July 20, 1937. E. A. STIENEN 2,087,308

SINGLE AND MULTIPLE PRESSURE DYEING MACHINE

Filed May 18, 1935 2 Sheets-Sheet 1

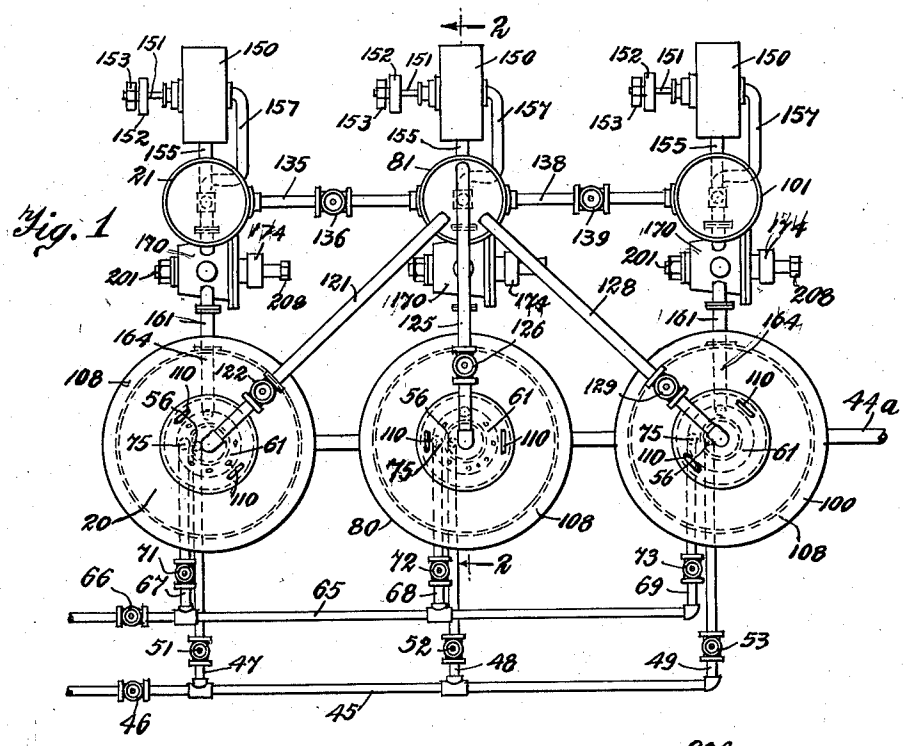


Fig. 1

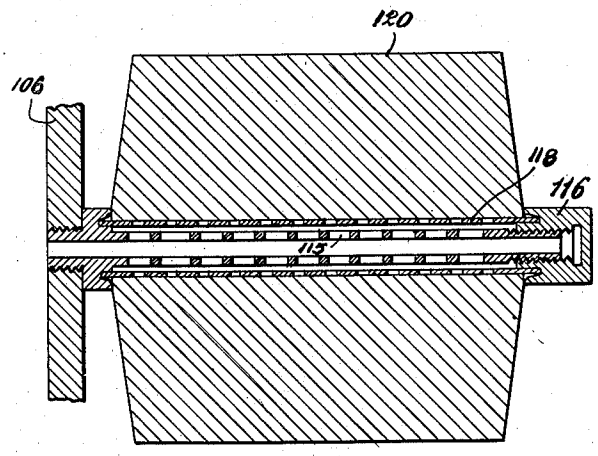


Fig. 5

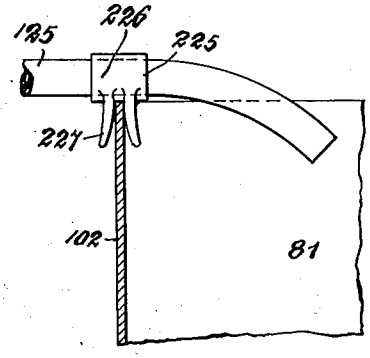


Fig. 6

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SINGLE AND MULTIPLE PRESSURE DYEING MACHINE

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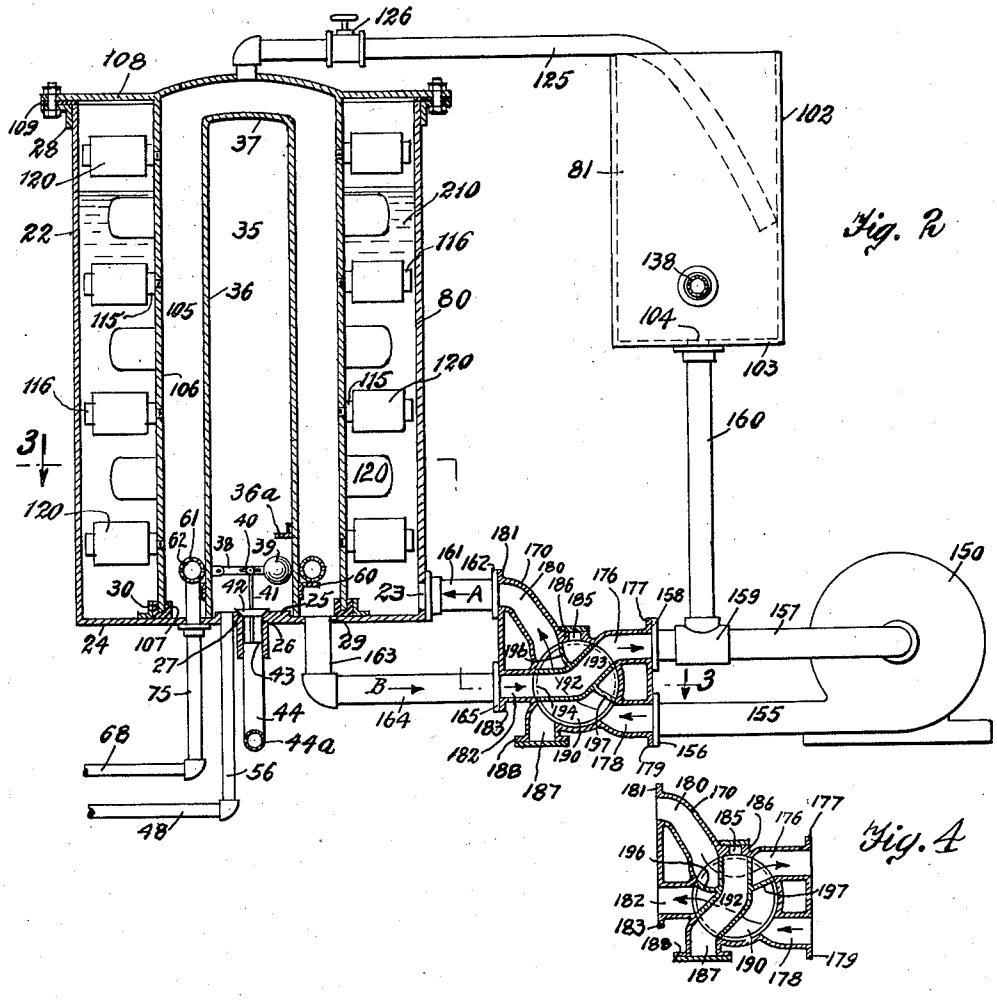


Fig. 2

Fig. 4

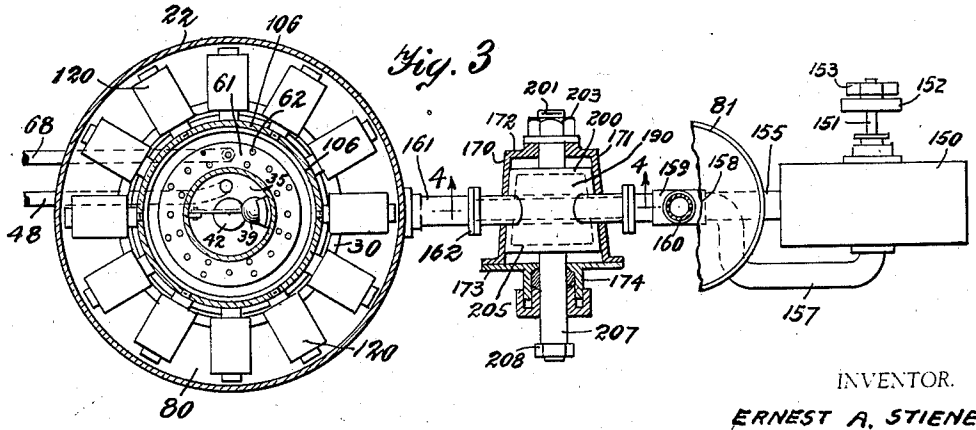


Fig. 3

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SINGLE AND MULTIPLE PRESSURE DYEING MACHINE

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Application May 18, 1935, Serial No. 22,152

2 Claims. (Cl. 8—19)

This invention relates to a single and multiple pressure dyeing machine for dyeing textiles and the like.

One of the objects of the invention is the production of a plurality of dyeing machines, wherewith textiles and the like can be easily dyed the same color, as if dyed in one machine.

A second object of the invention is the production of a plurality of dyeing machines, in each of which a textile can be dyed a different color if desired at the same time.

A third object of the invention is the production of means wherewith one, two or all of a plurality of dye tanks can be heated at the same time by indirect heating chambers and can have any condensed steam automatically discharged from said chambers.

A fourth object of the invention relates to the apparatus by which one, two or all of a plurality of dye tanks can have introduced in the dye liquor used, live steam for quick heating.

A fifth object of the invention relates to the apparatus, by which separated groups of textiles can be impregnated with dye liquor from the same source, to dye said textiles the same color, as if said textiles were all treated in one group.

In the accompanying drawings Fig. 1 represents a top plan view of three dye tanks with their overflow, feed and expansion tanks and their appurtenances; Fig. 2 shows an enlarged section of Fig. 1 on the line 2—2; Fig. 3 indicates a top plan view of Fig. 2 partly broken away with a section as on the line 3—3 of Fig. 2; Fig. 4 represents a section of Fig. 3 as on the line 4—4 of the valve casing of the controlling valve; Fig. 5 indicates an enlarged fragmentary section of one of the spindle carriers with its spindle and appurtenances, and Fig. 6 shows an enlarged fragmentary portion of Fig. 3 in section with a modification.

In this exemplification three similar dye tanks are indicated in their entireties by the numerals 20, 80 and 100, and their coacting similar overflow, feed and expansion tanks are respectively indicated in their entireties by the numerals 21, 81 and 101. Each of the tanks 21, 81 and 101 comprises the cylindrical shell 102 and the bottom wall 103 with the outlet opening 104. The axial centers of the dye tanks 20, 80 and 100 are in one line and the axial centers of the overflow, feed and expansion tanks are also in one line parallel to the first line.

Each dye tank comprises the cylindrical shell 22 with its port 23 and the bottom wall 24 having the disclike projection 25 with an outlet port 26 having the valve seat 27. To the top end of each shell 22 is secured the annular shaped angle iron 28. A port 29 is indicated in the bottom wall 24 and an annular shaped angle iron 30 is fastened thereto. An indirect heating chamber 35 is shown with the cylindrical shell 36 having the stop 36a and the head 37. The chamber 35 extends up from the bottom wall 24. A trap is shown within and at the lower end of the chamber 35. The said trap comprises the arm 38 pivoted to the shell 36 and which has extending therefrom the ball float 39. In the arm 38 is a longitudinal enlarged opening 40, in which is pivoted the upper end of the valve stem 41, that has fastened thereto the valve 42 having the guide ribs 43. Each of the valves 42 coacts with its adjacent valve seat 27. A discharge pipe 44 extends from each bottom wall 24 and is coaxial with its valve seat 27. Piping 44a connects the pipes 44. The stop 36a prevents the valve 42 rising too high.

A line of piping for steam, for indirect heating, is indicated at 45 with its valve 46. Horizontal branch pipes 47, 48 and 49 extend from the piping 45 and have respectively connected thereto the valves 51, 52 and 53. From each of the pipes 47, 48 and 49 extends a vertical pipe 56. Each of the pipes 56 leads to its coacting chamber 35.

An annular angle iron 60 extends from the outer face of each shell 36 and supports the annular shaped steam pipe 61 for the direct heating of the dye liquor used in the tanks 20, 80 and 100. A plurality of discharge openings 62 extend through the wall of each pipe 61.

A line of steam piping 65 for the direct heating of the dye liquor is indicated with its valve 66. Horizontal branch pipes 67, 68 and 69 extend from the piping 65 and have respectively connected thereto the valves 71, 72 and 73. From each of the pipes 67, 68 and 69 extends a vertical pipe 75 that is connected to its coacting annular steam pipe 61.

Steam is supplied by the piping 45 when its valve 46 is open, and when the valves 51, 52 and 53 are all open, the steam simultaneously enters all of the indirect heating chambers 35. The steam can enter any one or two of said chambers 35 by opening the valve or valves in their respective cross pipe and closing the valve or valves of the other cross pipes or pipe. It will also be noted that the steam piping 65 when its valve 66 and the valves 71, 72 and 73 are all open simultaneously furnishes steam for all of the annular steam pipes 61 for direct heating. The steam can enter any one or two of said annular steam pipes 61 by open-

ing the valve or valves in their respective cross pipes and closing the valve or valves in the other cross pipes or pipe. When the steam in the chambers 35 condenses, it is automatically discharged therefrom through the pipes 44 and the piping 44a, when said condensed steam rises to a predetermined level, by the lifting of the valves 42 with their ball floats 39.

Each of the dye tanks 20, 80 and 100 has detachably connected thereto a spindle carrier designated in its entirety by the numeral 105. Each spindle carrier comprises the cylindrical shell 106, which at its bottom end has connected thereto the annular U shaped gasket 107, which bears on the bottom wall 24 and is maintained in operative position by the angle iron 30. Each shell 106 has integral therewith the head 108. Between the head 108 and the angle iron 28 is indicated the annular gasket 109. A pair of eye bolts 110 extend from the head 108 to lift and position each spindle carrier 105 out of and into its dye tank. From the shell 106 of each spindle carrier extend a plurality of rows of perforated spindles 115, which lead through the shell 106 and are each closed by a cap 116 at their outer ends. The spindles 115 of one row preferably stagger with the spindles of the next adjacent row. Each of the spindles 115 supports a material carrier comprising a perforated core 118, around which is wound a textile 120.

From the head 108 of the dye tank 20 extends the flexible overflow pipe 121 having the valve 122, and which may lead to its coacting overflow, feed and expansion tank 21, or to the overflow, feed and expansion tank 81. From the head 108 of the dye tank 80 extends the flexible overflow pipe 125 having the valve 126, and which leads to its coacting overflow, feed and expansion tank 81. From the head 108 of the dye tank 100 extends the flexible overflow pipe 128 having the valve 129 and which may lead to its coacting overflow, feed and expansion tank 101 or to the overflow, feed and expansion tank 81.

The overflow feed and expansion tanks 21 and 81 at their lower portions are connected by the pipe 135 having the valve 136. The overflow feed and expansion tanks 81 and 101 are connected at their lower portions by the pipe 138 having the valve 139.

For each of the dye tanks 20, 80 and 100 is provided a circulating pump 150. Each of said pumps 150 is indicated with its driving spindle 151 having the pulley 152. Each of said spindles is preferably journaled in a journal bracket 153. Each of said pumps has extending therefrom the outlet conduit 155 with the flange 156, and the curved inlet conduit 157 having the flange 158.

The said flanges 156 and 158 are positioned one over the other with their axes in the same vertical plane.

In the conduit 157 is indicated the T 159 and a conduit 160 connects the T 159 with the opening 104 of its coacting overflow, feed and expansion tank.

From the shell 22 of each dye tank and coaxial with its port 23 extends the conduit 161 having the flange 162. From the bottom wall 24 of each dye tank extends the conduit having the members 163 and 164. Each latter member is shown with the flange 165. The member 163 extends from the port 29 of the bottom wall 24. The conduits 161 and 164 have their longitudinal axes in the same vertical plane and are in the same vertical with the longitudinal axes of the conduits 155 and 157.

Between the flanges of the conduits 155, 157, 161 and the member 164, is positioned for each dye tank a controlling valve designated in its entirety by the numeral 170. Each controlling valve 170 comprises the tapered valve casing, having the wall or shell 171, with its wall 172 at one end and the cover 173 at its other end with the usual stuffing box 174.

The shell 171 has extending therefrom the port 176 with the flange 177, the port 178 with the flange 179, the port 180 with the flange 181, and the port 182 with the flange 183. A supplemental port 185 has the flange 186 and a supplemental port 187 has the flange 188. The longitudinal axes of all the ports of the valve casing are in the same vertical plane. Also all the axes of the flanges of the posts of the valve casing are in the same vertical plane with the axes of the flanges of the conduits 155, 157, 161 and the member 164.

A rotatable plug valve 190 is positioned in the valve casing having the shell 171 and has extending therethrough the curved port 192 having the ends 193 and 194.

Wings 196 and 197 extend from the outer face of the wall of the port 192 to the shell 171. The longitudinal axis of the port 192 is in the same vertical plane with all the ports of the shell 171. The plug valve 190 is shown with the wall 200 from which extends the threaded shank 201. The latter extends through an opening in the wall 172 and is shown with the nut 203. The other wall 205 of the valve 190 has extending therefrom the stem 207 which extends through the stuffing box 174 and has connected thereto the operating handle 208.

To operate the dyeing machines simultaneously, the operator preferably introduces the dye liquor into the central overflow, feed, and expansion tank 81, and from the latter the dye liquor flows to the overflow, feed and expansion tanks 21 and 101, when the valves 136 and 139 in the pipes 135 and 138 are open. The three circulating pumps 150 are started by means not shown coacting with the pulleys 152 and each of the dye tanks 20, 80 and 100 have simultaneously pumped therein when the valve 190 is positioned as indicated in Fig. 2. The dye liquor 210 under pressure flows in the direction of the arrow A around the wall of the port 192 from the conduit 155 to the conduit 161. The dye liquor 210 rises in each dye tank and flows through each winding of textile 120 and then flows into each perforated spindle 115 and from the latter enters the spindle carrier 105.

Upon its return the dye liquor flows through the port 29 in the direction of the arrow B through the member 164, the port 192 of the plug valve and into the conduit 157 and then into the circulating pump 150.

If it is desired to reverse the flow of the dye liquor through the windings of the textiles 120 the plug valve 190 is positioned as indicated in Fig. 4. The dye liquor will then flow from the conduit 155 around the wall of the port 192 and flow through the member 164 opposite to the direction of the arrow B and enter the spindle carrier 105 through the port 29. The liquor will rise and enter the spindles 115 and flow through the windings of the textiles 120. The liquor will then enter the conduits 161, flow around the wall of the port 192 and enter the conduit 157 to be returned to the circulating pump 150.

Any overflow of dye liquor from the dye tanks 20, 80 and 100 flows to the central overflow, feed and expansion tank 81 through the pipes 121, 125

and 128, when the latter are positioned as indicated in Fig. 1, and when the valves in the latter pipes are open. After a short interval of time it is preferable to close the valves 122 and 129 and swing the pipe 121 to lead to the overflow, feed and expansion tank 21 and then open the valve 122, when the dye liquor from the tank 20 will flow into the tank 21. Also the valve 129 may be closed and the pipe 128 swung to lead the overflow of dye liquor to the overflow, feed and expansion tank 101. The valve 129 is then opened and the dye liquor from the tank 100 will flow into the tank 101. The flow of the dye liquor between the tanks 21, 81 and 101 is controlled by the valves 136 and 139.

When it is desired to only use the dye tank 20 with its overflow, feed and expansion tank 21, only its circulating pump 150 is operated. The pipe 121 is swung to lead to the tank 21 the valve 122 is opened and the valve 136 is closed.

When the dye tank 80 is only to be used, its circulating pump 150 is only operated with the valves 136 and 139 closed, and the overflow liquor will flow from the tank 80 into the tank 81, when the valve 126 of the pipe 125 is open. When only the dye tank 100 is to be used, only its circulating pump 150 is operated and the pipe 128 is swung to lead to the overflow, feed and expansion tank 101, the valve 139 is closed, and the valve 129 is opened.

It will be noted that the overflow dye liquor in each of the overflow, feed and expansion tanks 21, 81 and 101 returns to its circulating pump 150 through the conduits 160 and 157.

Referring to Figs. 1 and 2 attention is called to the fact that the distance between the axial centers of the dye tank 80 and its coacting overflow, feed and expansion tank 81, is less than the distance between the axial centers of the tanks 20 and 81, and less than the distance between the axial centers of the tanks 100 and 81. Therefore, the overflow pipe 125 when leading to the tank 81 takes the position indicated in Fig. 2.

Referring to Fig. 6 each of the overflow pipes of the dye tanks may have a clamping hook 225 connected thereto. Each clamping hook 225, comprises the sleeve 226, which tightly encircles its overflow pipe and has extending therefrom the clamping fingers 227, which detachably engage the shell of its coacting overflow, feed and expansion tank, to maintain the overflow pipe in operative position. To the port 187 of each valve 170 a vacuum pipe may be connected to draw dye liquor from its coacting dye tank and the ports 187 are used for draining the dye tanks. The ports 185 and 187 may be dispensed with.

Attention is called to the fact that the pressure in the dye tanks 20, 80 and 100 when in operation is always sufficient to produce an overflow of the dye liquor in their coacting overflow, feed and expansion tanks.

Various modifications may be made in the invention and the present exemplification is to be taken as illustrative and not limitative thereof.

Having described my invention, I claim:

1. In a single and multiple dyeing machine, the combination of a plurality of dye tanks, an indirect heating chamber in each dye tank, means to lead steam into each of the chambers independently of each other or into two or a plurality of said heating chambers simultaneously, means to automatically discharge condensed steam from said indirect heating chambers, an overflow, feed and expansion tank for each dye tank, piping connecting the latter tanks, valves in said piping, an overflow pipe normally leading from each dye tank to its overflow, feed and expansion tank, each overflow pipe arranged to lead to one of the other overflow, feed and expansion tanks, a circulating pump for each dye tank to circulate a dye liquor through the same to impregnate and flow through objects in the dye tanks, means to reverse the direction of the flow of the dye liquor through the dye tanks, and means to directly heat the dye liquor in each dye tank with steam.

2. In a single and multiple dyeing machine, the combination of a plurality of dye tanks, a detachable spindle carrier extending into each dye tank, perforated spindles for textiles extending from each carrier and leading into the same, a conduit for a dye liquor leading into each tank, a conduit extending from each tank leading from the interior of the spindle carrier, a circulating pump for each dye tank to circulate dye liquor through said conduits, a valve interposed between each pump and its dye tank to reverse the direction of the flow of the dye liquor in the dye tanks, an indirect heating chamber in each spindle carrier, means to lead steam to each heating chamber, a discharge pipe for each heating chamber, a trap coacting with each discharge pipe to automatically discharge condensed steam from each chamber, means to directly feed steam to the dye liquor in each tank an overflow, feed and expansion tank for each dye tank, an overflow pipe connecting each dye tank with its overflow, feed and expansion tank, means to lead the dye liquor from said latter tanks to the circulating pumps, and piping connecting the lower portion of the overflow, feed and expansion tanks to maintain the character of the dye liquor the same in all the dye tanks.

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