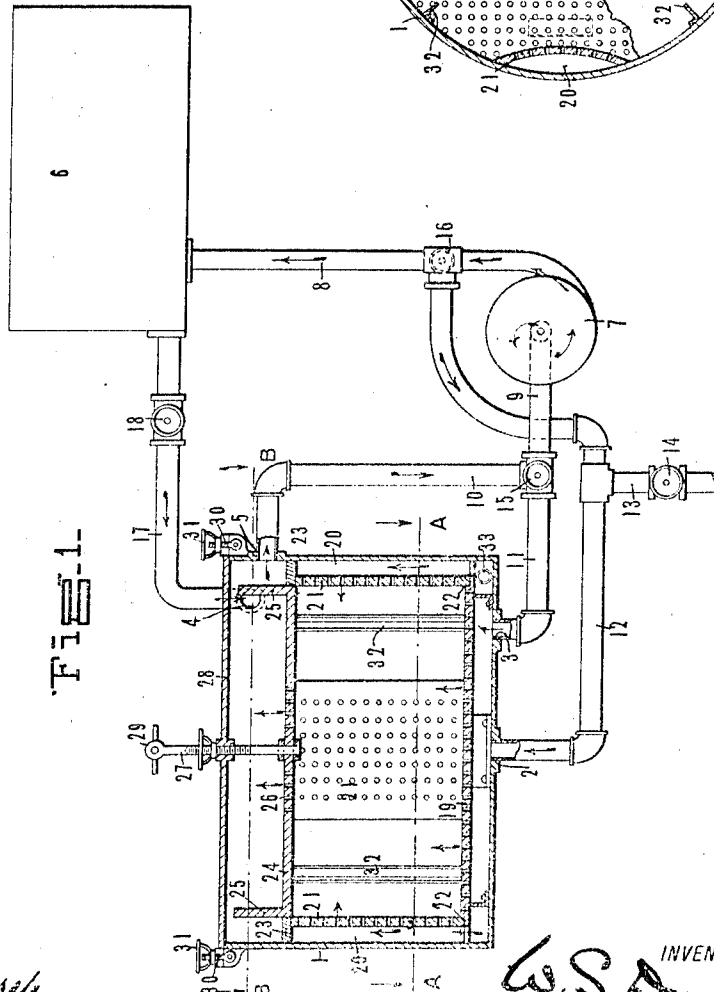
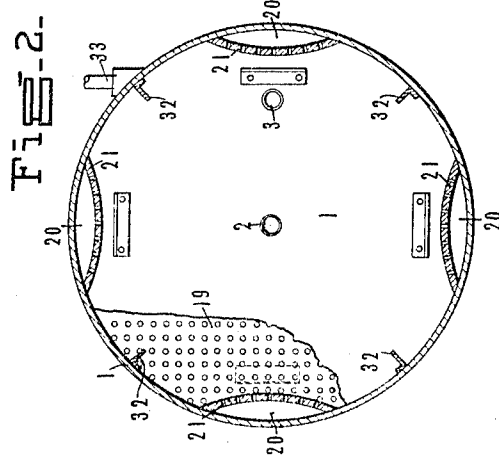
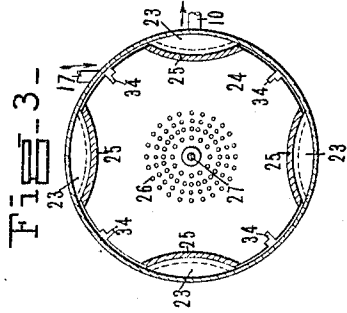


W. S. DUELL.
DYEING MACHINE.
APPLICATION FILED SEPT. 3, 1910.

1,040,654.

Patented Oct. 8, 1912.



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DYEING-MACHINE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM SACKETT DUELL, a citizen of the United States, residing at Amsterdam, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Dyeing-Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to machines used in dyeing and analogous arts, and more particularly to machines of the character embodying a circulatory system for the dye liquor or other active fluid.

One of the objects of the invention is the production of a simple and efficient machine of the character above referred to.

Another object is the provision of a practical machine of the described character in which channeling is reduced to a minimum and substantially prevented.

Another object is the construction of an efficient machine which, besides avoiding channeling, has relatively large capacity, and may be readily packed. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the drawings wherein is shown one of the various possible embodiments of my invention, Figure 1 is a side elevation of the dyeing machine, partly in section for a clear disclosure; Fig. 2, is a sectional plan view of the dye vat, taken on the line A—A, Fig. 1, the false bottom shown broken away. Fig. 3 is a sectional plan view of the vat on a reduced scale on the line B, B.

Referring now in detail to the drawings, wherein similar reference characters refer to similar parts throughout the several views:—The numeral 1 indicates a tank or vat, preferably cylindrical in shape and provided in its bottom portion with orifices 2 and 3 and in its upper portion with orifices 4 and 5.

The numeral 6 indicates an elevated reservoir for the active fluid employed, in this instance dye liquor, and 7 indicates a pump,

preferably of a rotary character, communicating with the bottom of the reservoir through the pipe 8, and directly with the upper and bottom portion, respectively, of the tank by means of the pipe 9 and its branches 10 and 11 leading from the orifices 5 and 3. Branching from the pipe 8 is a pipe 12 leading to the central orifice 2 of the tank, and the latter pipe is also provided with a lead 13 provided with a stop cock 14, for a purpose which will hereinafter appear. At the juncture of the pipe 9 and its branches 10 and 11 is a three way valve 15, and a similar valve 16 is located at the point where the pipe 12 joins the pipe 8. A pipe 17 leads directly from the reservoir 6 to the orifice 4 of the tank, and a faucet 18 is placed therein to control the flow there-through. A suitable motor may be provided to drive the pump 7.

With the parts arranged as thus far described, and assuming the reservoir 6 to contain a quantity of dye liquor sufficient for the purposes of the machine, the tank 6 may be filled with the dye liquor by opening the faucet 18. An amount of liquor is run into the tank sufficient to fill it to a point above the orifice 5, said liquor also filling the pump 7 and the pipes 9, 10 and 12 and a portion of the pipe 8 leading from the pump. The three way valves 15 and 16 are positioned so that when the pump is started the dye liquor is drawn from the upper portion of the tank to the pump through the pipes 10 and 9 and forced through pipes 8 and 12 to the lower portion of the tank, thence circulating through the tank, this circulation being continuous as long as the pump is driven. The liquor in the tank may be removed and delivered into the reservoir by arranging the valve 15 to open the pipe 11 to the pump, and the valve 16 to cut out the pipe 12. By opening the cock 14 the tank may be emptied, and it will be obvious that by the described arrangement other desirable results, which it is thought unnecessary to specify, may be obtained.

When the material to be dyed is placed in the tank and the dye liquor circulated as designed, said liquor tends to flow in more or less well defined currents or channels, a feature which is especially objectionable when the material to be dyed is permeable, fibrous, etc., in which cases it should be made to pass through the material. To avoid this

"channeling", as it is called, the tank possesses characteristics which interfere with the production of individual currents, and provide for an even and equal current or flow of the liquor through all parts of the material, so that a uniform color is produced throughout the stock. To this end the tank embodies a receptacle for the material to be dyed, which in the present instance comprises a base or false bottom 19, spaced from the bottom of the tank and providing for the distribution of the dye liquor. The material to be dyed rests on the base and said base is preferably perforated or foraminous, whereby the dye liquor is more uniformly distributed throughout the face of the material.

In order that the dye liquor may reach all parts of the material, the receptacle is provided with passageways 20 discharging into the material by means of foraminous diaphragms, or partitions 21 spaced from the walls, of the tank and from each other, whereby the receptacle comprises alternate foraminous and imperforate side walls, the diaphragms with the wall of the tank defining passageways 20 communicating with the space below the false bottom and opening against the material through the perforations. To establish these passageways, the base is recessed at different points 22 and the diaphragms 21 are alined respectively with the edges of the recesses, and rise to such height as may be necessary to span the material. Preferably the diaphragms are curved transversely and the perforations therein are relatively angularly arranged to more effectually distribute the dye liquor. The upper ends of the passageways 20 are closed by means of plates 23 secured to the wall of the tank or otherwise suitably fastened in place. These plates conform to the wall of the tank and to the curve of the diaphragms 21. The receptacle is further provided with a removable and adjustable cover, or superior material confining portion 24, of a shape corresponding with the plan of the tank as modified by the diaphragms 21, so that when placed in position it may be adjusted up and down in the receptacle. Those portions of the edge of the cover opposite the diaphragms 21 are provided with upright flanges 25, conforming to the curved wall of the diaphragms 21, and the cover is designed to closely fit the imperforate portion of the tank walls and the face of the diaphragms, so that in all positions of adjustment any current of liquor between the meeting edges of the tank and cover is practically prevented. Furthermore when the cover is adjusted to a position below the upper end of the passageways 20 the flanges 25 close the adjacent passages or openings in the diaphragms, thus serving as valves and direct-

ing the flow of dye liquor to the space beneath the cover.

The cover 24 has an outlet or discharge opening intermediate the walls of the tank and preferably formed by a centrally arranged foraminous portion 26 of the cover. Between the foraminous portion and its edge the cover is imperforate, and as it is designed to closely fit the sides of the tank and the partitions 21, the dye liquor in circulating is forced to pass through the foraminous center. To the cover 24 is swiveled a rod 27 threaded through the top 28 of the tank, and provided at its upper end with a perforated handle 29. The top is secured in position on the tank walls by any suitable device, in the present instance by a series of clamps each consisting of a rod 30, pivoted to the tank and passing through a slot in the edge of the top, a nut 31 being provided to fasten the parts together. The cover is slotted at 34 to accommodate the baffle plates.

Projecting into the receptacle are baffle plates 32, located on the side walls of the tank between the partitions 21. The purpose of these plates will hereinafter appear. A steam or other pipe 33 to heat the dye liquor is provided beneath the false bottom of the tank.

The operation of the machine in dyeing will now be described. The material to be dyed is packed in the receptacle as uniformly as possible, the cover 24 and top 28 are applied, and any pressure on the material is obtained by turning rod 27 by means of handle 29. The vat is filled with dye liquor from the reservoir 6 by opening the cock 18. When the liquor has risen to the proper height in the vat or tank, covering the material and the orifice 5, the valves 15 and 16 are adjusted to establish a continuous path from the orifice 5 through pipes 10 and 9, the pump 7, pipes 8 and 12, to the central orifice 2 in the bottom of the vat. When the pump is driven in the proper direction, the dye liquor will be drawn out of the upper portion of the vat through orifice 5 and forced into the lower portion through orifice 2, entering the space below the false bottom 19 and spreading in all directions, passing through the perforations in the false bottom into the material. The liquor also enters the passageways 20 via the recessed portion of the base, and enters the material from the side through the foraminous partitions 21. In this way the liquor is made to penetrate the material both longitudinally and transversely, and as the liquor is constantly drawn through the central opening in the cover, the tendency of the liquor is to converge toward the central opening from all sides. Thus the body of liquor masses itself as it flows toward the outlet 26, and there is no tendency to separate into defined currents or

channels. The material is pressed against the imperforate peripheral portion of the cover and the liquor forced to pass through the material to gain an outlet. Should the material be pressed away from the sides by the entering liquor, such as might occur by improper packing, the baffle plates will prevent the liquor channeling around the stock, and assist in directing it through the material. By the provision of the adjustable cover 24, the tank may be made to operate on less material than will fill the tank, as said cover may be lowered some distance below the upper edge of the diaphragms or partitions 21 by the adjusting rod 27, as previously explained. Notwithstanding this adjustment, the flow of liquor is still controlled as aforesaid by reason of the flanges 25, which cut off the flow through those perforations in the partitions which may be above the cover.

It will thus be perceived that the machine accomplishes the objects for which it was designed, besides possessing other advantages apparent from its construction. The unobstructed character of the receptacle furnishes a vat of large capacity as well as one which may be readily packed.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent:—

1. In a dyeing apparatus or the like, in combination, material confining means comprising a base and alternate imperforate and foraminous wall portions, a cover having a discharge opening therein and means for circulating a liquid through said apparatus.

2. In a dyeing apparatus or the like, in combination, material confining means comprising alternate imperforate and foraminous side wall portions, and a foraminous top and bottom, said parts being so positioned and arranged as to permit dye liquor to enter through a plurality of inclosing faces and converge toward another face.

3. In a dyeing apparatus or the like, in combination, a tank, perforated partitions coacting with the walls of said tank at spaced intervals thereabout to form a material confining receptacle, and a movable

cover having an opening and valve portions, the latter adapted to close and open perforations in the partitions.

4. In a dyeing apparatus or the like, in combination, a receptacle comprising a perforated base, a plurality of perforated partitions arranged about the side walls of the tank and connected with a source of supply of dyeing fluid, said partitions coacting with the walls of the tank to form a material confining receptacle, a cover having a plurality of discharge openings, and a flange about said cover adapted to coact with the perforations in the partitions to close and open the same to regulate the flow of dye liquor there-through.

5. In a dyeing apparatus or the like, in combination, a cylindrical tank having a perforated false bottom, a plurality of partitions having perforations therein arranged about the side walls of the tank, the space behind the partitions being in communication with the space beneath the false bottom whereby the dye liquor from a common source of supply may flow through said perforations, and a perforated cover therein coacting with the side walls of the tank and the partitions to close and open the perforations in the partitions thereby regulating the flow of dye liquor therethrough.

6. In a dyeing apparatus or the like, in combination, a tank having a base and a false bottom, partitions having perforations therein projecting upwardly from the false bottom at regular intervals about the walls of the tank and in communication with a common source of supply of dye liquor, and a cover adjustable with respect to said partitions and having valve portions coöperating with the perforations in the partitions to open and close the same.

7. In a dyeing apparatus or the like, in combination, a tank, a plurality of perforated partitions coacting with the side walls thereof, a cover for said tank provided with cutaway portions coöperating with the partitions, valve portions on said cover adapted to open and close perforations in the partitions to regulate the supply of dye liquor therethrough, and means operable from without said tank for adjusting the position of said cover.

8. A dye vat comprising a tank having imperforate walls, a foraminous false bottom having recessed peripheral portions, foraminous partitions in the tank alined with the recessed portion of the bottom, and with the walls defining passageways for dye liquor, and a cover having a central opening and imperforate peripheral portion.

9. In a dyeing apparatus or the like, in combination, a dye vat comprising a tank having a foraminous false bottom, and side walls having spaced foraminous partitions forming lateral passages for dye liquor, a

cover having a central foraminous portion and imperforate peripheral portions, a reservoir for dye liquor, a pump, passageways between the pump and vat, a passageway between the pump and reservoir and valves in the passageways all arranged so that the dye liquor may be continuously circulated through the vat, or delivered from the vat to the reservoir, and means whereby the dye liquor may be delivered directly from the reservoir to the vat.

10. In a dyeing apparatus or the like, in combination, a tank having a base and side walls, a cover adapted to be secured thereto, a false bottom to said tank upwardly projecting partitions coacting with the side walls of said tank to form a material confining receptacle, a cover for the material confining receptacle coacting with the partitions and walls of the tank, said false bottom walls and cover having perforations therein through which dye liquor is adapted to pass, and baffle plates positioned about the interior walls of the material confining receptacle to obstruct the free circulation of the dye liquor.

11. In a dyeing apparatus or the like, in combination, a cylindrical tank, perforated walls within said tank and coacting with the side walls thereof to form a material confining receptacle, a perforated cover for the receptacle, baffle plates positioned about the interior of the receptacle to obstruct the free circulation of the dye liquor, and means for forcing the dye liquor through some of the perforated parts toward another perforated part.

12. In a dyeing apparatus or the like, in combination, a tank, a plurality of perforated members some of which coact with the side walls of said tank to form a material confining receptacle, one of said perforated parts forming a cover, means for moving the cover operable from without the tank to open and close some of the perforations in the side walls, and baffle plates positioned within the material confining receptacle adjacent some of the openings to obstruct a free circulation of the dye liquor.

13. In a dyeing apparatus or the like, in combination, a dye vat having a cover adapted to be secured thereto and having an inlet and an outlet arranged at opposite sides of the vat, a plurality of perforated members positioned within the vat, some of which coact with the side walls of the vat to form a material confining receptacle positioned between the inlet and outlet whereby the dye liquor may circulate therethrough and means for moving one of the perforated members to close some of the perforations in another perforated member.

14. In a dyeing apparatus or the like, in combination, a dye vat having a cover adapted to be secured thereto, and having an inlet

and an outlet arranged near opposite sides of the vat, a plurality of perforated members positioned within the vat, some of which coact with the side walls of the vat to form a material confining receptacle positioned between the inlet and outlet whereby the dye liquor may circulate therethrough, and means operable from without the vat for opening and closing some of the perforations in order to regulate the flow of dye liquor.

15. In a dyeing apparatus or the like, in combination, a dye vat having a cover adapted to be secured thereto, and having an inlet and an outlet arranged near opposite sides of the vat, a plurality of perforated members positioned within the vat between the inlet and outlet whereby the dye liquor may circulate therethrough, and means for opening and closing some of the openings in the members for regulating the flow of dye liquor therethrough.

16. In a dyeing apparatus or the like, in combination, a dye vat having a cover adapted to be secured thereto, and having an inlet and an outlet arranged at opposite sides of the vat, a plurality of perforated members positioned within the vat, some of which coact with the side walls of the vat to form a material confining receptacle positioned between the inlet and outlet whereby the dye liquor may circulate therethrough, a cover for the material confining receptacle for opening and closing some of the openings in the side walls of the receptacle for regulating the flow of dye liquor therethrough, and baffle plates about the interior of the receptacle for causing the dye liquor to flow in the circuitous path.

17. In a dyeing apparatus or the like, in combination, a dye vat having an inlet at the bottom and an outlet at the top for permitting a flow of dye liquor therethrough, a false bottom to said vat having perforations therein, a plurality of perforated partitions positioned about the side walls of the vat and in communication with a space beneath the false bottom, a movable perforated member for holding the material to be dyed in place, and means for forcing the dye liquor through the perforations in the false bottom and the side partitions whereby it circulates through the material to be dyed toward the outlet opening at the top.

18. In a dyeing apparatus or the like, in combination, a dye vat having an inlet at the bottom and an outlet at the top for permitting a flow of dye liquor therethrough, a false bottom to said vat having perforations therein, a plurality of perforated members positioned about the side walls of the vat and in communication with a space beneath the false bottom, a movable perforated member for holding the material to be dyed in place, means for forcing the dye liquor

through the perforations in the false bottom
and the side members whereby it circulates
through the material to be dyed toward the
outlet opening, and means operable from
5 without the tank for forcing the holding
member downwardly upon the material to
be dyed.

In testimony whereof I affix my signature,
in the presence of two witnesses.

WILLIAM SACKETT DUELL.

Witnesses:

NELLIE A. GREEN,
WM. E. H. BELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
