

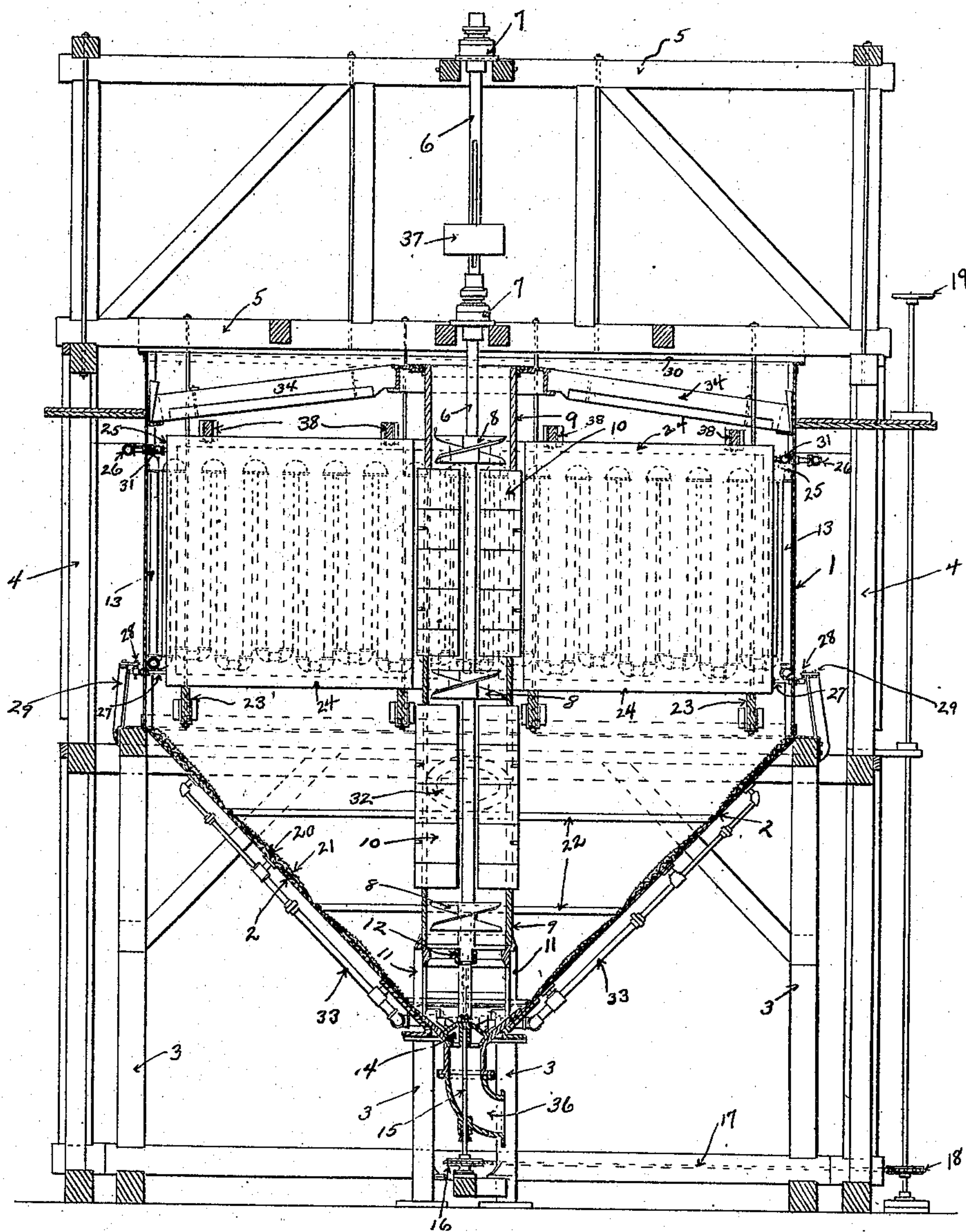
W. A. HENDRYX.
COMBINATION AGITATOR AND DECANTING FILTER.
APPLICATION FILED NOV. 9, 1907.

899,489.

Patented Sept. 22, 1908.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses:
R. M. Lous
Chas. P. Davies

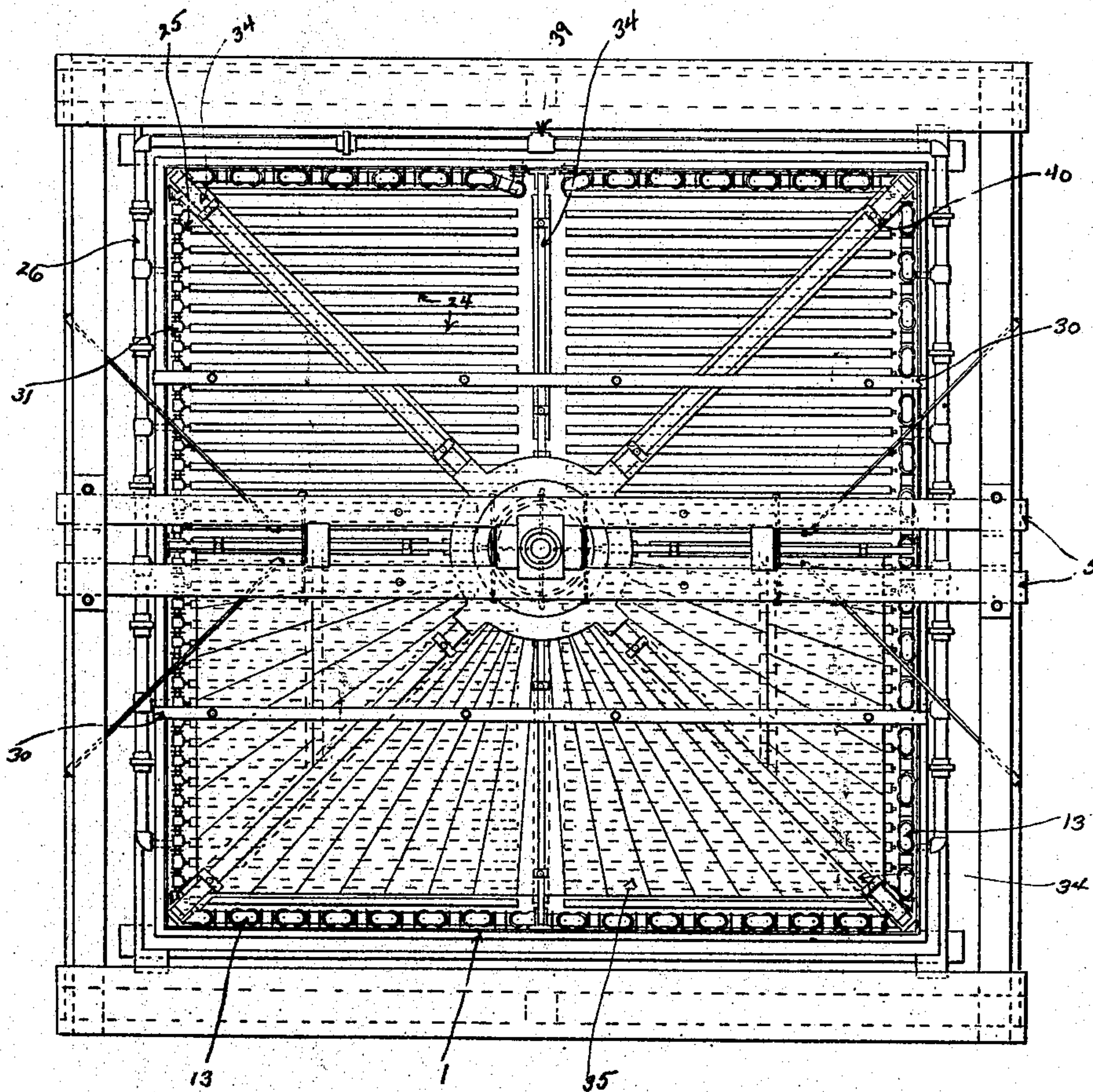
Inventor:
Wilbur A. Hendryx
By Leo R. Bishop
Att'y

W. A. HENDRYX.
COMBINATION AGITATOR AND DECANTING FILTER.
APPLICATION FILED NOV. 9, 1907.

899,489.

Patented Sept. 22, 1908
2 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
R. M. Lous
Chas. P. Davis

Inventor:
Wilbur A. Hendryx
By Leo D. Bishop
Att'y.

UNITED STATES PATENT OFFICE.

WILBUR ALSON HENDRYX, OF DENVER, COLORADO.

COMBINATION AGITATOR AND DECANTING-FILTER.

No. 899,489.

Specification of Letters Patent.

Patented Sept. 22, 1908.

Application filed November 9, 1907. Serial No. 401,465.

To all whom it may concern:

Be it known that I, WILBUR ALSON HENDRYX, a citizen of the United States, residing at Hotel Metropole, in the city of Denver, in the county of Denver and State of Colorado, have invented new and useful Improvements in a Combination Agitator and Decanting-Filter, of which the following is a specification.

10 This invention relates to apparatus for the treatment of ore-pulp or other solid materials by agitating the same with solvent or other liquids which are thereafter separated by filtration.

15 The object of the invention is the provision of an efficient apparatus for such treatment.

For a full understanding of my invention reference is made to the accompanying drawings illustrating a preferred embodiment thereof.

25 In said drawings Figure 1 is a central vertical section through the tank or vessel; and Fig. 2 is a plan view of the same, one-half of the aerating apron or spreader being removed, and a portion of the filter cell connections omitted.

Referring to the drawings, 1 represents a tank, illustrated as rectangular in form and as provided with a pyramidal bottom 2, converging to a substantially conical apex. The tank as represented is supported by suitable timbers 3. The upright supports 4 together with the horizontal supports 5 serve the purpose of securing in place the pumping or agitating mechanism within the tank. Upon the horizontal supports 5 are placed suitable bearings 7 which centralize and support the vertical shaft 6. Secured to this shaft are 40 one or more propeller blades or flights designated by numeral 8. Surrounding the shaft and propeller blades is an open-ended cylindrical well or casing 9, which in this case is located at or near the center of the tank.

45 Within the well 9 are substantially vertical flukes or ribs 10 located out of contact with the shaft and the propeller blades. At the lower end of the casing is placed a suitable bearing 12 for the shaft 6; this bearing is preferably made of rubber, and serves to hold the shaft in place as it revolves and to eliminate vibration. The cylindrical well or casing rests upon legs or supports 11, shown as four in number.

55 While I have represented the pumping or agitating mechanism within the tank, the

same may be located outside the tank, and in such case will be arranged to draw the pulp and liquid from the discharge 36, and to discharge the same onto the aerating apron or spreader, or into the tank when the apron is removed.

At or near the top of the tank are placed suitable supports 34 upon which rests the spreader or aerating apron 35. Conveniently located within the tank are coils of pipe 13 which serve the purpose of heating the pulp and liquid to the desired temperature by the use of steam, hot water or the like.

70 As illustrated in the drawings, the valve 14 is controlled and operated by means of the handwheel 19 which is connected to the valve by means of the sprocket wheels 16 and 18 and chain 17.

75 Numeral 20 is a support, conveniently of cocoa matting, placed upon the bottom of the tank. Over this support of cocoa matting I have shown a canvas covering 21 secured at its edges, and fastened down by means of strips or cleats 22. Horizontal supports 23 are located within the tank and carry filter cells designated by numeral 24. Near the top of the filter cells or communicating with the interior thereof are openings 85 25 which are connected up to mains 31 within the tank, and these to another and exterior system of mains 26. Near the bottom of the filter cells are located solution outlets 27 which pass through the tank and are controlled by valves 28 which are simultaneously actuated by a common lever system 29. The horizontal supports 30 extending across the tank aid in supporting the filter cells by means of vertical tie rods extending 95 to the supports 23. The filter cells are held in place and spaced by means of notched timbers 38.

32 is a manhole or opening in the tank bottom. The pulp discharge is represented by 100 numeral 36. Conveniently located at the bottom of the tank are suitable inlet pipes 33 communicating with the tank beneath the cocoa matting 20. The pulley 37 propels the shaft as represented in the drawings. 105

The method of operating the apparatus will vary in accordance with the character of the material to be treated and the nature of the operation to be performed upon it. As an example I will describe its application to 110 the treatment of ores: Crushed, ground or pulverized ore together with a liquid, usually

a suitable solvent solution, is run into the tank and heat is applied, if necessary, by supplying steam, hot water, or the like to the coils 13; or heat may be otherwise applied.

5 The pumping or elevating mechanism is then actuated to convey the liquid and pulp from the bottom of the tank and to distribute them in a comparatively thin layer over the aerating apron 35, the said aerating apron

10 providing a convenient means for the introduction of oxygen into the liquid, for example, into cyanid or into ferrous sulfate solutions. The liquid and pulp flow from the aerating apron back into the tank and

15 are again brought up by means of the pump. After the charge has been agitated for a suitable time the pumping is stopped and the solutions allowed to filter through the cells 24 and to pass out through the outlet openings 27 and the valves 28. At the same

20 time wash solutions, or water, are run in through the pipes 33 and under the canvas 21. The canvas serves the purpose of thoroughly and evenly distributing the inflowing

25 wash, so that there is practically no channeling of the pulp, but an even and thorough displacement of the liquid therefrom.

After the filtration has been operated for a suitable time, I close the valves 28 and intro-

30 duce wash solution, or water, through the opening 39 and through the pipes 26, 31 and 25 thereby dislodging the slimes or solid material which has collected on the filter cells. I then run in more wash solution

35 either at the bottom of the tank, or through the cells, or introduce it at the top of the tank, and again start the pump and agitate the mixture for a suitable time, when the operation of filtration is repeated. I may

40 agitate the mixture during the filtration, or I may agitate, filter, and run in wash solutions at the bottom at the same time.

While I have described the above general method of operation, I find that some ores

45 require a very different treatment to secure the best results, depending on the character of the ore. After the charge has been agitated, heated, aerated and filtered to the desired degree, I open the valve 14 and run the

50 contents either to waste or subject them to such further treatment as may be desired.

In this apparatus I prefer to use the filter cells described and claimed in my co-pending application, Serial No. 329,611, filed August

55 9th, 1906. Other forms of filter cells may however be used to advantage and I do not limit myself to this form. While I have shown a square tank, I may use a round tank such as that shown in my Patents, Nos. 785,214,

60 834,803 and 866,858.

The apparatus will be employed for the partial or complete recovery of the liquids

and of the ore values, depending upon the character of the ore. For certain ores and for certain methods of treatment the cocoa 65 matting and canvas covering on the bottom of the tank may be omitted.

I claim:

1. Apparatus for treating ore-pulp, comprising a tank, means for circulating and 70 aerating material therein heating means for the circulating material, a plurality of filter cells in position to be submerged in the material in said tank, and means for withdrawing liquid from the tank through said cells. 75

2. Apparatus for treating ore-pulp comprising a tank, means for circulating and aerating material therein, a plurality of filter cells in position to be submerged in the material in said tank, means for withdrawing 80 liquid from the tank through said cells, and means for distributing wash liquid in the lower portion of said tank.

3. Apparatus for treating ore-pulp, comprising a tank, means for circulating material therein, heating means for the circulating 85 material, a plurality of filter cells in position to be submerged in the material in said tank, and means for withdrawing liquid from the tank through said cells. 90

4. Apparatus for treating ore-pulp, comprising a tank, filter cells vertically disposed therein heating means for the contents of said tank, and external connections to the upper and lower portions of said filter cells. 95

5. Apparatus for treating ore-pulp, comprising a tank having a converging bottom and having circulating means, filter cells in position to be submerged in the material in said tank and a filter disposed above and 100 substantially parallel to the bottom of said tank.

6. Apparatus for treating ore-pulp, comprising a rectangular tank provided with circulating means, a plurality of filter cells in 105 said tank in position to be submerged in the material therein, and heating pipes in said tank.

7. Apparatus for treating ore-pulp, comprising a rectangular tank having a converging 110 bottom and provided with circulating means, heating means for the circulating material, a plurality of filter cells in said tank in position to be submerged in the material therein, means for withdrawing liquid from 115 the tank through said cells, and a discharge gate at the bottom of said tank.

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

WILBUR ALSON HENDRYX.

Witnesses:

R. M. LOWE,

CHAS. R. DAVIES.