A. E. CUSTER.

VIBRATORY SCREENING AND SIZING DEVICE.

APPLICATION FILED FEB. 8, 1913.

1,131,478.

Patented Mar. 9, 1915

2 SHEETS—SHEET 1.

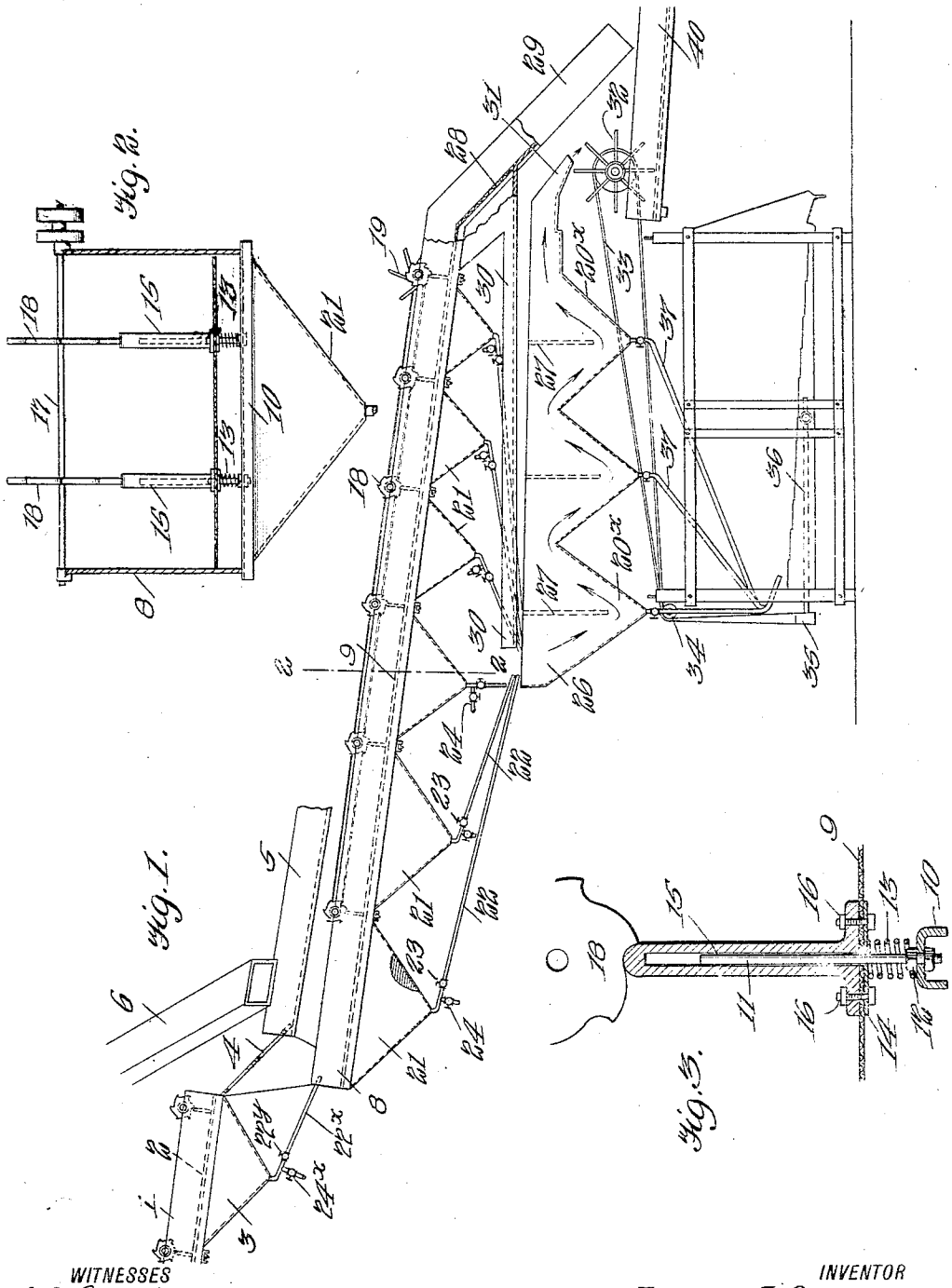


Fig. 1.

Fig. 2.

Fig. 5.

WITNESSES

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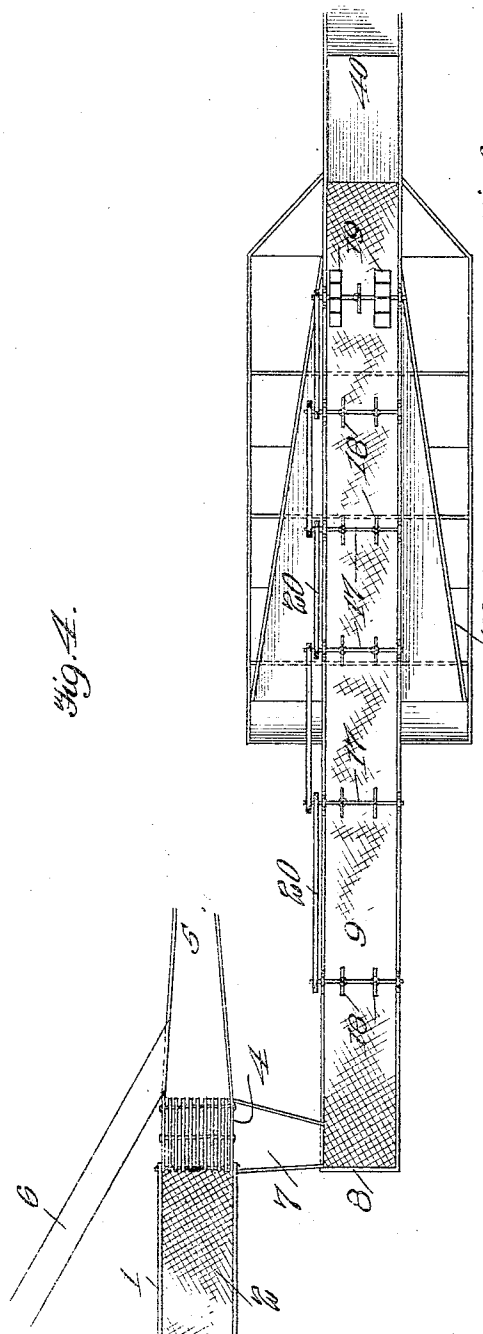


Fig. 4.

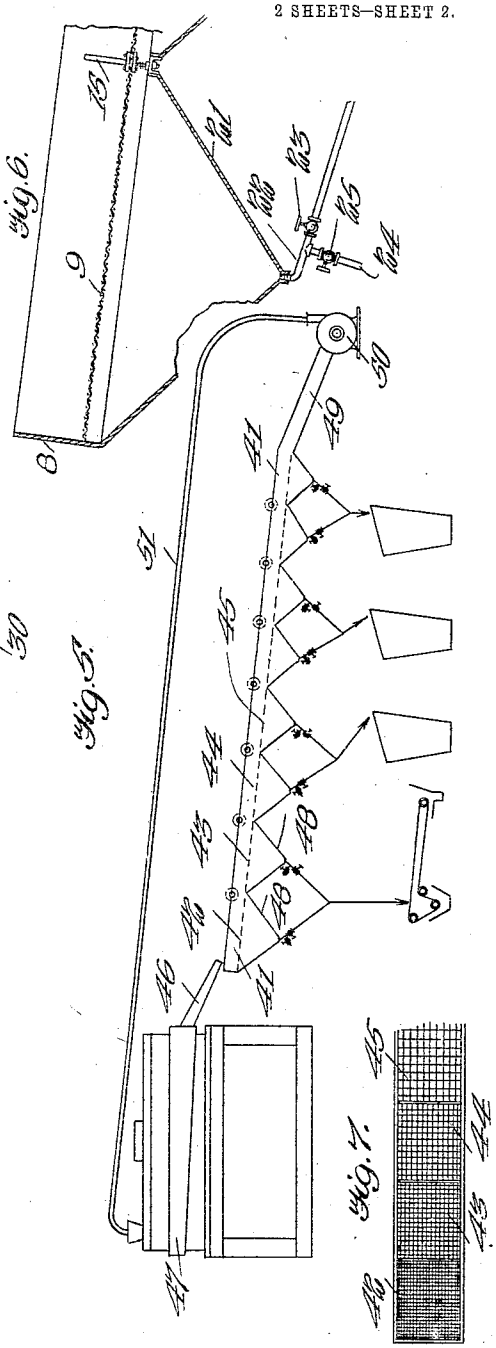


Fig. 5.

Fig. 6.

Fig. 7.

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VIBRATORY SCREENING AND SIZING DEVICE.

1,131,478. Specification of Letters Patent. Patented Mar. 9, 1915.

Application filed February 8, 1913. Serial No. 747,097.

To all whom it may concern:

Be it known that I, ARTHUR E. CUSTER, a citizen of the United States, and a resident of Salt Lake City, in the county of Salt Lake and State of Utah, have made certain new and useful Improvements in Vibratory Screening and Sizing Devices, of which the following is a specification.

My invention relates to improvements in screening and sizing devices for use in treatment of ores and other similar substances, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of my invention is to provide a device for economically treating ores in which the over-size is separated from the fine material, the latter being fed to an amalgamator, or device for final treatment of material in the form of a thickened pulp.

A further object of my invention is to provide a vibratory screen in a launder operated by the water which passes through the launder.

A further object of my invention is to provide novel means for disposing of the over-size.

A further object is to provide novel means for flushing the screens.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming part of this specification in which—

Figure 1 is a side view of the device as a whole, Fig. 2 is an enlarged sectional view on the line 2—2 of Fig. 1, Fig. 3 is a detail view of the screen holding and vibrating mechanism, Fig. 4 is a plan view of the device, Fig. 5 is a diagrammatic view of a modified form of the device, Fig. 6 is a section through one of the separating tanks, and Fig. 7 is a plan view of a portion of the apparatus shown in Fig. 5.

In carrying out my invention I provide a launder 1 having a sizing screen 2 disposed therein. Below the sizing screen is a tank 3. At the end of the launder 1 is a grizzly 4 which communicates with a discharge chute 5, leading to the dump or to the re-crushing machinery (not shown). An auxiliary pipe or flume 6 discharges into the chute 5 for aiding in carrying off the over-size.

Arranged to extend under the grizzly 4 is a laterally extending chute 7, which delivers the water and material which passes through the grizzly into a launder 8. The latter, as will be seen from Fig. 1, is of considerable length. This launder is provided with a screen 9, which may be of any suitable material, that is, a punched or slotted plate or woven wire screen. This screen is of any suitable mesh for the work to be done and is supported at intervals by devices such as that shown in Fig. 3. It will be observed that at intervals along the launder 8 I have provided U-shaped metal cross members 10 secured to the bottom of the launder. A guide rod 11 is secured to the cross member 10 by means of nuts 12. A spring 13 surrounds the guide rod 11 and bears at one end on the cross member 10 and at the other on a washer 14. The screen 9 is held between the washer 14 and a movable post or sleeve 15 which surrounds the guide rod 11 and between whose base and the washer 14 the screen 9 is clamped by means of the bolts 16. It will thus be seen that the screen is cushioned upon the spring 13. As will be seen from Fig. 2 there are a plurality of these screen supports in alinement. In the figure I have shown two, but obviously there may be more or less, depending upon the size of the screen.

Rotatably carried by the walls of the launder directly above the screen supports are the transverse shafts 17 upon which are mounted cam wheels 18, such as that shown in Fig. 3, arranged to engage the upper end of the post or sleeve 15 so as to force the latter downwardly against the tension of the spring 13. One of these shafts 17 bears one or more wheels 19 which are driven by the force of the water passing down the launder. These wheels are connected by pulleys and belts 20 so as to provide power for operating the cam wheels 18 on the shaft 17, thereby causing the vibration of the screen 9.

Disposed beneath the launder 8 and the screen 9 is a series of tanks 21 of conical shape at each of whose bottoms is a pipe 22 which is provided with a valve 23. A pipe 24 connects with the pipe 22 between the valve 23 and the bottom of the tank 21 and is provided with a valve 25. In Fig. 1 I

have shown a plurality of these tanks 21 each having a pipe 22 and a pipe 24 having communication with the bottom of the tank. All of the pipes 22 terminate above a large distributing box and classifier 26 whose bottom is composed of a series of conical-shaped tanks 20^x. Extending downwardly from the top of the distributing box toward the bottom of each tank is a baffle plate 27 whose purpose will be explained later.

At the end of the launder 8 is a de-watering screen 28. A portion of this screen is disposed in the over-size chute 29. A feed launder 30 has one end disposed beneath the screen 28, the other end being flared outwardly, as shown in Fig. 4, and being disposed above one end of the distributing box and classifier 26. The latter is provided with a discharge chute 31 which terminates in such a position as to permit the water which is discharged to drive a wheel 32. The latter is provided with a belt 33 running over the pulley 34 and passing to a drive wheel 35 for operating the amalgamator 36. Pipes 37 extend from the bottoms of the tanks 20^x to the amalgamator, these pipes being controlled by suitable valves.

From the foregoing description of the various parts of the device the operation thereof may be readily understood. The launder 1 receives the ore or other material from the crusher and screens out the finer material from the over-size which then pass down the grizzly 4 into the over-size chute 5, being carried off by means of the water received from the auxiliary chute 6 to the dump. The water now passes through the grizzly and carries with it any suspended matter into the chute 7 which empties into the launder 8. The fine material which settles in the tank 3 may be fed into the launder 8 by means of the auxiliary pipe 22^x, the flow being controlled by the valve 22^y. The pipe 24^x is a water pipe which will permit the flushing of the tank 3 from below and also the cleaning of the screen 2 when the valve 22^y is closed. The material passing through the launder 8 is screened by the vibratory motion imparted to the screen 9 in the manner already explained. The fine material settles in the tanks 21 and from there may be passed directly into the distributing box and classifier by means of the pipes 22. Each tank and the screen above it may be flushed by water which passes through the pipe 24, the latter pipe being controlled by the valve 25 as shown in Fig. 6. This prevents any clogging of the screen 9. The water which passes down the launder operates the wheel or hydraulic motor 19, which furnishes power for operating the cams. As the teeth of the latter pass over the sleeve 15 (see Fig. 3) it forces the latter downwardly against the tension of the spring 13, thus causing a vibratory motion of the entire screen. The water which reaches the screen 28 drops through and is carried rearwardly in the launder 30 to one end of the distributing box and classifier 26, the over-size being passed on through the chute 29. It will be noted that the water has to pass downwardly in the distributing box underneath the baffles 27. This prevents the washing away of values such as fine gold. The latter settles in the bottom of the tanks 20^x. The water which passes out of the chute 31 drives the wheel 32 and this is belted to the amalgamator which it operates. The water leaving the wheel 32 passes out of the discharge chute 40, thus washing the over-size out upon the dump. In Fig. 5 I have shown a modified arrangement in which the launder 41 is provided with a series of screens 42, 43, 44, 45, etc., (see Fig. 7) of different mesh, the finer screen being located near the chute 46 which leads from the crusher 47. Beneath each screen is a tank 48 similar to the tanks 21, shown in Fig. 1. These tanks are provided with means for draining them and for flushing them similar to the means already described. At the end of the launder 41 is a chute 49 for the over-size which may be pumped or elevated by means of an elevator 50 through the pipe 51 back again to the crusher, or the chute 49 may lead directly to the dump. In the modified form of the device the arrangement of the different size screens provides for the sizing of the ores or other products which it is desired to screen or classify.

By the use of the vibratory screen defined screen size material will be had. The valves which lead from the bottoms of the tanks such as 21 and 48 may be so regulated as to furnish a thickened pulp. The arrangement described greatly reduces the wear on the screens. It furnishes an efficient device for separating out or classifying the screened material of different size. The provision of the wheels for operating the cam devices which vibrate the screen reduces the power necessary to operate the device. Of course, these cams may be operated by other power, not shown, without departing from the spirit of the invention. The water escaping from the end of the launder 8 is used again in the distributing box or classifier. The baffles in the latter device prevent the washing away of the fine material such as fine gold, while the water from the distributer is used in furnishing power for operating the amalgamator or other similar device. This water then passes onto the over-size chute and aids in carrying off the over size.

It will thus be seen that the device described provides an economical way of treating ores or other similar material. Furthermore the device is easily cleaned or

flushed so that there is no danger of the screens clogging up. The device requires little attention when once installed and the parts are easily accessible for repair or replacement if any of them should wear out.

I claim:—

1. The combination with a launder, of a screen arranged therein, a cushion supporting device for said screen comprising an upright guide member arranged to extend through the screen, means for supporting said upright guide member, a movable sleeve arranged to fit over said guide member, said screen being secured to said sleeve, and a spring disposed between said screen and the bottom of the launder.

2. The combination with a launder having a vibratory screen therein, of an oversize chute at the end of said launder, a stationary screen disposed in said oversize chute, a return feed launder having one end disposed below said stationary screen, and a receptacle for receiving the water from said return feed launder.

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