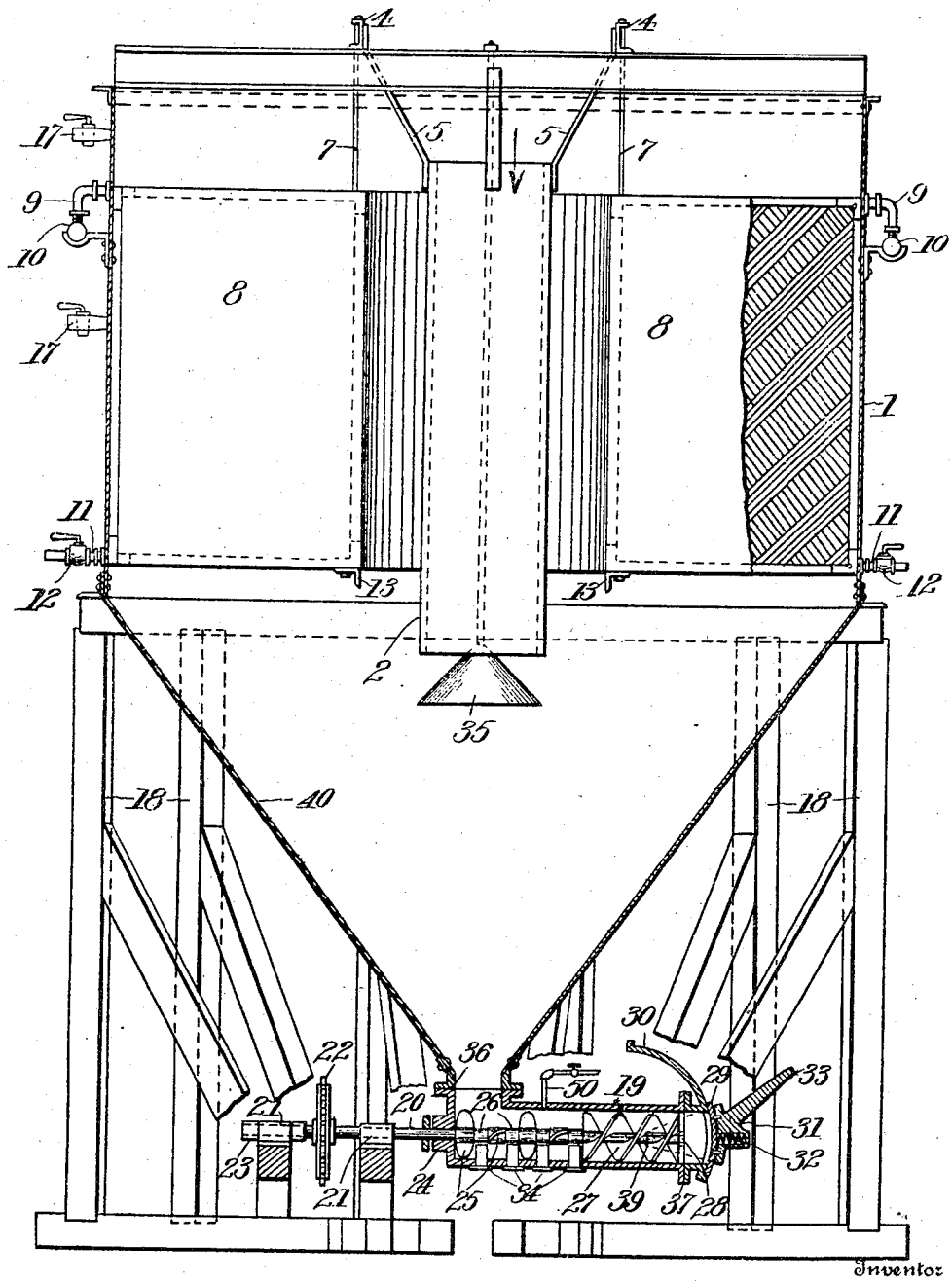
W. A. HENDRYX.

DEWATERING DEVICE.

APPLICATION FILED JUNE 12, 1909.

960,546. Patented June 7, 1910.



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DEWATERING DEVICE.

960,546. Specification of Letters Patent. Patented June 7, 1910.

Application filed June 12, 1909. Serial No. 501,879.

To all whom it may concern:

Be it known that I, WILBUR ALSON HENDRYX, 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 Dewatering Devices, of which the following is a specification.

My invention relates to a device applicable primarily to removing water or solutions from crushed or ground ore, though it is, of course, capable of use for effecting the separation of other solids from liquids in which they may be suspended or with which they may be associated.

For a full understanding of my invention reference is made to the accompanying drawing, wherein the figure is a central vertical sectional view of a preferred form of device.

Referring to the drawing 1 indicates a round tank having a converging bottom. For the purposes of this device the tank may be round, or square, or rectangular or of any desired shape. An inverted frustum of a cone or pyramid may be used with good results.

Extending across the top of the tank are beams 3, 4, and secured to these beams are straps 5, 6, which carry a centrally arranged filling tube 2. Surrounding this tube 2 are a number of filter cells 8, which may be radially arranged if the tank is circular in form, these filter cells being supported by an annular ring 13, which is hung by rods 7 from the beams 3, 4. Inlet pipes 9, connected to the supply main 10, and outlet pipes 11, for the cells pass through and are secured to the walls of the tank, these pipes affording additional supports for the filter cells.

12, 12 are valves for the outlet pipes 11.

I prefer to use filter cells of the kind shown in my Patent No. 885,047, granted April 21, 1908, and the representation here is accordingly more or less diagrammatic.

17, 17, are decanting cocks arranged at suitable heights on the tank.

35 is a deflecting cone or plate secured to the tube 2, and is designed to break the force of the stream of pulp as it is run into the tank. The tank itself is supported on a series of posts or standards 18, and extending downwardly from the circular or prismatic body-portion of the tank is a converging hopper 40. Secured to the open end of the hopper by a flange 36 is an L-shaped tube 19. A shaft 20, mounted in bearings 21 passes through a stuffing-box 24 into the horizontal portion of the tube 19. This shaft 20 is driven by a suitably operated sprocket-wheel 22, and has thrust collars 23 to prevent longitudinal movement. Within the tube 19, the shaft has secured to it a series of propeller blades 25, spaced apart by spacing rings 26, which blades may be considered as continuations of the conveyer screw 27, also secured to the shaft 20. These blades and the screw may be fastened to the shaft in any desired manner, as by squaring the shaft and providing the hubs which carry the blades and screw with a similarly shaped opening. A set collar or nut 28 is fitted on the squared end of the shaft. Passing through slots in the bottom of the tube 19 are ribs or flukes 34, extending upwardly between the blades 25, for the purpose of preventing rotation of the mass of pulp or tailings as it is being delivered through the tube 19.

Secured to the end of the tube is a valve mechanism comprising a curved valve plate 29, arranged to slide on a correspondingly curved guide plate 30, the valve plate 29 being held up to its seat by a spring 32 in the head 31, which is mounted on pivots 39 secured to the pipe 19. 33 is a suitable handle for operating the valve.

The manner in which my invention is operated depends upon the class of material to be handled. It is useful in metallurgical plants such as concentrating mills, cyanid mills, and in the filtration of solutions in treatment of ores. The flow of water and crushed ore, as in concentration plants may go continuously to this machine, in which case the water is taken off through the decanting cocks 17 or filter cells 8 while the thickened solids are removed by the mechanism at the bottom of the tank. In this case the water is returned for re-use. In cyanid mills my invention may be used to separate the water from the refuse pulp or tailings in order to save the water or solution for re-use or for the valuable chemicals in the solution, or it may be used to dewater the tailings in order to stack them, thereby keeping the same out of creeks whose waters are used for irrigation or domestic purposes. Poisonous chemicals,

such as cyanid, are kept out of rivers and creeks, thereby preventing the destruction of horses, cattle, fish and other animals.

One manner of operation of my invention in cyanid mills is as follows: Crushed ore together with water or solution is run into the tank through the tube 2. The ore is allowed to settle in the bottom of the tank while the liquid rises and passes off through the decanting cocks 17 or the filter cells 8, a considerable amount of settled solids being kept in the tank in the space beneath the cells to prevent the water or solids from running out. As soon as the tank contains sufficient settled solids the valve 29 is opened and the shaft 20 revolved slowly. The revolving sections of a screw 25 convey the solids onto the screw 27. The ribs or flukes guide the pulp and keep it from revolving around with the sections. The screw 27 conveys the pulp on out through the discharge valve 38. As the solids settle in the converging bottom of the tank they become more and more compacted and action of the propeller blades 25, ribs 34, and screw 27 in forcing the pulp through the partially opened valve, is to squeeze the moisture out of the solids and back up into the tank. This feature of preserving and recovering the liquids, while delivering the solids practically dewatered, is of particular importance in the treatment of materials in which the liquids may themselves be valuable or contain valuable ingredients. The density of the pulp when discharged can be further regulated by opening the valve 29 to a greater or less extent. When opened to its full extent, it permits free passage of the material, while a smaller opening causes the pulp or tailings to be more closely compacted. The discharged solids thus obtained can be conveyed away on a conveyer belt or in a car.

If the water or solution is clear enough it may be decanted off over the top of the tank or through the decanting cocks 17, the filter cells being omitted.

While I have shown the sections of a screw 25, ribs 34, and screw 27, I may use one continuous screw or several propellers attached to the shaft, the purpose of this mechanism being to convey the settled solids out of the tank while at the same time convey the same under pressure, thereby discharging pulp containing a low percentage of moisture.

In some instances, it may be necessary to lubricate the solids as they are being delivered through the tube 19. For this purpose I provide a valved-pipe 50, through which water, in small quantities, may be introduced.

While I have shown a gate or valve at the delivery end of the tube 19 in order to regulate or control the pressure which the screw may exert to compact the solids, other means capable of exerting a restraining effect on the material issuing from such tube, may be used.

I claim:

1. An apparatus comprising a receptacle, an imperforate delivery tube connected to the bottom thereof, a valve for controlling delivery from said tube, and power actuated means for forcing material through said tube.

2. An apparatus comprising a receptacle, a delivery tube connected to the bottom thereof, a valve for controlling delivery from said tube, a screw conveyer for forcing material through said tube, and means for preventing rotation of the material in said tube.

3. An apparatus comprising a receptacle, a delivery tube connected to the bottom thereof, a conveyer mounted in said tube and comprising spaced propeller blades, and means interposed between the blades for preventing rotation of material in the tube.

4. An apparatus comprising a receptacle, a delivery tube connected to the bottom thereof, a conveyer mounted in said tube and comprising spaced propeller blades, and fixed ribs secured to the tube and interposed between the blades for preventing rotation of material in the tube.

5. The combination of a receptacle, a delivery tube connected with the bottom thereof, a conveyer mounted in said tube, said conveyer comprising a series of spaced propeller blades and a screw mounted on the same shaft, and means secured to the tube and located between the spaced blades for preventing rotation of the material.

6. The combination of a receptacle, a delivery tube connected with the bottom thereof, a conveyer mounted in said tube, said conveyer comprising a series of spaced propeller blades and a screw mounted on the same shaft, means secured to the tube and located between the spaced blades for preventing rotation of the material, and a valve or gate at the mouth of the tube.

7. The combination of a receptacle having an imperforate delivery tube connected to the bottom thereof, a conveyer in said tube, and a valve or gate for controlling the size of the delivery opening.

8. The combination of a receptacle having an imperforate delivery tube connected to the bottom thereof, a conveyer in said tube, and a sliding valve or gate for controlling the size of the delivery opening.

9. The combination of a receptacle having an imperforate delivery tube connected to the bottom thereof, a conveyer in said tube, and a sliding spring-pressed valve or gate for controlling the size of the delivery opening.

10. The combination of a receptacle having a delivery tube connected to the bottom

thereof, a conveyer in said tube, and a curved sliding valve or gate for controlling the size of the delivery opening pivotally mounted on the tube.

11. A device for separating liquids from solids comprising a receptacle, a series of filter cells mounted therein, said receptacle having a converging lower portion, an imperforate delivery tube therefor, and a screw-conveying device for forcing the solid material through the tube.

12. A device for separating liquids from solids comprising a receptacle, a series of filter cells mounted therein, said receptacle having a converging lower portion, an imperforate delivery tube therefor, a screw-conveying device for forcing the solid material through the tube, and a valve or gate for controlling the size of the delivery opening.

13. A tank for treating ores, comprising a body-portion, filter-cells arranged therein, a converging bottom having an imperforate delivery tube in its lower portion, and means for forcing the solids under pressure through said tube.

14. A tank for treating ores, comprising a body-portion, filter-cells arranged therein, a converging bottom having an imperforate delivery tube in its lower portion, means for forcing the solids under pressure through said tube, and means for regulating the pressure exerted on the material in the tube.

15. A dewatering apparatus comprising a receptacle, an imperforate delivery tube connected to the bottom thereof, power actuated means for forcing material through said tube, and means at the end of said tube for controlling the delivery therefrom.

16. A dewatering apparatus comprising a receptacle, an imperforate delivery tube connected to the bottom thereof, a screw for forcing material through said tube, and means at the end of said tube for controlling the delivery therefrom.

17. An apparatus comprising a receptacle, filter-cells therein, a delivery tube connected to the bottom thereof, a valve for controlling delivery from said tube, a screw conveyer for forcing material through said tube, and means for preventing rotation of the material in said tube.

18. An apparatus comprising a receptacle, filter-cells therein, a delivery tube connected to the bottom thereof, a conveyer mounted in said tube and comprising spaced propeller blades, and means interposed between the blades for preventing rotation of material in the tube.

19. An apparatus comprising a receptacle, filter-cells therein, a delivery tube connected to the bottom thereof, a conveyer mounted in said tube and comprising spaced propeller blades, and fixed ribs secured to the tube and interposed between the blades for preventing rotation of material in the tube.

20. The combination of a receptacle, filter-cells therein, a delivery tube connected with the bottom thereof, a conveyer mounted in said tube, said conveyer comprising a series of spaced propeller blades and a screw mounted on the same shaft, and means secured to the tube and located between the spaced blades for preventing rotation of the material.

21. The combination of a receptacle, filter-cells therein, a delivery tube connected with the bottom thereof, a conveyer mounted in said tube, said conveyer comprising a series of spaced propeller blades and a screw mounted on the same shaft, means secured to the tube and located between the spaced blades for preventing rotation of the material, and a valve or gate at the mouth of the tube.

22. The combination of a receptacle, filter-cells therein, a delivery tube connected to the bottom thereof, a conveyer in said tube, and a curved sliding valve or gate for controlling the size of the delivery opening pivotally mounted on the tube.

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

WILBUR ALSON HENDRYX.

Witnesses:

N. P. LEONARD,

C. W. FOWLER.