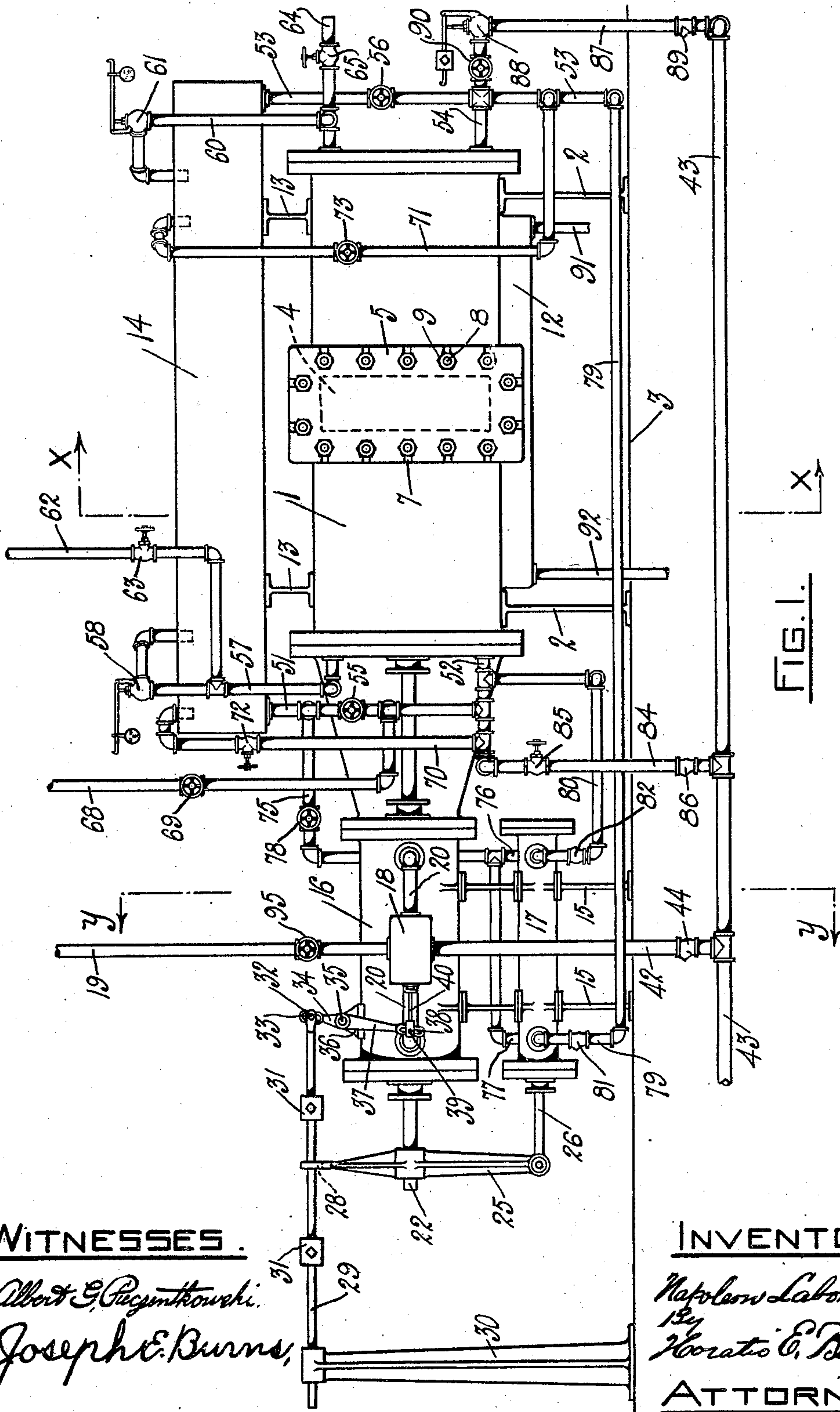


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DYEING, BLEACHING, AND WASHING MACHINE.
APPLICATION FILED OCT. 2, 1908.

929,314.

Patented July 27, 1909.

3 SHEETS—SHEET 1.



WITNESSES.

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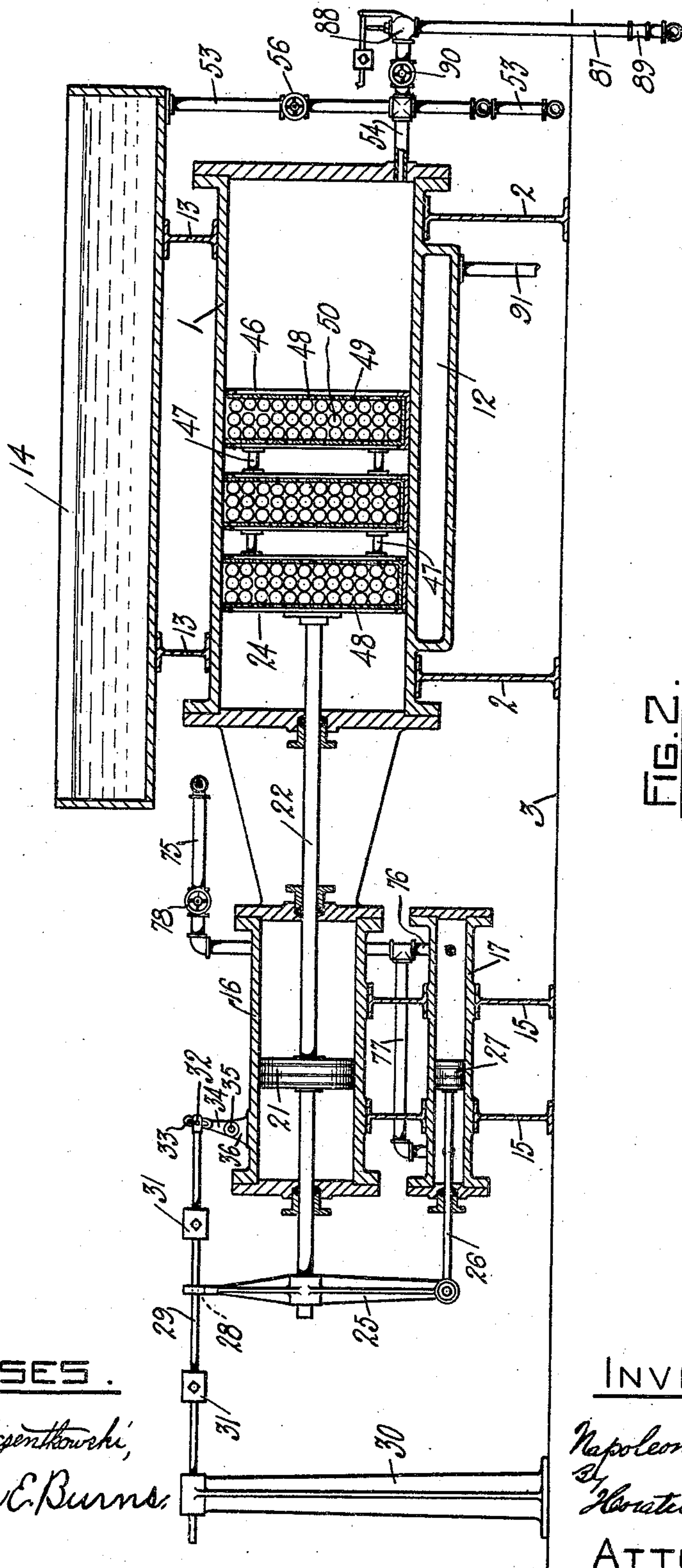


FIG. 2.

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3 SHEETS—SHEET 3.

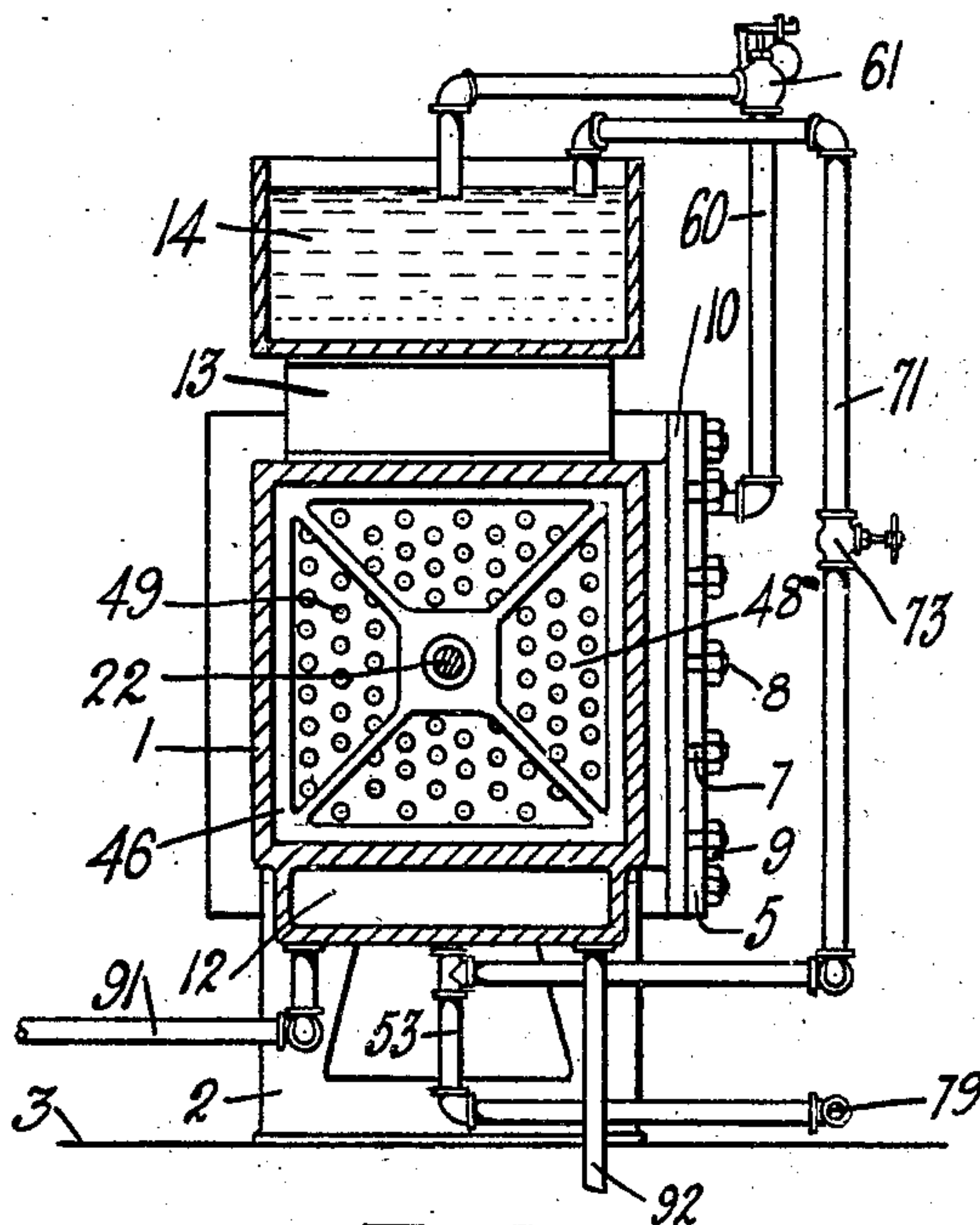


FIG. 3.

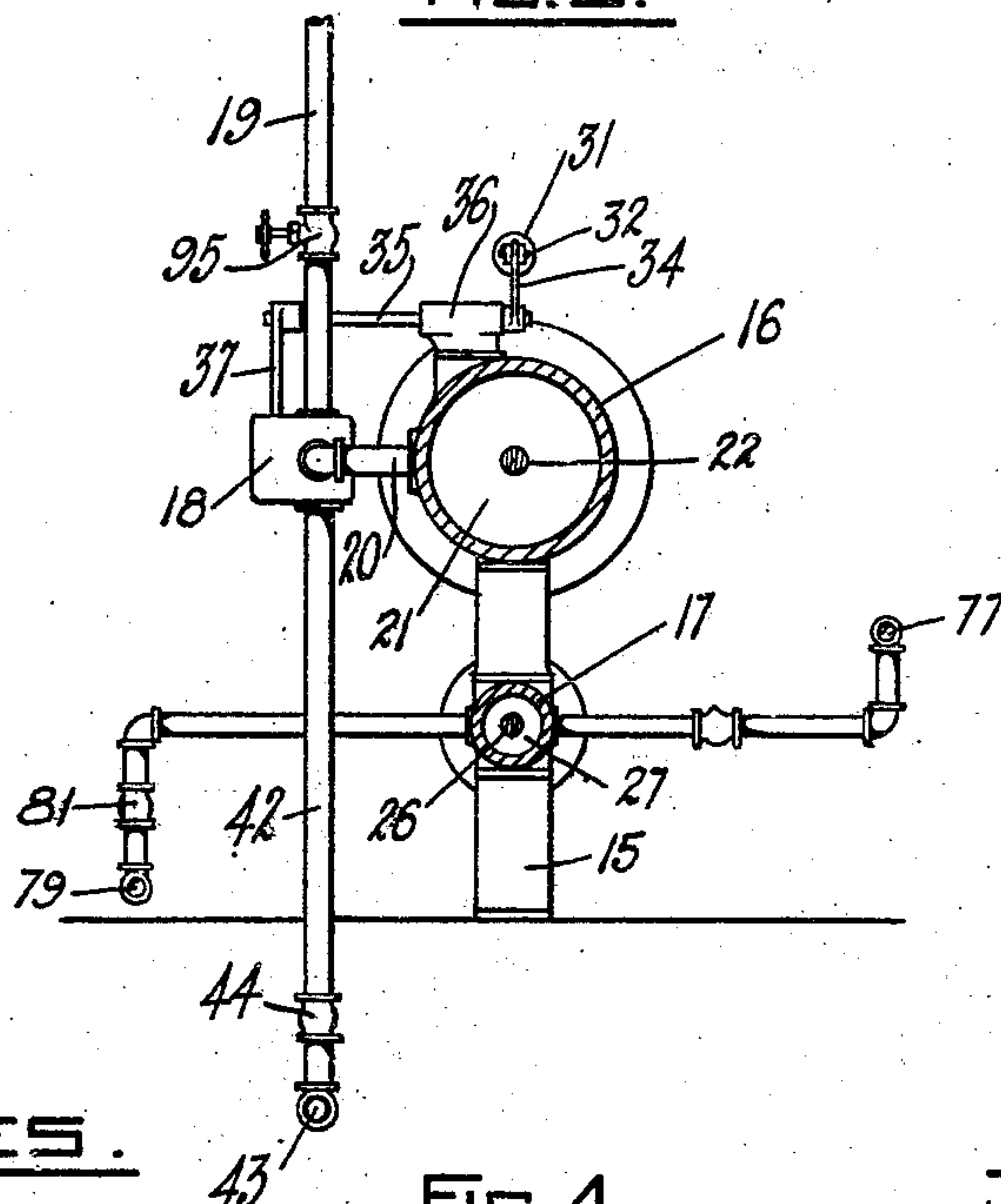


FIG.4.

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UNITED STATES PATENT OFFICE.

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DYEING, BLEACHING, AND WASHING MACHINE.

No. 929,314.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed October 2, 1908. Serial No. 455,804.

To all whom it may concern:

Be it known that I, NAPOLEON LABONTY, a subject of the King of Great Britain, residing at Woonsocket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Dyeing, Bleaching, and Washing Machines, of which the following is a specification.

My invention relates to that type of dyeing, bleaching or washing machines which comprises a dyeing or operating tank wherein a cage for the units containing the articles to be dyed is reciprocated in the dye liquor. In such a machine the saturation of the enclosed articles is not always uniform and complete. This defect is due to the occasional excessive accumulation of liquids upon one side of the cage relatively to the quantity upon the opposite side, occasioned by the reciprocation of the cage.

It is the purpose of the present invention to obtain a uniform and complete treatment of the articles by equalizing the quantity of liquor at both ends of the cage during the agitation or reciprocation of the latter, or in alternately compensating before and behind the cage for the liquor alternately displaced by the pressure, compression, or suction of the liquor occasioned by the reciprocation of the cage. And to provide a constant supply of liquor to compensate for that absorbed by the articles being dyed.

A further object of the invention is to facilitate the introduction into the tank of the units containing the articles to be dyed; also, to provide an improved means for maintaining the contents of the dyeing tank at a high temperature, and to provide improved means for introducing, discharging, and circulating the liquors or flushing agent and removing the accumulated sediment.

To the above enumerated ends essentially my invention comprises means for forcing into the tank, alternately upon opposite sides of the reciprocating cage, an auxiliary or supplementary supply of dye liquor. The preferred agency for this purpose is a pump whose discharge is timed relatively to the reciprocation of the cage. While not essential, it is convenient to have the pump operatively connected with, or its discharge regulated by, the mechanism for reciprocating the cage.

Further invention consists in providing a heating chamber adjacent the operating

tank; in placing a door in the side of the tank; in providing means for forcing the contents of the operating tank into the storage tank; and in the novel and convenient construction and arrangement of the piping.

The invention consists further and finally in the features, combinations, and details of construction hereinafter described and claimed.

In the drawings which constitute a part of these specifications Figure 1 is a side elevation of a dyeing machine embodying my invention, Fig. 2, a central longitudinal vertical section of the same, Fig. 3, a section on line *x x* of Fig. 1, and Fig. 4, a section on line *y y* of Fig. 1.

Like reference characters indicate like parts throughout the views.

The machine may be operated by any desired power, such as water, gas, compressed air, or steam. In this instance, steam is employed as the motive agent. The framework or body may be of any form or arrangement best adapted to fulfil the requirements of the structure. A convenient form therefor, and the one preferred, comprises, as herein shown, an air-tight operating tank, 1, which is in this case rectangular, but may be cylindrical, and is mounted upon supports, 2, fixed to the floor, 3. A rectangular opening, 4, in the side of the tank is covered by a removable plate or door, 5, provided with marginal slots, 7, to accommodate bolts, 8, and nuts, 9, which connect the door with a flange, 10, upon the tank, 1, around the margin of the opening, 4. The door or cover may be of any desired air-tight construction. Upon the bottom of the tank is a jacket or compartment, 12, containing steam for maintaining the dye liquors at a high temperature. Supports, 13, upon the tank, 1, sustain a supply tank, 14, for storing the liquors.

Adjacent one end of the operating tank, 1, are mounted upon supports, 15, one above the other, a steam cylinder, 16, and a pump cylinder, 17, respectively. 18 is a steam chest, 19, its steam feed pipe, and 20 the steam connections from the chest to the steam cylinder. This cylinder is provided with the usual piston, 21, and piston rod, 22, whose forward portion enters the tank, 1, and is fixed in any convenient manner to the end of a carrier frame indicated in a general way by 24. The rear portion of the piston rod extends through the rear head of the cylinder, having fixed to its end a ver-

tical bar, 25, to whose lower end is pivoted the stem, 26, of a piston, or plunger, 27, of the pump, 17. Through an opening, 28, in the upper end of the bar, 25, passes a slid-
 5 able rod, 29, journaled in an upright, 30, upon the floor, 3. Fixed to the rod, 29, upon opposite sides of the bar, 25, are dogs, 31. A pin, 32, upon the end of the rod, 29, registers in a slot, 33, in an arm, 34, fixed
 10 to the end of a rock shaft, 35, mounted in a bracket, 36, upon the top of cylinder, 16. Fixed to the opposite end of the rock shaft is an arm, 37, provided with a slot, 38, to receive a pin, 39, upon stem, 40, of a D valve
 15 in the steam chest, not shown, which works in the usual manner. A steam exhaust pipe, 42, leads from the steam chest to a horizontal waste pipe, 43, and is provided with a check valve, 44.

20 For convenience the pump is herein shown adjacent the power cylinder, and as automatically operated by the latter through intermediate connections; but the pump may, if desired, be located remotely from the
 25 power cylinder, disconnected entirely therefrom, and operated from another source of power.

The carrier frame, 24, comprises a plurality of open frames 46, which conform to
 30 the shape of the tank and are connected with each other by rods, 47. In each of the compartments or frames, 46, is a removable box or unit, 48, whose front and rear walls are provided with perforations, 49, and is adapted
 35 to hold the cops, 50, or other articles or materials intended to be dyed, bleached or washed.

Dye liquor is fed by gravity from the storage tank, 14, to the front end of tank,
 40 1, through pipes, 51 and 52; and to the rear end of tank, 1, through pipes, 53 and 54. Pipes, 51, and 53, have respectively valves 55 and 56. Extending from the upper portion of tank, 1, is a pipe, 57, whose end
 45 overhangs the storage tank and is provided with a relief valve, 58. Extending from the opposite end of the tank, 1, is a pipe, 60, which overhangs the tank, 14, having a relief valve, 61. These pipes are purposed to
 50 reconduct the liquors to the storage tank whenever the pressure in the operating tank exceeds a proper degree. From any convenient source of steam supply a steam pipe, 62, leads to pipe, 57, and is provided with a
 55 globe valve, 63, whereby steam may be admitted to tank, 1, for heating or saturating its contents, or forcing the liquors from tank 1 to tank 14. An escape pipe, 64, opens into the operating tank through pipe, 60, and has
 60 a globe valve, 65. For flushing and washing purposes a water pipe, 68, provided with a valve, 69, leads from a source of water supply to the pipe, 51. For reconducting the
 65 liquors to tank, 14, is a pipe, 70, connected with pipe, 52; and a pipe, 71, connected

with pipe, 53. Pipes, 70 and 71, have respectively valves, 72 and 73.

Dye liquor is fed to the pump from the storage tank through a suction pipe, 75, whose upper end is connected with pipe, 51, 70
 and whose lower end branches into two suction pipes, 76 and 77, which open into the pump cylinder, 17, at each side of its center. Pipe, 75, has a valve, 78. The pump has two
 75 discharge pipes, 79 and 80, corresponding with its suction pipes and having check valves, 81 and 82. Pipe, 80, is connected with tank, 1, through pipe, 52; and pipe, 79, is connected with the opposite end of the
 80 tank through pipes, 53 and 54.

For the purpose of conveying the sediment and waste from tank, 1, is a pipe, 84, connecting pipes, 52 and 43, and provided with a globe valve, 85, and check valve, 86. For the same purpose is a pipe, 87, extend-
 85 ing from pipe, 54, to pipe, 43, and provided with a safety valve, 88, and check valve, 89. Adjacent valve, 88, upon pipe, 54, is a globe valve, 90. The valve, 88, is used to relieve pressure in tank, 1, during washing opera-
 90 tions, and is released when dye liquors are being discharged. Chamber, 12, is supplied by steam pipe, 91, from any source of supply, and pipe, 92, is a steam exhaust pipe, which leads to a steam trap not shown. 95

The operation of my machine is as follows: The articles to be dyed are packed in the several boxes, 48, outside the tank, 1, then slid through the opening, 4, of the tank
 100 into their several frames or compartments, 46, and the door, 5, tightly engaged by its bolts. Dye liquor is admitted to the dyeing tank from the storage tank through pipes 51, 52, 53 and 54, and steam is admitted
 105 through pipes 62 and 57, which raises the temperature of dye liquors. The tank is filled to a point where the liquid escapes from the pipe, 64. By means of a wheel valve, 95, upon the steam pipe, 19, the power
 110 mechanism is set into operation, reciprocating through the piston rod, 22, in the usual manner the cage, 24, whereby the liquor is forced through the perforations of the boxes, 48, to saturate their contents. The valve in the steam chest, 18, is operated by the recip-
 115 rocating piston through bar, 25, rod 29, arm 34, rock shaft 35, arm 37, and pin 39. The piston rod, 22, also, through the bar, 25, and stem, 26, actuates the plunger, 27, of the pump, whose forward stroke injects liquor
 120 into one end of the tank, 1, through pipes, 80, 52, and whose backward stroke forces liquor into the other end of the tank through pipes, 79, 53, 54. The action or strokes of the piston and plunger are synchronous. It
 125 will be seen that as the cage moves to the right liquor is being injected into the left end of the tank; and when the cage is upon its return stroke, the liquor is injected into
 130 the right end of the tank; thus insuring a

compensating supply of liquor at the point and when needed to meet the action of the cage, and supply additional liquor. Any excessive compression of the liquors in tank 1
 5 occasioned by the reciprocation of the cage forces the excess of liquor into tank, 14, through pipes 57 and 60. When it is desired to reuse any of the liquor, steam is admitted to tank, 1, through pipes, 62 and 57,
 10 and valves, 72 and 73, are opened to permit its passage through pipes 70 and 71 to tank 14.

For washing, water is admitted to tank 1 through pipes 68, 51 and 52, and escapes,
 15 during the reciprocation of the cage which performs the cleansing operation upon the contained articles, through pipes, 54 and 87, under pressure regulated by valve, 88.

The operation of bleaching is performed as described for dyeing, except that for dye
 20 liquors is substituted bleaching compounds or liquors.

What I claim is,

1. In a machine of the type set forth, the
 25 combination with the operating tank, the cage, and means for reciprocating the cage, of means acting synchronously with relation to the reciprocating means for injecting liquid into the tank.

30 2. In a machine of the type set forth, the combination with the operating tank, the cage, and means for reciprocating the cage, of means timed with relation to the reciprocation of the cage for injecting liquid into
 35 the ends of the tank alternately.

3. In a machine of the type set forth, the combination with the operating tank, the cage, and means for reciprocating the cage,
 40 of means actuated by said reciprocating means for injecting liquids into the tank upon opposite sides of the cage alternately.

4. In a machine of the type set forth, the combination with the operating tank, the cage in the operating tank, and means for
 45 reciprocating the cage, of a storage tank, means in the operating tank communicating with the storage tank for conducting liquids to the storage tank under a predetermined pressure, and means timed with relation to
 50 the reciprocation of the cage for injecting liquid into the operating tank upon opposite sides of the cage alternately.

5. In a machine of the type set forth, the combination with the storage tank, the oper-
 55 ating tank, and supply pipes connecting the tanks, of a cage slidably mounted in the operating tank an engine piston adjacent the operating tank, a piston rod connecting the

piston and cage, a pump, suction pipes connecting the pump and storage tank, dis- 60
 charge pipes leading from the pump into the operating tank at each side of the cage, and means for actuating the pump.

6. In a machine of the type set forth the combination with the storage tank, the oper- 65
 ating tank, and pipes connecting the tanks, of a cage slidably mounted in the operating tank, an engine cylinder adjacent the operat-
 ing tank, a piston in the cylinder, a piston rod connecting the piston and the cage, a 70
 pump adjacent the engine piston, a piston in the pump, means for connecting the two piston rods, suction pipes connecting the pump and storage tank, and discharge pipes
 connecting the pump with opposite ends of 75
 the operating tank.

7. In a machine of the type set forth the combination with the storage tank, the oper-
 ating tank, and pipes connecting the tanks, of a cage slidably mounted in the operating 80
 tank, an engine cylinder, a piston in the cylinder, a piston rod traversing the piston having one end connected with the cage and having its opposite end projecting beyond
 the cylinder, a steam chest, steam posts ex- 85
 tending from the chest to the cylinder, a valve in the chest, a valve stem upon the valve, a valve rod slidably mounted adjacent
 the cylinder, dogs upon the valve rod, opera-
 tive connections between the valve rod and 90
 valve stem, a pump cylinder adjacent the engine cylinder, a piston in the pump cylinder, a piston rod upon the pump piston, a bar fixed to the projecting end of the engine
 piston rod, one of whose ends is connected 95
 with the pump piston rod and the other of whose ends slidably engages the valve rod, suction pipes connecting the storage tank and pump cylinder, and discharge pipes connecting the pump cylinder with the forward 100
 and rear portions of the operating tank.

8. In a machine of the type set forth the combination of a closed operating tank provided with an opening in its side, a remov-
 able door covering the opening, a reciprocating cage within the tank, compartments in 105
 the cage registerable with the opening, and perforated boxes slidably mounted in the compartments containing the articles to be
 treated. . 110

In testimony whereof I have affixed my signature in presence of two witnesses.

NAPOLEON LABONTY.

Witnesses:

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 HORATIO E. BELLOWS.