

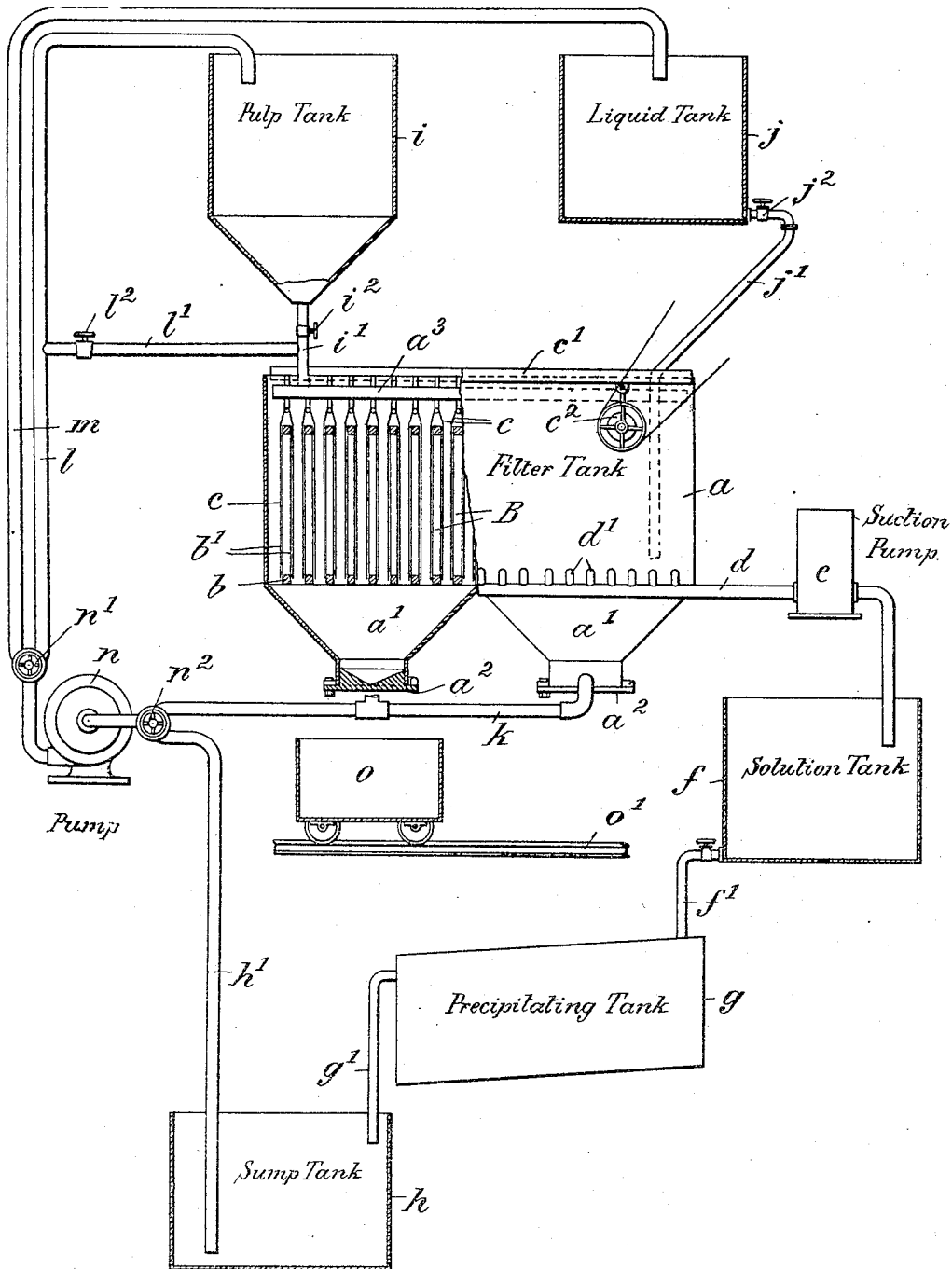
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H. R. CASSEL.
PROCESS OF FILTERING SLIMES.

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NO MODEL.



Witnesses:

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UNITED STATES PATENT OFFICE.

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PROCESS OF FILTERING SLIMES.

SPECIFICATION forming part of Letters Patent No. 774,349, dated November 8, 1904.

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To all whom it may concern:

Be it known that I, HENRY R. CASSEL, a citizen of the United States, residing at New York city, (Manhattan,) county and State of New York, have invented new and useful Improvements in Processes of Filtering Slimes, of which the following is a specification.

This invention relates to an improved process of extracting the values from slimes by filtration in an efficient and economic manner.

The accompanying drawing represents an elevation, partly in section, of a preferred form of apparatus for carrying my invention into effect.

15 The letter *a* represents a filter-tank provided with a hopper-shaped bottom *a'*, adapted to be closed by a gate *a''*. The drawing shows a pair of hoppers; but any convenient number may be used. Within the tank *a* are contained a series of filter-cells *B*, each composed of a rigid supporting-frame *b*, to which is secured a strainer *b'*, composed of filter-cloth or other suitable material. The cells *B* are preferably arranged at equal distance from each other and extend from end to end of the tank. Against both sides of each cell *B* is placed a protective sheet or mantle *c*, of filter-cloth or similar material, such sheets being suspended from a movable overhead frame *c'*. This frame may be shaken by an eccentric *c''* or otherwise, so as to agitate the mantles. All of the cells *B* communicate by branches *d'* with a common suction-pipe *d*, through which the filtrate is drawn by suction-pump *e* into a solution-tank *f*. This tank communicates by pipe *f'* with a precipitating-tank *g*, which in turn by pipe *g'* communicates with a sump-tank *h*.

40 *i* is a pulp-storage tank from which the pulp may be delivered to the filter-tank *a* by pipe *i'*, having cock *i''*, and through distributing-launders *a''*. A liquid-tank *j* also communicates with filter-tank *a* by pipe *j'*, having cock *j''*. The lower end of tank *a* is in communication with both the tanks *i* and *j* by means of a common outlet-pipe *k* and a pair of branch pipes *l m*, which enter tanks *i* and *j*, respectively. A centrifugal pump *n*, having three-way cock *n'*, is adapted to convey the contents of tank *a* either back into

tank *a* by pipes *k l'*, or into tank *i* through pipes *k l*, or into tank *j* through pipes *k m*. The pump *n* is also connected by pipe *h'* to the sump-tank *h*, so as to convey the contents of tank *h*, through pipes *h' m*, to tank *j*. A three-way cock *n''* permits communication to be established between pump *n* and either pike *k* or pipe *h'*. Below the discharge-gates *a''* of tank *a* travels a dump-car *o* upon track *o'*.

In practicing my invention by means of the above-described apparatus I proceed as follows: The slimes containing the precious metal are mixed with a suitable solvent, such as cyanid of potassium, and are run into tank *a*, additional slimes being added during the process, so as to always keep the cells *B* submerged. The pump *e* is started to draw the liquid from the pulp into the filter-cells *B* through the filtering-cloths *c* and *b'*. From the cells the filtrate is sucked by the pump *e* through branches *d'* and pipe *d* into the solution-tank *f*.

In order to prevent the settling of the pulp at the bottom of tank *a*, to maintain it in a homogeneous condition, and to keep it slightly in agitation, the centrifugal pump *n* is set into motion. This will carry the pulp from the bottom of tank *a*, through pipes *k l'*, back into tank *a*, where it is evenly distributed through launders *a''*, thus causing circulation between the filter-cells.

During the process as thus far described the pulp gradually thickens against the mantles *c*, owing to the withdrawal of the solution from the slimes. This thickened pulp will adhere in the form of homogeneous cakes. When a layer of sufficient thickness has thus accumulated, cock *i''* is closed and the non-adhering pulp is carried into pulp-tank *i* by pump *n*, suction within the cells being all the while maintained. The pump *n* is now stopped and the cock *j''* is opened to admit the wash-water from tank *j* into tank *a*, so as to continuously cover the cells. This water will displace any soluble values and solvent still retained in the pulp-cakes. These values will thus be drawn by the pump *e* into the cells *B* and thence into tank *f*. When the cakes have been sufficiently washed and their values extracted, the pump *n* is restarted and connected

to pipe m by cock n' , the water contained within tank a being thereby reconveyed into tank j . The gates a^2 are now opened, the pump e is arrested, and the eccentric c^2 set in motion, so as to agitate the mantles c and shake off the adhering residues. These residues will fall through gates a^2 into cars o or conveyer-belts, to be delivered to the dump. The gates a^2 are then closed, the cock i^2 is opened, and the pulp from tank i is discharged into tank a , together with a fresh body of pulp, when the operation is repeated.

The solution from tank f is run into tank g , where the metal is precipitated. The overflowing liquid is conveyed from tank g into tank h and may thence be carried into tank j by pump n through pipes $h' m$, the valves $n^2 n'$ being properly set.

The drawing shows the tanks $i j$ arranged above tank a ; but they may obviously be placed in any other suitable position.

What I claim is—

1. An improved process of filtering slimes, which consists in filtering off the liquid from the pulp by suction in a tank containing filter-cells, and simultaneously agitating the pulp between the cells, substantially as specified.

2. An improved process of filtering slimes, which consists in filtering off the liquid from the pulp by suction in a tank containing filter-cells, and simultaneously agitating and circulating the pulp between the cells, substantially as specified.

3. An improved process of filtering slimes, which consists in filtering off the liquid from the pulp in a tank by suction, withdrawing the non-adhering pulp from the tank, and reconveying such pulp to the tank, substantially as specified.

4. An improved process of filtering slimes, which consists in filtering off the liquid from the pulp in a tank by suction, withdrawing the non-adhering pulp from the tank, introducing water into the tank, and continuing the suction after the introduction of the water, substantially as specified.

5. An improved process of filtering slimes, which consists in filtering off the liquid from the pulp by suction in a tank containing filter-cells, simultaneously circulating the pulp between the cells, and removing the thickened residue from the sides of said cells by agitation, substantially as specified.

6. An improved process of filtering slimes in a filtering-tank having inclosed filter-cells, which consists in filtering off by suction the liquid from the pulp contained in the tank, withdrawing the non-adhering pulp through the bottom and conveying it to the top of the

tank, removing the thickened residues from the sides of the filter-cells, and discharging them through the bottom of the tank, substantially as specified.

7. An improved process of filtering slimes, which consists in filtering off the liquid from the pulp in a tank by suction, withdrawing the non-adhering pulp from the tank, introducing water into the tank to recover the value of the adhering pulp, continuing the suction after the introduction of the water, removing the water from the tank, and removing the adhering pulp, substantially as specified.

8. An improved process of filtering slimes, which consists in filtering off the liquid from the pulp by suction in a tank containing filter-cells, causing the thickened residue to be deposited upon movable mantles placed against said cells, and agitating the mantles, substantially as specified.

9. An improved process of filtering slimes, which consists in filtering off the liquid from the pulp in a tank by suction, forming a thickened layer upon movable mantles, withdrawing the non-adhering pulp from the tank, introducing water into the tank to recover the value of the adhering pulp, continuing the suction after the introduction of the water, removing the water from the tank, agitating the mantles to shake off the adhering pulp, and discharging the pulp, substantially as specified.

10. An improved process of filtering slimes, which consists in filtering off the liquid from the pulp by suction in a tank, forming a thickened layer upon movable mantles, withdrawing the non-adhering pulp from the tank, introducing water into the tank to recover the value of the adhering pulp, removing the water from the tank, agitating the mantles to shake off the adhering pulp, and discharging the thickened pulp through the bottom of the tank, substantially as specified.

11. An improved process of filtering slimes, which consists in filtering off the liquid from the pulp by suction in a tank containing filter-cells, withdrawing the non-adhering pulp through the bottom and delivering it at the top of the tank above the filter-cells, and simultaneously circulating the pulp between the cells, substantially as specified.

Signed by me at New York city, (Manhattan,) New York, this 4th day of January, 1904.

HENRY R. CASSEL.

Witnesses:

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