

J. B. GREEN.
SLIME FEEDING DEVICE FOR CONCENTRATORS.
APPLICATION FILED JUNE 2, 1909.

941,918.

Patented Nov. 30, 1909.

2 SHEETS—SHEET 1.

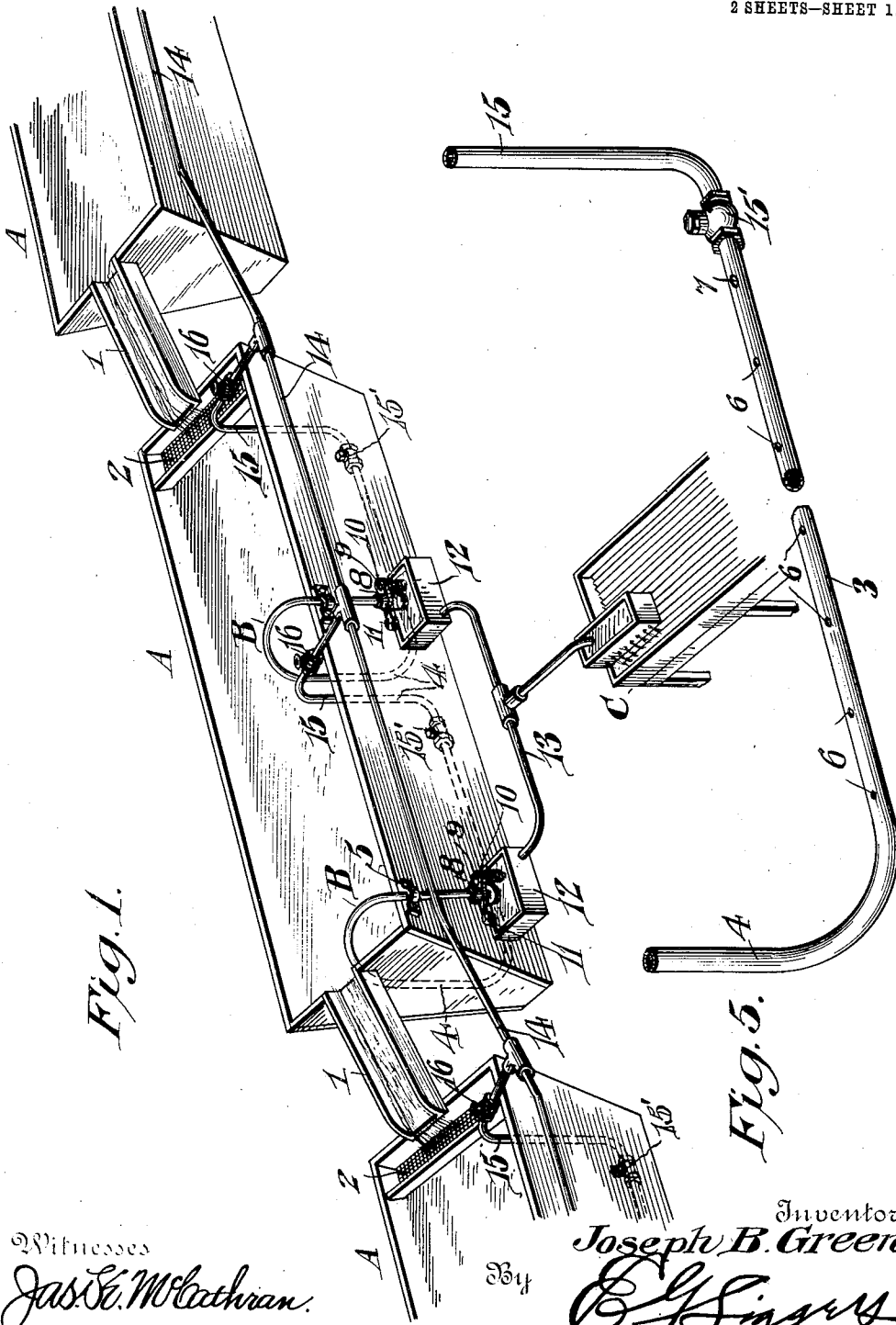


Fig. 1.

Fig. 5.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

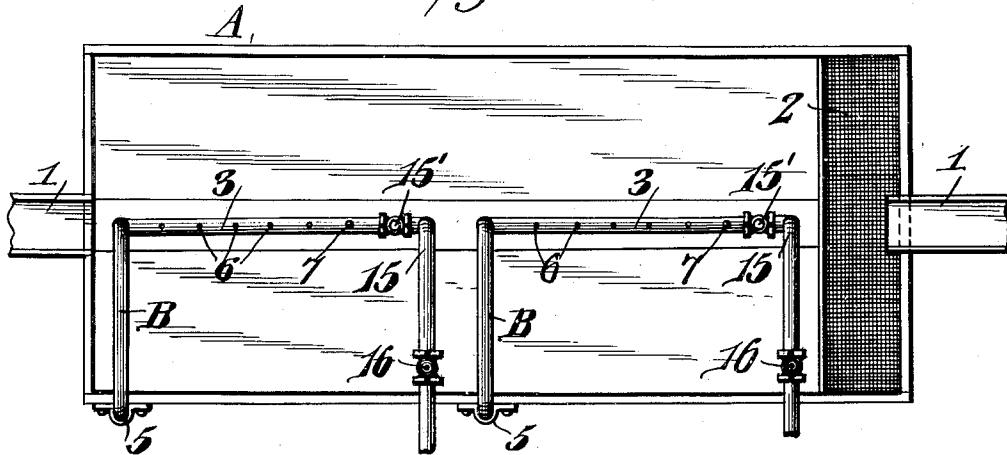


Fig. 3.

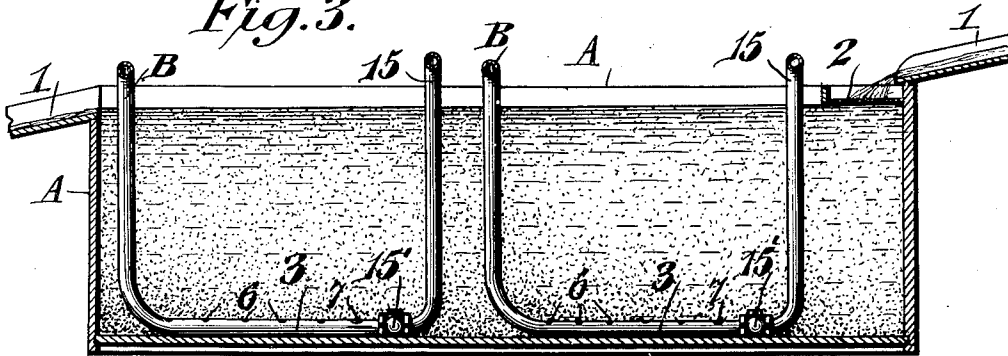


Fig. 8.

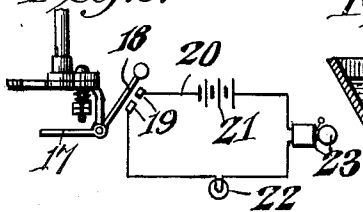


Fig. 4.

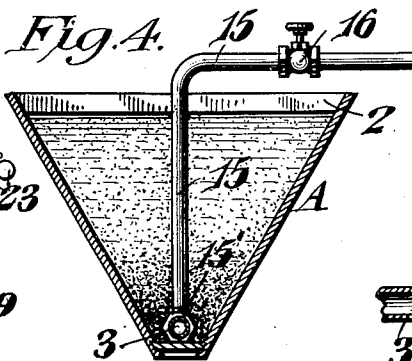


Fig. 7.

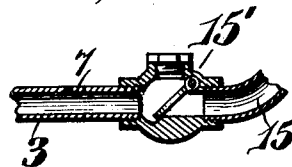
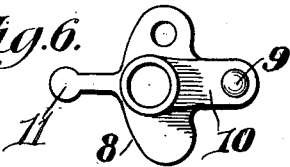


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOSEPH B. GREEN, OF WALLACE, IDAHO, ASSIGNOR OF ONE-FOURTH TO HARVEY A. HOUSTON AND ONE-FOURTH TO HENRY LIEB, BOTH OF WALLACE, IDAHO.

SLIME-FEEDING DEVICE FOR CONCENTRATORS.

941,918.

Specification of Letters Patent.

Patented Nov. 30, 1909.

Application filed June 2, 1909. Serial No. 499,631.

To all whom it may concern:

Be it known that I, JOSEPH B. GREEN, a citizen of the United States, residing at Wallace, in the county of Shoshone and State of Idaho, have invented a new and useful Slime-Feeding Device for Concentrators, of which the following is a specification.

This invention relates to an apparatus for feeding slime from settling tanks to the concentrators or separators of a mill, and the invention relates more particularly to improvements in siphonic feeding devices disclosed in my prior application, Serial No. 469,288, filed December 26, 1908.

The object of the present invention is to provide a siphonic feeding device which is especially adapted for removing the settlings from tanks in which the percentage of slime in the water is comparatively small, so that the use of single siphons arranged at intervals along the settling tanks, as contemplated in my prior application, would be to a degree impracticable because of the large number of siphons required, and although the present siphon is particularly useful for thin slimes, it, nevertheless, can be used for thicker slimes as well.

Another object of the invention is the arrangement of a water supplying device for operating as a siphon starter or means for preventing clogging of the siphon, or an agitator in the bottom of the settling tank when, for any reason, it is necessary to stop the feed to a concentrator, as when the latter is shut down for repair or the like, the advantage being to prevent settling of the slime over the inlet portion of the siphon.

A further object is the employment of a signal device whereby the attendant is warned when any siphon becomes clogged or otherwise inoperative, so that he can immediately correct the conditions without unnecessary delay.

In the accompanying drawings, which illustrate one embodiment of the invention, Figure 1 is a perspective view of a settling tank with the improved slime feeding apparatus applied. Fig. 2 is a plan view of the tank. Fig. 3 is a longitudinal central section thereof. Fig. 4 is a transverse section of the tank. Fig. 5 is an enlarged perspective view of the siphon with portions broken away. Fig. 6 is a detail view of the gate valve for the siphon. Fig. 7 is a sectional

view of the check valve between the siphon and its water supply pipe. Fig. 8 is a diagrammatic view of the electric signaling means for the siphon.

Similar reference characters are employed to designate corresponding parts throughout the views.

Referring to the drawings, A designates a plurality of settling tanks arranged in the usual manner to discharge one into the other and connected together by discharge spouts 1 whereby the slime-containing water passes successively through the tanks, each tank having a strainer 2 for removing any foreign matter from the water. In each tank is arranged at least one siphonic slime-removing device designated generally by B, the number of such devices depending upon the length of the tank and the richness of the slime in the water, some siphons being comparatively short and others long according to operating conditions.

Each slime-removing or feeding device comprises a pipe 3 extending along the bottom of the tank longitudinally thereof and having one end formed into a riser 4 which is bent laterally over one side of the V-shaped tank and is held in place by a bracket 5 or other securing means. This pipe, which is usually about three-quarters of an inch in diameter, is provided with a plurality of small apertures 6 arranged at short intervals along the horizontal portion thereof for admitting the slime, and the aperture 7 at the end remote from the discharge leg of the siphon is much larger than the other apertures so as to provide for a free flow of water through the horizontal limb of the siphon. The combined area of these apertures is about the same as the area of the discharge end of the siphon, and when any one or more apertures become clogged, the siphon will cease to operate so that the attendant will then be required to flush out the siphon, the manner of doing so being hereinafter more fully described. On the outer end is arranged a gate valve 8 whereby the flow through the siphon can be regulated or entirely cut off. The gate valve is fulcrumed at 9 on a bracket 10 carried by the siphon and is equipped with a handle 11 to operate the same. Under the discharge end of the siphon is a feed box 12 which is connected by spouting 13 with a separator C of

any approved construction. Any number of siphons may be connected with the separator, as may be found desirable in practice.

Extending along the settling tanks is a water supply pipe 14 that is connected with a source of water under pressure and each siphon is connected with this pipe by a branch 15 which extends inwardly over the side of the tank and downwardly to the bottom thereof for attachment with the siphons. The apertured inlet pipe 3 is thus formed with risers at opposite ends, one forming the suction leg of the siphon and the other the portion of the water supply pipe. Between the point of connection of the branch pipes and siphons are check valves 15' which open toward the siphon and close toward the supply pipe. Each branch pipe is equipped with a hand-operated cut-off valve 16 which, upon being opened, allows water to pass into its respective siphon for any of three purposes. The water supply is used for starting the siphon and in this case the water passes completely through the siphon and thereafter the valve 16 can be closed and the siphon will continue to operate by its own suction. If while in operation, the siphon becomes clogged, the water valve 16 can be opened and the gate valve closed so as to thereby flush out the siphon and open the apertures 6 and 7 thereof. And again, if the concentrator is out of commission, for any reason, the water supply pipes of the siphons connected with such concentrator can be opened so as to maintain a flow of water out of the apertures of the siphons and thus agitate the slime and prevent the latter from settling and caking over the inlet portions of the siphons. Siphons of this character used in connection with the form of siphon disclosed in my prior application greatly increase the output of the slime over methods heretofore proposed and at the same time less attention is required to keep the feeding apparatus operating.

It is extremely important that the attendant should be made aware of the clogging of any feeding device without delay, so that the efficient operation of the concentrator will not be impaired. For this purpose, the signal device shown in Fig. 8 may be employed which consists of a lever 17 or equivalent means located in the path of the liquid discharge through the siphon to control a circuit closer. This circuit closer is open as long as the water is flowing, and as soon as the water stops as by clogging of the siphon, the circuit closer will complete a signal circuit. Attached to the lever is an arm 18 that forms a bridging contact for engaging the fixed contact post 19 connected with a circuit 20 that includes a battery 21 and a suitable signal such as a lamp 22 or bell 23. As soon as the circuit is closed, the signal will be energized to warn the attendant that the

siphon is stopped and that his attention is required. The siphon can then be flushed out in the manner heretofore described without leaving any substantial break in the operation of the concentrator.

In the present instance, a single concentrator is shown in connection with a single settling tank to receive the slime therefrom by means of the siphons operating simultaneously. In extremely long tanks, it may be necessary to use more than a single concentrator for each tank with a group of siphons for each concentrator. It has been found, by actual practice, that a single concentrator can treat the slime or pulp fed by the siphons from a sixty-five foot settling tank, whereas with the same tank operating under like conditions, it is necessary to employ five concentrators when the slime is drawn off through plugs placed in the bottom of the tank after the method heretofore in general use in slime mills. Since the siphons remove the slime from the tank in the region where it is thickest, that is to say, immediately at the bottom of the tank, and since the head under which the siphons operate is about one-third the depth of the water in the tank, the feed to the concentrator is of such thickness that very little slime is carried off with the water from the concentrator and the collection of slime is almost double that of the five concentrators operating under the plug method of removing the slime.

From the foregoing description, taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the apparatus which I now consider to be the best embodiment thereof, I desire to have it understood that the apparatus shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims appended hereto.

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

1. The combination of a settling tank of V-shaped cross section having an inlet at one end and an outlet at the other end, with a slime-discharging siphon having the lower end of its suction limb provided with an inlet section extending longitudinally along the bottom of the tank in the direction of flow of the slime-containing liquid in the latter and extending through the region of settled slime, said inlet section having a plurality of apertures through which slime is drawn into the siphon.

2. The combination of a settling tank, with a siphon having an outlet portion dis-

posed exterior to the tank and having an inlet portion extending longitudinally of and within the tank at the bottom, said inlet portion having a plurality of longitudinally spaced suction apertures.

3. The combination of a settling tank, an apertured pipe extending longitudinally thereof and within the region of settled slime, a siphon connected with one end of the pipe for drawing slime through the latter, a water supply conduit connected with the pipe at the end thereof opposite from the siphon, means for controlling the water supply, and means for controlling the siphon whereby the latter can be started or flushed out or the settlings in the tank maintained in an agitated state while the siphon is idle.

4. The combination of a settling tank, a siphonic slime-discharging means having its inlet arranged within the region of settled slime in the tank, a valve controlled water supplying device connected with the inlet end of the siphon for discharging water entirely through the latter, and a valve for closing the outlet end of the siphon for discharging water into the tank through the inlet of the siphon for preventing settling of the slime over said inlet when the siphon is idle.

5. The combination of a settling tank, a pipe arranged within and extending along the bottom thereof and having a plurality of longitudinally-spaced apertures, risers on the ends of the pipe, one riser forming a siphon, a water supply pipe connected with the other riser, and a valve controlling the supply of water from the last-mentioned pipe.

6. The combination of a settling tank, with a device for removing the settled slime from the tank, said device comprising a pipe arranged within and extending along the

bottom thereof and having a plurality of longitudinally spaced apertures, risers on the ends of the pipe, one riser forming a siphon, a water supply pipe connected with the other riser, a valve controlling the supply of water from the last-mentioned pipe, and a gate valve on the siphon.

7. The combination of a settling tank, with a plurality of siphons each having a horizontal inlet portion arranged in the region of settled slime therein, the inlet portions of the siphons being disposed in different parts of the tank, and a common water supply system connected with the horizontal portions of all the siphons for starting the latter and maintaining them in operative condition.

8. The combination of a settling tank, an apertured pipe extending longitudinally within the tank and having upwardly-extending terminal members extending out of the tank and one of the members forming a siphon, a gate on the siphon, and a valve-controlled water feed pipe connected with the other member.

9. The combination of a settling tank, an apertured pipe in the bottom thereof, a siphon connected with one end of the pipe, a water supply pipe connected with the opposite end of the pipe, a check valve between the two pipes opening in a direction to permit water to flow from the supply pipe to the apertured pipe, and a gate valve on the siphon.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOSEPH B. GREEN.

Witnesses:

JOHN H. SIGGEERS,
EDITH L. BROWN.