

July 12, 1932.

W. P. COHOE
MACHINE FOR AND METHOD OF DYEING CLOTH AND
OTHERWISE TREATING TEXTILES
Original Filed Dec. 28, 1926 2 Sheets-Sheet 1

1,867,210

Fig. 1.

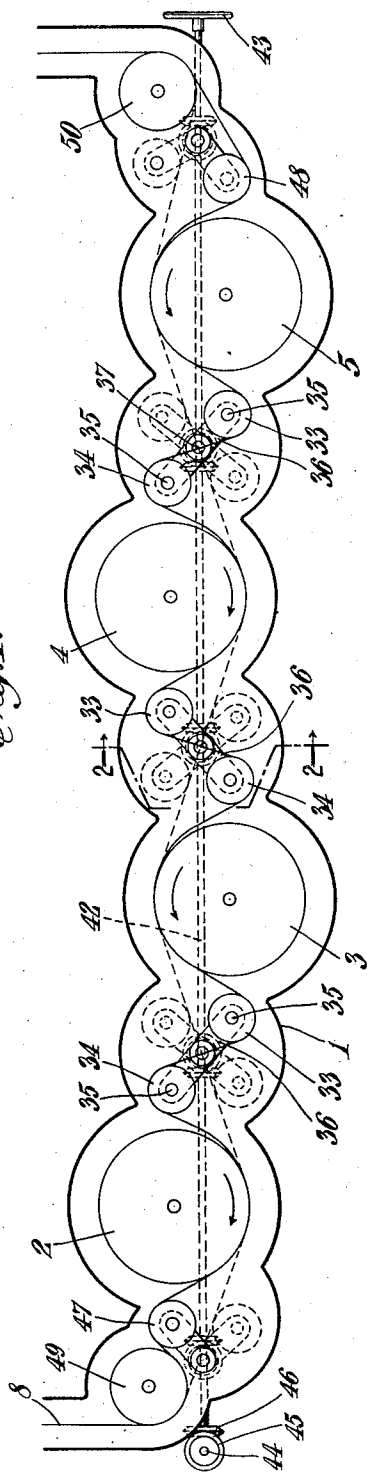
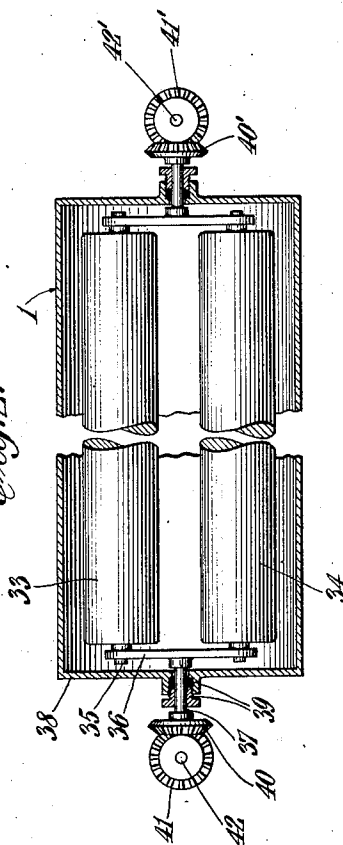


Fig. 2.



INVENTOR
Wallace P. Cohoe,
BY
Prinole, Wright, Malt & Bean,
ATTORNEYS

July 12, 1932.

W. P. COHOE
MACHINE FOR AND METHOD OF DYEING CLOTH AND
OTHERWISE TREATING TEXTILES

1,867,210

Original Filed Dec. 28, 1926 2 Sheets-Sheet 2

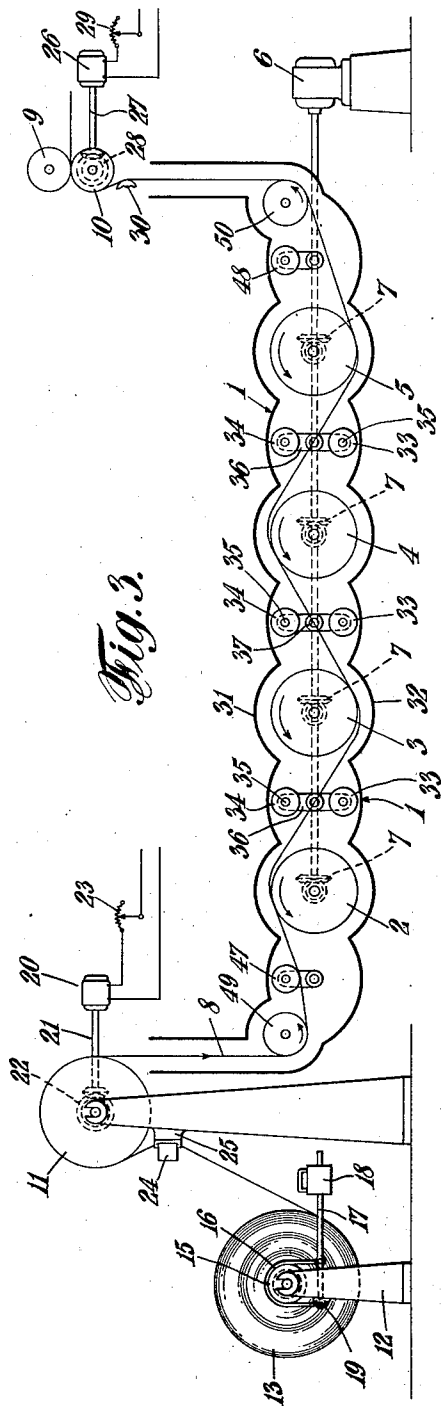


Fig. 3.

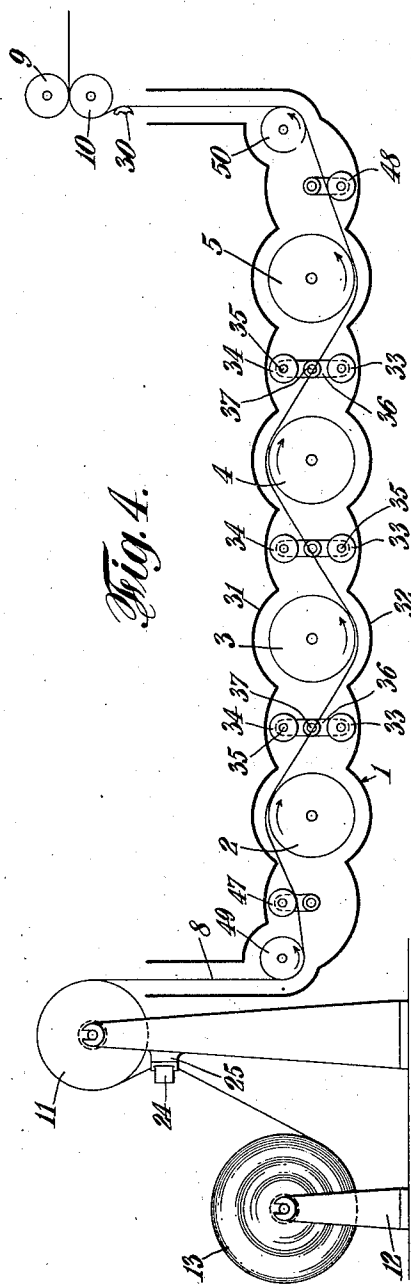


Fig. 4.

INVENTOR
Wallace P. Cohoe
BY
Prindle, Wright, Neal & Bean
ATTORNEYS.

UNITED STATES PATENT OFFICE

WALLACE P. COHOE, OF RIVERDALE-ON-HUDSON, NEW YORK, ASSIGNOR TO COHOE PROCESSES, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

MACHINE FOR AND METHOD OF DYEING CLOTH AND OTHERWISE TREATING TEXTILES

Original application filed December 28, 1926, Serial No. 157,520. Divided and this application filed December 28, 1928. Serial No. 323,922.

This invention relates to a method and machine for dyeing cloth and otherwise treating textiles with fluids, and is a division of my copending application, Serial No. 157,520, filed December 28, 1926.

As is explained more fully in my copending application, I apply the phenomenon of skin friction to the treatment of textiles and similar materials with a fluid preferably by rapidly revolving a roll, which is hereinafter referred to as an active roll, in contact with the fluid at such a high rate of speed that a substantial layer of the fluid is formed on the surface of the active roll and moved therewith, and passing the textile adjacent to the roll, so that the roll draws with it a stream of fluid which is forced against the textile and either penetrates the textile or passes entirely through it, depending upon the way in which the machine is operated and upon the textile used. The rapidly moving body or roll creates a stream of fluid which possesses a large amount of kinetic energy, and when the textile is interposed in the path of the moving stream in such a manner as to decrease the velocity of the stream, considerable pressure is exerted, tending to force the fluid to penetrate or even pass entirely through the textile.

It will be understood that the area of influence of the rapidly moving body, specifically illustrated by a rapidly revolving active roll, extends quite a distance from the surface of said moving body, and that the fluid which is in contact with the surface of the moving body moves at approximately the same speed as the speed of the moving body, but those portions of the fluid which are not in contact with the surface of the moving body move more slowly than the body moves, and the farther the fluid is from the surface of the moving body, the slower the fluid moves; in other words, the fluid may be considered to be in layers parallel to, or in the case of an active roll concentric with, the surface of the body, and when the body is moved, those layers which are next to the surface of the body move with approximately the same speed as said surface, but those layers which are farther removed from said surface move more

slowly, and the speed of movement of the fluid layers will vary as their distance from the surface of the moving body. Therefore, if I consider the fluid stream which is set up by the surface of the rapidly moving body as composed of a series of layers, it will be understood that those layers which are next to said surface possess more kinetic energy than those layers which are farther removed from the surface, and therefore textiles may be differently treated, depending upon whether or not they are held closely adjacent to the surface of the moving body or are held away from it, that is, textiles may be differently treated, depending upon whether they are treated by the layers which possess a large amount of kinetic energy or those which possess a less amount of kinetic energy.

In my machine I may adjust the position of the textile in relation to the surface of the moving body either by auxiliary or guide rolls, or by manipulation of the means for passing the textile into the fluid container and to the active or pumping rolls, that is, I may adjust the position of the textile in the fluid stream and change the position of the textile from one to another of the above-mentioned layers of the fluid stream to obtain the desired treatment of the textile. In the present machine, the guide rolls are adjustable and one or two guide rolls are preferably placed in front of and behind each active roll, so that the textile may be led onto and/or away from each active roll at any desired angle, in order that the textile may be given substantially the same treatment by each of the active rolls.

If the surface of the body is roughened, there is, of course, a greater coefficient of friction between the surface of the body and the fluid than when the surface of the body is smooth, and therefore a roughened roll will impart greater movement to the fluid than will a smooth roll which is revolved at the same peripheral speed. It will also be understood that in the cases where the surface of the moving body has a special shape or contour, special currents may be set up in or imposed upon the fluid stream created by the rapid movement of the body.

With this short general exposition of the broad principles of my invention, I shall give a short description of some of the features thereof, which are as follows.

One of the features of the present invention is a machine in which the textile may be treated with an even number of active rolls, to the end that both sides of the textile may receive equal treatment.

Another feature of the invention is a machine having guide rolls for the textile, the positions of which rolls, relative to the active rolls, may be changed from the outside of the machine to adjust the position of the textile with relation to the active rolls to obtain the same or different treatments of textiles in the machine.

Another feature of the invention is a machine of the above type in which the walls of the container are so shaped that they assist in directing against the textile the fluid stream which is created by the active rolls.

Other features of the invention are the methods of utilizing a machine, having any or all of the above-enumerated features, to treat textiles.

Other objects and features of the invention will more fully appear from the following description and the accompanying drawings and will be particularly pointed out in the claims.

The drawings diagrammatically illustrate some of the relations between the active rolls and guide rolls and textile within a machine of the type described and the methods of use of the machine and embody certain of the broad principles of the invention.

In the drawings:

Fig. 1 illustrates diagrammatically a form of construction of a machine having guide rolls to position the textile with relation to the active or pumping rolls.

Fig. 2 is a broken section on line 2—2 of Fig. 1.

Figs. 3 and 4 are diagrammatic side views showing various methods of treating textiles on my machine, and in accordance with my process.

Only such mechanism is illustrated in the drawings and will be described in the specification as is necessary to illustrate how the machine is used in a single step in the general process of treating a textile with a fluid solution of a dye. It will be understood that this description is merely illustrative of general methods of treating textiles with fluids by the use of my machine, and, although only a single machine with its associated apparatus is shown, it will be understood that other units or complete ranges of the machine may be used in sequence for the further treatment of textiles with fluids, as, for instance, the washing and further treatment of a textile after it has been dyed by

the machine and in accordance with the method about to be described.

The machine illustrated herein includes a container 1, within which the active or pumping rolls 2, 3, 4 and 5 are revolved at a high rate of speed, preferably from a motor 6 through gears 7. Obviously, by changing the ratio of the gears, any roll may be driven faster or slower than any other roll, and by changing the positions of the meshing gears, the direction of rotation of any roll may be changed. Although any number of active rolls may be used, I preferably use an even number, in order that, as will be described later, the textile may receive equal treatment on both sides. The textile is led into the container and adjacent to the active rolls and then out of the container between the upper and lower press rolls 9 and 10, respectively. As is more fully disclosed in my above-designated copending application, the active rolls, which are revolved at a high rate of speed, create a stream of dye liquor or other fluid which possesses a large amount of kinetic energy. The stream of fluid thus created moves in the direction of movement of the roll which creates it and is driven with great force against the textile which is passed adjacent to the rolls, preferably at a speed slower than the peripheral speed of the rolls and either in the direction of movement of the rolls or contra thereto, so that there is a differential movement between the textile and the periphery of the adjacent roll. Due to the kinetic energy of the fluid stream, the fluid may be forced entirely through the textile, or, if the rolls are driven more slowly, the fluid stream may be given only sufficient energy to penetrate the textile and not to pass entirely through it. In the case where the textile is led partially around the rolls, a pocket or enclosure is formed by the textile adjacent to each roll, within which pocket the stream of fluid builds up a very appreciable pressure which causes the fluid to pass through the textile.

The textile is fed to the machine over a feeding roll 11 from a stand 12. It is desirable that the rate at which the textile passes into the container be positively controlled, because the fluid streams set up by the active rolls may exert a great force tending to pull the textile into the machine in the case where the peripheries of the rolls and the textile move in the same direction.

For the purpose of controlling the manner in which the textile is fed into the container and thus controlling the treatment of the textile, means are provided for driving the feed roll 11 and opposing the movement of the textile roll 13. Any suitable braking mechanism may be used to retard the movement of the textile roll 13 to change the tension on the textile. Such braking mechanism may conveniently be a brake drum 15

and a friction belt 16 which operate in conjunction with a pivoted lever 17 and a weight 18 which may be moved along the lever. The lever 17 may be pivoted at 19, at which point one end of the friction belt may be fastened. The other end of the friction belt is fastened to the lever 17. Obviously, by moving the weight 18 on the lever 17 nearer to or farther from the pivot 19, the braking action of the belt 16 on the roll 13 may be decreased or increased and thus the tension on the textile changed.

At times it may be desirable to positively feed the textile into the container as fast as it is removed therefrom in order to relieve the tension on the textile and thus to control the treatment of the textile by the active rolls, as will be more fully explained hereinafter. For this purpose, any suitable mechanism may be provided for positively driving the feed roll. As is illustrated, in Fig. 3, the feed roll may be positively driven from a motor 20, through shaft 21 and gears 22. The speed of the motor may be controlled by the rheostat 23. It will thus be seen that by braking the roll 13 or positively driving forward the roll 11, more or less tension may be applied to the length of textile under treatment.

In order to keep the width of textile smooth on the feed roll 11, it is led in contact with a bar 24 which may conveniently be fastened upon the bracket 25, and which is preferably in the illustrated position with relation to the feed roll so that there is a large area of contact between the textile and the feed roll, which assists in the control of the textile from the feed roll.

The textile may be drawn through the container by any suitable mechanism such as the motor 26 which drives the lower press roll 10 through the shaft 27 and gears 28. The speed of the motor 26 may be controlled by a rheostat 29 so that the speed of the press rolls 9 and 10 may be regulated in accordance with the speed of the feed roll 11. A bar or roll 30 smooths out the textile as it comes from the machine and before it passes between the press rolls 9 and 10.

It will thus be understood how the press rolls or the feed roll and textile roll, or all of them (depending upon whether the active rolls revolve with or against the direction of movement of the textile), constitute a means for passing the textile through the container at a speed slower than the peripheral speed of the active or pumping rolls. It will also be understood that, due to the fact that the tension on the textile may be adjusted by braking the textile roll or driving the feed roll, the textile may be drawn tightly in contact with, or permitted to balloon away from the active rolls, and thus the position of the textile in the fluid stream be adjusted.

The portions 31 and 32 of the top and bot-

tom, respectively, of the container which are adjacent to the active rolls are preferably curved to assist in directing the fluid stream set up by the rapidly revolving active or pumping rolls. These portions 31 and 32 may be given any suitable curvature to direct the fluid stream as desired, but preferably the said portions are curved concentrically with the active rolls, and therefore the fluid stream set up by the active rolls is always concentric with the rolls. The said portions 31 and 32 may be spaced from the rolls as desired, and it is evident that if a machine is made for a certain size roll and then a smaller roll is used, there will be more space between the surface of the smaller roll and the portions 31 and 32 than if the original size roll were retained, and also the opposite will be true in case a larger size roll is substituted. In treating some types of textiles, as will be described later, it has been found to be desirable to provide a rather large space between the surface of the roll and the adjacent portions 31 and 32 of the container, to permit the textile to balloon away from the active rolls, and in other cases it is desirable to have the surfaces of the rolls quite close to the portions 31 and 32 of the container so that a fairly narrow and swiftly moving stream is produced.

For the purpose of guiding the textile over the active or pumping rolls and for the purpose of adjusting the position of the textile with relation to the active rolls and of adjusting the textile in the various layers of the fluid stream or in the layer of fluid formed on the surface of the active rolls, I preferably provide guide rolls over or under which the textile passes. The guide rolls shown on the drawings are adjustable with relation to the active rolls for accomplishing the specific desired positioning of the textile so that the desired treatment of the textile may be obtained. The guide rolls are not driven but are revolved by contact with the textile.

In the machine shown in the accompanying drawings, the guide rolls may be adjusted in their positions with relation to the active rolls so that different textiles may receive different treatments in the same machine. The guide rolls 33 and 34 extend entirely across the container and are so supported that their positions with relation to the adjacent active rolls may be changed without interfering with the passage of the textile through the container. For this purpose, the spindles 35 of the guide rolls may be journaled in arms 36 fastened to short shafts 37 which pass through the side walls of the container, which walls are diagrammatically shown in Fig. 2 and designated 38. Packing and packing nuts 39 surround the shafts 37 to prevent the leakage of fluid. The guide rolls may be moved by any suitable mechanism such as a beveled gear 40 which

is fastened to each of the shafts 37 and meshes with a gear 41 on a rod 42 which extends the full length of the container and which is rotated by a hand wheel 43. It is desirable for the arms on each side of the container to move in unison with each other and, therefore, the rod 44 extends across the outside of the container and, by means of gear 45 which meshes with gear 46 on the rod 42 and a gear similar to the gear 45 which meshes with a gear similar to the gear 46 on the rod 42', the rod 42' is rotated in unison with the rod 42 to move the arms adjacent to rod 42' in unison with the arms adjacent to the rod 42. This mechanism allows the guide rolls to be adjusted from the exterior of the machine.

The guide rolls which are between the active rolls are preferably in pairs, so that the textile may be guided or led onto or away from the adjacent active rolls at substantially the same angle, but it is only necessary for single guide rolls 47 and 48 to be used adjacent the front and rear active rolls. The auxiliary guide rolls 49 and 50 may be, and preferably are, used to lead the textile directly from the feed roll 11 into the container and out of the container to the press rolls 9 and 10.

The shafts 37 are preferably placed in the plane of the axes of the two adjacent active rolls and midway between the said axes so that a guide roll is in front of and behind each active roll and similarly placed with respect to the adjacent active roll so that the textile may be led onto and away from the active rolls at the same angle, which may be changed as desired. From Fig. 1, it will be seen that all of the guide rolls 33 (the guide roll 47 being considered as one of the guide rolls 33) which lead the textile onto the succeeding active rolls have the same position relative to the succeeding active rolls and the textile passes from each guide roll 33 onto each active roll at the same angle. Similarly, all of the guide rolls 34 (the guide roll 48 being considered as one of the guide rolls 34) which lead the textile away from the preceding active rolls have the same position relative to the preceding active rolls and the textile passes from each active roll to each guide roll 34 at the same angle.

Furthermore, from the above description of the mechanism for adjusting the positions of the guide rolls, it will be seen that all of the guide rolls 33 which are directly in front of the active rolls, are connected so that they move together and by equal amounts, and likewise all of the guide rolls 34 which are directly in back of the active rolls are connected so that they also move together and by equal amounts. This ensures the equal treatment of the textile by each active roll.

The front and rear guide rolls 33 and 34 which are between each pair of adjacent active rolls are connected by the arms 36 so that they also move together and by equal

amounts, with the result that the textile is not only led onto each active roll at the same angle and away from each active roll at the same angle, but also both passes onto and away from any individual active roll at the same angle.

The adjustable guide rolls are very important in that they permit different textiles to be treated differently in the same machine, as will more fully hereinafter be described.

A few of the many methods of treating textiles with the machine will now be described. For the purpose of description, textiles may be divided primarily into two classes—(1) the heavy, thick, closely woven textiles, and (2) the light, loosely woven textiles. Obviously, more force is required to drive the fluid into or through the heavy textiles than is required to drive the fluid into or through the light textiles. It is true of the operation of my machine that the film of fluid which is on the surface of an active roll is revolving at substantially the same speed as the roll and possesses the greatest kinetic energy, and that the layers of the fluid stream move at lesser speeds and possess smaller amounts of kinetic energy the farther they are from the surfaces of the active rolls. Furthermore, if the surface of the roll is roughened, there is more friction between the surface of the roughened roll and the fluid than if the surface of the roll is absolutely smooth, and consequently a roughened roll will create a fluid stream having more total kinetic energy than a smooth roll will create. Also, the faster the roll revolves, the greater will be the force of the fluid stream and the kinetic energy it possesses. Therefore, in general, a heavy textile is preferably treated by holding it closely to the active rolls to obtain the full force of all of the fluid stream, but a light textile is treated by holding it at a distance from the surface of the roll where it does not obtain the full force of the stream.

The position of the textile with relation to the active rolls and the layer of fluid on the surface of the rolls and the position of the textile in the different layers of the fluid stream may be, and actually is, controlled in my machine in two distinct ways. The first way of adjusting the position of the textile is by moving the adjustable guide rolls in the manner hereinbefore described. If the guide rolls are in the position shown in full lines in Fig. 1 and the textile is led over the guide rolls as is indicated by the full lines in the figure, it is obvious that the textile will be forced more closely to the surfaces of the active rolls than if the guide rolls and textile assume the dotted line positions, and, therefore, when a heavy textile is treated, the guide rolls and textile will usually be in the full line positions, but when a light textile is treated, the guide rolls and textile will usually

be in the dotted line positions. When the leading-in strip of material is threaded between the rolls, the guide rolls are usually given the dotted line positions in order to facilitate the threading of the textile through the machine, but when the machine is in actual operation, these guide rolls may assume any position to accomplish their purpose of guiding the textile over or under the active rolls in the desired manner and either holding the textile away from the active rolls or forcing it against them.

The position of the textile may also be adjusted by controlling the tension on the textile. As has previously been explained, the fluid stream may be considered to be made up of a plurality of layers of fluid, each of which moves at a less speed as it is farther removed from the surface of the active roll, and this fluid stream tends to balloon the textile away from the active rolls. Thus, as the textile balloons away from the adjacent roll, it moves to a position in one of the outer layers of the fluid and it will continue to balloon out until the pressure of the fluid stream, that is, the pressure of the fluid between the textile and the adjacent active roll, is equal to the pressure caused by the tension on the textile tending to pull the textile toward the roll. Obviously, there will be less pressure on the textile the farther it is from the active roll and, therefore, the textile may be positioned in the various fluid layers, and thus receive various treatments by the fluid, by varying the tension on the textile. The tension on the textile may easily be regulated by means of the brake mechanism 14 on the textile roll 13 and by the use of the motor 20 for positively driving the feed roll. If a heavy braking pressure is applied to the brake on the textile roll 13, a great tension is placed on the textile which is forced closely to the surfaces of the rolls so that the full effect of the fluid stream is exerted against the textile; on the other hand, if the feed roll 11 is driven in the direction of movement of the textile to feed the textile into the container at a rate equivalent to the rate at which the press rolls 9 and 10 draw the textile from the container, the textile is under no tension other than that produced by its contact with the moving streams of fluid set up by the rolls and, therefore, can balloon away from the rolls. Of course, the tension produced by the fluid streams may be very great, and in cases where the active rolls have been driven at an exceedingly high rate of speed in a direction contra to the direction of movement of the textile through the container, the tension caused by the fluid stream has torn the textile apart near the last active or pumping roll; however, when the textile is positively fed into the container, that is, where no tension is placed on the textile by either the textile roll 13 or the feed roll 11, the textile usually

balloons a considerable distance from the active rolls, and by controlling the operation of the feed roll and the textile roll and thus controlling the tension on the textile where it enters the container, the position of the textile with relation to the surface of the adjacent active roll, and thus the position of the textile in the fluid stream and in the several layers of the stream, may be adjusted at will.

In the case where all of the active or pumping rolls are driven in the direction of movement of the textile through the container, as shown in full lines in Fig. 4, it is obvious that the textile will tend to move through the container without being drawn through it by the press rolls 9 and 10. The tendency of the textile to move through the container is opposed by the friction of the guide rolls and the drag of the feed roll 11 and textile roll 13, and thus the position of the textile may be controlled by braking the textile roll. If the textile is led over the guide rolls and active rolls as shown in full lines in Fig. 1, it will be understood that the tension on the textile is greater, due to the friction of the guide rolls, than if the textile is led through the container as shown in dotted lines, and thus the tension on the textile may be increased by manipulation of the guide rolls as well as by the operation of the press rolls and the feed roll or the textile roll.

To prevent the textile being placed under too great a tension by the active rolls, it may be desirable to revolve one roll in the direction of movement of the textile and another roll against the movement of the textile as shown in full lines in Fig. 3. Thus, each roll will exert its full effect on the textile and the textile adjacent that roll will be placed under the tension caused by the fluid stream created by that roll, but because the next roll will be exerting a tension opposite to the tension of the preceding roll, the resulting tension on the textile after passing two rolls revolving in opposite directions with relation to the direction of movement of the textile will be practically the same as was the tension on the textile when it passed the feed roll, that is, the tensions caused by the two active rolls will neutralize each other and will be practically nothing.

Obviously, the speed of a fluid stream and its kinetic energy depends upon the peripheral speed of the active roll which creates it, and therefore if a large and small roll are revolving at the same number of revolutions per minute, the small roll will create less of a fluid stream than will the large roll. Therefore, when light textiles are to be treated in my machine, I may remove the large active rolls and substitute smaller rolls for the large rolls. In addition to creating a fluid stream moving at a slower rate of speed and, therefore, having less kinetic energy than a stream formed by the revolutions of a large roll, the

periphery of the small roll will obviously be spaced a greater distance from the curved portions 31 and 32 of the top and bottom of the container, and, therefore, when a small roll is used, the textile may balloon farther away from the surface of the roll before it contacts with the wall of the container than if a large roll is used, which condition is desirable when treating a light textile, such as chiffon.

On the other hand, if a heavy textile is to be treated, a large roll may be used, which leaves only a slight space between its surface and the adjacent portions 31 and 32 of the container. The peripheral speed of the surface of the large roll will create a very swiftly moving fluid stream having a great amount of kinetic energy, the force of which will be accentuated because of the small distance between the periphery of the roll and the adjacent curved portions 31 and 32 of the wall of the container.

According to the preferred method of treating textiles in the machine, the heavy textiles are forced closely adjacent to, but not in actual contact with, the active rolls, as is shown in Fig. 4, so that the textile rides over the rolls on a fluid film, a part of the fluid of which film passes through the textile, and the light textiles are permitted to balloon away from the rolls so that they receive a lighter treatment. In some instances, however, particularly in the case of the treatment of heavy textiles, it is desirable to have the textile contact with the surfaces of the adjacent active rolls, as is shown in Fig. 3, so that all of the fluid passes into or through the textile, and the textile is submitted to treatment by the layer of fluid which has the greatest speed and the most kinetic energy.

In the specification and claims, I have used certain terms in describing my invention, and I desire to define those terms more fully for the purpose of construing the specification and claims.

By the term "textile" as used in the specification and claims, I have in mind the definition of the word appearing in Webster's International Dictionary, namely, "that which is, or may be, woven, a fabric or material for weaving", because the machine and process are applicable not only to the handling and treating of woven, knitted or braided fabrics, but also a series of warps or other suitable yarns from a beam, thus treating the yarns in a similar manner to fabrics.

By the term "fluid stream" or "fluid film" or "layer of fluid" or equivalent expressions as used in the specification and claims, I mean such a stream or film or layer as is set up by a body moving through the fluid at a high rate of speed and not at the usual speeds at which cloth is moved through jigs, etc., in the usual processes of dyeing or otherwise treating the cloth with a fluid.

Although a particular preferred form of the invention has been described, it is recognized that modifications may be made, and it is distinctly to be understood that the invention is to be construed as broadly as the limitations in the claims, taken in conjunction with the prior art, may allow.

I claim—

1. In a method of treating a textile with a fluid by revolving a roll within a container in contact with the fluid at such a high rate of speed that a substantial layer of the fluid is formed on the surface of the roll and revolves therewith, and passing the textile between the container and the roll and adjacent to the roll, whereby the fluid is forced against the textile, the method of treating different types of textiles which include; treating a heavy textile by passing it adjacent to said roll and holding the textile close to the surface of the roll.

2. In a method of treating a textile with a fluid by revolving a roll within a container in contact with the fluid at such a high rate of speed that a substantial layer of the fluid is formed on the surface of the roll and revolves therewith, and passing the textile between the container and the roll and adjacent to the roll, whereby the fluid is forced against the textile, the method of treating different types of textiles which include; treating a heavy textile by passing it adjacent to said roll which has such a diameter that its periphery is close to the nearest part of the container and holding the textile close to the surface of the roll.

3. In a method of treating a textile with a fluid by revolving a roll at a high rate of speed in contact with a fluid in a container having parts adjacent to the roll concentric with the roll, and passing the textile between the roll and the container and adjacent to the roll whereby the fluid is forced against the textile, the method of treating different types of textiles which include; treating a heavy textile by passing it adjacent to said roll and holding the textile close to the surface of the roll.

4. In a method of treating a textile with a fluid by revolving a roll at a high rate of speed in contact with a fluid in a container having parts adjacent to the roll concentric with the roll, and passing the textile between the roll and the container and adjacent to the roll whereby the fluid is forced against the textile, the method of treating different types of textiles which include; treating a heavy textile by passing it adjacent to said roll which has such a diameter that its periphery is close to the nearest part of the container and holding the textile close to the surface of the roll.

5. A machine for treating a textile with a fluid including a container for the fluid, an active roll within a container for contact

with the fluid and adjacent which the textile passes, means adapted to pass the textile through the container, means adapted to revolve the active roll at such a high rate of speed that a substantial layer of the fluid is formed on the surface of the active roll and moved therewith and forced against the textile, and adjustable guide rolls, one in front of and one behind the active roll and in contact with which the textile passes, said guide rolls being adjustable and connected to each other to move together and to move the same amount whereby the textile may be led to and away from the active roll at the desired angle.

6. A machine for treating a textile with a fluid including a container for the fluid, a plurality of active rolls within the container for contact with the fluid and adjacent which the textile passes, means adapted to pass the textile through the container, means adapted to revolve the active rolls at such a high rate of speed that a substantial layer of the fluid is formed on the surface of the active rolls and moved therewith and forced against the textile, and adjustable guide rolls in front of and one behind each active roll and in contact with which textile passes, said guide rolls being adjustable and connected to each other to move together and to move the same amount whereby a textile may be led to and away from each active roll at the desired angle.

7. A machine for treating a textile with a fluid including a container for the fluid, a plurality of active rolls within a container for contact with the fluid and adjacent which the textile passes, means adapted to pass the textile through the container, means adapted to revolve the active rolls at such a high rate of speed that a substantial layer of the fluid is formed on the surface of the active rolls and moved therewith and forced against the textile and an adjustable guide roll similarly placed in front of each active roll and in contact with which the textile passes, all of said guide rolls being adjustable together and by the same amount to lead the textile on to each of the active rolls at the same angle.

8. A machine for treating a textile with a fluid including a container for the fluid, a plurality of active rolls within a container for contact with the fluid and adjacent which the textile passes, means adapted to pass the textile through the container, means adapted to revolve the active rolls at such a high rate of speed that a substantial layer of the fluid is formed on the surface of the active rolls and moved therewith and forced against the textile, and an adjustable guide roll similarly placed in back of each active roll and in contact with which the textile passes, all of said guide rolls being adjustable together and by the same amount to lead

the textile away from each of the active rolls at the same angle.

In testimony that I claim the foregoing, I have hereunto set my hand this 24th day of December, 1928.

WALLACE P. COHOE.

70

75

80

85

90

95

100

105

110

115

120

125

130