No. 796,383. PATENTED AUG. 1, 1905.

J. A. WILLARD.

DYEING MACHINE.

APPLICATION FILED SEPT. 9, 1904.

2 SHEETS—SHEET 1.

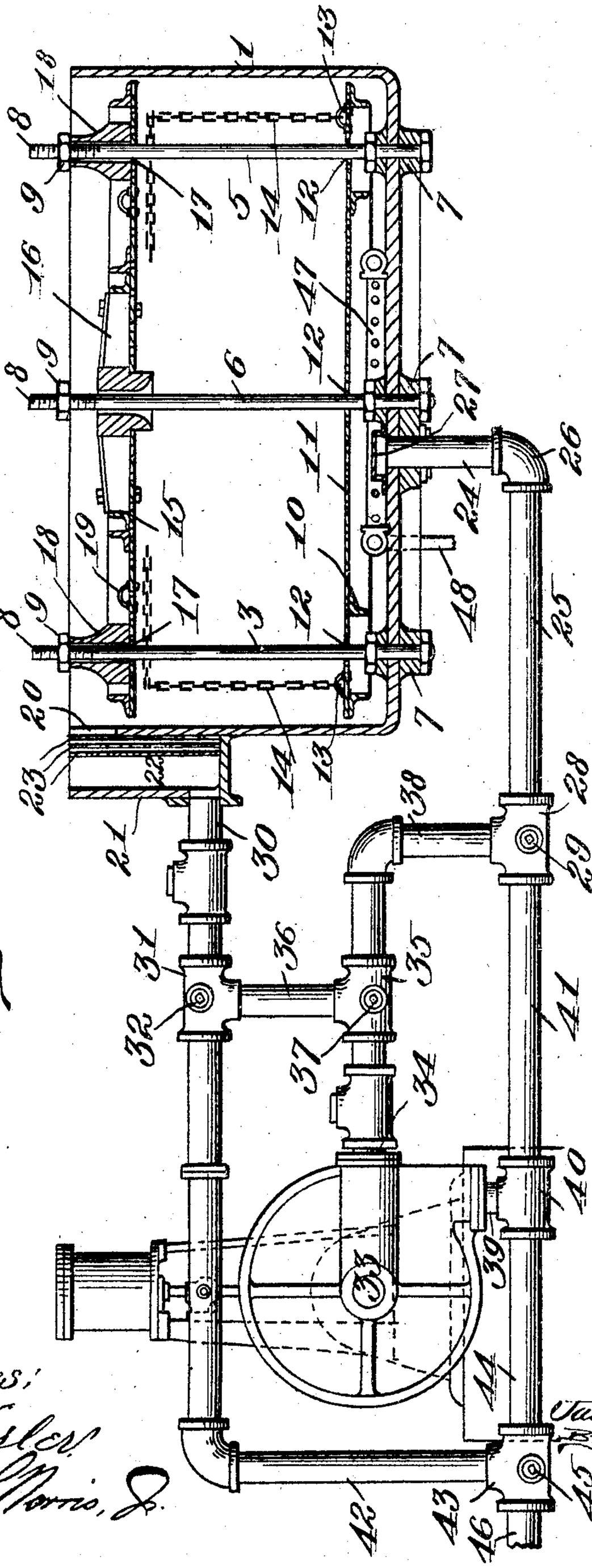

Fig. 1.

Witnesses:
C. F. Keller
James A. Morris, Jr.

Inventor
James A. Willard
By James L. Norris
Atty

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Fig. 3.

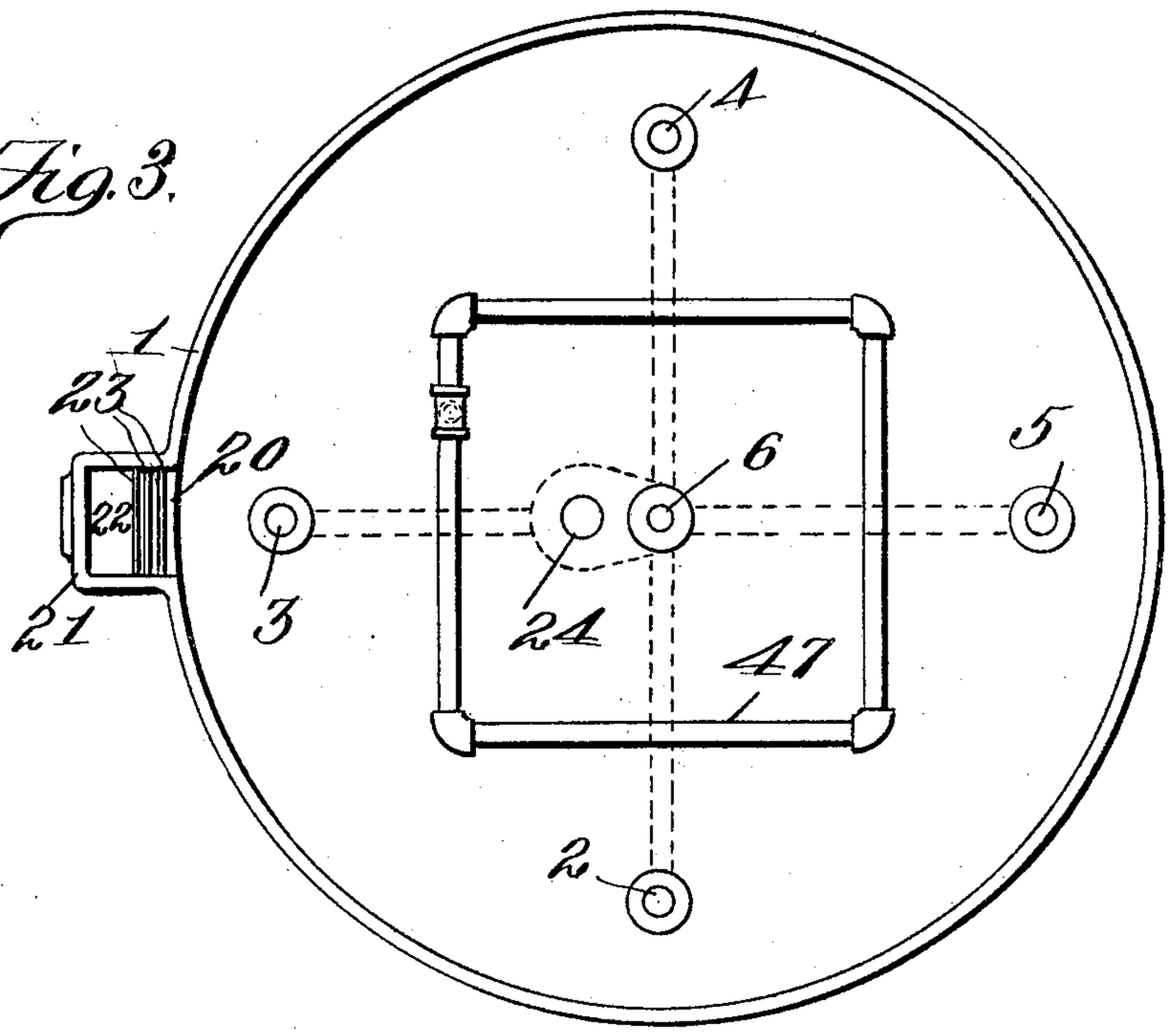
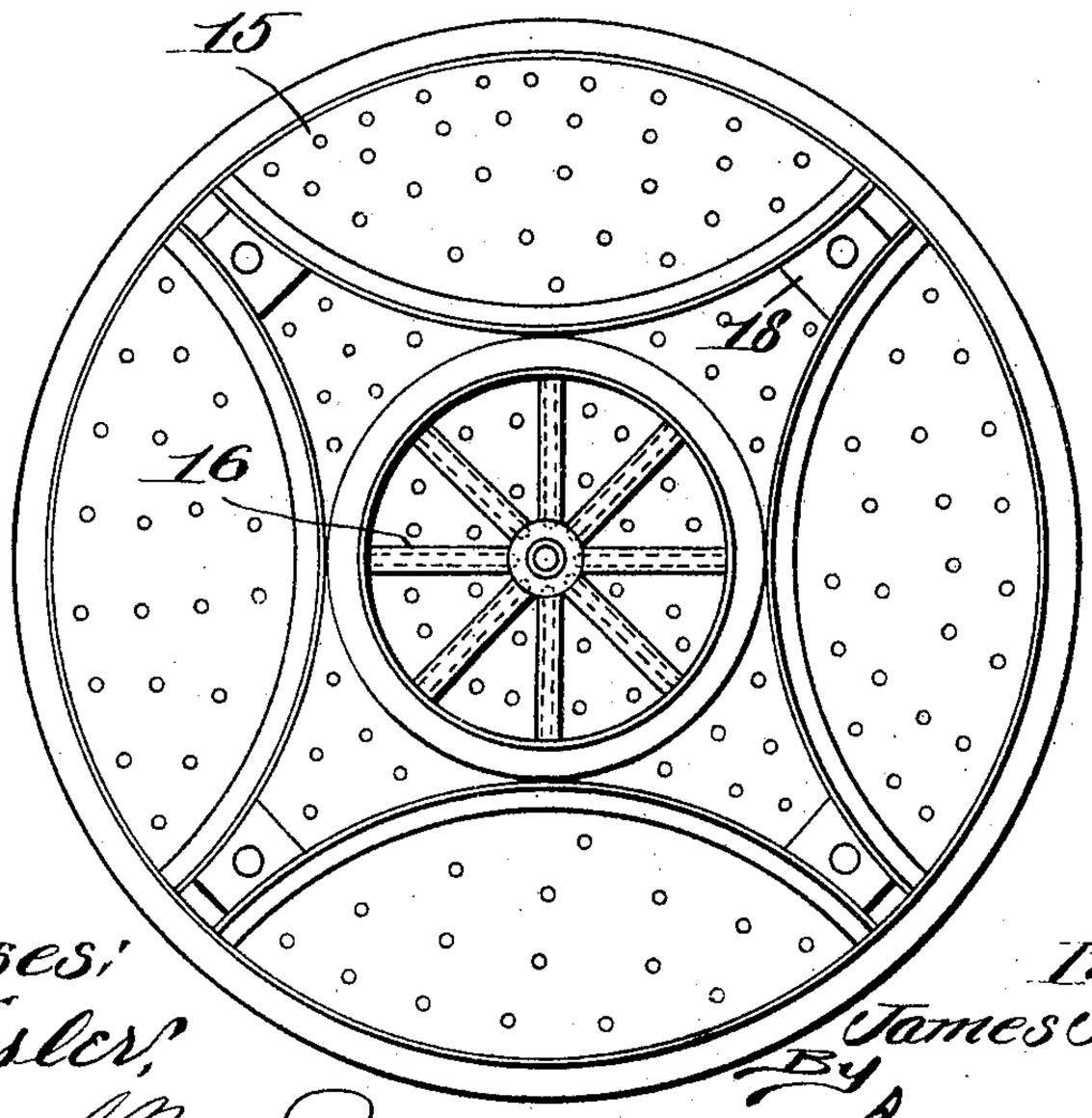


Fig. 2.



Witnesses:
C. D. Kesler
Willis L. Morris, Jr.

Inventor
James A. Willard
By James L. Norris
Atty

UNITED STATES PATENT OFFICE.

JAMES A. WILLARD, OF CHATTANOOGA, TENNESSEE, ASSIGNOR TO VACUUM DYEING MACHINE COMPANY, OF CHATTANOOGA, TENNESSEE, A CORPORATION OF TENNESSEE.

DYEING-MACHINE.

No. 796,383 Specification of Letters Patent. Patented Aug. 1, 1905.

Application filed September 9, 1904. Serial No. 223,888.

To all whom it may concern:

Be it known that I, JAMES A. WILLARD, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented new and useful Improvements in Dyeing-Machines, of which the following is a specification.

This invention relates to dyeing-machines.

The object of the invention is to construct an apparatus or machine which is particularly adapted for dyeing, washing, and fixing dyestuffs upon the material being operated on, while it is submerged, at all times and without the material coming in contact with air until the color has been set and made fast or permanent; furthermore, so constructed as to permit of readily removing from the machine the material after it has been treated and to permit of transporting the treated material to any point desired.

The invention further aims to provide a dyeing-machine with means to prevent the exit from the machine of dirt, trash, or other matters during the circulation of the dyeing medium—that is to say, to prevent foreign bodies entering the pipe system to clog the same during the circulation of the dyeing medium.

The invention further aims to provide a dyeing-machine with new and novel means for retaining the compression top plate in position and to further provide means to deflect the dye liquor as it is supplied to the bottom of the vat below the material-supporting plate.

With the foregoing and other objects in view the invention consists of the novel combination and arrangement of parts hereinafter more specifically described, illustrated in accompanying drawings, and particularly pointed out in the claims hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, and wherein like characters of reference denote corresponding parts throughout the several views, and in which—

Figure 1 is a sectional elevation of a dyeing-machine constructed in accordance with this invention. Fig. 2 is a top plan view of a portion of the machine, and Fig. 3 is a top plan view of the vat with the supporting and compression plate removed.

Referring to the drawings by the reference characters, 1 denotes an opening vat or receptacle adapted to be mounted upon a suitable support, and secured to the bottom of the vat and extending upwardly therein is a series of combined guide and retaining rods 2, 3, 4, 5, and 6. The guide and retaining rods are secured to the bottom of the vat 1 through the medium of holdfast devices 7, and the upper ends of said rods are screw-threaded, as at 8, and said ends 8 carry clamping and retaining nuts 9 for the compression-plate, to be hereinafter referred to.

Supported upon the bottom of the vat 1 through the medium of the depending angular-shaped member 10 is a removable perforated material-supporting plate 11. The members 10, as well as the plate 11, conform to the contour of the vat 1, and said plate 11 is provided with a series of openings 12 to permit of the passage of the rods 2, 3, 4, 5, and 6. The plate 11 is also provided with a series of eyes or other suitable connecting means, as indicated by reference character 13, for attaching a plurality of chains thereto, the chains being indicated by reference character 14. The chains or equivalent devices are adapted to be connected to any suitable hoisting device, so that said plate 11, with the material, can be lifted out of or lowered into the vat 1.

The reference character 15 denotes the removable perforated compression top plate, which is provided with a reinforcing-spider 16 and further provided with openings 17 to permit of the passage of the rods 2, 3, 4, 5, and 6. The plate 16 is further provided with tapering collars or equivalent devices, (indicated by reference character 18,) which are adapted to be engaged by the clamping-nuts 9, so that the plate 15 when in its adjusted position—that is to say, when the material has been properly compressed—will be retained in such position through the medium of the nuts 9. That portion of the plate which surrounds the center rod 6 is not shown provided with a collar 18 in the same manner as for the rods 2, 3, 4, and 5; but said collar can be employed, if desired. The plate 15 is provided with a series of eyes, as indicated by the reference character 19, to permit of attaching it to a suitable hoisting device, so that said plate 15 can be removed from or replaced in the vat 2, as desired.

The vat 1 near the top thereof is provided with an outlet 20, communicating with a receptacle 21, which is secured to or formed integrally with vat 2. The said receptacle 21 forms an overflow-chamber 22 for the dye liquor during the circulating operation and before the liquor is drawn into the suction-pipe, to be hereinafter referred to. Within the chamber 22 is arranged a filtering device, as indicated by reference character 23, and, as shown, consists of a plurality of screens arranged in closed proximity to the outlet 20, and said screens 20 or filtering devices are adapted to prevent the entrance of dirt, trash, or other foreign bodies into the overflow-chamber, so that such matters can be carried off by the suction-pipe, to be hereinafter referred to.

The pipe system for circulating the dyeing medium or washing medium in either direction comprises a primary feed-pipe consisting of the members 24 and 25, connected together by the elbow-coupling 26. The member 24 communicates with the vat 1 at the bottom thereof, a suitable opening being provided for such purpose, and above said opening a deflector 27 for the dye liquor is arranged. The member 18 is attached to a T-coupling 28, which carries a three-way valve 29. Communicating with the overflow-chamber 22 is a suction-pipe 30, attached at one end to the T-coupling 31, having a three-way valve 32. Communicating with the pump 33 is a pipe 34, which also connects with the T-coupling 35, the latter being connected to the T-coupling 31 through the medium of the branch pipe 36. The T-coupling 35 is provided with a three-way valve 37. The T-coupling 35 is connected with the T-coupling 28 through the medium of the branch pipe 38. The pump 33, through the medium of the pipe 39, is connected with the T-coupling 40, which is in communication with the T-coupling 28, through the medium of the pipe connection 41.

The foregoing referred to those parts of the pipe system which will enable the circulation of the dyeing medium in one direction. For causing a reversal of the flow of the dye liquor the pipe system is further provided with a pipe connection 42, which is attached at one end to T-coupling 31 and at its other end to the T-coupling 43, the latter being in communication with the T-coupling 40 through the medium of the branch pipe 44. The T-coupling 43 has also communicating therewith a dye-liquor-supply pipe 46 to permit of readily charging the vat with the necessary quantity of dye liquor, so that the circulation of the dyeing medium from and through the vat can be had. By setting the proper valves the circulation of the dyeing or washing medium in the necessary direction can be had as occasion required. The manner of initially charging the vat with the dye liquor is that the quantity of liquor is such that it will completely submerge the material within the vat, and during the operation of pulling upon the body of dye liquor and forcing it back through the material in the vat the level of the body of dye liquor will never fall below the top of the body of material. Consequently the material being dyed will never come in contact with the atmosphere during the dyeing operation.

To heat the dye liquor during the dyeing operation, a perforated steam-pipe in the form of a square, and as indicated by the reference character 47, is arranged upon the bottom of the vat 1 below the plate 11. The steam-supply pipe which communicates with the perforated pipe 47 is indicated by reference character 48. Although the perforated steam-pipe is shown substantially in the form of a square, yet it can be circular, segmental, or of other contour.

It is thought that the operation of the machine can be thoroughly understood from the foregoing description, and it is also thought that the many advantages of a dyeing-machine constructed in accordance with the foregoing description, taken in connection with the accompanying drawings, can be thoroughly understood, and it will furthermore be evident that changes, variations, and modifications can be resorted to without departing from the spirit of the invention or sacrificing any of its advantages, and I therefore do not wish to restrict myself to the details of construction hereinbefore described, and pointed out in the accompanying drawings, but reserve the right to make such changes, variations, and modifications that properly come within the scope of the protection.

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

1. A dyeing-machine involving a vat, a removable perforated material-supporting plate arranged therein, a removable perforated compression-plate operating in said vat, a receptacle forming an overflow-chamber communicating with the interior of the vat, a plurality of tapering collars carried by said compression-plate, a plurality of guide and retaining arms extending upwardly in said vat and through said plates and collars, a guide and retaining rod arranged centrally of said vat and extending upwardly through said plates, means mounted upon said plurality of rods and engaging said collars for retaining compression-plate in position, means mounted upon said centrally-arranged rod and engaging said compression-plate to assist in retaining it in position, and means opening into said chamber and said vat for circulating a liquid through the latter.

2. A dyeing-machine embodying a vat and a casing, the wall of said vat forming the rear wall of the casing and cut away so as to establish communication between the casing and

the vat, said vat adapted to receive the material to be treated and said casing forming an overflow-chamber for the dyeing medium, combined with means communicating with said chamber and with said vat for circulating a dyeing medium.

3. A dyeing-machine embodying a vat and a casing, the wall of said vat forming the rear wall of the casing and cut away so as to establish communication between the casing and the vat, said vat adapted to receive the material to be treated and said casing forming an overflow-chamber for the dyeing medium, combined with means communicating with said chamber and with said vat for circulating a dyeing medium therethrough, and a filtering medium arranged in said chamber.

4. A dyeing-machine involving a vat, a removable perforated material-supporting plate arranged therein, a removable compression-plate operating in said vat, a plurality of tapering collars carried by said compression-plate, a plurality of guide and retaining rods extending upwardly through said vat, plates and collars, a combined guide and retaining rod arranged centrally of said vat and extending upwardly through the said plates, means mounted upon said plurality of rods and engaging said collars for retaining said compression-plate in position, and means mounted upon said centrally-arranged rod and engaging said compression-plate to assist in retaining it in position.

5. A dyeing-machine involving a vat, a removable perforated material-supporting plate arranged therein, a removable compression-plate operating in said vat, a plurality of tapering collars carried by said compression-plate, a plurality of guide and retaining rods extending upwardly through said vat, plates and collars, a combined guide and retaining rod arranged centrally of said vat and extending upwardly through said plates, means mounted upon said plurality of rods and engaging said collars for retaining said compression-plate in position, means mounted upon said centrally-arranged rod and engaging said compression-plate to assist in retaining it in position, means for circulating a dyeing medium through said vat, and a heating-medium-supply pipe substantially square in contour interposed between the bottom of the vat and said removable supporting-plate and communicating with a steam-supply.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JAMES A. WILLARD.

Witnesses:
L. B. LOCKWOOD,
S. N. POSTLETHWAITE.