

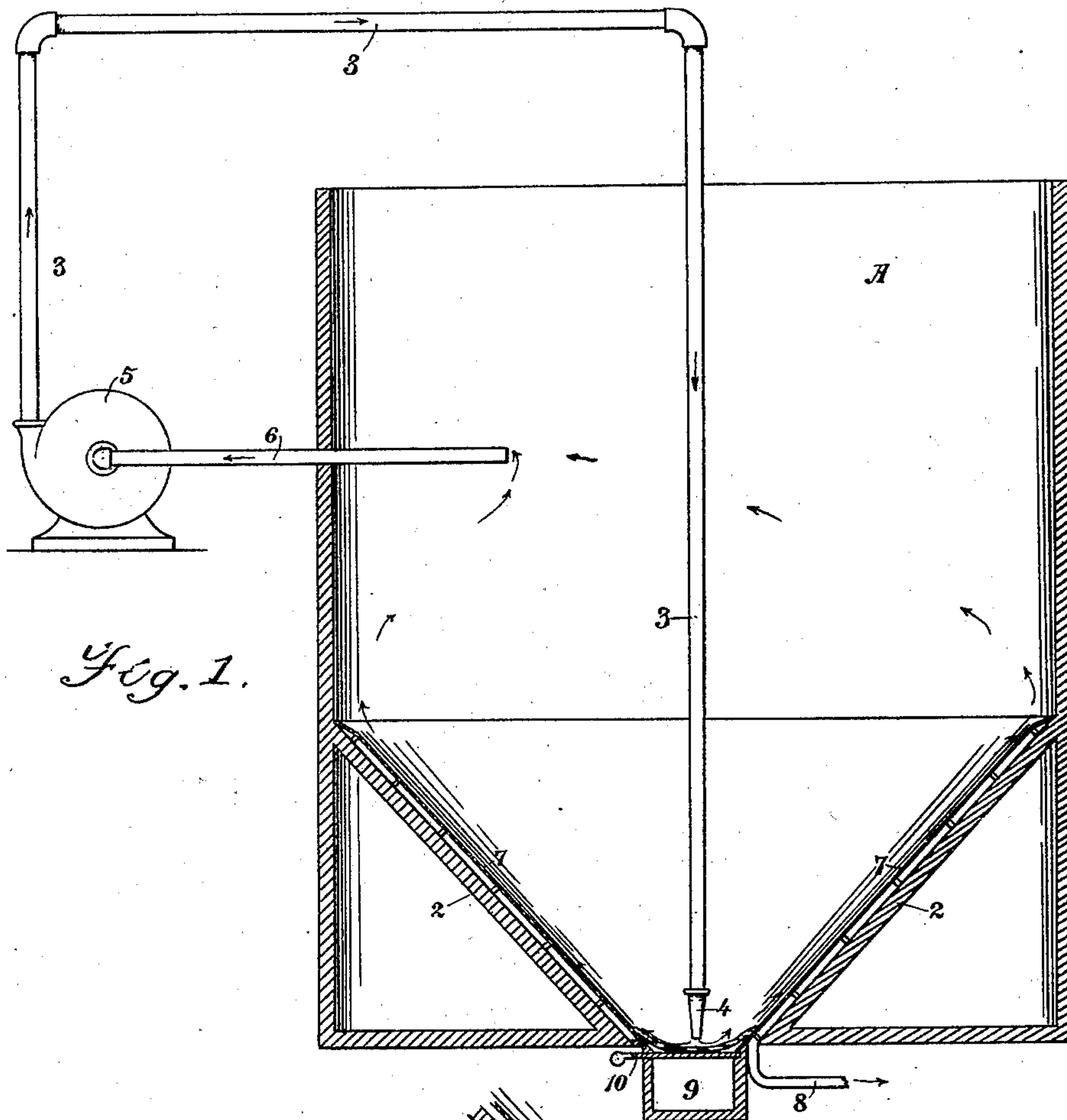
No. 671,028.

Patented Apr. 2, 1901.

J. R. PHILLIPS.  
PULP AGITATOR.

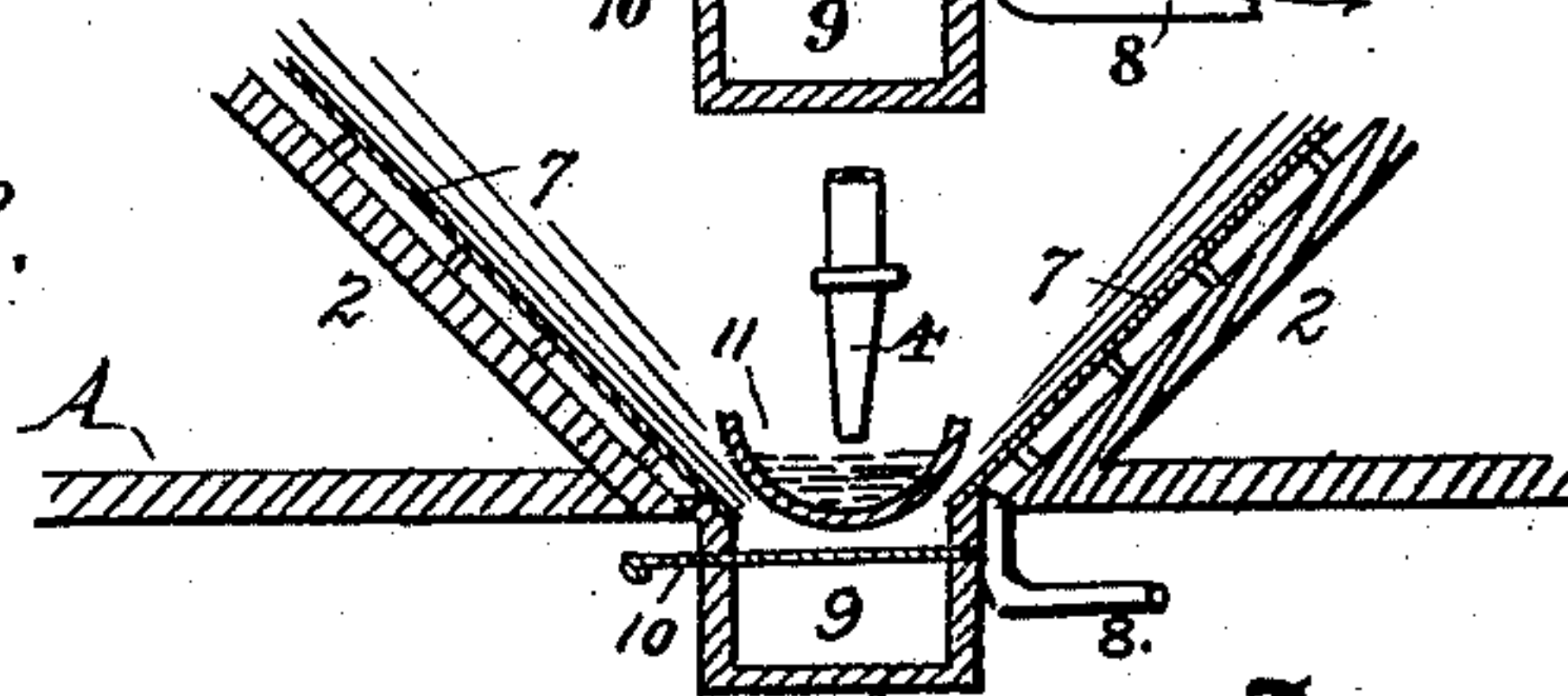
(Application filed May 15, 1900.)

(No Model.)



*Fig. 1.*

*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

JOHN R. PHILLIPS, OF STOCKTON, CALIFORNIA.

## PULP-AGITATOR.

SPECIFICATION forming part of Letters Patent No. 671,028, dated April 2, 1901.

Application filed May 15, 1900. Serial No. 16,743. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN R. PHILLIPS, a citizen of the United States, residing at Stockton, county of San Joaquin, State of California, have invented an Improvement in Pulp-Agitators; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to apparatus which is especially designed for use in the working of pulp or tailings containing valuable metal or the like.

It consists of an inclined or funnel-shaped tank or containing vessel into which the pulp is placed with water, cyanid solution, or other equivalent liquid, a circulating or suction and force pump by which the surface liquid may be drawn from the tank, and a pipe extending centrally down to near the bottom of the cone, with a discharge-nozzle through which the liquid is delivered with force, so as to flow upward along the sides of the funnel and through the material, whereby the latter is loosened, agitated, and prevented from packing. In conjunction with this may be used a canvas or equivalent filter-lining for the funnel, with means for providing a space intermediate between it and the sides of the funnel for the filtering through of water, and a means for conducting such filtered water away from the apparatus.

My invention also comprises details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a vertical section of the apparatus. Fig. 2 is a sectional detail of the lower portion of the tank and cone-shaped bottom, showing the quicksilver-well and the discharge end of the pipe 3.

In the treatment of pulp of various descriptions, notably such as arises from the crushing of metal-bearing ores, if the pulp is to be treated in tanks or like receptacles, and especially in such processes as that known as "cyaniding," where the precious metal is extracted by the action of a solution of cyanid of potassium, it is necessary to intimately mix the pulp with the cyaniding or other solution, and particularly to prevent the pulp from settling down into a solid mass in the bottom of the tank. It is the object of my

invention to provide an apparatus where such results can be accomplished.

I have here shown my invention as carried out by means of a tank or receptacle A, of any suitable or desired shape or description. This tank has a cone-shaped bottom or interior 2, converging toward the bottom, and the pulp or material to be treated is placed within the tank, lying in this cone-shaped bottom. If not in some manner continually agitated, it would soon settle and become packed into a hard mass. I therefore employ some suitable forcing apparatus by which a jet of liquid can be discharged through a pipe 3 and a nozzle 4 near the bottom of the cone, so that the jet thus discharged will rise up through the material, expanding as it rises by reason of the conical shape of the chamber, and the pulp will thus be lifted and continually agitated and kept in a loose condition.

When the apparatus is used for the treatment of the pulp by cyanid, the cyanid solution is placed in a tank, and it is then desirable to circulate this solution continuously through the material. This is effected by means of a forcing mechanism of any description. It is here illustrated in the form of a centrifugal pump, as at 5, in which the liquid is drawn from the tank into the pump by means of a pipe 6, connecting with the inlet or suction of the pump, and is discharged through the pipe 3, which leads into the center of the tank and to the nozzle, as before described. The induction-pipe 6 connects with the tank near the upper portion containing the liquid, so that the liquid is continually drawn off from the top and is returned into the tank through the nozzle 4 at the bottom, thus circulating it through the pulp, while at the same time serving to agitate the latter and prevent its packing.

When the pulp is mixed with water, as before indicated, it is desirable to filter out the water contained in the pulp, so that the solution will not be too much weakened for effective work. I have therefore shown a canvas lining 7 extending around the interior of the cone-shaped tank and supported at a little distance therefrom by ribs or like projections, so as to leave an annular space or channel between the canvas and the interior of the cone. Into this space the water will grad-



ually filter and is drawn off therefrom by a pipe 8, connecting with a vacuum-pump or any suitable means for discharge.

9 is a discharge-sluiice having a gate 10, whereby the contents of the tank can be drawn off at any desired interval.

If the apparatus is to be used as an amalgamator, the sides of the cone may be covered with silver-plated or amalgamated plates in place of the lining 7, and a well of quicksilver may be placed at the bottom of the cone, as shown at 11. This well preferably consists of a curved cup placed between the nozzle 4 and the gate 10 and holds a sufficient amount of quicksilver for the purpose desired. The action of the jet and the movement of the pulp or sand over the inclined sides of the cone will be similar to that previously described, and in this case any gold or silver will be retained by the quicksilver or upon the plate.

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

1. A device for agitating pulp, comprising a containing-tank with an open bottom and inclined sides, a sluice underlying the bottom opening and connecting directly therewith, a sliding gate for closing said opening, and cutting off communication with the sluice, a pipe in the tank and terminating near said gate and discharging in line therewith, and means for forcing the liquid through the pipe so that it rises up through the pulp.

2. An apparatus for cyaniding and agitating pulp consisting of a tank having a conical bottom, a gate-controlled opening in said bottom, a vertical pipe centrally disposed having a discharge-nozzle at the lower end near the gate and interior to the tank, a circulat-

ing-pump or the like, a pipe connecting the inlet of said pump with the upper part of the tank, a second pipe connecting the discharge of the pump with the nozzle within the tank whereby a liquid is circulated continuously through the pulp and the latter prevented from settling, and means for separating and conducting to the outside of the tank the water contained in the pulp.

3. An apparatus for cyaniding and agitating pulp consisting of a tank having a conical bottom, a circulating-pump or the like with connections whereby liquid is drawn from the upper part of the tank and a nozzle whereby it is discharged vertically and centrally downward near the bottom of the interior whereby the pulp is lifted and agitated, a canvas or equivalent filter-lining supported out of contact with the interior sides of the cone and means for conducting away the water passing through said filter.

4. In a device of the character described, the combination of a tank having inclined sides and a bottom opening, a sluice underlying said bottom opening and connecting therewith, a sliding gate for closing said opening, and cutting off communication with the sluice, a pipe in the tank and terminating near said gate, means for forcing the liquid through the pipe so that it rises up through the pulp, and a curved cup interposed between the nozzle and gate and adapted to contain quicksilver.

In witness whereof I have hereunto set my hand.

JOHN R. PHILLIPS.

Witnesses:

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