

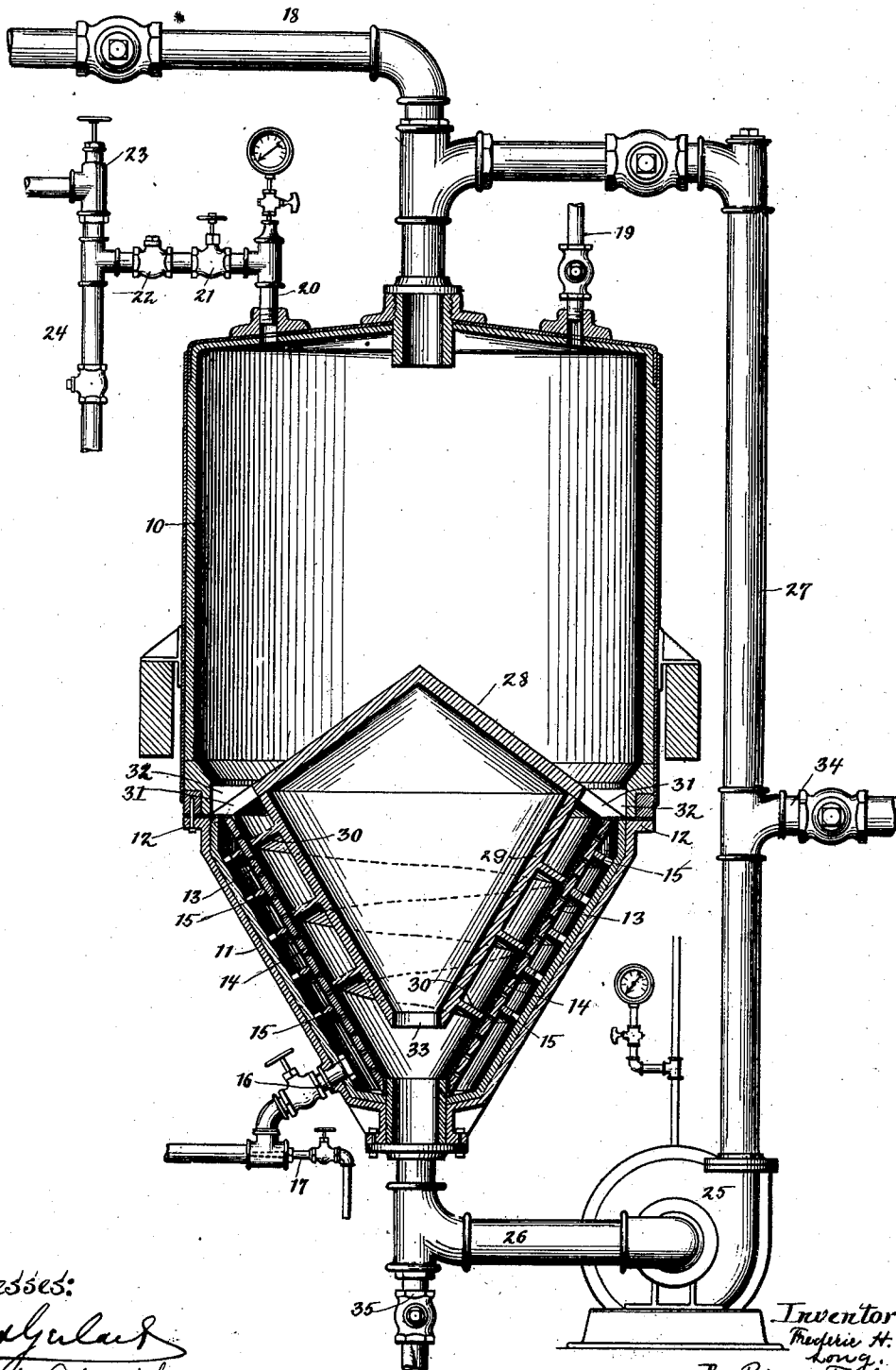
No. 691,706.

Patented Jan. 21, 1902.

F. H. LONG.
METALLURGICAL FILTER.

(Application filed Oct. 18, 1900.)

(No Model.)



Witnesses:

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UNITED STATES PATENT OFFICE.

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METALLURGICAL FILTER.

SPECIFICATION forming part of Letters Patent No. 691,706, dated January 21, 1902.

Application filed October 18, 1900. Serial No. 33,419. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC H. LONG, a resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Metallurgical Filters, of which the following is a full, clear, and exact description.

My invention relates to that class of filters set forth in my United States Patent No. 653,684, dated July 17, 1900, and of which the present invention is an improvement. Such filters are designed for treatment of the refuse gangue and associated solution left at the end of the extraction stage in wet methods for extracting metals from their ores, by which the rich solution necessarily retained by the gangue is recovered.

In the apparatus set forth in the above-mentioned patent a charge of the gangue and accompanying solution is washed under pressure in a filter-tank, while it is maintained in active circulation to insure thorough cleansing and to prevent banking of the dense slime against the filter medium or septum.

The present improvement seeks to provide an apparatus which while retaining all the advantages of the former construction maintains the circulation of the charge in more intimate relation with the filter-septum, and thereby increasing the rapidity of the process.

The nature of the invention will appear from the following description and be thereafter more particularly pointed out by claims at its conclusion.

The accompanying drawing displays the preferred form of my improved apparatus in longitudinal vertical section.

The filter vessel, as in my former construction, consists of a sheet-metal tank 10, lined throughout with wood to prevent corrosion and provided with a sloping conical bottom 11. The bottom 11 is flanged and removably secured, as at 12, to the filter-body and supports the conical-filter septum. This filter-septum consists of the perforated hopper 13 and the suitably-secured cotton duck or canvas cover 14 and is sustained out of contact with the surface of the bottom by perforated wooden supports 15.

The outlet-port and valved pipe 16 afford a regulated exit for the accumulated filtrate and in order to increase the rapidity of filtra-

tion is provided with a steam or air ejector nozzle 17. The gangue or other material is supplied at intervals through the valved feed-pipe 18. Valved pipe 19 may serve as a vent for the confined air or gas, so that the semi-liquid charge will completely fill the closed vessel, and the wash-water supplied through the pipe 20 will act in hydrostatic column to exert its pressure in aid of rapid filtration. For this purpose pipe 20 is connected to an overhead receiver (not shown) and is provided with a regulating-cock 21 and check-cock 22. It is also provided with the supply-valve 23 and the valved waste-pipe 24. If preferred, air may be introduced under pressure through the pipe 19, which will aid in rapid filtration and also in such cases as the extraction of gold and silver by the cyanide process materially aid the chemical action of the solvent in extracting any valuable portions remaining in the gangue.

To agitate the charge, so as to thoroughly expose it to the rinsing effect of the wash-water and to keep the filter clean for persistent separation and removal of the clear liquid, the contents of the vessel are placed under a forced circulation from end to end of the tank by means of the centrifugal pump 25 or other suitably-arranged means. The inlet of the pump is connected to the bottom of vessel by the elbow-pipe 26, opening into the space above the filter-septum. The exit-port of the pump connects with the valved return-pipe 27, connected to the feed-pipe 18. The pump operates to withdraw the mixed slime and liquid from the bottom of the vessel and return them anew to the top, thereby maintaining the charge in a constant state of agitation, while pressure is exerted to force the liquid past the filter to the outlet-port 16.

In order that the charge shall not in its circulation take the path of least resistance and pass directly from the inlet at the top to the outlet at the bottom, I successively interpose between the ends of the vessel the conical spreader 28 and the inverted conical baffle 29, both constructed, preferably, of wood. The baffle 29 is supported upon the filter-septum, but is held out of contact with the surface thereof by the projecting spiral flange 30. The spreader 28 rests upon the upper

edges of the filter-septum and the baffle and is provided at its edges with openings 31 for the passage of the charge. The spreader is held in place by the triangular space-blocks 5 32, secured to the walls of the vessel-body 10. In order that the pressure may be equalized on both sides of spreader and baffle, the lower end of the latter is provided with an opening 33. It will be observed that in the forced 10 circulation the charge is diverted by the spreader 28 to the top of the filter and intimately directed over the entire surface of the filter-septum by the baffle 29 and spiral flange 30, so that such surface is swept clear of 15 slime and the clear solution rapidly forced through the filter-cloth 14 and out the exit 16.

Valved exit-pipes 34 and 35 are provided, through which the vessel may be emptied—through the former by the aid of the pump 25 20 and through the latter by gravity.

The device may be used to wash not only metallurgical gangue, but wood paper-pulp and other like materials held in semiliquid suspension. The details of structure may be 25 varied by the mechanic's skill without departure from the essentials of the invention.

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

30 1. The combination with a vessel having a filter-septum and an outlet-port for the filtrate beyond such septum, of suitable means for establishing a circulation of the vessel contents and a baffle parallel to and adjacent 35 said septum to intimately direct such circulation over the surface thereof.

2. The combination with a vessel having a filter-septum and an outlet-port for the filtrate beyond such septum, of suitable means for 40 establishing an end-to-end circulation of the vessel contents above said septum, and a baffle interposed between the ends of the vessel parallel to and adjacent said septum, whereby the contents are forced into intimate 45 contact with the filter-septum.

3. The combination with a vessel having a filter-septum and an outlet-port for the filtrate beyond such septum, of suitable means for 50 establishing an end-to-end circulation of the vessel contents above said septum, and a spiral baffle interposed between the ends of the vessel and arranged adjacent said filter-

septum to intimately direct such circulation over the surface thereof.

4. The combination with a vessel having a 55 filter-septum and an outlet-port for the filtrate beyond such septum, of suitable means for establishing an end-to-end circulation of the vessel contents above said septum, and a baf- 60 ffe-plate having a projecting spiral flange interposed between the ends of said vessel and resting on said filter-septum to intimately direct such circulation over the surface thereof.

5. The combination of a vessel having a conical filter-septum and an outlet-port for the 65 filtrate beyond such septum, of means for establishing an end-to-end circulation of the vessel contents above said septum, and a conical baffle-plate having a projecting spiral flange 70 interposed between the ends of the vessel and resting on said conical filter-septum to intimately direct such circulation over the surface thereof.

6. The combination with a vessel having a filter-septum and an outlet-port for the filtrate 75 beyond such septum, of suitable means for establishing an end-to-end circulation of the vessel contents above said septum, a spreader and a spiral baffle successively interposed 80 between the ends of said vessel to intimately direct such circulation over the surface of said filter-septum.

7. The combination of a vessel having a conical filter-septum and an outlet-port for the 85 filtrate beyond such septum, of means for establishing an end-to-end circulation of the vessel contents above said septum, a conical spreader and an oppositely-facing conical baffle-plate having a projecting spiral flange 90 successively interposed between the ends of the vessel and arranged adjacent said conical filter-septum to intimately direct such circulation over the surface thereof.

8. The combination with a closed vessel having a filter-septum and an outlet-port for the 95 filtrate beyond such septum, of suitable means for establishing a circulation of the vessel contents under pressure above said septum, and an ejector-nozzle connected with said outlet-port.

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