R. P. SMITH & G. E. DRUM.

DYEING MACHINE.

APPLICATION FILED AUG. 15, 1908.

905,473.

Patented Dec. 1, 1908.

3 SHEETS—SHEET 1.

Fig. 1.

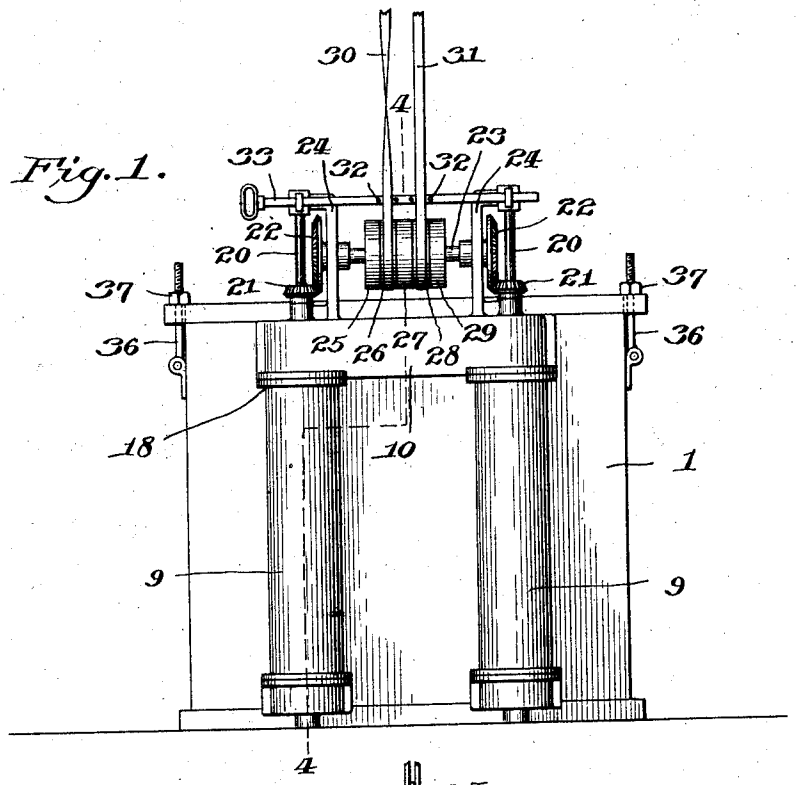
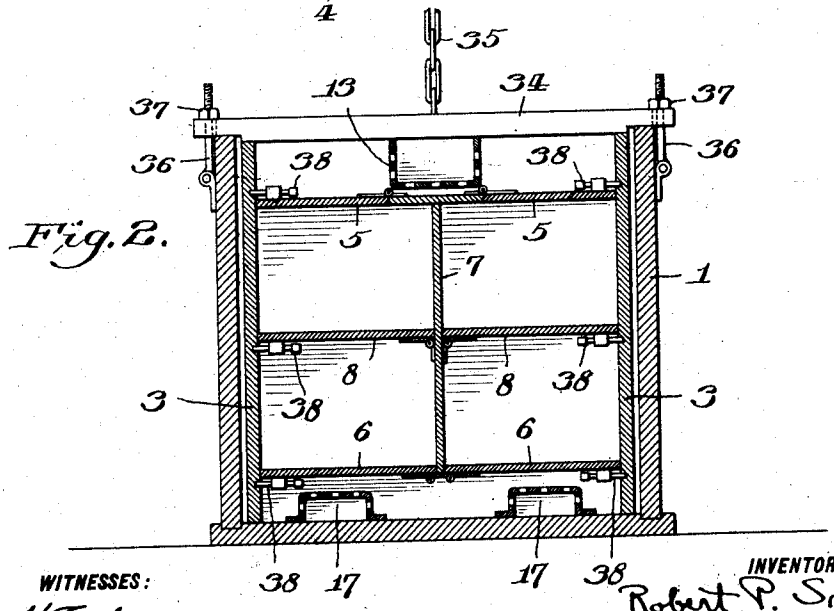


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

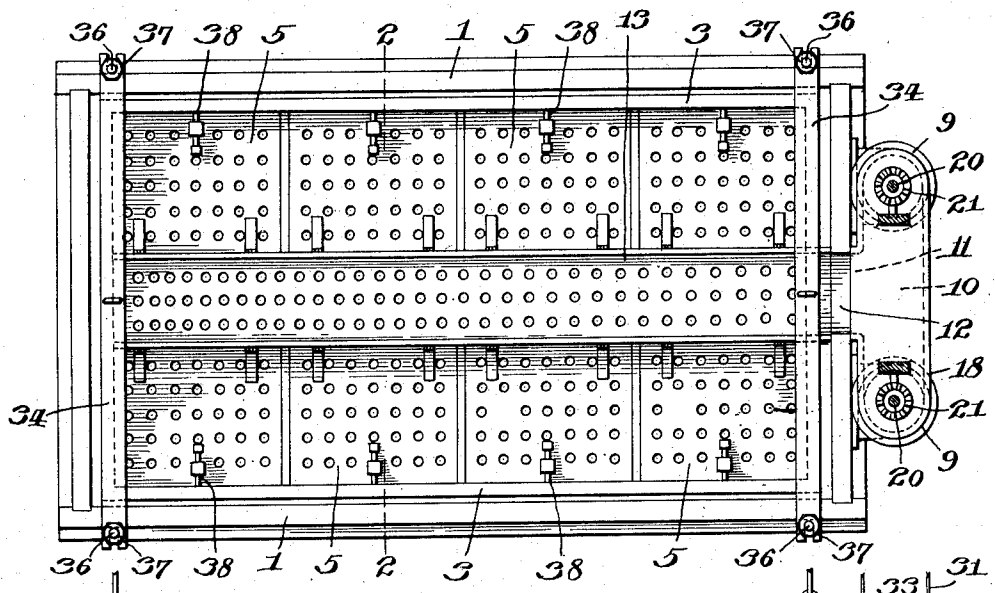
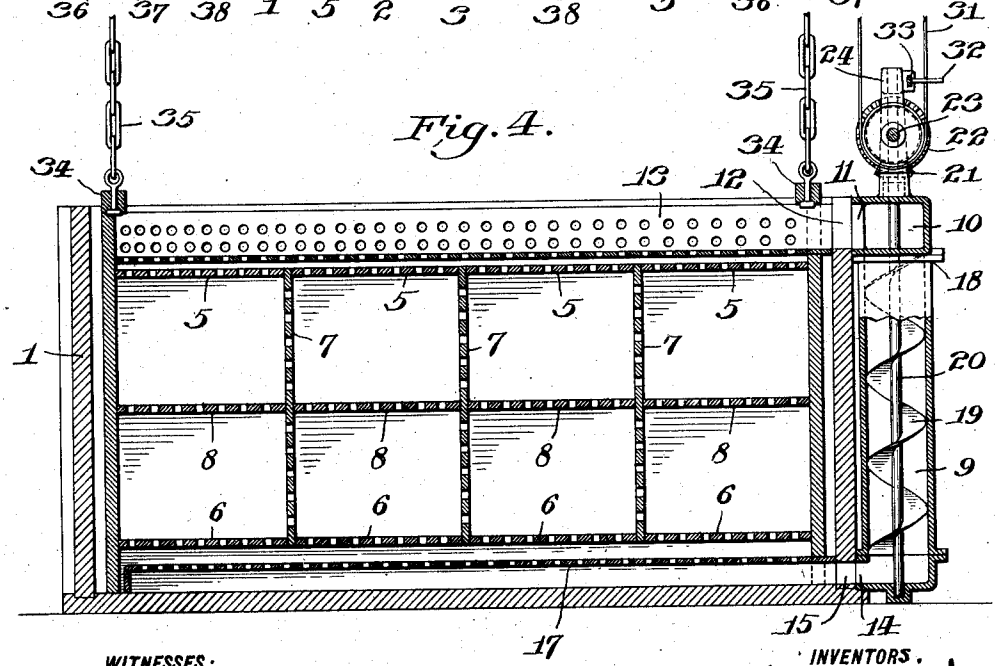


Fig. 4.



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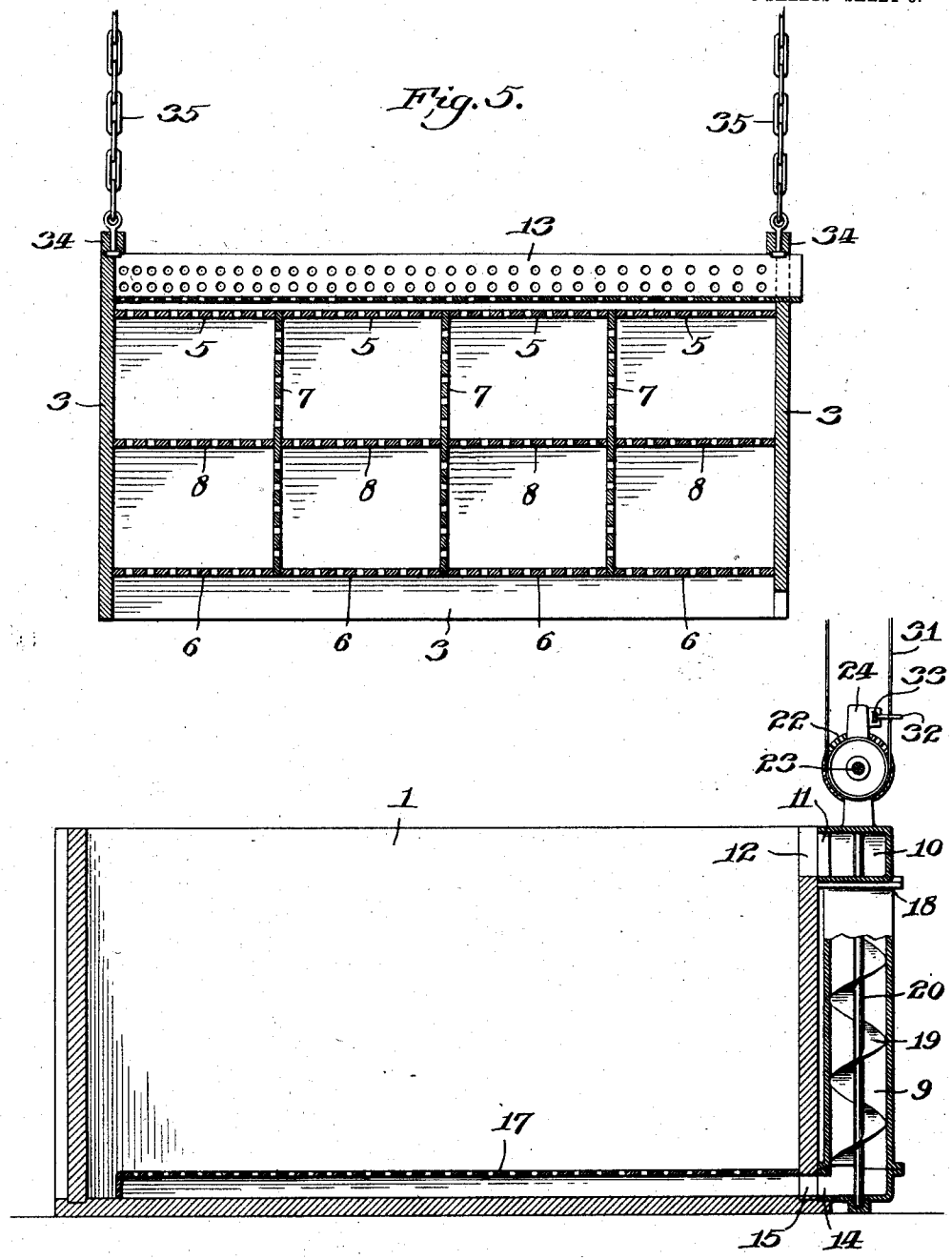
APPLICATION FILED AUG. 15, 1906.

905,473

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3 SHEETS—SHEET 3.

Fig. 5.



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UNITED STATES PATENT OFFICE.

ROBERT P. SMITH AND GEORGE E. DRUM, OF PHILADELPHIA, PENNSYLVANIA.

DYEING-MACHINE.

No. 905,473. Specification of Letters Patent. Patented Dec. 1, 1908.

Application filed August 15, 1906. Serial No. 330,636.

To all whom it may concern:

Be it known that we, ROBERT P. SMITH and GEORGE E. DRUM, citizens of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Dyeing-Machines, of which the following is a specification.

The object of my invention is to provide a dyeing machine of simple and efficient construction whereby the material to be dyed may be expeditiously handled and thoroughly subjected to the dyeing liquid; and to this end the invention consists in the novel features of construction and combinations of parts which will be hereinafter fully described and claimed.

In the drawings, Figure 1 is an end elevation of a dyeing machine embodying my invention. Fig. 2 is a transverse sectional view, as on the line 2—2 of Fig. 3. Fig. 3 is a plan view, partly in section. Fig. 4 is a longitudinal sectional view, as on the line 4—4 of Fig. 1. Fig. 5 is a view similar to Fig. 4, showing the receptacle raised from the tank.

1 designates a tank adapted to contain the dyeing liquid, said tank being of suitable shape and size for its intended purpose. This tank is designed to receive a receptacle for the material to be dyed, and the receptacle is adapted to be introduced into or removed from the tank, as desired. In the present embodiment of the invention, the receptacle comprises the side walls 3, the perforated top 5, the perforated bottom 6 and the perforated partition walls 7 and 8, dividing the receptacle into separate compartments for the reception of the material to be dyed. By mechanism hereinafter described, the dyeing liquid within the tank 1 is caused to flow through the receptacle when it is submerged within the tank.

The side walls 3 extend above the top 5 and below the bottom 6 and are adapted to engage the bottom of the tank 1; to the end that when the dyeing liquid is forced into the space inclosed by the walls 3 below the bottom 6, the liquid will flow up through the receptacle, and when the dyeing liquid is introduced within the space inclosed by the walls 3 above the top 5, the liquid will flow down through the receptacle. In either case the dyeing liquid is prevented by the extending side walls from flowing through the tank exteriorly of the receptacle.

On one end of the tank 1 is mounted a frame 18 comprising two laterally-disposed, cylindrical portions 9 which are connected at their upper ends by the walls of a passageway 10 which opens into the cylindrical portions 9. The passageway 10 is provided with a centrally-arranged opening 11 in register with an opening 12 in the end wall of the tank 1; and registering with the opening 12, when the receptacle is within the tank, is one end of a trough or passageway 13 which is mounted on the receptacle and extends centrally over the top thereof. The lower ends of the cylindrical portions 9 are provided with openings 14 which register with openings 15 in the end wall of the tank 1; and registering with the openings 15 are the open ends of channel irons 17 forming passageways which extend along the bottom of the tank 1 and which are inclosed by the side walls 3 of the receptacle when it is in the tank.

Journaled in the frame 18 are vertical shafts 20 provided with propellers 19 arranged within the cylindrical portions 9. The upper portions of the shafts 20 are provided with bevel gear wheels 21 in mesh with similar wheels 22 on a horizontal shaft 23 which is journaled in bearings 24 rising from the frame 18. This shaft 23 is provided with five pulleys 25, 26, 27, 28 and 29, the central one 27 of which is fixed to the shaft 23 and the other four 25, 26, 28 and 29 of which are loosely mounted on the shaft. Passing around the pulleys 26 and 28 are belts 30 and 31, respectively, which are driven in reverse directions; and engaging the belts 30 and 31 are fingers 32 projecting from a reciprocative belt shifting bar 33 mounted to slide in extensions on the bearings 24. By shifting the bar 33, the belts 30 and 31 may be engaged with either the pulleys 25 and 27 or the pulleys 27 and 29, respectively. Thus it will be seen that the shaft 23 and perforce the propellers 19 may be driven in either direction at will.

The walls of the trough 13 and channel 17 are provided with perforations to permit the dyeing liquid to flow into or out of the same. When the propellers 19 are driven in one direction the dyeing liquid will be drawn from the passageway 17 and discharged into the trough 13 from which it will flow down through the receptacle to the passageway 17; and when the propellers 19 are driven in the reverse direction, the dyeing liquid will

be forced into the passageway 17 and up through the receptacle to the trough 13 from which it will flow back to the propellers 19. The perforations in the trough 13 and channel 17 gradually increase in number from their ends near the propellers 19 to the opposite ends thereof, thus providing for a substantially uniform distribution of the dyeing liquid to all parts of the receptacle, during the circulation of the liquid in either direction.

Secured to the receptacle and extending transversely over the ends thereof are bars 34 to which are attached chains 35 as a means whereby the receptacle may be raised from or lowered into the tank 1. The ends of the bars 34 extend outwardly and are provided with slots for the reception of bolts 36 when the receptacle is within the tank. The bolts 36 are provided with nuts 37 to engage the tops of the bars 34, and the bolts are pivotally connected at their lower ends to the sides of the tank 1, to the end that when the receptacle is lowered into the tank, the bolts 36 may be moved into the slots in the bars 34 and the nuts 37 screwed down to force the bottom of the receptacle into engagement with the bottom of the tank and hold the receptacle submerged within the dyeing liquid.

The perforated top of the receptacle is divided into sections comprising hinged doors adapted to open upwardly to afford access to the receptacle; and the perforated bottom 6 is also divided into sections comprising hinged doors adapted to open downwardly to permit the discharge of the dyed material. The horizontal partition walls 8 are hinged and are adapted to open downwardly to permit the discharge of the dyed material from the upper compartments. The hinged sections of the receptacle forming the doors are held in the position shown by suitable bolts 38.

The operation, briefly described, is as follows:—The material to be dyed is introduced to the compartments of the receptacle through the hinged doors thereof, and after closing the doors, the receptacle is lowered into the dyeing liquid within the tank 1, the dyeing liquid entering and filling the receptacle through the perforated bottom 6. The perforated top 5 serves to force the material to be dyed down into the dyeing liquid. In the absence of the top 5 some material to be dyed would float upon the top of the liquid and would not be submerged. After the receptacle has been introduced to the tank, the bolts 36 are moved into the slots in the bars 34 and the nuts 37 are tightened to force the bottom of the receptacle against the bottom of the tank and retain the receptacle submerged. The belt shifter 33 is now operated to move one of the belts 30 or 31 onto the pulley 27 thus actuating the propellers 19 and causing the dyeing liquid to circulate and flow through the receptacle to act upon the material to be dyed. The belt shifter 33 may now be operated to shift the other belt onto the pulley 27 to reverse the propellers 19 and thus reverse the flow of the dyeing liquid through the receptacle. After the material to be dyed has been thoroughly subjected to the dyeing liquid in this manner, the receptacle is raised from the tank and the doors of the receptacle are opened to permit the discharge of the dyed material, or the receptacle may be introduced to another tank to subject the material to another liquid before it is discharged.

We desire it to be understood that any convenient arrangement of passageways and any well known propelling mechanism may be used to circulate the dyeing liquid in connection with our invention; and also modifications of the various parts may be resorted to without departing from our invention.

We claim,

1. In a dyeing machine the combination of a tank to contain the dyeing liquid, a receptacle to receive the material to be dyed, said receptacle being movable into and out of the tank and comprising a perforated top, a perforated bottom, and side walls extending above the perforated top, one of said side walls having an opening extending therethrough above said top, and means for causing the dyeing liquid to flow through said opening when the receptacle is within the tank.

2. In a dyeing machine the combination of a tank to contain the dyeing liquid, a receptacle to receive the material to be dyed, said receptacle being movable into and out of the tank and comprising a perforated top, a perforated bottom, and side walls extending above the perforated top, one of said side walls having an opening extending therethrough above said top, walls forming a passageway leading from the lower portion of the tank to the upper portion thereof, the upper end of said passageway being located to register with said opening when the receptacle is within the tank, and means for causing the dyeing liquid to flow through said passageway.

3. In a dyeing machine the combination of a tank to contain the dyeing liquid, a receptacle to receive the material to be dyed, said receptacle being movable into and out of the tank and comprising a perforated top, a perforated bottom, and side walls extending above the perforated top, one of said side walls having an opening extending therethrough above said top, and reversible mechanism for causing the dyeing liquid to flow through said opening when the receptacle is within the tank.

4. In a dyeing apparatus the combination with a tank to contain the dyeing liquid, of

a receptacle to receive the material to be dyed, movable into and out of the tank and provided with top and bottom perforated walls, openings through one wall of the tank near the top and bottom thereof, means for causing a circulation of liquid through said openings and perforated troughs leading from the openings and extending lengthwise of the receptacle above the top and below the bottom of the same respectively, said troughs being narrower than the receptacle.

5. In a dyeing apparatus, the combination with a tank to contain the dyeing liquid, of a receptacle to receive the material to be dyed, movable into and out of the tank and provided with top and bottom perforated walls, openings through one wall of the tank near the top and bottom thereof, means for causing a circulation of liquid through said openings and troughs leading from the openings and extending lengthwise of the receptacle above the top and below the bottom of the same respectively, said troughs having perforations through the walls thereof which gradually increase in area toward the end of the troughs remote from said openings in the end walls of the tank.

6. In a dyeing machine and in combination, a tank having an opening centrally of one end wall thereof in the top of the same and two separated openings in said end wall near the bottom thereof, a chamber having openings communicating with the openings in the end wall for the circulation of the dyeing liquid, propelling means within the chamber and a receptacle for containing the material to be dyed located within the tank and provided with a perforated top and a perforated bottom for the circulation of the dyeing liquid.

In testimony whereof we affix our signatures in presence of two witnesses.

ROBERT P. SMITH.
GEORGE E. DRUM.

Witnesses:
WILLIAM BUCKLEY,
ROBT. J. THOMPSON.