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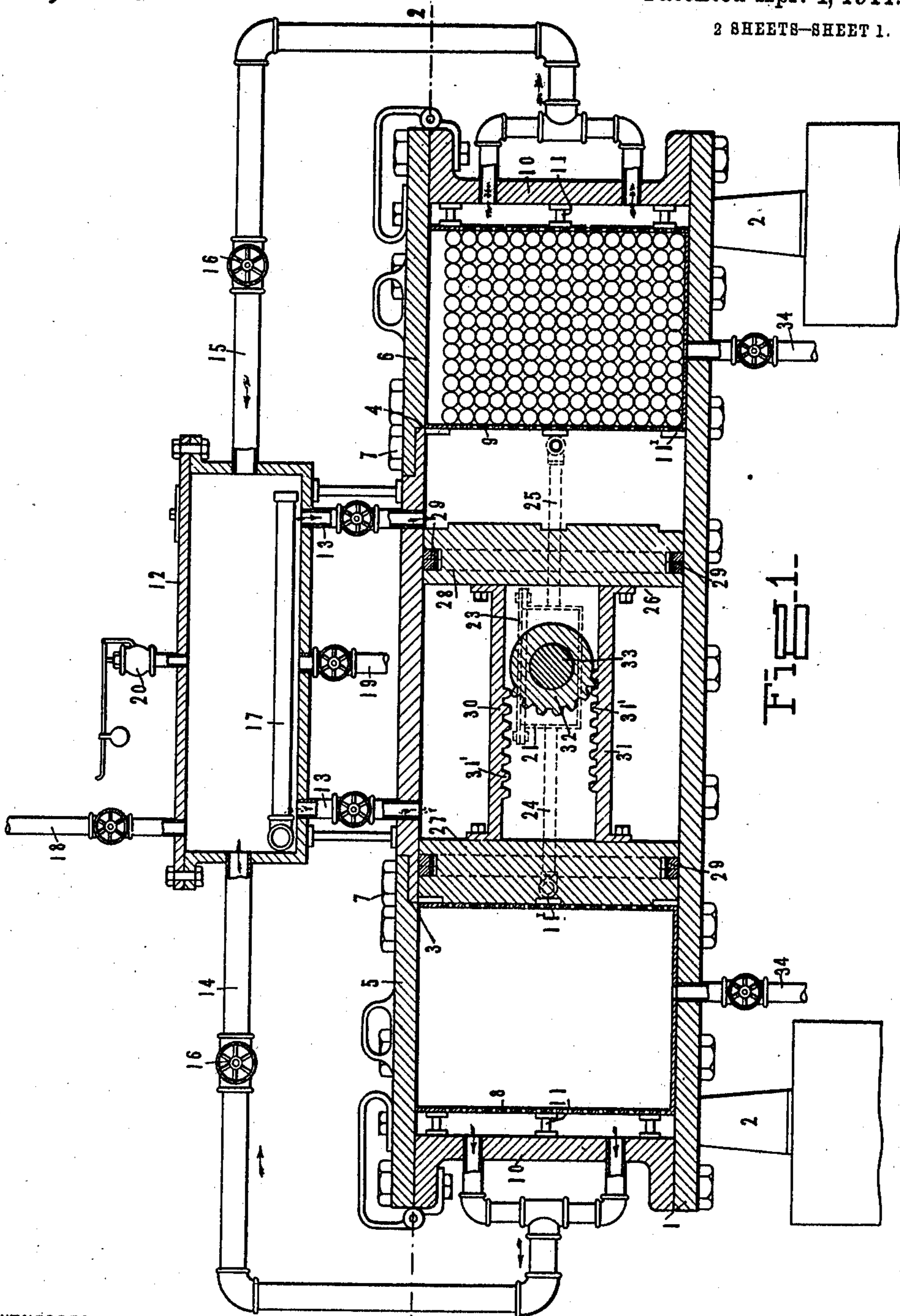
DYEING APPARATUS.

APPLICATION FILED NOV. 9, 1908.

988,633.

Patented Apr. 4, 1911.

2 SHEETS—SHEET 1.



WITNESSES  
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DYEING APPARATUS.

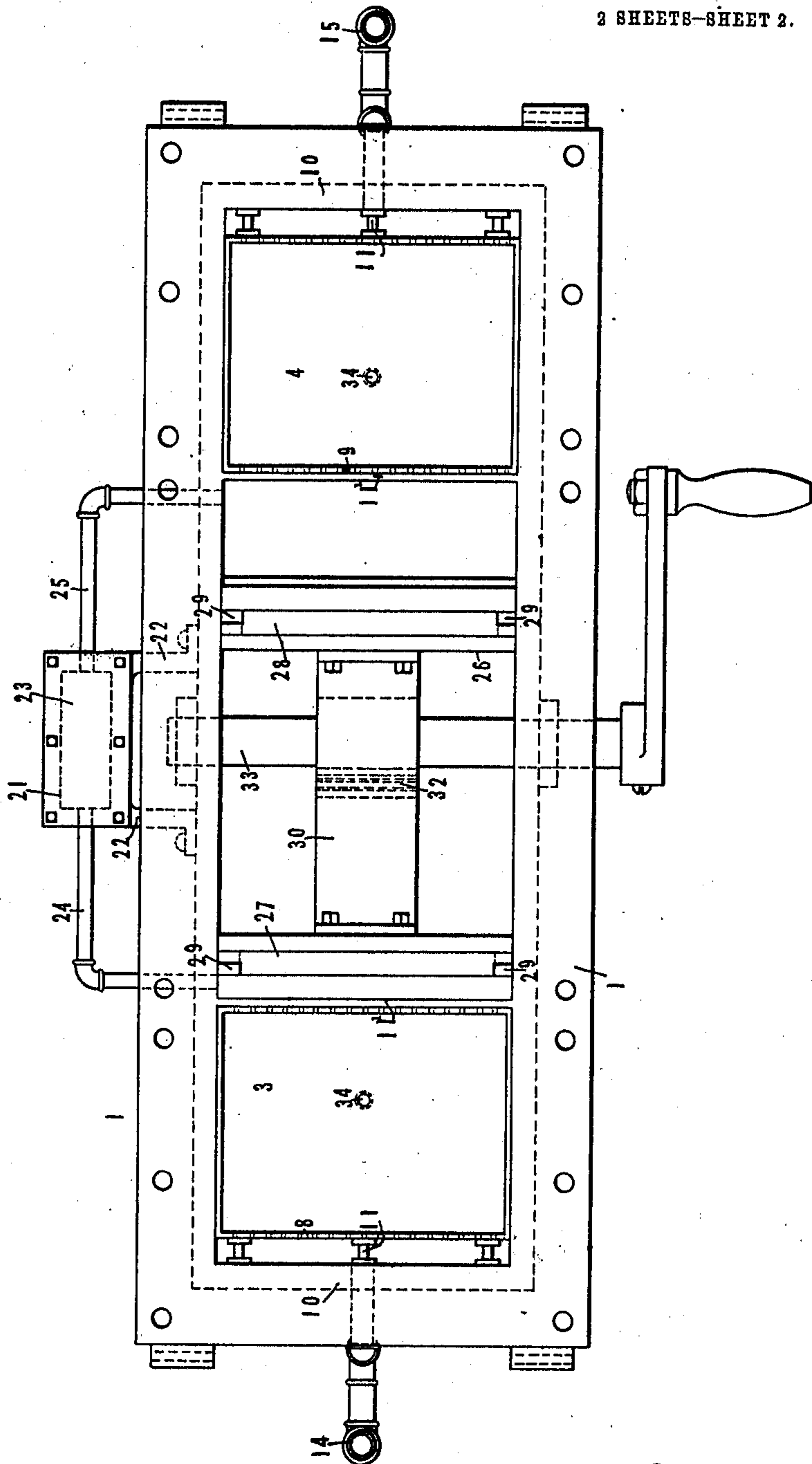
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2 SHEETS-SHEET 2.

Fig. 2-



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# UNITED STATES PATENT OFFICE.

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## DYEING APPARATUS.

988,633.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed November 9, 1908. Serial No. 461,721.

*To all whom it may concern:*

Be it known that we, JOHN C. EVENDEN and CHARLES FROHLICH, citizens 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 Apparatus, 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 apparatus for dyeing, scouring, bleaching or otherwise treating fibrous material, and it more particularly relates to an improvement in apparatus of this character adapted for dyeing materials such as raw cotton and wool, hosiery, knit underwear and cops.

One of the objects of the invention is to provide apparatus such that the material treated will be uniformly saturated or impregnated with the dye.

Another object is to provide dyeing apparatus whereby the material to be dyed as well as the dye liquor may be easily and quickly handled.

Another object is to provide mechanism whereby the dye liquid may be utilized repeatedly if desired, and which affords improved facilities for maintaining or changing the temperature of the dye liquid.

A further object is to provide a machine which will occupy a minimum amount of space and which may be operated with little care or attention on the part of the operator.

Other objects will be in part obvious, and in part pointed out herewith.

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 accompanying drawings wherein is illustrated one of the various possible embodiments of our invention, Figure 1 is a central longitudinal section of a machine constructed in accordance therewith; Fig. 2 is a horizontal sectional view taken substantially on the line 2—2 Fig. 1.

Similar reference characters refer to similar parts throughout both views of the drawings.

Referring now to the drawings, wherein we have shown our improved machine adapt-

ed for dyeing yarn in cop form, 1 denotes a rectangular tank mounted upon suitable supports 2 which may rest upon the ground or floor. This tank, which is adapted to hold the dye liquor and the material to be dyed, is provided, in the present instance, with openings as at 3 and 4, respectively, in its upper wall near either end thereof, said openings being adapted to be closed by cover plates 5 and 6, respectively. Cover plates 5 and 6 are fastened tightly in place as by means of bolts and nuts 7 so as to provide against the escape of the dye liquor during the operation of the machine.

Located within the tank 1 directly beneath each of openings 3 and 4 are perforated receptacles 8 and 9, respectively, said receptacles being lightly spaced from the end walls 10 of the dye tank as by means of spacing members 11, said spacing members and the bars 11' forming suitable compartments in which the receptacles may be set.

12 denotes a closed tank from which the dye liquor is supplied to the dye tank through valved conduits 13 which lead into said dye tank at points intermediate said receptacles. The supply tank is also connected with the end walls 10 of the dye tank by means of conduits 14 and 15, suitably valved, as at 16, which are branched to enter the upper and lower portions of the tank at the ends thereof. The dye liquor may be maintained at the desired temperature by means of a steam conduit 17 located in supply tank 12, and the dye liquor may be supplied to tank 12 through a conduit 18 leading into the upper portion thereof. A drain conduit is provided at 19 leading from the bottom wall of the supply tank and a relief or safety valve is provided at 20 in the upper wall of the supply tank.

A receptacle 21 is provided exteriorly of the dye tank and supported thereon as by means of brackets 22, said receptacle being provided with a removable cover portion 23. This receptacle is adapted for holding a sample of the material to be dyed, and is connected with the dye tank at points adjacent receptacles 8 and 9 by means of conduits 24 and 25, respectively.

A piston 26 is located within the dye tank intermediate receptacles 8 and 9. Piston 26 in the present instance comprises end plates 27 and 28, respectively, of rectangular shape to conform to the interior conformation of the dye tank, spring pressed blocks

as at 29, being provided for preventing the passage of the dye liquor between the piston and the walls of the tank. Bars 30 and 31 provide a rigid connection for plates 27 and 28, respectively, said bars being provided with teeth as at 31', with which co-operates a mutilated gear 32 mounted upon a shaft 33 adapted to be driven from a suitable source of power.

It will be understood that by means of the construction last above described a rotation of gear wheel 32 will operate to reciprocate the piston in the dye tank. It will also be understood that mechanism other than mutilated gear construction may be employed for reciprocating the piston.

Conduits 34 which will lead from the bottom of the dye tank may be utilized for draining the tank of the spent dye liquor or for conducting the same to a suitable receptacle when it is desired to utilize the same for another dyeing operation.

Having thus described the construction of this embodiment of our invention, the operation thereof may now be understood.

The material to be dyed is placed in the receptacles 8 and 9 which, for convenience, are made removable, enabling them to be lifted from the dye tank for the purpose of loading or unloading. The receptacles are then inserted in their compartments in the end portions of the dye tank and said tank is then closed by means of the cover plates 5 and 6. At this point it may be noted that while we have shown the dye tank open at the top, such openings may be formed in the side walls if desired, suitable closures being provided for rendering the tank water tight. After the dye liquor has been heated to the desired degree in the supply tank 12 it may be discharged into the spaces between the piston and the receptacles 8 and 9, respectively, by opening the valves in the conduits 13. The apparatus is then ready for operation. It will be understood, of course, that tank 1 will be kept filled with the dye liquor, which may be discharged therein by gravity or forced therein by means of suitable pumps. During the reciprocation of piston 26 the dye liquor will be forced alternately in opposite directions through the material in the receptacles 8 and 9, the dye liquor, after passing through the receptacles, flowing into the supply tank 12 through the conduits 14 and 15. A similar circulation of the dye liquor will take place through the sample receptacle 21 by means of the conduits 24 and 25. In other words, the dye liquor will circulate alternately in opposite directions through the entire apparatus, the desired temperature thereof being at all times maintained by means of the steam conduit 17. When it is desired to unload the machine, the valves and conduits 13 are closed and the dye tank drained through the

conduits 34. The cover portions are then unlocked and the receptacles 8 and 9 removed from the storage tank and unloaded, when the dyeing operation may be repeated upon fresh material. It will, accordingly, be seen that we have provided apparatus especially well adapted to attain, among others, all the ends and objects above pointed out, in an extremely simple, yet efficient manner. The locating of the piston within the dye tank effects an economy in the use of space, and the provision of the sample box exteriorly of the dye tank results in a great saving of time, since it permits the material being treated to be examined without making it necessary to suspend the operation of the machine while the dye tank is being opened for inspection.

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.

Having described our invention, what we claim as new and desire to secure by Letters Patent, is:

1. In apparatus of the class described, the combination with a closed tank adapted for holding liquids, of a perforated receptacle located near each end of said tank, a piston located in said tank intermediate said receptacles and adapted to be reciprocated whereby the liquid is forced through said receptacles, a supply tank, and conduits connecting said supply tank with either end of said first mentioned tank.

2. In apparatus of the class described, the combination with a closed tank adapted for holding the liquid, a receptacle having two opposite sides perforated and being otherwise normally water-tight, located in said tank, a piston located in said tank and adapted to be reciprocated to force the liquid through said receptacle in opposite directions, a liquid supply tank, and a conduit connecting said liquid supply tank with said first mentioned tank.

3. In apparatus of the class described, the combination with a tank adapted for holding the dye liquid, of a perforated receptacle located within said tank near each end and spaced from the end walls thereof, a piston in said tank intermediate said receptacles, means for reciprocating said piston, a closed supply tank, and conduits extending from said supply tank to each end of said dye tank.

4. In apparatus of the class described, the combination with a closed tank for holding the dye liquor, of a plurality of perforated receptacles located in said tank, a piston ar-

ranged intermediate said receptacles, means for driving said piston, a supply tank, conduits connecting said supply tank with said dye tank at points intermediate said receptacles, and conduits connecting said supply tank with the ends of said dye tank.

5. In apparatus of the class described, the combination with an elongated dye tank, of a plurality of perforated receptacles for holding the material to be dyed located within said dye tank, reciprocatory means located in said dye tank between said receptacles and adapted to force the dye liquor through said receptacles and the material to be dyed, a tank for supplying dye liquor to said dye tank, conduits connecting said supply tank with said dye tank at points intermediate said receptacles, and conduits connecting said supply tank and the end portions of said dye tank.

6. In apparatus of the class described, the combination with a closed tank for holding the dye liquor, of a plurality of perforated receptacles located within said dye tank, a receptacle being provided near each end thereof, means for spacing said receptacles from the end walls of said dye tank, a piston located intermediate said receptacles, means for reciprocating said piston, a supply tank for the dye liquor, conduits connecting said supply tank with said dye tank at points intermediate said receptacles, conduits connecting said supply tank with the spaces provided between said receptacles and the end walls of the dye tank.

7. In apparatus of the class described, the combination with a dye tank, of a tank for supplying dye liquid to said dye tank, a sample box located adjacent said dye tank, conduits connecting said sample box with different portions of said dye tank, and means within said dye tank for maintaining the circulation of the dye liquor through said conduits and sample box.

8. In apparatus of the class described, the combination with a closed dye tank, of a plurality of perforated receptacles for holding the material to be dyed located within said dye tank, a piston located in said dye tank intermediate said receptacles and adapted to force the dye liquor therethrough, a sample box located adjacent said dye tank, conduits connecting said receptacles with said dye tank at points intermediate said receptacles, and means for supplying dye liquor to said dye tank.

9. In apparatus of the class described, the combination with a closed tank for holding the dye liquor, of perforated receptacles located in said tank and spaced from the end walls thereof, a piston located in said tank intermediate said receptacles, means for driving said piston in opposite directions whereby the dye liquor is forced to flow in opposite directions through said recep-

tacles, a sample box disposed adjacent said dye tank, conduits connecting said sample box with said dye tank at points intermediate said receptacles whereby said piston will cause a circulation of dye liquor through said sample box, a supply tank, filling conduits connecting said supply tank with said dye tank at points intermediate said receptacles, and circulating conduits connecting said supply tank with said dye tank at the end portions thereof.

10. In apparatus of the class described, the combination with a closed dye tank, of perforated receptacles located therein, a reciprocating piston located intermediate said receptacles, a supply tank, means located in said supply tank for heating the dye liquid, and conduits connecting said supply tank with said dye tank at points intermediate said receptacles and at the end portions thereof.

11. In apparatus of the class described, the combination with a closed dye tank provided with an opening at either end, a perforated receptacle located at each end of said tank in registry with said openings, cover plates for said openings, a piston located intermediate said receptacles, mutilated gear mechanism for reciprocating said piston, a supply tank, conduits connecting said supply and dye tanks at points intermediate said receptacles, a conduit extending from each end of said supply tank to one end of said dye tank, and branched into the end wall thereof at its upper and lower portions, and a steam conduit located in said supply tank for heating the dye liquid.

12. In apparatus of the class described, the combination with a closed tank adapted for holding the dye liquor, receptacles for holding the material to be dyed located within said tank, a receptacle for holding a sample of the material to be dyed located exteriorly of said tank and connected therewith at different points thereof, a closed tank for supplying the dye liquor to said dye tank, conduits extending from said supply tank, each of said conduits being connected with said dye tank at the upper and lower portions of the end walls thereof, and means located in said dye tank for compelling a circulation of dye liquor alternately in opposite directions through said dye tank, sample receptacle and supply tank.

13. In apparatus of the class described, the combination with a closed tank adapted for holding the dye liquor, of perforated receptacles located within said tank, a closed tank for supplying the dye liquor to said dye tank, conduits connecting said supply tank with either end of said dye tank, conduits connecting said supply tank with said dye tank at points intermediate said receptacles, conduits leading from the bottom portion of said dye tank through which said

tank may be drained, a piston located intermediate said receptacles, and mutilated gear mechanism coöperating with said piston intermediate its ends for reciprocating the  
5 same.

14. In apparatus of the class described, the combination with a closed dye tank, a perforated receptacle located at each end of said dye tank, means for spacing said  
10 receptacles from the end walls of said dye tank, a receptacle for holding a sample of material to be dyed located exteriorly of said dye tank, conduits connecting said dye tank with said sample receptacle, a closed  
15 tank for supplying the dye liquor to said dye tank, circulating conduits extending from said supply tank to said dye tank and connected with the latter at the upper and lower portions of the end walls thereof, fill-  
20 ing conduits connecting said supply tank with said dye tank at points intermediate the end walls of the latter, a steam conduit located in said supply tank for heating the dye liquor, conduits leading from the bot-  
25 tom wall of the dye tank through which the spent dye liquor may be discharged, a piston located in said dye tank intermediate said receptacles and adapted when reciprocated to compel a circulation of the dye liq-

uor alternately in opposite directions, and 30 means for driving said piston.

15. In an apparatus of the character described, the combination with a dye tank, of means for supplying dye liquor to said dye tank, an accessible sample box adapted to  
35 contain a portion of the material to be dyed located adjacent and outside of said dye tank, and means connecting said dye tank and said sample box whereby the condition of the material in said dye tank is evidenced  
40 by conditions in said sample box.

16. In an apparatus of the character described, in combination, a dye tank, a plurality of perforated receptacles located therein, a dye liquor supply tank, a sample box,  
45 conduits connecting said sample box to said dye tank at points adjacent said receptacles, and means for circulating said dye liquor through said receptacles and said sample box alternately in opposite directions. 50

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

JOHN C. EVENDEN.  
CHARLES FROHLICH.

Witnesses:

HARRY SHERBURNE,  
GEORGE H. SHERBURNE.

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

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