

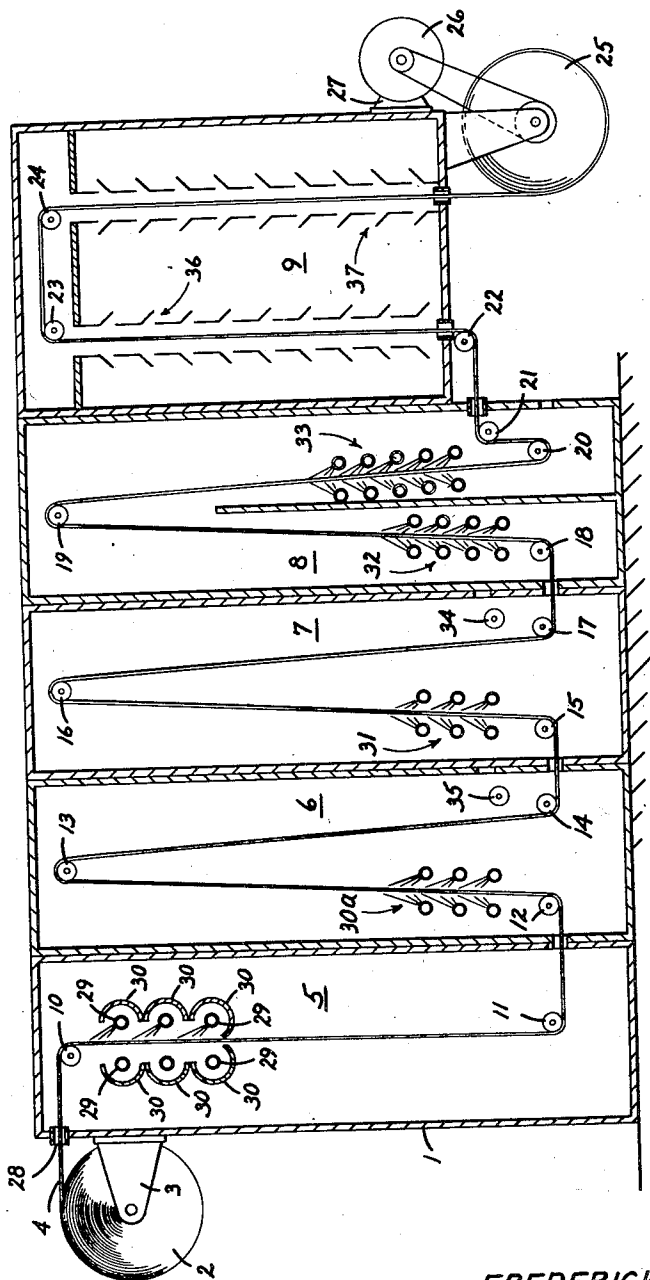
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SPRAY APPLICATION OF DYESTUFF AND OTHER MATERIALS

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SPRAY APPLICATION OF DYESTUFF AND
OTHER MATERIALS

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This invention is for improvements in or relating to the spraying of liquids and has particular reference to the treatment of fabric or other surfaces which can be moved past the spraying devices.

In a general type of conventional continuous piece goods fluid treating machine, large volumes of the treating liquor are required to accommodate the amount of goods that must be under treatment at any one time because of the manner required for manipulating the goods in the baths. The amounts of chemicals and dyes or bleaching agents employed in the fiber treating solutions is of course proportional to the amount of solution used and at the end of each run these solutions are discarded with attendant loss of dissolved chemicals, for the solutions are often unstable and even when stable the storage of large volumes of such liquids is impracticable.

To avoid the tension on the goods that is attendant in the conventional apparatus, methods have been devised to drive a larger number of the rolls over which the goods pass, or to employ nip or squeeze rolls spaced at more frequent intervals to pull the cloth along and to squeeze out excess liquor where desired. However, due to shrinking and stretching of goods when wetted, these methods are not entirely satisfactory, except where complicated electrical controls and compensators are employed and such controls add greatly to the cost of the equipment. The principal object of the present invention is to provide a device for applying and controlling an exact amount of treating fluid to the fabric of textile structure under treatment.

Another object of this invention is to provide a fabric treating apparatus for treating cloth in the continuous piece, which is compact, simple in operation and in which the fabric is not subjected to undue tension while being treated.

A further object of the invention is to provide a continuous piece goods dyeing and treating machine which requires a minimum volume of treating liquor per unit of goods under treatment. Other objects and advantages of the present invention will become apparent from a study of the following description and drawing.

In the drawing;

The figure is an elevation of a preferred embodiment of the present invention.

As shown in the figure, reference character 1 indicates the frame of the present invention. The supply roll 2 on which the fabric 4 is contained is suitably attached to the frame 1, by the supporting member 3. The fabric 4 passes from the

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supply roll 2 and it is guided throughout the treatment chambers 5, 6, 7, 8 and 9 by the rollers 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24 to the take-up reel 25. The driving means 26 is provided for the take-up reel 25 through a suitable coupling, and is attached to the frame 1 by the supporting member 27.

In operation the fabric 4 passes from the supply roll 2 through an opening 28 in the frame 1, and into the spraying chamber 5 which may be termed the primary treatment chamber. It passes over the roller 10 and assumes a path perpendicular to its former plane of travel. After the fabric 4 passes over the roller 10, it travels past banks of suitably placed opposed dye spraying means 29. Six such spray banks are shown in the figure, however there can be any number incorporated in the invention. These banks are so arranged that the fluid spray of treating material may strike the fabric in a direction opposite to its direction of travel. The fluid spray comprises a high velocity, finely dispersed liquid or vapor that impinges and penetrates into the moving fabric. However, some of the particles of treating fluid may be deflected from the fabric due to the high velocity of application from the jets, nozzles or the like and are kept from dropping into the lower portion of the chamber by the spray guards 30 which are suitably placed about each bank of spraying means. These spray guards are sloped slightly so that the deflected treating liquor flows back to a sump (not shown) from which point it is pumped to the spray nozzles. In this way a complete recirculation system is embodied. By treating fluid is meant any liquid or gaseous matter used for bleaching, dyeing, coating, soaping, rinsing, or the like.

After the fabric 4 is impregnated with the treating fluid it passes through the lower portion of the chamber which acts as a setting chamber. From here the fabric passes around the roller 11 and into the steaming and oxidizing chambers 6 and 7 in succession. Some fabrics require different dyes due to their fiber content which gives them different characteristics as to color fastness, etc. Dyes such as leuco-vat dyes require a soap and rinse in addition to steaming and oxidation. This invention anticipates all these characteristics of different dyestuffs. As shown, however, this invention has the steaming, oxidizing and soap and rinse chambers in that order. However, it is to be understood that these chambers can be used in any order or any of them can be eliminated.

As depicted, after the fabric leaves the spray-

ing chamber 5 it passes into the steaming chamber 6 around the roller 12 and up and over the roller 13. Suitably placed in the path of the fabric between the rollers 12 and 13 are the high velocity steaming means 30a. This high velocity steam is applied on both sides of the fabric, as shown, by nozzles, jets, or the like. The particles of steam strike the fabric at an angle with the direction of travel of the fabric. Although these steaming means may be placed at any part in the chamber it was found that the best results were obtained when they were placed in the position shown.

The fabric passes from the roller 14 into the removable oxidizing chamber 7. Here the fabric passes around the rollers 15, 16, and 17 which are in the same position respectively as rollers 12, 13 and 14 in the steaming chamber. The banks of oxidizing spraying means 31 are suitably placed along the path of the fabric 4 between the rollers 15 and 16. The oxidation is effected by the atmosphere or oxidizing agents such as sodium bichromate, sodium perborate or the like. As illustrated in this invention, any of the above mentioned oxidizing substances can be used as the oxidizing agent. These oxidizing agents are sprayed on the moving fabric by nozzles, jets or the like, at an angle with the direction of the moving fabric. In this chamber the dyestuff is regenerated.

The fabric then passes from the roller 17 into the soap and rinse chamber 8 and around the rollers 18, 19 and 20 located at the same points in this chamber as the rollers 12, 13 and 14 and 15, 16, and 17 were located in the steaming and oxidizing chambers. Suitably located in the path of the fabric and between the rollers 18 and 19 are the banks of soaping means 32 which spray a soap solution on both sides of the moving fabric. Suitably located in the path of the moving fabric between rollers 19 and 20 are banks of rinse sprays 33. The rinse sprays wash the soap off the fabric and remove any impurities that have collected during the prior processes.

The fabric 4 after being treated is guided into the drying chamber 9 over rollers 21 and 22. The steaming and oxidizing chambers have rollers 35 and 34 respectively, that are placed in the same relative position as the roller 21, as shown in the soap and rinse chamber 8. With these rollers so positioned it is possible to place any of the chambers just before the drying chamber.

As shown, after the fabric passes around roller 22 it is guided through two banks of heating elements 36 and 37 by the rollers 23, 24 and the take-up reel 25. In this chamber the fabric is dried by blasts of hot air passing through jets, nozzles, or the like. The hot air passes through the jet banks at an angle to the fabric in the same direction as the travel of the fabric. After the fabric has passed through the drying chamber it is wound on the take-up reel 25.

Unlike the more common vat dyeing processes in use at the present, this invention provides a device for controlling the amount of treating fluid applied to the fabric. This is done by nozzles, jets or the like which apply dyeing or bleaching fluid to the moving fabric. By using this means a more uniform impregnation of the fabric can be achieved. The greatest advantage of this

invention is that it is possible to dye or bleach fabric without applying any harmful tensioning or squeezing to the fabric. Another advantage of the present invention is its flexibility. By that is meant the ease with which it is possible to remove or interchange the steam, oxidation and soap and rinse chambers.

Although this invention has been described with reference to the improvements shown, it will readily be appreciated that numerous changes may be made without departing from the spirit and scope of the invention as described in the appended claims.

I claim:

1. Apparatus for treating fabrics, comprising a plurality of juxtaposed chambers including a primary treating chamber, a drying chamber, and at least one treating chamber intermediate of the primary and drying chambers, each intermediate chamber having entrance and exit passages in opposite walls thereof, rollers within the chamber, one roller being adjacent each of the passages for guiding the fabric proceeding therethrough, and at least one other roller being mounted on an axis displaced from the plane of the axes of those adjacent the passages for guiding the fabric through a devious path through the chamber, a fabric exit passage in the wall of the primary chamber registering with the fabric entrance passage of the adjacent intermediate chamber, a fabric entrance passage in the wall of the drying chamber and a roller associated therewith adjacent the fabric exit passage of the adjoining intermediate chamber, and means adjacent the fabric path in the primary and intermediate chambers for spraying treating liquids in controlled amounts directly upon the fabric.

2. Apparatus in accordance with claim 1 in which the rollers adjacent the passages in each intermediate chamber are disposed in the lower portion thereof and the other roller is disposed in an upper portion thereof.

3. Apparatus in accordance with claim 1 in which the spray means in the primary chamber and in each intermediate chamber is disposed adjacent the point of entrance of the fabric into the respective chambers.

4. Apparatus in accordance with claim 3 in which guard means are provided near the spray means to collect excess spray.

5. Apparatus in accordance with claim 1 comprising a plurality of intermediate chambers each having entrance and exit passages through opposite walls located at the same level whereby the intermediate chambers are interchangeable.

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