J. H. ALPENFELS.

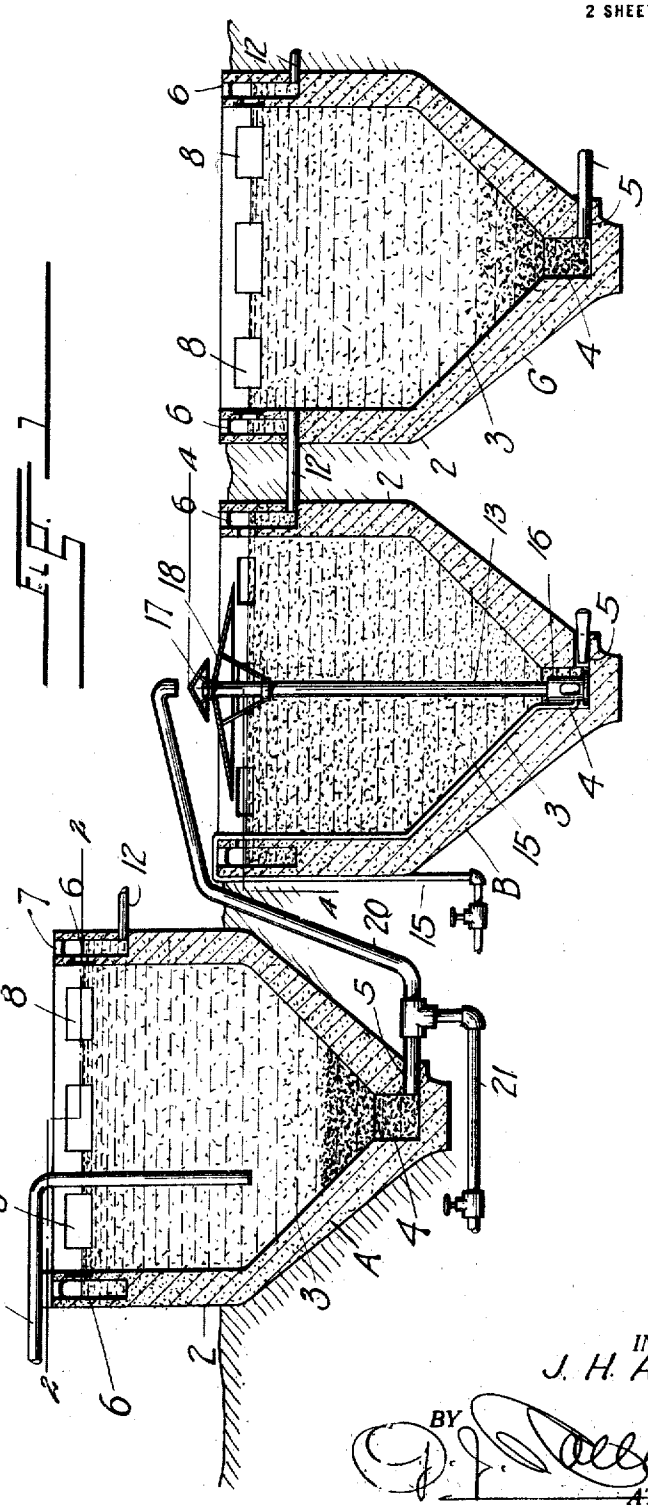
DECANTING APPARATUS.

APPLICATION FILED FEB. 5, 1916.

1,210,392.

Patented Jan. 2, 1917.

2 SHEETS—SHEET 1.



WITNESSES:

F. H. Gunn.

L. Rhoades

INVENTOR.

J. H. ALPENFELS.

BY

ATTORNEY

J. H. ALPENFELS.

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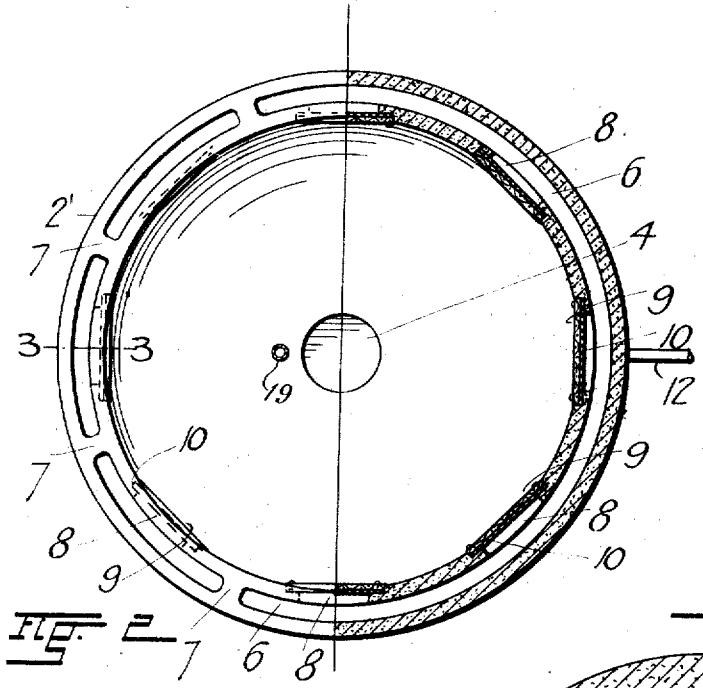


FIG. 2.

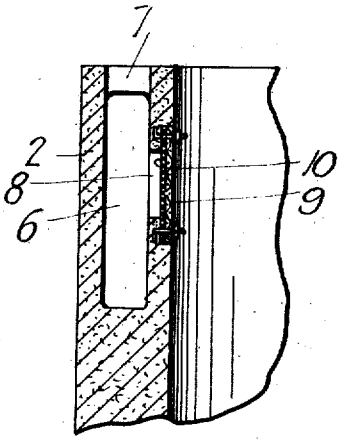


FIG. 3.

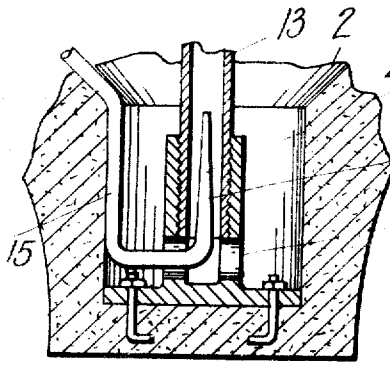


FIG. 5.

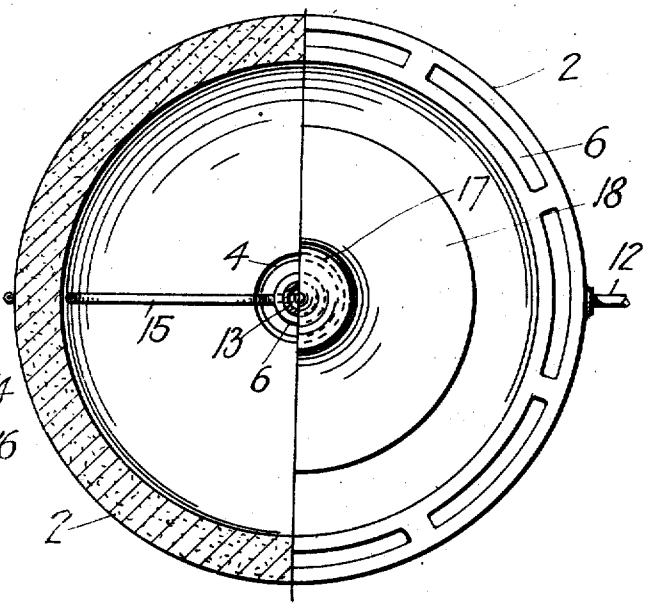


FIG. 4.

WITNESSES:

F. H. Gunn.

C. Rhoades

INVENTOR.

J. H. ALPENFELS.

BY

ATTORNEY

UNITED STATES PATENT OFFICE.

JULIUS H. ALPENFELS, OF DENVER, COLORADO.

DECANTING APPARATUS.

1,210,392. Specification of Letters Patent. Patented Jan. 2, 1917.

Application filed February 5, 1916. Serial No. 76,424.

To all whom it may concern:

Be it known that I, JULIUS H. ALPENFELS, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Decanting Apparatus, of which the following is a specification.

This invention relates to improvements in apparatus of the type employed for separating the value-bearing solution from slimes in the treatment of ores by the cyanid process, and its primary object is to provide an element of simple construction which may be made and installed at a low cost and which when arranged in series, will automatically effect a clean separation of the liquid from solids in material under treatment, without the use of power driven devices or other moving parts.

By reason of the fact that the coöperating elements of my invention operate independent of any motive power except the forces of gravitation, they may be placed at any desired distance apart, thereby obviating the provision of large and costly housings while by partially embedding the elements in the ground, they may be installed without the use of supporting structures usually found in plants of the character to which my invention appertains.

With the above and other objects in view, all of which will fully appear in the course of the following description, my invention consists in the features of construction and arrangement of parts illustrated in the accompanying drawings in the various views of which like parts are similarly designated, and in which,

Figure 1 is a sectional elevation of a series of coöperative elements constructed and relatively arranged in accordance with my invention, Fig. 2, a composite plan view and transverse section taken along the line 2—2, Fig. 1, and drawn to an enlarged scale, Fig. 3, a still further enlarged section along the line 3—3, Fig. 2, Fig. 4, an enlarged composite elevation and transverse section taken along the line 4—4, Fig. 1, and Fig. 5, an enlarged section of the lower portion of one of the elements shown in Fig. 1.

Referring more specifically to the drawings, the elements of my invention which coöperate to separate clear solution from slimes discharged from the battery or tube mill in the wet treatment of ores by the cyanid process, each consist of a vat 2 preferably made of plastic material and of any desired form in cross section.

The vat of my invention as shown in the drawings, is circular in cross section and its lower portion tapers interiorly as at 3, toward a central, shallow well 4 which has an opening 5 for the discharge of settling solids. The vat is furthermore provided with a trough 6 formed in the upper edge of its circumferential wall and bridged at intervals as at 7 for the purpose of strengthening the construction.

The trough 6 communicates with the interior of the vat by a number of equidistantly arranged ports 8 which are covered by a filtering medium preferably composed of a layer of cloth 9 such as cocoanut matting, and a protective wire screen 10, as is best shown in Fig. 3 of the drawings.

A pipe 12 connected with the bottom of the trough is provided for the discharge of its liquid contents.

In the series of coöperative vats shown in Fig. 1 of the drawings, the vat immediately succeeding that into which the slimes discharged from the battery or tube-mill are fed, has an air-lift consisting of a centrally disposed, stationary pipe 13 and a nozzle 14 at the end of a pipe 15 which connects with a source of fluid pressure.

The pipe 13 is removably supported upon a hollow stand 16 secured upon the bottom surface of the well 4. The stand has a plurality of openings through which material collecting in the well may pass to the lower end of the pipe into which it is drawn by the air ejected from the nozzle 14 which is disposed within the lower portion of the pipe as shown in Fig. 5.

The pipe 13 carries at its upper end a protective hood 17 which prevents material fed into the vat from entering the pipe, and it supports at a subjacent point, a cone-shaped apron 18 which serves to direct the material toward the sloping surface of the vat.

In installing the vats of my invention, they are partially embedded in the ground as shown in Fig. 1, each vat being slightly lower than the preceding one, to permit of the flow of material from one to the other.

Since no moving parts are used in the operation of the apparatus, the vats may be placed at any distance apart and in any position with relation to each other.

Large and costly buildings, such as those erected at the milling plants at present in use to cover the machinery required in the operation of the different elements which coöperate in the cyanid treatment of ores, are unnecessary in the installation of the present invention since there are no machine parts to be protected against moisture and each vat may if so desired, be separately covered by a roof or a building of small dimensions.

Of the series of elements shown in Fig. 1, the first vat designated by the letter A serves in the operation as a settling tank into which the slimes discharged from the battery or tube-mill, are fed through a conduit 19.

The second vat designated by the letter B provides an agitator for the slimes which are discharged through the outlet in the bottom of the first vat and fed into the second vat through a conduit 20, and the third vat C which receives the overflow from the second tank through its pipe 12, acts as a secondary settling tank to separate the remaining value-bearing solution from the worthless solids.

It will be readily understood that in accordance with the nature of the ore under treatment, the number of vats comprised in the series may be increased and the treatment of the slimes prolonged until all the solution contained therein is separated from its solid constituents.

In the operation of the system of vats, the slimes and solution discharged from the battery or tube-mill, are fed into the vat A through the conduit 19. The solids settling out of the liquid, slide along the slanting bottom surface of the vat into the well 4 at the lower end thereof, from which they are removed through the conduit 20 and fed into the second tank of the series, upon the hood 17 which covers the pipe 13 of the air-lift. The liquid rising out of the settling solids in the first vat, passes through the filters which cover the ports 8, and enters the trough 6 in a clarified condition suitable for direct delivery through the pipe 12 to the precipitation boxes in which the metals carried in solution are recovered. The thickened slimes upon being discharged from the vat A, are thinned by the addition of barren solution which enters the conduit 20 through a pipe 21, and the slimes and solution are together fed into the second tank over whose area they are distributed by the conical apron 18. The settling solids sliding along the tapering bottom surface of the vat 12, collect in the well at the lower end thereof and are drawn through the outer pipe of the air-lift and redistributed over the level of liquid determined by the position of the ports 8. The material is thus constantly maintained in a state of agitation for the thorough intermixture of the thickened matter discharged from the first tank of the series, and the barren solution introduced thereinto through the pipe 21. Inasmuch as no solids are discharged at the lower end of the agitating vat B, the discharge opening 5 of the same is closed and to facilitate the outflow of the solids and liquid through the ports 8, the filters ordinarily covering the same are preferably removed. The upper strata of the material contained in the vat overflow through the ports 8 into the trough 6 then through the pipe 12 into the third vat of the series in which the solids finally settle out of the solution, to be discharged through the outlet at the lower end of the well, and as valueless matter, removed to the dump. The weakened solution passing through the screen-covered ports of the vat C, enters the trough thereof in a clarified condition and is conducted through the pipe 12 to the storage tanks for use in the treatment of other quantities of ore.

It will be seen from the above description that in the operation of my invention the value-bearing solution is separated from the worthless solids automatically and without the use of moving parts, that the solution is delivered from the series of coöperative elements in a clarified condition suitable for immediate delivery to the precipitation boxes or the storage tanks, and that as mentioned hereinbefore, the relative position and distances apart of the vats have no bearing upon the effective and continuous operation of the same.

Having thus described my invention what I claim and desire to secure by Letters-Patent is:

1. In apparatus for settling solids out of liquid, a vat having an outlet for settling solids, a plurality of ports for the overflow of liquid rising out of the settling solids, a trough to receive liquid passing through said ports, and filters covering said ports.

2. In apparatus for settling solids out of liquid, a vat having an outlet for settling solids, a plurality of ports for the overflow of liquid rising out of the settling solids, a trough to receive liquid passing through said ports, and filters composed of screen-covered fabric, covering said ports.

3. In apparatus for settling solids out of liquid, a vat having an outlet for settling solids, a plurality of ports for the overflow of liquid rising out of the settling solids, a trough to receive liquid passing through said ports, and removably disposed filters covering said ports.

4. In apparatus for settling solids out of liquid, a settling vat of plastic material, having an outlet for settling solids, a trough provided by a recess in the upper portion of its wall, and ports for the overflow of liquid

rising out of settling solids, connecting its interior with said trough.

5. In apparatus for settling solids out of liquid, a settling vat of plastic material, having an outlet for settling solids, a trough provided by a recess formed in its wall and opening in the upper edge of the same, and ports for the overflow of liquid rising out of settling solids, connecting the interior of the vat with said trough.

6. In apparatus for settling solids out of liquid, a settling vat of plastic material, having an outlet for settling solids, a trough provided by a recess formed in its wall and opening in the upper edge of the same, and ports for the overflow of liquid rising out of settling solids, connecting the interior of the vat with said trough, and screens covering said ports within said recess.

7. Apparatus for settling solids out of liquid comprising in combination, a series of vats each having a tapering bottom and an overflow for liquid rising out of solids settling toward said bottom, a conduit connecting with the bottom portion of the first vat of the series and disposed to discharge into the upper portion of a second vat, said first vat being placed higher than said second vat to compel the discharge of settling matter through said conduit, a stationary air-lift having an ingress adjacent the bottom of the second vat and an egress above the liquid level determined by the overflow of the same, and a conduit through which the overflow of the second vat, passes into a third vat of the series, said third vat having in its bottom an outlet for the discharge of settling solids.

8. Apparatus for settling solids out of liquid comprising in combination, a series of vats each having a tapering bottom and an overflow for liquid rising out of solids settling toward said bottom, a conduit connecting with the bottom portion of the first vat of the series and disposed to discharge into the upper portion of a second vat, said first vat being placed higher than said second vat to compel the discharge of settling matter through said conduit, means for introducing a liquid into matter passing through said conduit, a stationary air-lift having an ingress adjacent the bottom of the second vat and an egress above the liquid level determined by the overflow of the same, and a conduit through which the overflow of the second vat, passes into a third vat of the series, said third vat having in its bottom an outlet for the discharge of settling solids.

In testimony whereof I have affixed my signature in presence of two witnesses.

JULIUS H. ALPENFELS.

Witnesses:
G. J. ROLLANDET,
L. RHOADES.