80°C., and such final drying stage may coincide with or follow the exposure of the fabric to the water vapour.

[56] **References Cited**

UNITED STATES PATENTS

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10 Claims, No Drawings

DRYING OF FABRICS TREATED WITH CHLORINATED HYDROCARBONS

This invention relates to a method, using hot air, for drying fabric which has been treated, in particular dyed, bleached or cleaned, with chlorinated hydrocarbons.

In view of the increasing shortage of water and in order to achieve various advantages in processing, in recent times there has been an increasing tendency to use chlorinated hydrocarbons for the finishing and processing of textile fabrics, in particular for dyeing, bleaching or cleaning. For simplicity's sake this treatment medium will hereafter be called the "solvent."

If attempts are now made to use hot air to dry textile fabrics treated with this type of organic solvent, the following problem arises:

If the temperature of the hot air is kept below the boiling temperature of the solvent, a residual amount of 3 - 5 percent is still left in the textile fibres after the drying. Apart from the loss of solvent caused thereby, this residual content is also highly undesirable in view of the subsequent smell effects (such as during the ironing of these fabrics).

This residual amount of solvent can be reduced by using a hot air drying temperature above the solvent boiling point. However, only a few textile fibres can withstand such high drying temperatures, and most have their feel deteriorated. With rolls and similar forms of made-up textiles, the use of high temperatures in hot air drying can easily lead to a very harmful build-up of heat within the roll.

The object of the invention is therefore to avoid these defects while providing a method of drying fabric which has been treated with organic solvents, which in simple manner and without affecting the fabric quality gets rid of the solvent content remaining after drying with hot air.

According to the invention, this object is achieved in that after initial drying by hot air, in the final phase of drying the fabric is brought into contact with water vapour.

If water vapour were allowed to act on the fabric as soon as drying started, this would result in a heavy deposit of condensate, which could lead to wetting of the fabric and migration of dyestuff (the latter especially when dyeing takes place with water-soluble dyes in the emulsion system).

However, if in accordance with the invention, water vapour is not applied until the final phase of drying (after initial drying by means of hot air), the following desirable effect is achieved: the relatively small amount of water produced by condensation of the water vapour forms an azeotropic mixture, boiling below 100°C, with the residual solvent still present in the fabric. In this way the solvent residue can be removed practically completely from the fabric at a relatively low temperature.

In the method provided by the invention, the fabric is preferably dried with hot air until the moisture content produced by the subsequent treatment with water vapour does not appreciably exceed the normal take-up (i.e., the normal moisture capacity) of the fabric. This method also avoids the undesired phenomenon usually found with normal hot air drying — that the excessively dried fabric needs an appreciable time to recover its normal moisture content (this applies particu-

larly to plant and animal fibres).

The following example will serve to explain the method in accordance with the invention.

5 50 kg. of polyamide knitted fabric are dyed with 800 litres of a mixture consisting of 98 percent perchlorethylene, 1.5 percent water and 0.5 percent dyestuff and emulsifier.

After leaving the bath, the fabric is first spin-dried and then subjected to hot air drying for a period of 30 minutes in a container of conventional construction. For this purpose, 1,500 cubic metres per hour of air are circulated over the solvent condensation. During this stage the temperature of the air is raised from 20° to 80° C. in 30 minutes.

15 The vapour valve and the ventilation valve of the container are then opened for 5 minutes, so that the container is filled with water vapour supplied from a convenient source, e.g., the central low pressure water vapour supply. The resulting mixture of water vapour, air and solvent passes into a cooler. The air circulation is then re-started, and the flow of air through the fabric at a temperature of about 80°C. removes the remaining water vapour from the fabric.

20 Within the scope of the invention it is obviously also possible to maintain the air circulation during the last phase of drying, and merely to add water vapour to the hot air to the required extent.

I claim:

1. A method of removing a chlorinated hydrocarbon solvent from fabric which has been dyed, bleached, cleaned, or otherwise treated with such solvent, said method comprising initially of circulating hot air through said fabric; subjecting said fabric to water vapour to produce an azeotropic mixture of said water vapour and residual solvent retained by said fabric; and further circulating hot air through said fabric.

2. The method set forth in claim 1 wherein the initial circulation of hot air continues until the moisture content capable of being absorbed by the fabric does not appreciably exceed the normal moisture take-up capability of the fabric.

3. The method set forth in claim 1 wherein said fabric is subjected to water vapour and to said further circulation of hot air in succession.

4. The method set forth in claim 1 wherein said fabric is subjected to water vapour and to said further circulation of hot air simultaneously.

5. The method set forth in claim 1 wherein the temperature of the air initially circulated is less than 100° C.

6. The method set forth in claim 5 wherein the temperature of the initially circulated air is increased from about 20° C. to about 80° C. over a period of about 30 minutes.

7. The method set forth in claim 1 wherein the temperature of the further circulated air is lower than 100° C.

8. The method set forth in claim 7 wherein the temperature of the further circulated air is about 80° C.

9. The method set forth in claim 1 wherein the azeotropic mixture has a boiling point lower than 100° C.

10. The method set forth in claim 9 wherein the temperature of the initially circulated air is lower than 100° C. and wherein the temperature of the further circulated air is lower than 100° C.

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