

No. 632,517.

Patented Sept. 5, 1899.

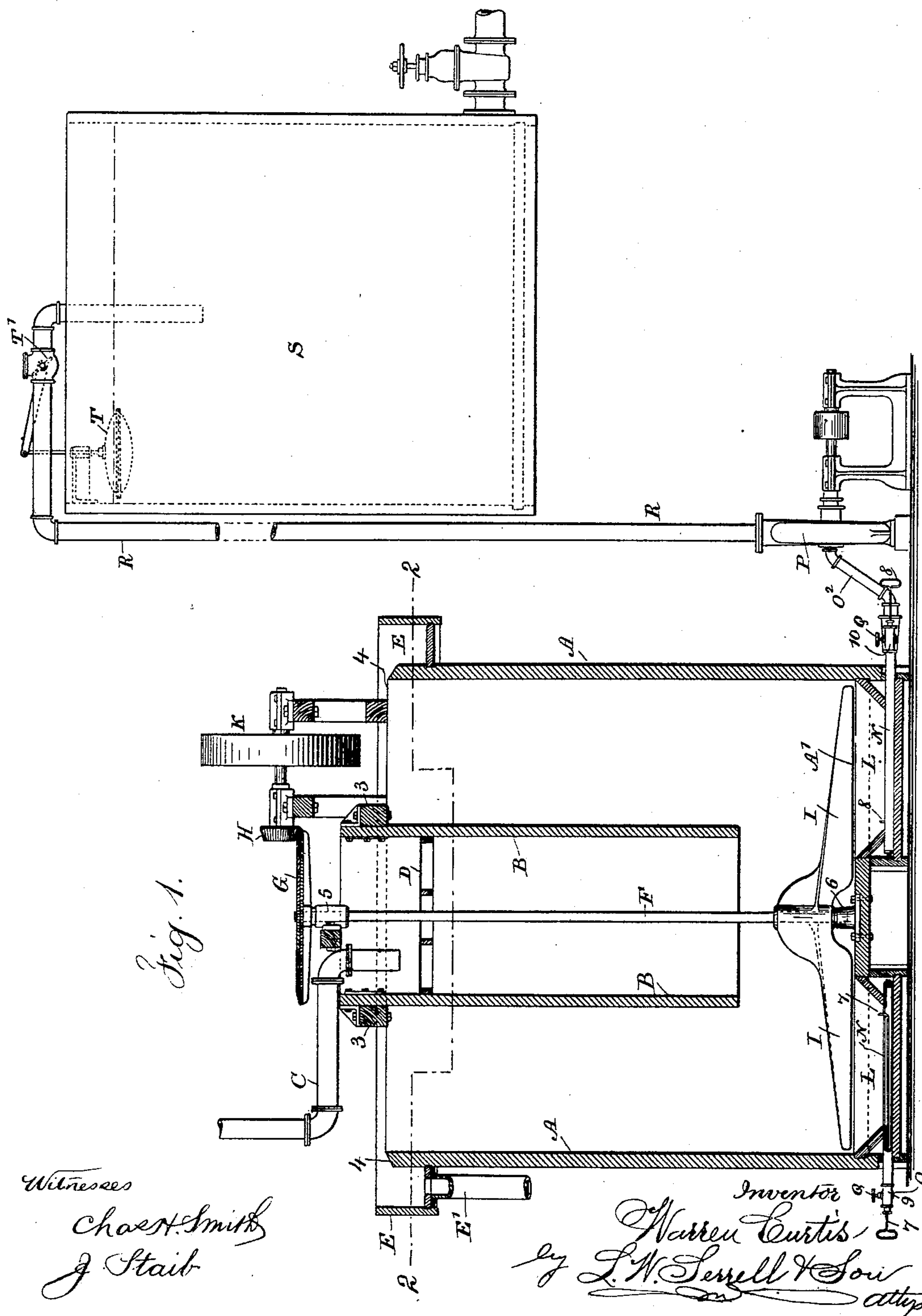
W. CURTIS.

SETTLING AND RECOVERING APPARATUS FOR PAPER AND PULP MANUFACTURE.

(Application filed Oct. 27, 1897.)

(No Model.)

2 Sheets—Sheet 1.



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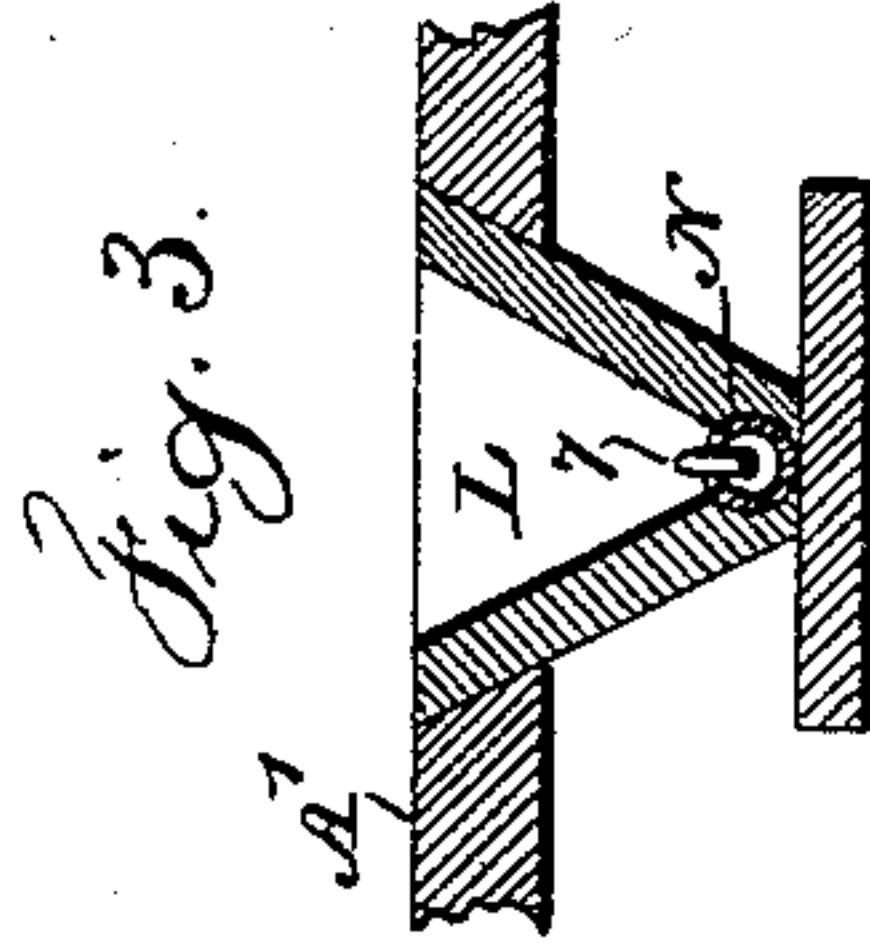
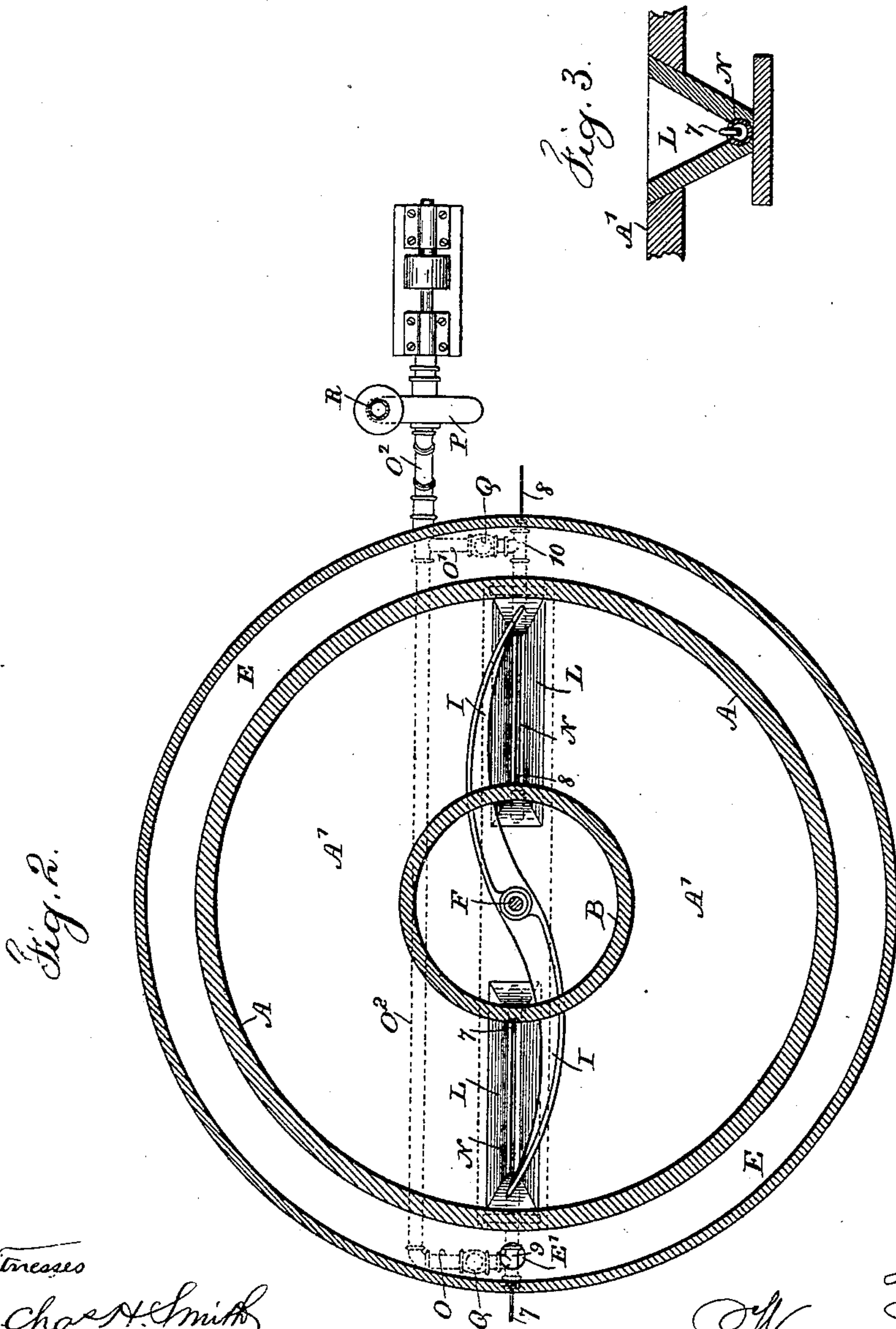
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(No Model.)

2 Sheets—Sheet 2.



Witnesses

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UNITED STATES PATENT OFFICE.

WARREN CURTIS, OF PALMER, NEW YORK.

SETTLING AND RECOVERING APPARATUS FOR PAPER AND PULP MANUFACTURE.

SPECIFICATION forming part of Letters Patent No. 632,517, dated September 5, 1899.

Application filed October 27, 1897. Serial No. 656,483. (No model.)

To all whom it may concern:

Be it known that I, WARREN CURTIS, a citizen of the United States, residing at Palmer, in the county of Saratoga and State of New York, have invented an Improvement in Settling and Recovering Apparatus for Paper and Pulp Manufacture, of which the following is a specification.

In the manufacture of paper and pulp the water that passes away from the grinding and screening mechanism and paper and pulp machines often contains fibers, clay, and other useful materials, which are not only lost by being run off to streams and water-courses but pollute and injure the water, and laws have been enacted to prevent this, and tanks have been heretofore constructed for the purpose of allowing these materials to subside, and in Letters Patent No. 599,957, granted to me March 1, 1898, a long tank or vat is represented for this purpose.

In many paper-mills there is not space enough for the employment of a long settling-vat; and the object of the present invention is to economize room and provide for allowing the solid materials to subside from the water and to be collected and saved.

I make use of an upright vat or tub, preferably circular and with a pendent baffle-tube into which the water is allowed to pass gradually and descend, and the liquid rises around the baffle-tube, leaving the solid material to subside, and the liquid is allowed to flow away by an annular trough, and the solid materials, subsiding upon the bottom, are moved gradually by a rotary scraper into hoppers, from which such materials are transferred to a tank or vat by pipes and a rotary pump.

In the drawings, Figure 1 is a vertical section of the improvement. Fig. 2 is a plan, partially in section, below the line 2 2, Fig. 1; and Fig. 3 is a cross-section, in larger size, of the trough at the bottom of the vat.

The vat A is preferably cylindrical, but may be polygonal, if desired, and of suitable size according to the quantity of water to be passed through the same, and the pendent baffle-tube B is supported by cross-beams 3, and the pipe C supplies the water and solid materials from the paper-machines into the pendent baffle-tube, and a suitable distribu-

ter D is provided, advantageously in the form of a screen or grating, so as to allow the water to flow without a plunging action down through the pendent baffle-tube and pass below the lower end thereof and rise within the surrounding vat, and the liquid flows over the top edge 4 of the vat into the annular trough E, around the upper end of the vat, from which a pipe E' conveys the water to the point of discharge. The water, flowing in a very thin layer over the level edge 4 of the vat, passes off so gradually that solid materials and fibers will not only be retained and subside in the vat, but the water will remain in such a quiescent condition that the clay and other solid materials will pass progressively to the bottom A' of the vat.

A central shaft F, supported in the bearings 5 and 6, is driven slowly by any suitable mechanism. I have shown the beveled wheel G, pinion H, and driving-pulley K for giving this motion, and upon the lower part of the shaft F arms I project, which are advantageously curved with the concave sides forward, and these scraping-arms traveling upon or near the bottom A' of the vat move the solid materials around with them, and there are hoppers L in the bottom A' of the vat, into which such solid materials are deposited by the movement of the arms, and at the bottom of each hopper is a pipe N, closely fitting the inclined sides of the hopper and having a longitudinal slot for the solid materials to pass into the pipe together with sufficient water to cause the materials to flow by the pipes O O' O² to a suitable pump, preferably a rotary pump, as shown at P, and there are cocks at Q by which to regulate the quantity of water and solid materials passing at the respective places, so that the solid materials and water can be drawn by the pump P and forced by the pipe R into a tank or vat S, in which such materials are stored, and there is a valve T' and float T, by which the valve is actuated, so that the valve will be gradually closed as the level of the material in the storage-vat S rises, and thus check the flow of material into the tank, and from this storage-tank the materials are allowed to flow in a regulated quantity into the paper-making machinery.

The agitators 7 and 8 are in the form of

rods with ends bent up, passing through the slots of the tubes N, and the straight portions of the rods pass through stuffing-boxes 9 and 10, so that by these rods the materials in the split tubes N and in the lower portions of the
 5 hoppers L can be sufficiently agitated in case of clogging to properly mix the solid materials with the water to cause them to flow freely to the pump. These agitators and split delivery pipes and hoppers are similar to those
 10 shown in my aforesaid application. If desired, more than one pendent baffle-tube may be made use of and advantageously concentric with the baffle-tube B.

15 It will be observed that in consequence of the branch pipes extending off from the hopper-pipes the stuffing-boxes 9 and 10 can be at the outer ends of the hopper-pipes, so that the agitators 7 and 8 can be actuated at opposite sides of the tank and substantially in
 20 radial planes, and the pipe passing to the pump is not an obstruction in actuating the agitators.

I claim as my invention—

25 1. The combination with a cylindrical vat and the supply-pipe for supplying water and solid materials into the vat, of a pendent cylindrical baffle-tube supported within the vat and into which the materials pass from the
 30 supply-pipe, a substantially level overflow edge at the top of the vat and an annular trough around the overflow edge of the vat and a delivery-pipe from the same, a vertical shaft passing down into the vat with a bearing
 35 at the lower end and means for revolving the shaft slowly, scraping-arms secured to and extending out from the shaft near its lower end, hoppers in the bottom of the vat and discharge-pipes from the same, substantially as
 40 set forth.

2. The combination with a vertical cylindrical settling-vat, of a pendent cylindrical baffle-tube, beams extending across the vat for supporting the baffle-tube thereon, a pipe
 45 for supplying the materials within the baffle-tube, a distributor extending across the baffle-tube below the supply-pipe for checking the force of the inflowing liquid and causing it to descend gradually within the pendent baffle-
 50 tube, a substantially level overflow edge at the top of the vat, and an annular trough around said top edge and a pipe for conveying away the overflow liquid, substantially as set forth.

55 3. The combination with the vertical cylindrical settling-vat, of a pendent baffle-tube extending down within the same, supporting-

beams for the baffle-tube across the vat, a pipe for supplying the materials within the baffle-tube, a distributor across the baffle-tube
 60 for checking the force of the inflowing liquid and causing it to descend gradually within the pendent baffle-tube, a substantially level overflow edge at the top of the vat, and an annular trough around the overflow edge of
 65 the vat, and a pipe from the trough for conveying away the liquid, a vertical shaft central within the pendent baffle-tube and extending down through the tube and vat and means for revolving the shaft gradually,
 70 scraping-arms below the baffle-tube and connected at their inner ends to the shaft near its lower end and radial hoppers in the bottom of the vat below said arms into which the solid materials are scraped, and a pipe and
 75 pump for removing such materials, substantially as set forth.

4. The combination with the vertical cylindrical settling-vat and pendent baffle-tube extending down within the same, of a vertical
 80 shaft passing down within the vat a bearing at the lower end of the shaft and means for revolving the same at the desired speed, curved scraping-arms connected to the lower end of the shaft, hoppers in the bottom of the
 85 vat set radially, discharge-pipes along the bottoms of the hoppers having longitudinal slots for the materials to pass from the hoppers into the pipes, branch pipes from the discharge-pipes and cocks connected thereto,
 90 a pump and pipes connecting therewith for receiving and discharging the materials from the hoppers, packing-glands at the ends of the hopper, discharge-pipes and agitators passing through the glands and having ends extend-
 95 ing up through the slots of the pipes, substantially as and for the purposes set forth.

5. A settling apparatus for paper-pulp, consisting of a vat with a horizontal edge over which the water passes and a surrounding re-
 100 ceptacle for the water, a pendent baffle-tube into which the materials are supplied, a rotary scraper at the bottom of the vat and means for moving the same and a receptacle
 105 into which the paper-stock and other solid materials are delivered by the scraper and a discharge-pipe from the receptacle, substantially as specified.

Signed by me this 22d day of October, 1897.

WARREN CURTIS.

Witnesses:

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 HARRAL MULLIKIE.