No. 729,806. PATENTED JUNE 2, 1903.

J. & L. STOVEKEN.

AGITATION TANK.

APPLICATION FILED OCT. 31, 1902.

NO MODEL.

Fig. 1.

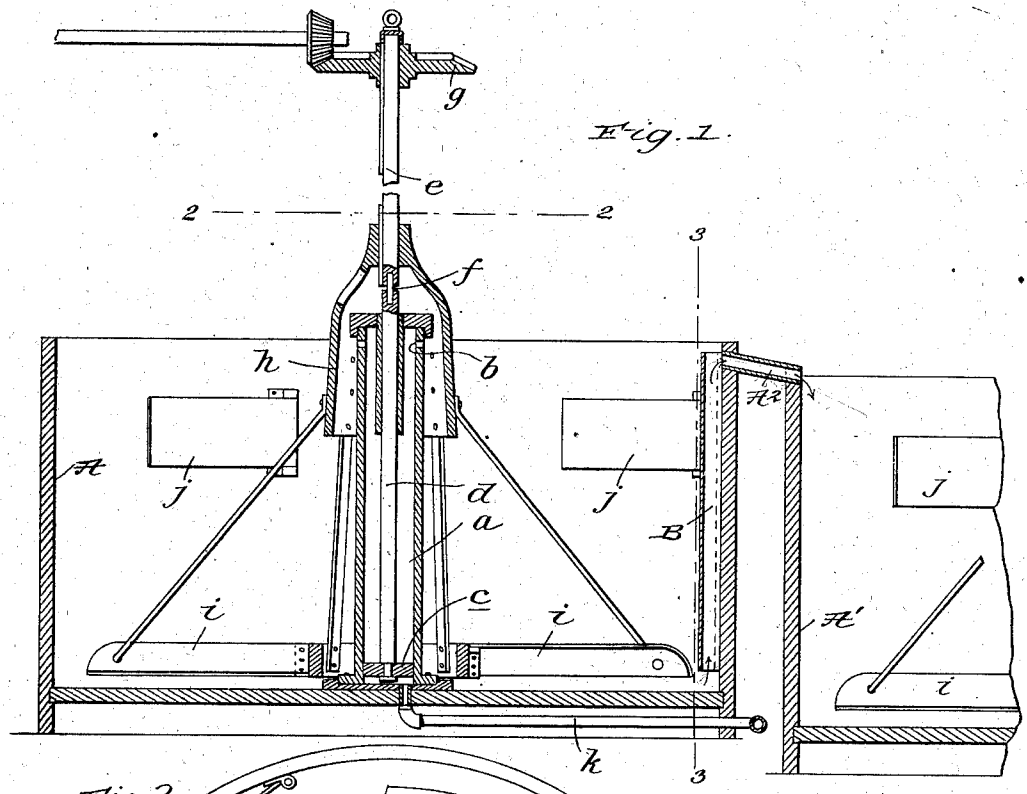


Fig. 2.

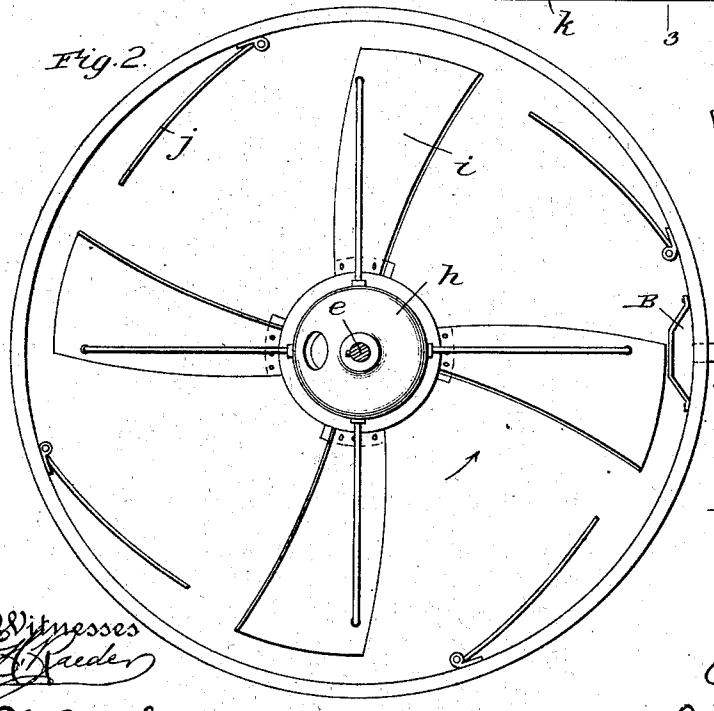
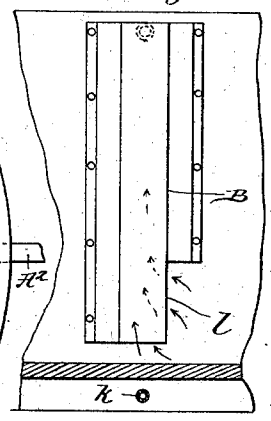


Fig. 3.



Witnesses
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No. 729,806. Patented June 2, 1903.

UNITED STATES PATENT OFFICE.

JOHN STOVEKEN, OF CRIPPLECREEK, AND LEO STOVEKEN, OF FLORENCE, COLORADO.

AGITATION-TANK.

SPECIFICATION forming part of Letters Patent No. 729,806, dated June 2, 1903.

Application filed October 31, 1902. Serial No. 129,619. (No model.)

To all whom it may concern:

Be it known that we, JOHN STOVEKEN, residing at Cripplecreek, in the county of Teller, and LEO STOVEKEN, residing at Florence, in the county of Fremont, State of Colorado, citizens of the United States, have invented new and useful Improvements in Agitation-Tanks, of which the following is a specification.

Our invention relates to improvements in agitation-tanks for use in apparatus for extracting precious metals from their ores; and it has for its general object to provide a highly-efficient and easily-operated agitation-tank designed more particularly for employment in the apparatus forming the subject-matter of our contemporary application, filed August 12, 1902, Serial No. 119,433, which apparatus is designed more especially for the treatment of ores in which only a small percentage of values can be saved by amalgamation and which ores are of too low grade to be treated by barrel chlorination and too clayey or slimy to be percolated by cyanid solution.

With the foregoing in mind the present invention will be fully understood from the following description and claims when taken in connection with the accompanying drawings, in which—

Figure 1 is a vertical section illustrating one agitation-tank embodying our invention as properly connected to a portion of a similar lower tank. Fig. 2 is a horizontal section of the tank at the left of Fig. 1, taken in the plane indicated by the broken line 2 2 of said figure; and Fig. 3 is a detail vertical section taken in the plane indicated by the broken line 3 3 of Fig. 1.

Similar letters of reference designate corresponding parts in all of the views of the drawings, referring to which—

A A′ are agitation-tanks constructed in accordance with our invention, the tank A′ being arranged in a plane slightly below the tank A and connected therewith through the medium of a pipe A^2 or any other suitable conduit.

The tanks A A′ are identical in construction, and therefore a detailed description of the one shown at the left of Fig. 1 and in Figs. 2 and 3 will suffice to impart an understanding of all.

Referring, therefore, to the said tank, *a* is a cylinder fixed in the center of the tank and having a vent *b* adjacent to its upper end; *c*, a piston movable vertically in the cylinder and having a rod *d* extending through the upper end or head thereof; *e*, a shaft connected by a step *f* or other means with the rod *d*, so as to enable it to move vertically with and rotate independently of said rod; *g*, a miter-gear to which the shaft *e* is keyed or feathered and through which said shaft is adapted to move vertically; *h*, a head connected to the shaft *e*, so as to turn and move vertically therewith; *i i*, agitating-blades connected together and to the head *h* and curved in the direction of their length and inclined in the direction of their width, Figs. 1 and 2, whereby they are adapted to throw comminuted ore and solution outward after the manner of a centrifugal pump and also upward after the manner of a plow; *j j*, stationary wings connected to the side wall of the tank and having for their purpose to force the mixture of comminuted ore and solution back to the center of the tank when said mixture is thrown outwardly and upwardly by the blades *i*, and *k* a pipe let into the cylinder *a* below the piston *c* and designed, in common with the pipes *k*, connected with the cylinders *a* of other tanks, of which there may be any desired number, to be connected with a source of fluid-pressure supply.

B is an upright conduit leading from a point adjacent to the bottom of the tank up to and communicating with the conduit A^2, which is preferably located at a point adjacent to the top of the tank. This conduit B, which is designed to serve a highly useful purpose, as will be presently pointed out, is preferably formed of sheet metal and has the lower portion of one of its side walls partly cut away, as indicated by *l*, Fig. 3, for a purpose presently described.

In the operation of the improved agitation-tank it will be observed that when the shaft *e* is rotated in the direction of arrow, Fig. 2, by a driving connection intermeshed with the miter-gear *g* the material in the tank will be thrown outwardly and upwardly against the wings *j*, which will roll it back into the center of the tank. This is materially ad-

vantageous, since in addition to being kept in suspension, and consequently the cyanid solution is caused to absorb the necessary oxygen and effect a rapid and complete dissolution of the gold and silver contained in the ore. The comminuted ore and solution are fed into the tank A, at the top thereof, and pass from said tank through the conduits B and A^2 into the next lower tank. The conduit B extends, as before described, to a point adjacent to the bottom of the tank A, and hence it will be seen that while the mixture of comminuted ore and solution enters said tank at the top it leaves the same at the bottom. In virtue of this the accumulation of coarse particles of ore at the bottom of the tank is prevented, and the agitation of the mass as a whole in the several tanks is rendered more continuous. The mixture of comminuted ore and solution while in a state of agitation enters the conduit B, through the lateral opening *l* thereof, after the manner indicated by arrows in Fig. 3.

It is desirable in the event of a stop in the operation to raise the agitator—*i.e.*, the blades *i* and the parts to which they are connected—of the several tanks out of the mixture or pulp therein. This in virtue of our improvements may be accomplished by an attendant opening a valve (not shown) controlling communication between a source of fluid-pressure supply and the pipes *k* of the several tanks, for it will be observed that when fluid-pressure is let into the cylinders *a* of the tanks the pistons *c*, shafts *e*, and agitators *i* of said tanks will be raised. To lower the agitators into the mixture or material in the several tanks, the attendant has but to open a bleeder (not shown) connected with the pipes *k*, when the agitators will gravitate or settle down into the working position. (Shown in Fig. 1.)

It will be appreciated from the foregoing that both the raising and lowering of the agitators in the several tanks may be quickly and easily effected without involving effort on the part of the attendant of the apparatus, which is a desideratum.

We have entered into a detailed description of the construction and relative arrangement of the parts embraced in the present and preferred embodiment of our invention in order to impart a full, clear, and exact understanding of the same. We do not desire, however, to be understood as confining ourselves to such specific construction and arrangement of parts, as such changes or modifications may be made in practice as fairly fall within the scope of our invention as claimed.

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

1. The combination of a tank having an outlet adjacent to its top, wings connected to and extending inwardly from the vertical wall of the tank, a conduit leading from a point adjacent to the bottom of the tank, and having a lateral opening adjacent to its lower end, a central vertical cylinder arranged in the tank, a piston movable in the cylinder, and having a rod extending through the upper head thereof, a gear disposed above the tank, and adapted to be connected by a driving connection with a motor, a shaft stepped on the piston-rod, and keyed to and adapted to move vertically through the gear, agitating means carried by said shaft, and comprising blades disposed below the wings, and curved in the direction of their length and inclined in the direction of their width, and a pipe communicating with the cylinder below the piston, and adapted to be connected with a source of fluid-pressure supply.

2. The combination of a tank, a central, vertical cylinder arranged therein, a piston movable in the cylinder, and having a rod extending through the upper head thereof, a gear disposed above the tank, and adapted to be connected by a driving connection with a motor, a shaft stepped on the piston-rod, and keyed to and adapted to move vertically through the gear, wings connected to and extending inwardly from the vertical wall of the tank, agitating means carried by the said shaft and surrounding the upper end of the cylinder, and comprising a head fixed on the shaft, blades disposed below the wings and connected together; said blades being curved in the direction of their length and inclined in the direction of their width, connections between the outer portions of the blades and the head on the shaft, connections between the inner portions of the blades and said shaft, and a pipe communicating with the cylinder below the piston, and adapted to be connected with a source of fluid-pressure supply.

3. The combination of a tank having an outlet adjacent to its top, a rotary agitator arranged in the tank, and a conduit leading from a point adjacent to the bottom of the tank to the outlet, and having a lateral opening adjacent to its lower end.

4. The combination of a tank having an outlet adjacent to its top, wings connected to and extending inwardly from the vertical wall of the tank, rotary agitating means arranged in the tank, and comprising blades curved in the direction of their length and inclined in the direction of their width, and a conduit leading from a point adjacent to the bottom of the tank to the outlet, and having a lateral opening adjacent to its lower end.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

JOHN STOVEKEN.
LEO STOVEKEN.

Witnesses:
JOSEPH STOVEKEN,
ELLA FRANCES LUTES.