

No. 702,556.

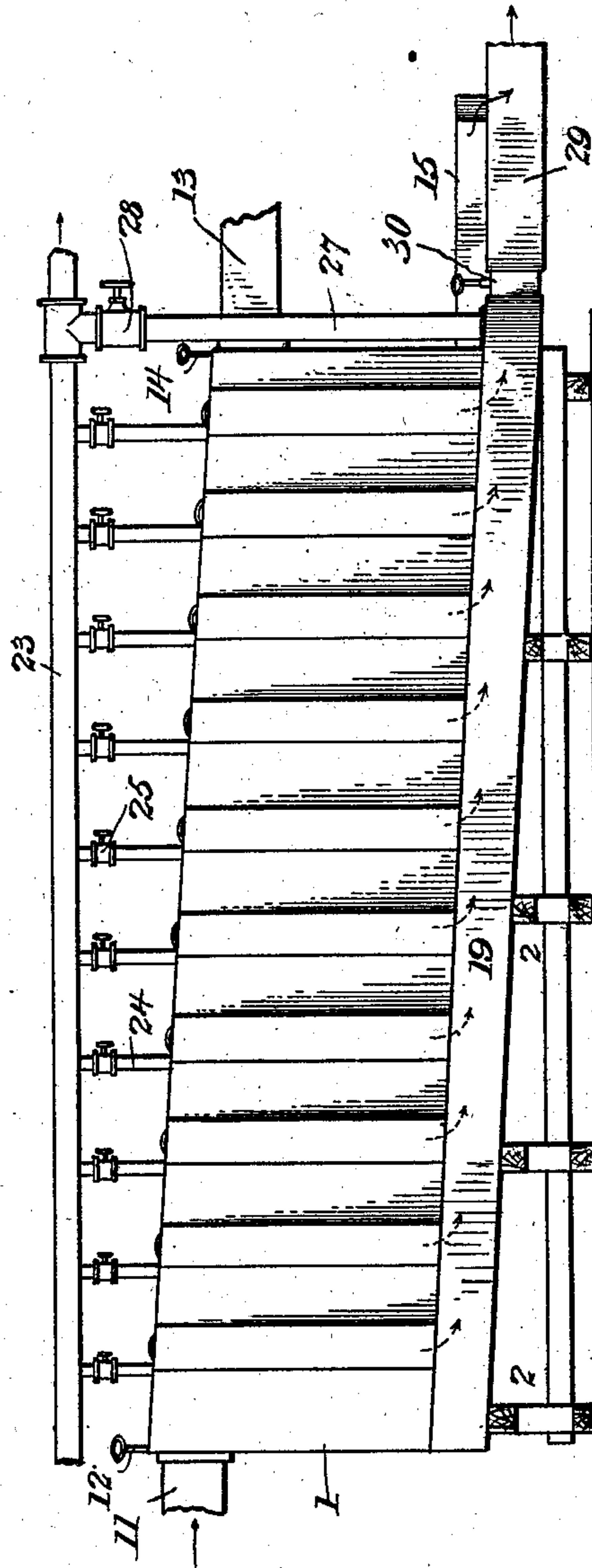
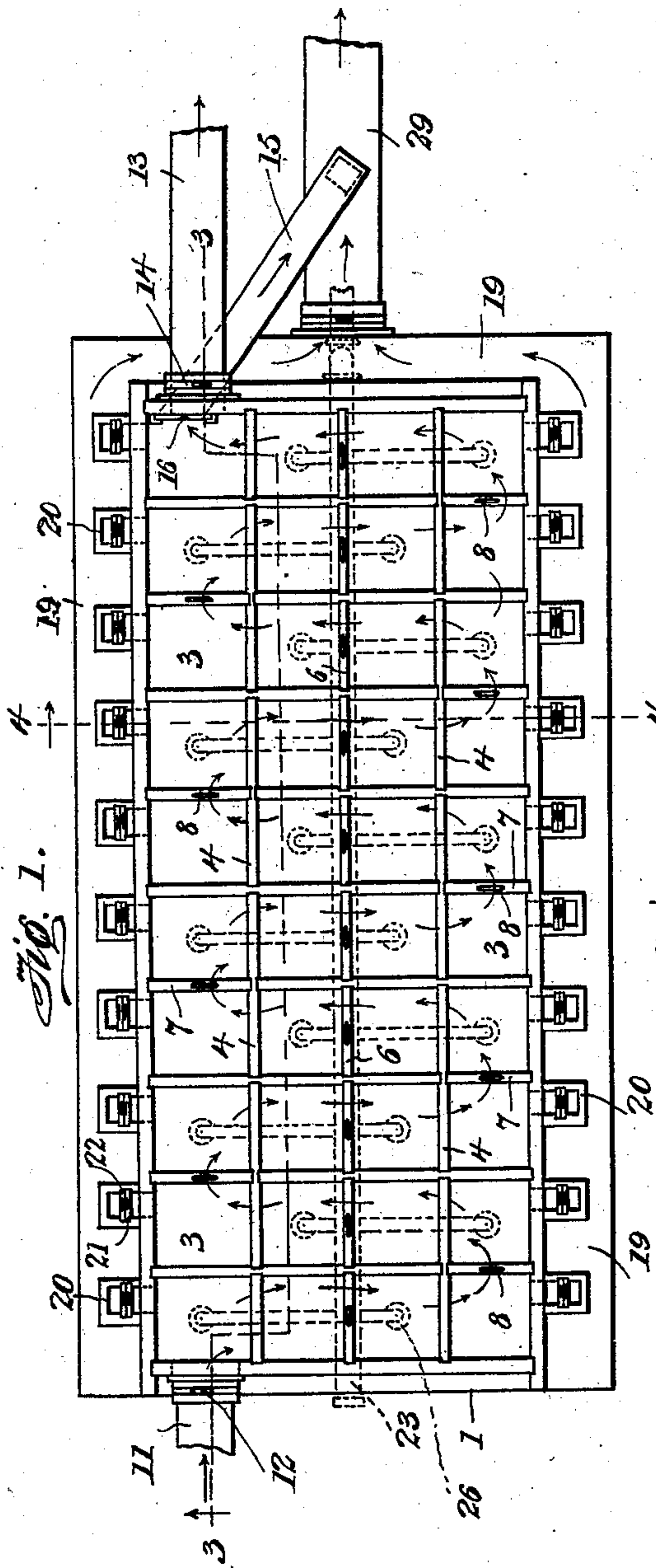
Patented June 17, 1902.

A. HINZKE.
PULP WASHING APPARATUS.

(Application filed Feb. 27, 1902.)

(No Model.)

3 Sheets—Sheet 1.



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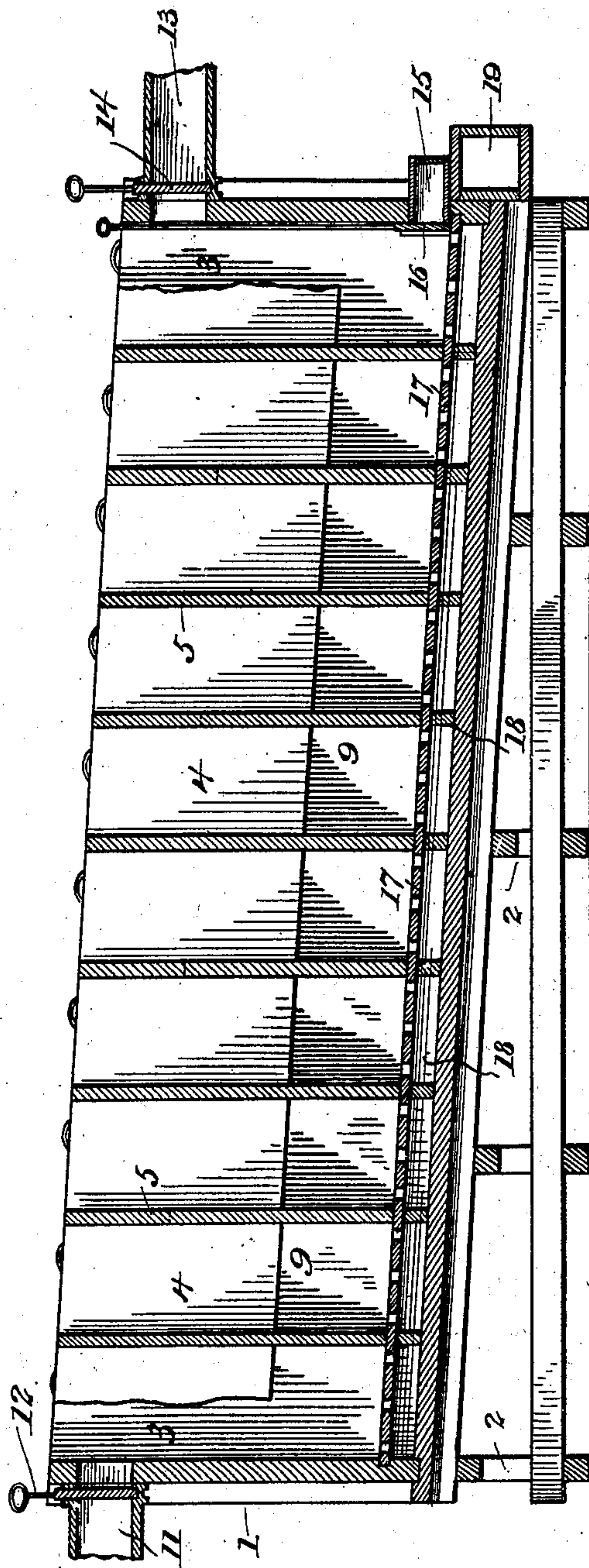
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3 Sheets—Sheet 2.

Fig. 3.



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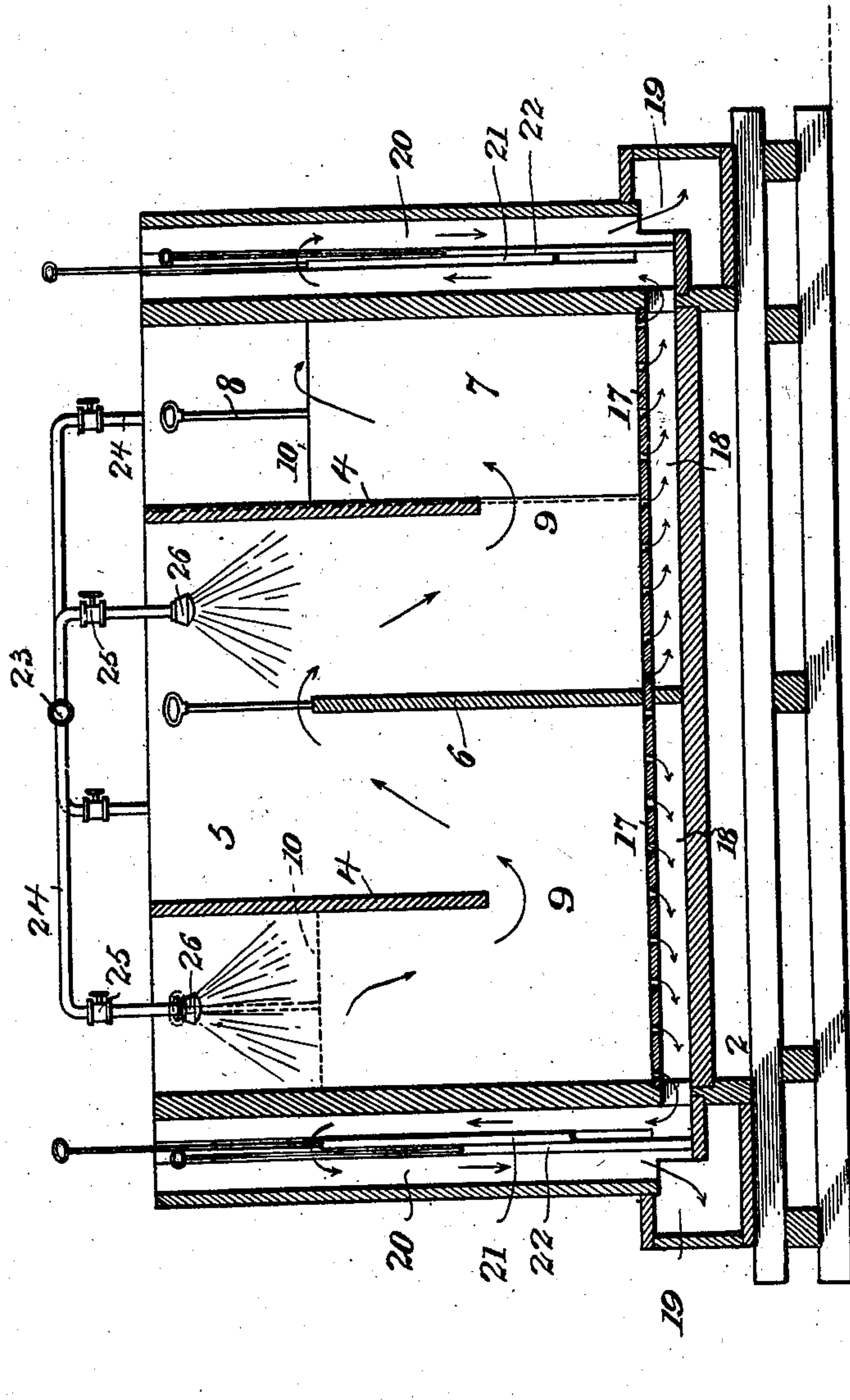
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Fig. 4.



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UNITED STATES PATENT OFFICE.

ALBERT HINZKE, OF RUMFORD FALLS, MAINE.

PULP-WASHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 702,556, dated June 17, 1902.

Application filed February 27, 1902. Serial No. 95,888. (No model.)

To all whom it may concern:

Be it known that I, ALBERT HINZKE, a citizen of the United States, residing at Rumford Falls, in the county of Oxford and State of Maine, have invented certain new and useful Improvements in Pulp-Washing Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an apparatus for washing sulfite pulp and similar materials to remove therefrom acids and other foreign substances incorporated therewith.

The object of the invention is to provide an apparatus of this character which is comparatively simple of construction and inexpensive of production, of maximum efficiency in use, and adapted to effect the washing of the pulp or material without the necessity of employing agitators or power-operated appliances.

With this and other objects in view, which will readily appear as the nature of the invention is better understood, said invention consists in certain novel features of construction and combination and arrangement of parts, which will be hereinafter more fully described, defined in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a top plan view of a washing apparatus constructed in accordance with my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical longitudinal section on the line 3 3 of Fig. 1. Fig. 4 is a vertical transverse section on the line 4 4 of Fig. 1.

Referring now more particularly to the drawings, the numeral 1 represents a washing-tank, which may be of any desired size and construction, but preferably is of oblong rectangular form and open at the top. This tank rests upon a frame or foundation composed of timbers or suitable supports 2 and inclines downward from its inlet to its outlet end, so as to cause the pulp and water to flow therein by gravity, as hereinafter described.

The interior of the tank is divided to form longitudinal and transverse rows of washing-

chambers 3 by stationary longitudinal partitions 4, stationary transverse partitions 5, a central series of movable longitudinal partitions 6, and transverse movable partitions 7, each of said movable partitions consisting of a vertically-slidable gate or valve, provided, for convenience in operating it, with a handle 8. The stationary longitudinal partitions 4 extend downward from the top of the tank and terminate above the bottom of the tank, forming underflow-passages 9, connecting the transverse rows of chambers in alternation with the central longitudinal row of movable partitions 6. The stationary transverse partitions 5, however, extend vertically the full depth of the tank and close communication between the longitudinal rows of chambers except at the points where the movable transverse partitions 7 are located. As shown, these partitions 7 are disposed alternately, with the partitions 5 in the two outer longitudinal rows on opposite sides of the tank, the partitions 7 of one row being also disposed on transverse lines between the partitions 7 of the other row, so that the central longitudinal rows of chambers have no communication with each other, while the chambers of each outer longitudinal row alternately communicate through the gates 6, and the transverse rows of chambers communicate with each other through the gates 7 and the underflow-passages 9. The two sets of gates or movable partitions 6 and 7 normally close communication between the lower ends of the chambers, but are of less length or depth than said chambers, so that the spaces above said gates form overflow-passages 10. Hence it will be seen that the pulp and water flowing through the tank are caused to take a back-and-forth zig-zag course through the chambers and in passing from one chamber to the other alternately flow upwardly and downwardly, thereby insuring a course of sufficient length in a comparatively short tank and the proper amount of agitation to effect the thorough washing of the pulp or material and the separation of the foreign substances therefrom.

The impure pulp is fed into one of the end chambers of one of the longitudinal rows through a feed pipe or conductor 11, provided with a gate or valve 12, while the purified or washed pulp discharges from the opposite end

chamber of the same row through an outlet pipe or conductor 13, having a controlling gate or valve 14. Thus it will be seen that the pulp will flow from the inlet-chamber across the tank through the chambers in the same transverse row, then back through the chambers of the next transverse row, and so on until the outlet-chamber is reached, when the purified pulp and clean water will discharge through the pipe 13, which is intended to convey the same to a storage-tank, (not shown,) in which the water is allowed to drain off. The flow of the pulp and water is of course facilitated by having the tank inclined to cause a circulation by the force of gravity. Also communicating with the discharge-chamber is a residuum-discharge pipe 15 and a valve or gate 16, controlling the flow of the residuum thereto.

Located above the bottom proper of the tank is a perforated false bottom 17, having a sheathing or cover of copper having alined perforations; and between this false bottom and the bottom of the tank are formed transverse passages 18, which communicate at their outer ends with a trough 19, formed around the sides and lower or discharge end of the tank, and with a series of vertical channels or conductors 20, located upon the sides of the tank above said trough. The water discharging from the chambers 3 flows through the false bottom 17 into the channels or passages 18 and thence directly into the trough or through the conductors 20 to the trough.

In each of the conductors 20 is arranged two gates or valves 21 and 22, one of which is up while the other is down, and the valve 22 is adapted, when forced down, to close the passage 18 from communication with the trough 19 and to cause the water to flow into the conductor 20, thence up through said conductor to a point above the level of the gate 21 and thence over said gate and down through said conductor to the trough 19. When the valve 22 is moved upwardly to open communication between the channels 18 and trough 19, the valve 21 is closed down, leaving a space below it through which the water from the chamber passes directly into said trough.

Arranged above the tank and extending longitudinally thereof is a water-supply pipe 23, which is provided with a series of branch pipes 24, each having a controlling-valve 25. The several branch pipes communicate with the different chambers or compartments in the tank to supply water thereto and are provided at their ends with nozzles or sprinklers 26, through which the water is sprayed into the chambers. The water thus supplied to the chambers first commingles with the pulp, which is in motion in the zigzag passage-way and is caused by the agitation produced to wash the pulp and to take up the acids and foreign substances, and this action is continued throughout the entire length of the passage-way, the water constantly flowing from the branch pipes into the chambers and

as constantly discharging, after taking up the foreign matters from the pulp, through the perforated bottom 17 into the passages 18 and thence to the trough 19. By this means the pulp is gradually washed on its passage through the zigzag passage-way, so that when it reaches the outer chamber it is purified or relieved of the acids and foreign substances and is ready to be discharged through the pipe 13 and conveyed to a storage-tank, in which the clear water is allowed to drain from the pulp. The pipe 23 is also provided with a branch 27, which communicates with the lower end of the trough 19 and is provided with a valve 28 for controlling the flow of water therethrough. This pipe is of relatively larger diameter than the branch pipes 24 and is designed as a flush-pipe for supplying water to the trough 19 to flush the tank with water to carry off the residuum or deposits left therein after the entire charge of pulp has been allowed to pass out through the pipe 13.

In cleaning or flushing the tank the valves 21 are closed, the valves 22 opened to afford communication between the passages 18 and trough 19, and then the valves 25 of the branch pipes 24 and the valve 28 of the pipe 27 are opened to allow the water to flow into the chambers 3 and into the trough 19. After this has been done the gates 6 and 7 of the chambers 3 at the upper end of the tank are opened and the water from the trough 19, which flows into said chambers through the passages 18 and perforated bottom 17, is allowed to flow across the surface of said bottom, and this operation is continued along the entire length of the tank, the valves or gates of the chambers being opened in regular order or succession until the entire surface of the bottom 17 is cleaned, and the residuum is carried to the lower end of the tank, where it discharges through the waste-pipe 29, provided with a controlling gate or valve 30.

When the movable partitions or gates 6 and 7 are drawn upwardly or opened, communication is directly established between the lower ends of those chambers which are normally in communication only through the overflow-passages, so that a better circulation of the water may be obtained in cleaning the surface of the bottom 17 and forcing the residuum to the lower end of the tank for discharge through the pipe 29.

In the operation of the apparatus it is found that by constructing the tank with a series of compartments forming a zigzag channel or course for the water and having alternate over and under flow passages in said channel the course is made of the necessary length for obtaining a thorough washing of the pulp or material without the necessity of employing a tank of abnormal size, so that when the pulp reaches the lower chambers or compartments it is thoroughly purified and ready to be discharged through the pipe 13 into a storage-tank for use.

From the foregoing description, taken in

connection with the accompanying drawings, it is thought that the construction, mode of operation, and advantages of my improved pulp-washing apparatus will be readily apparent without requiring a more extended explanation.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

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

15 1. A washing-tank comprising an inclined trough having parallel rows of chambers, the chambers of each row being in communication with each other through alternate up and down passages, and the end chambers of
20 each of the intermediate rows being in communication with the end chambers of the next adjacent rows at opposite sides of the tank, forming a zigzag passage, substantially as described.

25 2. A washing-tank comprising an inclined trough having a zigzagged longitudinal passage-way consisting of vertical chambers arranged in longitudinal and transverse rows, said chambers being formed of fixed and movable partitions, the fixed partitions in the
30 transverse rows forming underflow and the movable partitions overflow passages, substantially as specified.

35 3. A washing-tank comprising an inclined trough having a zigzagged longitudinal passage-way provided with alternate over and under flow passages, substantially as and for the purpose specified.

40 4. A washing-tank comprising an inclined trough having a zigzagged longitudinal passage-way consisting of vertical chambers arranged in longitudinal and transverse rows, said chambers being formed of fixed and movable partitions, the fixed partitions in the
45 transverse rows forming underflow and the movable partitions overflow passages, means for controlling the inflow and discharge of the pulp and the discharge of the residuum,

a water-supply pipe, means for conveying water from said supply-pipe to said chambers, 50 and means for also supplying water from said pipe for flushing the interior of the tank to wash away the residuum, substantially as set forth.

5. A washing-tank having a zigzag passage-way consisting of vertical chambers arranged in longitudinal and transverse rows, said chambers being formed by longitudinal and transverse stationary partitions and longitudinal and transverse movable partitions, the
60 longitudinal stationary partitions forming underflow and the movable partitions overflow passages, said movable partitions being capable of an upward adjustment to also form underflow-passages for the circulation of water along the bottom of the tank, substantially as described. 65

6. An apparatus of the character described comprising a tank provided with a zigzag passage-way, and a perforate false bottom with
70 passages below the false bottom for the discharge of the waste water, a trough communicating with said passages, valves establishing communication between the passages and trough, and means for supplying water to the
75 trough and passage-way for cleaning the interior of the tank, substantially as specified.

7. In an apparatus of the character described, the combination of a tank provided with chambers forming an irregular or zigzag
80 passage-way for the circulation of the pulp, with means for controlling the inflow and discharge of the pulp and the discharge of the residuum, a water-supply pipe, means for conveying water from said supply-pipe to said
85 chambers, and means for also supplying water from said pipe for flushing the interior of the tank to wash away the residuum, substantially as specified.

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

ALBERT HINZKE.

Witnesses:

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ELWIN H. GLEASON.