

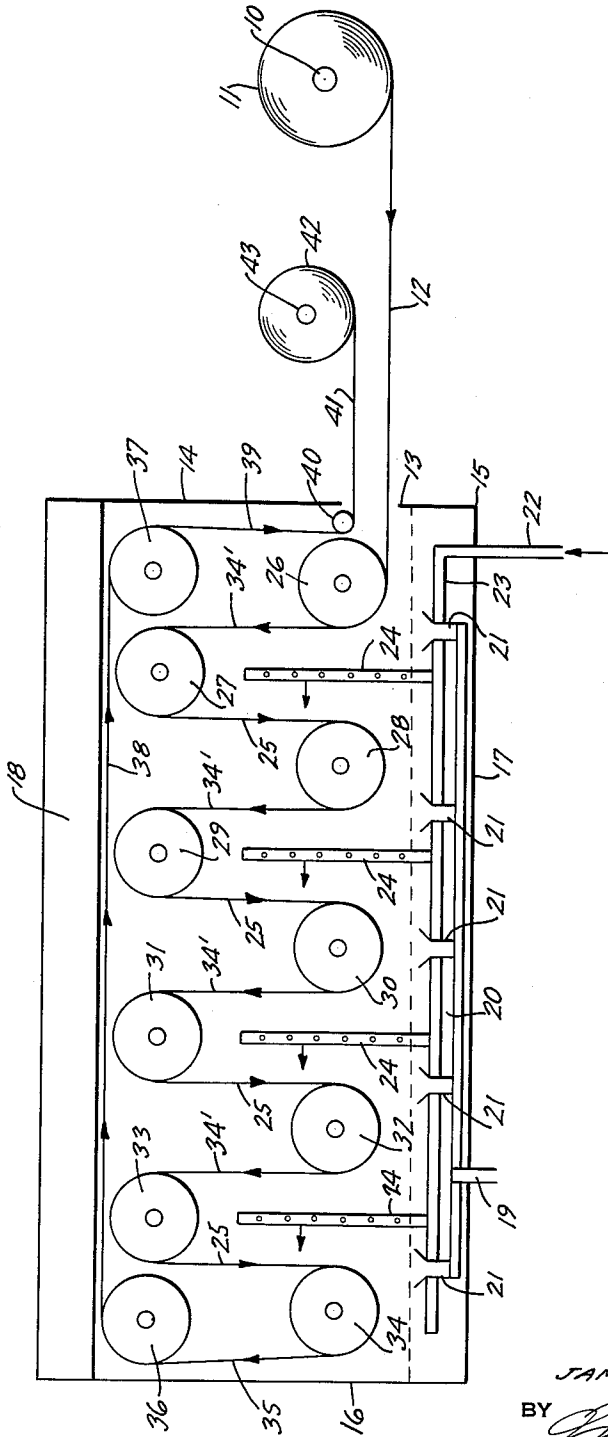
Aug. 6, 1963

J. ULLMAN

3,100,159

TEXTILE FABRIC PROCESSING

Filed Jan. 16, 1961



INVENTOR
JAMES ULLMAN
BY *James Ullman*
ATTORNEY

1

3,100,159

TEXTILE FABRIC PROCESSING

James Ullman, 40 E. 10th St., New York, N.Y.

Filed Jan. 16, 1961, Ser. No. 82,863

8 Claims. (Cl. 117-62)

The present invention relates to textile fabrics, and it particularly relates to the treatment of textile fabrics to remove undesirable odors therefrom.

Although not limited thereto, the present invention will be described in its application to removing fishy and resin type odors from cotton, rayon and other textile fabrics particularly such fabrics as have been resin finished to give wash-and-wear qualities, crease resistance, flame resistance and other similar treatments.

It is among the objects of the present invention to treat textile fabrics whether woven or knitted and particularly those of cellulose material such as cotton or rayon so as to remove aldehyde and amine odors therefrom so that in subsequent fabrications into garments or wearing apparel, there will not be a tendency for development of undesirable odors even though the fabrics have been subjected to resin type treatment and subsequent full or partial curing operations.

Another object is to provide an enhanced treatment of fabrics which have been subjected to finishing whether urea formaldehyde resin and melamine formaldehyde resins to achieve shrinkage control, crease resistance and desirable hand so that during subsequent wearing, cleaning and/or laundering and in humid and hot climates there will not be development of fishy, rancid, glue like or other unpleasant odors.

A further object is to provide a simple readily applicable inexpensive procedure of odor proofing textile fabrics whether woven or knitted or whether composed in part or whole of natural or synthetic fibers such as cotton, wool, rayon, nylon or linen which will not increase the cost of finishing nor require extra labor or delay in the finishing procedure and which will not also necessitate expensive apparatus or exacting control arrangements and which will give substantial assurance or elimination of undesirable odors regardless of the type of resins employed or the time and temperature of the cure or the amount or type of finishing after applied and regardless of the type of catalysts used.

A further object of the present invention is to provide an odor proofing procedure for wash-and-wear fabrics which will be effective during storage either in the form of a fabric or in the form of a finished garment over long periods of time regardless of climatic and humidity conditions.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In accomplishing the above objects, it has been found most satisfactory to remove aldehyde amine fishy glue like and similar odors from cotton, rayon and other textile fabrics by treating the fabrics immediately after curing and desirably within a period of one to five hours after curing with a combination of anhydrous ammonia and high pressure steam.

It has been found most satisfactory to use a dry steam or one containing no more than 5% to 10% of moisture at a pressure of 90 pounds and containing a concentration of 1% to 5% of anhydrous ammonia which is fed directly into or which is picked up by the incoming steam.

The time period may range from one minute to five

2

minutes and desirably the temperature is maintained at about 180° to 230° F. during the treatment.

In one preferred process according to the present invention, the goods are desirably passed through the vapor ammonia treatment at a rate of about 20 to 40 yards per minute in countercurrent fashion to the incoming steam containing about 2% of ammonia at a temperature of 190° to 210° F. with a textile exposure time of about two to three minutes and desirably about two minutes and forty seconds.

The anhydrous ammonia may be mixed with small amounts of volatile amines such as alkyl amines ranging from those having one to three carbon atoms.

Less desirable, it is possible to spray in very finely divided particles a higher molecular weight amino compound such as monoethanolamine, diethanolamine or triethanolamine or even aminoethylethanolamine.

These latter amines are desirably used in spray or nebulized form in amounts of 3 to 5%.

Desirably, they are employed after the fabric has been dried and cured at a temperature of 225° F. to 400° F. for a period of time ranging between twenty minutes and ten seconds.

It is desirable to eliminate sulphite compounds from a process but small amounts of sulphur dioxide ranging from 3 to 5% may be also introduced into the countercurrent flow of steam containing anhydrous ammonia.

Desirably anhydrous ammonia is utilized as the ammonia source and depending upon the size of the treatment chamber, it is fed into the chamber at a rate so that 2½% of the volume will consist of anhydrous ammonia.

For example, with a chamber having one hundred cubic feet, two and one-half cubic feet should consist of ammonia.

Although the fabric may be subjected to a wash before or after the ammonia treatment, it is most desirable to eliminate any washing, and if any subsequent treatment is to be employed, blowing steam upon the treated fabric appears to complete the process and remove all residue of ammonia therefrom.

Steam pressures of 15 to 30 pounds are not as satisfactory as those of 60 to 90 pounds, and it has also been found that temperatures of 200° to 250° F. are much more satisfactory than those of 100° to 200° F.

It is usually desirable if the steam and ammonia are combined inside the chamber.

Upon the attached drawing is shown a typical drawing of the apparatus which may be employed to assure a uniform distribution of steam and ammonia which are first mixed within the treating chamber.

The unprocessed piece goods is passed from a feed in roller 10 carrying the roll or ground 11 as indicated by 12 into the opening 13 in the side 14 of the treating chamber 15.

The chamber has the end wall 16, the bottom wall 17 and is closed at the top by the steam chest 18.

The steam inlet line 19 enters the bottom 17 and flows into a horizontal header 20 which has expanding outlets 21.

The ammonia line which removes anhydrous ammonia from a compressed cylinder enters at 22 through the bottom wall 17 and feeds into the header 23.

The header is provided with upstanding perforated pipes 24 which will feed the ammonia into the chamber 15 between and adjacent to the down going layers of cloth 25.

The incoming cloth 12 passes under the inlet roller 26 and then over the rollers 27, 28, 29, 30, 31, 32, 33, and 34 to give a festoon effect as indicated by the down coming sections 25 and the alternate upwardly going sections 34'.

3

The fabric after the treatment has been completed will pass upwardly as indicated at 35 over the top guide rollers 36 and 37 with a final pass as indicated at 38 across the top of the chamber 15 closely adjacent to the steam chest 18.

The fabric will then pass downwardly as indicated at 39 and out over the roll guide roller 40 as indicated at 41.

It will then be rolled up as indicated at 42 upon the processed piece goods roller.

It will be noted that the steam is fed in at the bottom of the chamber at about 60 to 90 pound pressure by the expansion inlets 21 while the ammonia is fed in through perforated openings which will equalize the flow through the vertical pipes 24 closely adjacent to the down coming fabric portions 25.

Desirably between one to five volumes of ammonia are fed in for every 70 to 90 volumes of steam which is desirably substantially dry or containing less than 10% of moisture.

If desired, the steam may be given a superheat of 5 to 20 degrees upon entering the chamber.

As many changes could be made in the above textile fabric processing, and many widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

Less preferably the invention may be applied to fabricated materials, such as draperies, furniture covers, spreads, covers, clothing or the like, which have been finished with materials or which contain surfacings or components likely to give rise to a formaldehyde odor. In lieu of or in addition to ammonia it is possible to use other ammoniacal compounds or amines. The process is applicable to a wide variety of fabrics of woven, knitted or netted character of natural or synthetic origin, such as cotton, acetate, nylon, wool, Dacron, Orlon, Acrilan, linen, silk, rayon, glass fibres, asbestos, polyethylene, polyurethane, polyester and the like. The temperature of the treatment may range from 175° F. to 250° F. and either tanks or cylinders of ammonia may be used and the residual ammonia may be removed by heat drying or blowing with steam.

Having now particularly described and ascertained the nature of the invention, and in what manner the same is to be performed, what is claimed is:

1. A process of finishing textile knitted and woven resin treated wash and wear clothing fabrics, said resin being of the type of formaldehyde-urea and formaldehyde-melamine resins to remove fishy odors therefrom comprising treating the fabrics with a mixture of gaseous steam and ammonia at a pressure of 60 to 90 pounds per square inch and a temperature of about 200 to 250° F. with the ammonia being present in an amount equal to about 1 to 5% of the steam.

2. A process of finishing textile knitted and woven resin treated wash and wear clothing fabrics, said resin being of the type of formaldehyde-urea and formaldehyde-melamine resins to remove fishy odors therefrom comprising treating the fabrics with a mixture of gaseous steam containing about 1 to 5% of ammonia at a pressure of about 60 to 90 pounds per square inch at a temperature of about 180 to 250° F.

4

3. A process of finishing textile knitted and woven resin treated wash and wear clothing fabrics, said resin being of the type of formaldehyde-urea and formaldehyde-melamine resins to remove fishy odors therefrom comprising treating the fabrics with a mixture of gaseous steam and ammonia at a pressure of about 60 to 90 pounds per square inch, the ammonia being used in a percentage of about 1 to 5% of the steam and the steam being in substantially dry condition at a temperature of about 180 to 250° F.

4. A process of treating resin finished cellulosic knitted and woven resin treated wash and wear clothing fabrics, said resin being of the type of formaldehyde-urea and formaldehyde-melamine resins which comprises subjecting them to treatment substantially immediately after curing to the action of a mixture of steam and ammonia in gaseous condition at a pressure of 60 to 90 pounds per square inch and a temperature of about 200 to 250° F. with the ammonia being present in an amount equal to about 1 to 5% of the steam.

5. A process of treating resin finished cellulosic knitted and woven resin treated wash and wear clothing fabrics, said resin being of the type of formaldehyde-urea and formaldehyde-melamine resins which comprises subjecting them to treatment substantially immediately after curing to the action of a mixture of steam containing about 1 to 5% of ammonia in gaseous condition at a temperature of about 200° to 250° F. at a steam pressure of about 15 to 90 pounds.

6. A process of treating resin finished cellulosic knitted and woven resin treated wash and wear clothing fabrics, said resin being of the type of formaldehyde-urea and formaldehyde-melamine resins which comprises subjecting them to treatment substantially immediately after curing to the action of a mixture of steam containing about 1 to 5% of ammonia in gaseous condition at a temperature of about 200° to 250° F. at a pressure of 60 to 90 pounds per square inch.

7. A process of treating woven cotton and rayon clothing fabrics of the type which have been cured to render them wash and wear by means of a resin selected from the group consisting of urea formaldehyde and melamine formaldehyde resins to achieve shrinking control and crease resistance which comprise treating them immediately after curing with a combination of dry steam containing no more than 10% of moisture at a pressure of 60 to 90 pounds with a concentration in the steam of 1 to 5% of anhydrous ammonia for a period of 1 minute to 5 minutes at a temperature of 180 to 230° F.

8. The process of claim 7, the textile fabrics being passed countercurrently to the flow of steam and ammonia at a rate of about 20 to 40 yards per minute at a temperature of 190 to 210° F. with an exposure time of 2 to 3 minutes after the fabric has been dried and cured at a temperature of 225° to 400° F.

References Cited in the file of this patent

UNITED STATES PATENTS

2,267,276	Hager	Dec. 23, 1941
2,950,989	Freeman	Aug. 30, 1960
2,973,285	Berke et al.	Feb. 28, 1961