W. E. DARROW.

HYDRAULIC CLASSIFIER FOR SEPARATING SAND AND SLIME.

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Fig. 2

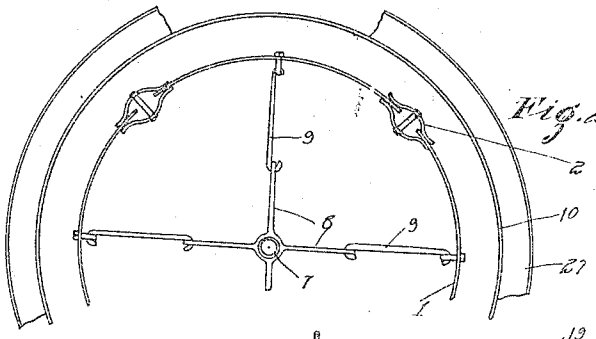
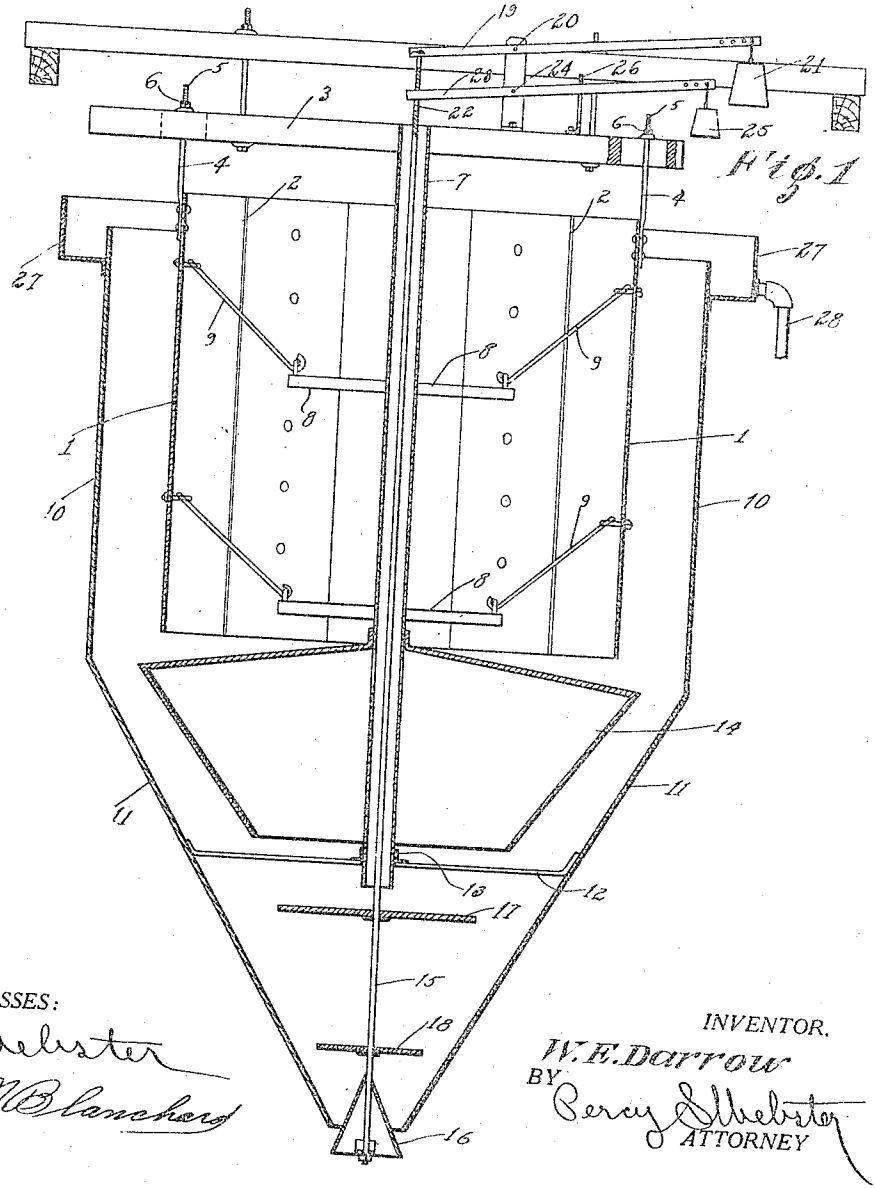


Fig. 1



WITNESSES:

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HYDRAULIC CLASSIFIER FOR SEPARATING SAND AND SLIME.

1,106,630. Specification of Letters Patent. Patented Aug. 11, 1914.

Application filed March 4, 1914. Serial No. 822,336.

To all whom it may concern:

Be it known that I, WILTON E. DARROW, a citizen of the United States, residing at Sutter Creek, in the county of Amador, State of California, have invented certain new and useful Improvements in Hydraulic Classifiers for Separating Sand and Slime; and I do declare the following to be a clear, full, and exact description of the same, reference being had to the accompanying drawing, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in classifiers for separating the slime and sand from crushed ores, delivering the slime free of the sand to a suitable receptacle from whence such slime may be carried to the concentrating trays for treatment, the washed sands being taken off at another point for cyanid treatment in leaching vats or such other treatment as may be desired.

The present invention embodies a means for washing the crushed ore as it comes from the mill to separate the said sand and slime, the mechanism being adjustable to control the flow of the sand, slime and water as it comes from the mill and of the clear water used for washing purposes in such a manner as to give accurate results and the invention further embodies an automatic adjustment for holding the sand in the washing vat in proportion to the amount of sand, water and slime coming from the mill, whereby the flow of the washed sand through the bottom of the washing vat will be so automatically controlled that only perfectly clean sand will pass therethrough so that there will no loss of slime.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects, I accomplish by means of such structure and relative arrangement of the parts as will fully appear by a perusal of the following specification and claims.

On the drawings, similar characters of reference indicate corresponding parts in the several views.

Figure 1 is a sectional view of the complete classifier. Fig. 2 is a top plan view of a fragmentary portion of the classifier.

Referring now more particularly to the characters of reference on the drawings, I first provide a receiving or distributing receptacle which comprises a plurality of semi-circular segments 1, the free ends of such segments projecting between friction spring members 2 whereby the said segments 1 may be slipped between the springs 2 to increase or diminish the diameter of the distributing receptacle in a manner and for a purpose as will presently appear. Such distributing receptacle is suspended from a supporting beam or other structure 3 by means of upwardly projecting rods 4 secured to the segments 1 at their lower ends and projecting through said beam 3 at their upper ends, such upper ends being threaded, as at 5, to receive nuts 6, such nuts bearing against the beam 3 whereby when said nuts are advanced on said threaded portion 5, this will pull the rods 4 to pull the segments 1 upwardly and with the upward movement of said segments 1 they are contracted inwardly to lessen the diameter of the distributing member by means of the following structure, namely: A pipe 7 projects centrally through the distributing member and is provided with a pair of projecting frame members 8 to which frame members 8 are engaged links 9, the other ends of said links 9 engaging the members 1, the connections between the members 9 and 8 and 9 and 1 being flexible to allow of the movement of the parts. Then when the said members 1 are pulled upwardly, the links 9 being connected to the rigid frame members 8 tend to pull inwardly on the segments 1 causing said segments to slip between the spring members 2 to decrease the diameter of the distributing member or vice versa if the members were lowered these links 9 would pass outwardly against them to increase the diameter of the distributing member, all for a purpose as will presently appear.

The distributing member 1—2 projects into a receiving vat comprising an upper cylindrical portion 10 having a funnel-shaped lower end 11. In the portion 11 are inwardly projecting supporting brackets 12 having a central collar 13 through which the pipe 7 projects to hold the same properly centered. Secured rigidly to the pipe 7 below the distributing member 1—2 and projecting in a plane beyond the plane of the edges of said distributing member is an inverted conical chambered member 14 forming a spreader for the sand and slime

and being spaced from the side walls of the member 11 in such a manner as to form an equal area of space between said member 14 and said member 11 from the lower to the upper end of said member 14.

Projecting centrally through the pipe 7 is a rod 15, which rod is provided at its lower end with a conical stopper or plug 16 adapted to form a valve to control the opening or closing of the lower end of the member 11. On this rod 15 below the lower open end of the pipe 7 is a pair of spaced disks or plates 17 and 18 respectively. On the upper end of the rod 15 is connected a lever 19 fulcrumed at 20 and provided with a weight 21 at its outer end. The rod 15 is provided at a point below the connection of the lever 15 with a slot 22 through which projects a lever 23, which lever is fulcrumed at 24 and provided with a weight 25 at its outer end. Said lever 23 beyond its fulcrum point moves in a slotted guide 26 which limits the movement of such lever in a manner and for a purpose as will presently appear.

Disposed around the upper end of the member 10 is a receiving trough 27 having its sides of a greater height than the top edge of the member 10, which receiving trough is provided with any suitable discharge outlet 28.

In practice, the water, sand and slime passing from the crushing mill is delivered into the distributing member 1—2 where it passes out between the lower end of said distributing member and the member 14, the lighter water and slime rising between the sides of the distributing member 1—2 and the sides of the member 10 and flowing over the top of the member 10 into the receptacle or trough 27. The heavier sands, mixed with a proportion of the slime, tend to fall down through the space between the member 14 and the sides of the member 11 and a current or stream of clear water is directed through the pipe 7. The force of this clear water directs itself through the space between the member 14 and the member 11 in equal proportions due to the area of such space being the same for the entire circumference thereof and this force of clear water passing through the sand moving downwardly through said space washes all the slime off of the sand and carries it up between the distributing member and the member 10 and over the upper edge of the member 10 into the trough 27 from which it is conducted to any suitable place through the discharge outlet 28 for further treatment. The direction of this clear stream of water is maintained upwardly instead of downwardly through the opening in the lower end of the member 11 by means of the following automatically controlled structure, namely: The weight of the sand falling into the member 11 is sustained in a measure by the disks 17 and 18, which weight of the sand under ordinary conditions is sufficient to overcome the weight of the levers 21 and 25 to hold the valve 16 open to such a degree as to admit of the discharge of but a small proportion of the sand and water through the said opening in the member 11 whereby the greater proportion of the force of water will be directed upwardly as set forth above, only a sufficient amount moving downwardly to carry the sand gradually through the opening controlled by the valve 16. If the full capacity of the classifier is lessened, then of course the weight of the sand on the members 17 and 18 would tend to lessen and if there were no means for automatically controlling the opening in the member 11, the force of the water would become so great as to drive all the sand, slime and other material downwardly through the opening in the member 11 thus rendering the classifier inoperative. To overcome this objection however I have provided the lever and weight mechanism at the top of the classifier, the operation of which is as follows: When the weight of the sand on the members 17 and 18 lessens, the weight of the two members 21 and 25, acting on their fulcrum points 20 and 24 respectively, tend to pull the rod 15 and consequently the valve 16 upwardly thus lessening the size of the opening in the member 11. This action of both of the weights 21 and 25 terminates when the lever 23 strikes the bottom of the slotted guide 26 and this position of the parts would then be maintained until the weight of sand increased or diminished. If it increased, the valve 16 would open again to full capacity, but if the weight of the sand decreased, then the weight 21 would become heavier than the weight of the sand and would cause the lever 19 to pull independently on the rod 15 (this independent movement being permitted by reason of the slot 22) and would thus act to close the valve 16 entirely or to such a degree as to prevent too great a flow of the water downwardly through said opening in the member 11 which would tend to carry the sand and slime through such opening instead of separating the sand and slime.

As will be readily conceived, it is necessary that the areas between the distributing member 1—2 and the member 14 and between said distributing member 1—2 and the member 10 be adjusted very nicely to cause the proper separation of the slime and sand at that point and similarly the space between the member 14 and the member 11 must be nicely adjusted so that the flow of the current of water therethrough will be of such force as to only wash the slime from the sand leaving the sand free to drop down into the lower end of the member 11. To this end, the member 1—2 is adjustable vertically and

diametrically in the manner set forth and further, the member 3 carrying the pipe 7 and member 14 may be raised or lowered, such pipe being guided through the collar 13 to keep it centered and then the automatic adjustment described provides for the lessening or increasing amount of material, received from the crushing mill.

From the foregoing description it will readily be seen that I have produced such a device as substantially fulfils the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice, such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention.

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

1. A device of the character described comprising a casing having a valve controlled lower end, a pipe projecting centrally into said casing, a spreader on said pipe having its sides spaced from the sides of said casing, a distributing receptacle disposed above such spreader and having its sides spaced from the sides of said casing, a rod projecting centrally through said pipe and connected with the valve at the lower end of said casing, a pair of spaced disks on said rod below said pipe and a weight controlled lever mechanism mounted on the upper end of said rod, as described.

2. A device of the character described comprising the combination of a casing having a valve controlled lower end, a spreader disposed within said casing, a pipe discharging below said spreader, a distributing receptacle disposed above such spreader, such receptacle comprising segmental sides slidably joined circumferentially with respect to each other, means for raising or lowering said segmental members and means for moving said segments through their sliding connection whenever they are raised or lowered whereby the diameter of said receptacle will be lessened or increased respectively, as described.

3. A device of the character described comprising a casing having a valve controlled opening in its lower end, a spreader disposed within said casing, a pipe discharging below such spreader, a distributing receptacle disposed above said spreader, means for raising and lowering said receptacle and means for lessening or increasing the diameter of said receptacle respectively as it is raised or lowered, as described.

4. A device of the character described comprising a casing having a valve controlled opening in its lower end, a pipe disposed centrally into said casing, an inverted cone shaped spreader disposed on said pipe, a distributing receptacle disposed above said spreader, said receptacle comprising segmental sides slidably joined at their free edges, arms rigidly connected to said pipe, links flexibly connected with said rigid arms and with said segmental members, and means for raising or lowering said segmental members, as described.

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

WILTON E. DARROW.

Witnesses:
STEPHEN N. BLEWETT,
FLOYD M. BLANCHARD.