M. P. BOSS.

ORE CONCENTRATOR AND CLASSIFIER.

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959,838.

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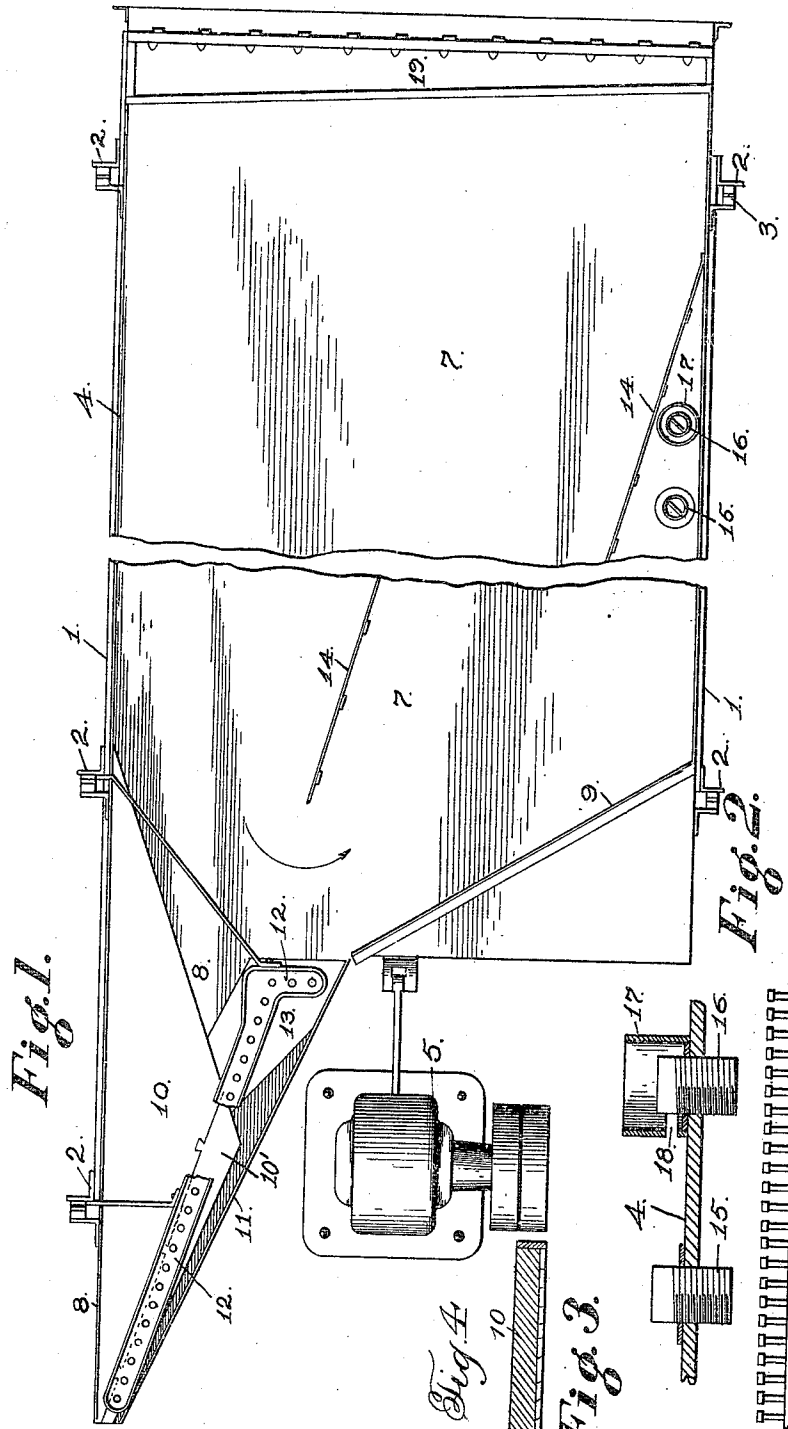

Fig. 1.

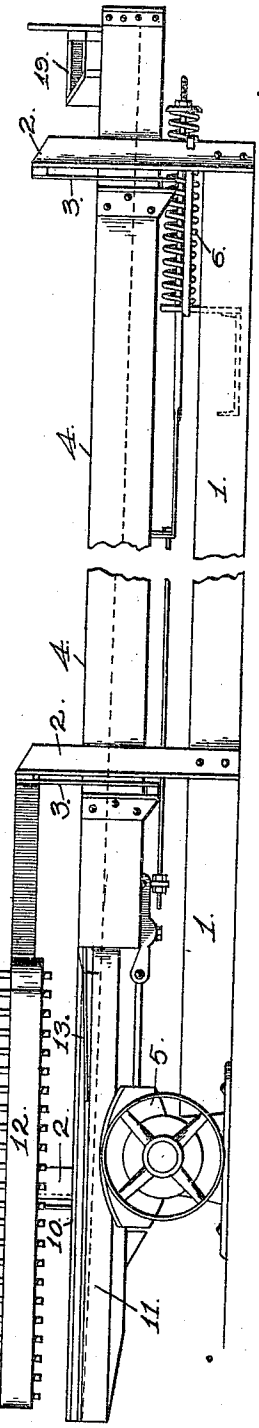

Fig. 2.

Fig. 3.

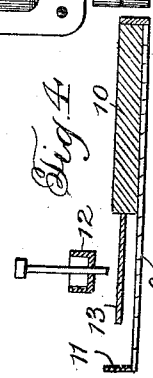

Fig. 4.

WITNESSES.

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ORE CONCENTRATOR AND CLASSIFIER.

959,838. Specification of Letters Patent. Patented May 31, 1910.

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To all whom it may concern:

Be it known that I, MARTIN P. BOSS, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Ore Concentrators and Classifiers, of which the following is a specification.

My invention relates to the class of shaking-table ore-concentrators.

The objects of my invention may be briefly and generally stated to be, first, to provide for an effective separation of the concentrates from the ore-pulp; second, to provide for the classified discharge of said concentrates; and, third, to provide for the classified discharge of the separated liquid pulp made up of the original water and slimes.

To these ends my invention consists in the novel construction and arrangement of parts which I shall hereinafter fully describe, by reference to the accompanying drawings in which—

Figure 1 is a plan view, broken, of my ore-concentrator and classifier. Fig. 2 is a side view, broken, of the same. Fig. 3 is a sectional detail, enlarged, showing the classifying discharges for the unprecipitated portion of the pulp. Fig. 4 is a transverse section of the extended end of the apparatus.

1 is a frame from which rise standards 2, both frame and standards being preferably of angle-iron. By means of hangers 3 depending from the standards 2, the concentrating table 4 is suspended. To said table is imparted an end-shake, by means of a suitable cam, eccentric, crank, or other such device, indicated by 5, which is connected with one end of the table, and suitable resisting springs 6 connected with the other end of the table.

The table 4 comprises a tray portion 7 and an extension portion 8. The bottom of the tray portion may be made of any suitable materials, such, for example as transverse matched boards covered with linoleum, and said bottom slopes upwardly, relatively to the sides of the tray, from its receiving end to its delivery terminal, where it communicates with the extension portion; that is to say, the tray portion is deepest at its receiving end.

The tray portion leads to and communicates with the extension portion 8 by converging walls, one of which is a diagonal flange 9, and the other is a portion of one edge of a plate or bench 10 of triangular outline, the remainder of said bench serving to form one upstanding side of the functional channel of the extension portion, the opposite side of said channel being formed by a continuous upstanding overflow flange or weir 11, which joins the flange 9 of the tray portion, and thence inclines obliquely to narrow the extension channel to its outer end. The shape of the bench 10 and its relation to the overflow flange 11 are such that the channel of the extension portion opens, at its greatest width, from the converging delivery terminal of the tray portion, and thence narrows symmetrically and rapidly for a portion of its length until it forms a narrow passage very gradually decreasing in width, to its outer end. The bottom of this whole extension channel slopes upwardly, relatively to its sides, from its junction with the tray portion, to its outer end; that is to say, said channel is deepest where it joins the tray portion and is shallowest at its outer end.

Over the bench 10 of the extension portion is a wash water box 12, said box projecting beyond the first inclined edge of the bench and overlying a portion of the wide entrance end of the extension channel. Under this projecting portion is a fender plate 13 to receive directly the wash water, said plate being raised above the bottom of the extension channel so that the concentrates may pass freely under it.

The tray portion has upon its surface a diagonal dividing wall 14 which begins at one of its sides at some distance from the receiving end of the tray portion, and thence extends toward and terminates in the narrowing delivery terminal of said tray portion.

In the tray portion, on that side of the dividing wall 14 which is opposite to the feed side, and well back from the delivery terminal of said tray in the angle formed by the dividing wall with the side of the tray portion, is located the discharge for the unprecipitated portion of the pulp. This discharge is made double, in order to classify the liquid pulp. One discharge, 15, is a vertically adjustable pipe, adapted, by its adjustment, to skim off from the surface of

the pulp the clearest water and such values as may float on the surface. The surface water thus taken may be returned to the crushing device. The other overflow discharge, 16, is also an adjustable pipe, but has fitted over it a hood 17, with an entrance 18 below the level of the surface of the pulp, so that it draws from the pulp below said surface and above the bottom.

At the receiving end of the tray portion is the pulp feed box, indicated by 19.

The operation of the device is as follows:—The pulp is fed from the box 19 across the receiving end of the tray portion 7 of the table. Over the entire surface of this tray portion the pulp spreads at some depth, being of greatest depth at the receiving end, and growing shallower, on account of the upwardly sloping bottom of the tray, toward its delivery terminal. This whole tray surface constitutes what may be termed in effect, a settling zone or field over which the concentrates are continually being precipitated. The unprecipitated portion of the pulp flows around the terminal end of the dividing wall 14, away from the precipitated material, to the classifying overflow discharges 15 and 16 with the effect heretofore mentioned. The precipitated material, brought along by the end-shake or "head motion" passes from the tray portion 7 to the extension portion 8, along the upwardly inclined bottom of which it moves in the narrowing channel of said extension. The precipitated material stratifies as it moves along the tray portion, the heaviest at the bottom and the lightest at the top; and, at the narrowing and shallowing terminal of the settling tray, as the stratified material enters the extension channel, the lighter concentrates are first washed over the beginning of the long side overflow flange 11 of said channel, by the reduced area of cross section and the cross flow of fresh water from the wash water box 12. As the concentrates move up the inclined bottom of the extension channel which narrows, as is shown, heavier and still heavier concentrates are washed over the flange 11, until the heaviest material is last to be washed over by the cross flow of water at the shallow end of the channel; so that the long side flange 11 has a regularly graduated overflow, the lightest at one end and the heaviest at the other; and between these, such divisions may be made as occasion requires. The wash water does not fall directly upon the concentrates, which would tend to disturb their stratification; but, said water falls first upon the edge of the bench 10 and upon the fender plate 13, and from these it flows upon the material. The edge of the bench 10, as is shown in Fig. 1, at 10′ may be fitted with a removable section, which upon removal and the substitution of a wider or a narrower section, permits the extension channel to be narrowed or widened as may be desired.

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

1. In an ore concentrator and classifier, a shaking tray constituting a settling zone and a section projecting beyond the tray, connected to the concentrates delivery terminal of the tray and having oppositely disposed upstanding sides constructed and arranged to form a channel of lessening cross area from its junction with the tray portion to its outer end, and one of which upstanding sides constitutes an overflow weir for the material delivered to the section.

2. In an ore concentrator and classifier, a shaking tray constituting a settling zone and a section projecting beyond the tray, connected to the concentrates delivery terminal of the tray and having a bottom and upstanding sides constructed and arranged to form a channel narrowing and shallowing toward its outer end, one of which upstanding sides constituting a continuous overflow weir for the material delivered to the section.

3. In an ore concentrator and classifier, a shaking tray constituting a settling zone, said tray having a depth lessening from its receiving end to the concentrates delivery terminal, and a section projecting beyond the tray portion connected to the concentrates delivery terminal thereof, the projecting section having a bottom and upstanding sides constructed and arranged to form a longitudinally extending channel narrowing and shallowing toward its outer end, one of which upstanding sides constituting a continuous overflow weir.

4. In an ore-concentrator and classifier, a shaking-table comprising a tray portion constituting a settling zone, and a section projecting beyond the tray portion connected to the concentrates delivery terminal of said tray portion, said section having a concentrating surface and oppositely disposed bordering upstanding sides, one of which constitutes a continuous overflow border for the contained concentrates.

5. In an ore concentrator and classifier, a shaking-table comprising a tray portion constituting a settling zone, and a section extending beyond the tray portion and communicating with the delivery terminal of said tray portion, the said extending section having upstanding sides, one of which upstanding sides forms a continuous overflow border for the contained concentrates, and means for delivering wash water to effect a cross flow to and over said overflow border.

6. In an ore concentrator, a shaking tray constituting a settling zone, and a section projecting beyond the tray portion connect-

ed to the concentrates delivery terminal of the tray and having a concentrating surface and upstanding sides constructed and arranged to form a longitudinally tapering channel, one of the upstanding sides constituting an overflow weir, for the material delivered to the section from the tray portion.

7. In an ore concentrator and classifier, a shaking-table comprising a tray portion constituting a settling zone, said tray portion having a depth lessening from its receiving end to its delivery terminal, and a section projecting beyond the tray portion connected to the delivery terminal of the tray portion and having upstanding sides arranged to form a channel which narrows and shallows to its outer end, one upstanding side of said channel forming a continuous overflow border for the contained concentrates.

8. In an ore-concentrator and classifier, a shaking-table comprising a tray portion constituting a settling zone, and an extension portion communicating with the concentrates delivery terminal of the tray portion, said extension portion having upstanding sides forming therebetween a channel of lessening cross area to its outer end, and one upstanding side of said channel forming a continuous overflow border for the contained concentrates, and means for delivering wash water from the other side of said channel to effect a cross flow to and over said overflow border.

9. In an ore concentrator and classifier, a shaking-table comprising a tray portion constituting a settling zone, and an extension portion communicating with the delivery terminal of said tray portion, said extension having a rising bottom and upstanding sides, one of which upstanding sides constitutes a graduated overflow for the contained concentrates.

10. In an ore-concentrator and classifier, a shaking-table comprising a tray portion constituting a settling zone, and an extension portion communicating with the delivery terminal of said tray portion, said extension having a rising bottom and an upstanding side which constitutes an overflow that is practically level and the course of which is oblique to the line of movement of the table.

11. In an ore-concentrator and classifier, a shaking-table comprising a tray portion constituting a settling zone, said portion having within its own area a suitable discharge for its original water and slime content, and a projection extending beyond the tray portion and communicating with the tray portion to receive the concentrates therefrom, said extension portion having a channel with a rising bottom and an upstanding flange constituting continuous side overflow for the contained concentrates.

12. In an ore concentrator and classifier, a shaking-table comprising a settling zone, said portion having within its own area a suitable discharge for its original water and slime content, and an extension portion communicating with the delivery terminal of the tray portion to receive the concentrates therefrom, said extension portion having a rising bottom and upstanding walls forming therebetween a channel narrowing to its outer end, and one of said upstanding walls constituting a continuous side overflow for the contained concentrates.

13. In an ore concentrator and classifier, a shaking-table comprising a tray portion constituting a settling zone, said portion having within its own area a suitable discharge for its original water and slime content, and an extension portion communicating with the concentrates delivery terminal of the tray portion to receive the concentrates therefrom, said extension portion having a rising bottom and upstanding walls forming therebetween a channel narrowing to its outer end, and one of said walls constituting a continuous side overflow for the contained concentrates, and means for delivering wash water from the other side of the channel to effect a cross flow to and over said side overflow.

14. In an ore concentrator and classifier, a shaking-table comprising a tray portion or settling zone having upon its surface a dividing wall around one end of which the liquid pulp flows from its ingress to its egress, and an extension section projecting beyond the tray portion and connected at a point adjacent the end of said divided wall to the concentrates delivery terminal of the tray portion to receive the concentrates therefrom, said extension section having a channel of lessening cross area from its junction with the tray portion to its outer end.

15. In an ore-concentrator and classifier, a shaking-table comprising a tray portion constituting a settling zone, and an extension portion connected to the concentrates delivery terminal of the tray portion to receive the precipitated material from the delivery terminal of the tray portion, said tray portion having upon its surface a dividing wall longitudinally inclined relative to the tray portion to direct the material toward said extension portion and around one end of which the liquid pulp flows away from the precipitated material, to its discharge, and a supplemental wall or deflector constructed and arranged to direct the precipitated material toward said extension.

16. In an ore-concentrator and classifier, a shaking-table comprising a tray portion constituting a settling zone, and an extension portion to receive the precipitated material from the delivery terminal of the tray portion, said tray portion having upon its surface a dividing wall around one end of

which the liquid pulp flows away from the precipitated material, and a classifying discharge in the tray portion back of its dividing wall, consisting of an overflow pipe to skim off the surface of the liquid pulp, and a hooded pipe to draw from the pulp below its surface and above its bottom.

17. An ore-concentrator and classifier consisting of a shaking table formed with a tray portion constituting a settling zone, an extension portion at the delivery terminal of the tray portion to receive the precipitated material therefrom, said extension portion having a channel with a cross section lessening to its outer end, a continuous side overflow and means for effecting a cross flow of water to and over said side overflow, a dividing wall on the surface of the tray portion around one end of which the liquid pulp flows away from the precipitated material, and a discharge means for said liquid pulp back of the dividing wall.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MARTIN PRIOR BOSS.

Witnesses:
J. G. JACOBS,
BEN L. CORUM.