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R. G. HART

2,308,077

ORE CONCENTRATOR

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Fig. 1.

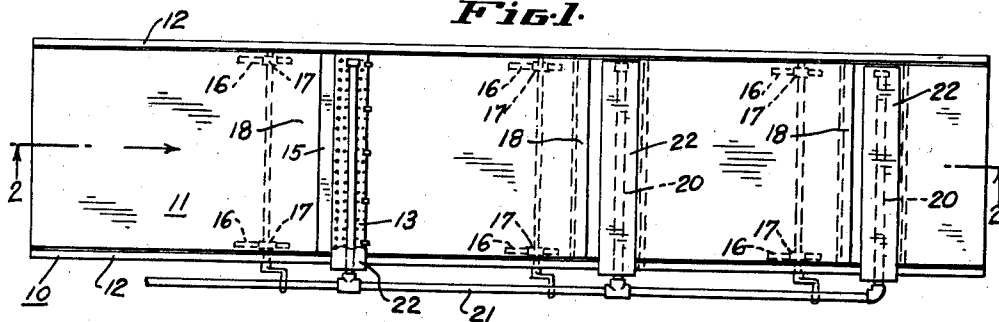


Fig. 2.

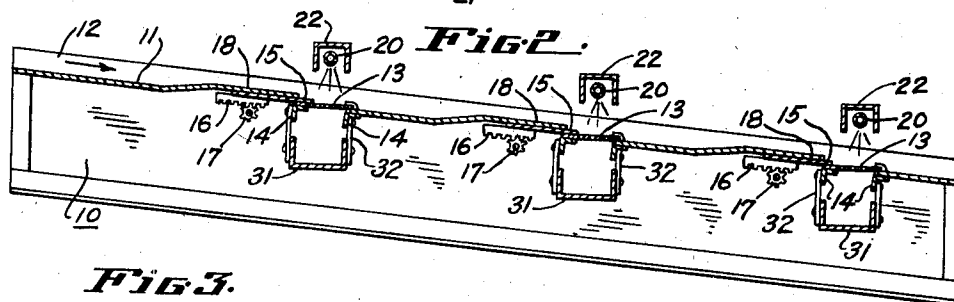


Fig. 3.

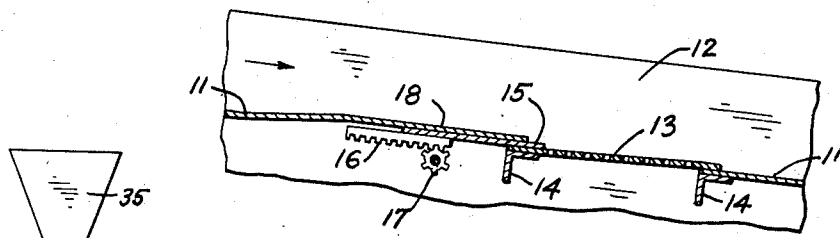
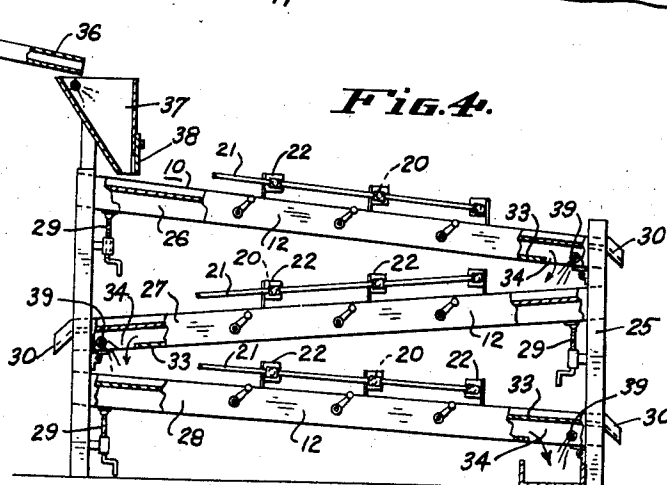


Fig. 4.



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ORE CONCENTRATOR

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4 Claims. (Cl. 209—458)

This invention relates to ore concentrators and more particularly ore concentrators of the gravity type. The invention forming the subject matter of this application relies essentially upon gravity for the separation of the valuable minerals from the worthless impurities. Moreover, this invention has for its objective mechanical concentration of valuable ores as distinguished from chemical methods of recovery.

The essence of the invention resides in the provision of inclined tables with adjustable screens therein at spaced intervals over which the pulp progresses, means being provided for adjustment of the inclination of the tables and the length of the screens therein.

Additional objects of the invention are the provision of a gravity separator which will be relatively inexpensive to install and operate, which will have a high degree of flexibility to meet varying conditions and which will provide the means of efficiently and profitably reaching the most valuable minerals.

Other objects of this invention will be made to appear as this specification proceeds and the novelty of the invention will be particularly pointed out in the appended claims.

Referring now to the drawing wherein a preferred form of the invention is shown,

Figure 1 is a top plan view of a concentrator table embodying the invention;

Figure 2 is a longitudinal section of the table taken along the line 2—2 of Figure 1;

Figure 3 is an enlarged fragmentary sectional view of one of the screens in the table showing the means for adjusting the length thereof; and

Figure 4 is a side elevational view of a concentrator embodying the principles of this invention.

The table 10 consists of an inclined plane surface 11 over which ore is adapted to progress as indicated by the arrows (see Figures 1 and 2). The table 10 is provided with the sides 12, and it may be supported on a frame, such as the conventional frame shown in Figure 4. At spaced intervals in the length of the table 10, separation screens 13 are provided. These screens have been shown in the drawings in the form of perforated plates, but it will be understood that screens of other types, such as wire mesh, may be substituted therefor without departing from the spirit of this invention. Thus the term "screens" is used here in its generic sense. As indicated in Figure 2, the screens are supported on angle irons 14 arranged transversely in the frame of table 10.

Means for varying the effective area of the screens 13 with respect to the direction of movement of the pulp are provided, being shown here in the form of a plate 15 extending transversely of the table frame and carrying at each of its ends a rack 16 which is adapted to be driven by a pinion 17. Obviously, the pinion 17 may be turned to drive the rack in any conventional way such as by a manually operated crank (see Figure 2). It will be noted from Figure 2 that the plate is slidably received under a portion of the table top 11 adjacent to the screen 13, the table top being bent upwardly so as to provide a sheath 18 for the plate 15 without offering any substantial obstruction to pulp moving along table top 11. From the foregoing description, it will be appreciated that the effective area of the foraminous member 13 may be conveniently varied to suit changing conditions encountered in the concentration of different ores and ores of various values.

As a means of accelerating and facilitating the separation of the ores through the screens 13, there is provided in conjunction with each screen a supply of fresh wash water. As shown in Figures 1 and 2, this may be obtained by supporting a perforated pipe 20, in communication with a supply conduit 21, directly above the screen and extending transversely of the table 10, the perforations in the pipe being so arranged as to direct the water stream onto the pulp as it passes over the screen 13. A shield 22, in the form of an inverted trough covering the pipe 20, is provided as a means of insuring that the water stream or rather the force of the water stream will be placed upon the pulp passing over the screen 13.

In Figure 4 there is shown a complete concentrator utilizing a plurality of the above-described tables. In this particular application of the principles of the invention, three such tables are shown in superposed relation supported within a common frame 25. For purposes of reference, the tables will be designated by the numerals 26, 27, and 28, reading from top to bottom. Since alteration of the inclination of the tables 26, 27, and 28 may be found desirable in actual practice, I have illustrated one of several means by which this may be accomplished (see Figure 4). Here I show the tables as having a hinged connection at one end to the frame 25, while the opposite end is free to be raised or lowered by a worm 29. Such permissible raising or lowering of the tables will also prove useful in

service and repair incidental to normal operations.

The less valuable ores passed by the screens 13 in the course of movement by gravity over the tables 10 are discharged through the chutes 30 at the end of each of the tables 26, 27, and 28 for subsequent conveyance to launders or muck piles in any known or conventional manner. Values screened out by the screen 13 may be captured if desired at the point of screening through the provision of suitable take off means, such as the chutes 31 shown in Figure 2 as being supported beneath the screens 13 by bracketed attachment 32 to angle irons 14.

If it be determined more profitable to pass the yield of the screens 13, or either of them, in table 26 (see Figure 4) to table 27 for further concentration, instead of segregating at the point of screening, then by eliminating the chute 31, the material will move over bottom 33 of table 10 until discharged through opening 34 adjacent the end thereof onto the plane surface 11 of the table 27. This operation, if desired, may be repeated in the passing of values from table 27 to table 28.

Delivery of pulp to the uppermost table 26 is contemplated through the medium of the hopper 35, discharge pipes 36 therefrom, and a distributor 37. Distributor 37 has a plurality of semi-circular openings in its face each of which is rendered adjustable by means of a gate 38 which may be raised or lowered to regulate and direct the flow of pulp onto the surface 11. As a means of facilitating movement and further concentration of valuable ores passing from one table to the other, I provide a source of fresh wash water adjacent the openings 34, shown in Figure 4 in the form of the perforate pipes 39.

It will be appreciated from the foregoing that I have provided a novel concentrator having a high degree of flexibility to meet any varied conditions and characteristics of ores to be treated. The device may be modified still further to suit

different needs without departing from the spirit of the invention as set forth in the appended claims.

The invention claimed is:

1. In an ore concentrator a table having a plane surface, an opening in the plane surface of the table extending transversely thereof, a perforate member in the opening, means for varying the effective area of the perforate member comprising a plate slidable over the perforate member, a sheath in the table surface for said plate, and means for moving the plate from an inoperative position in said sheath onto said perforate member.

2. In an ore concentrator a table having a plane surface, an opening in the plane surface of the table extending transversely thereof, a perforate member in the opening, means for varying the effective area of the perforate member comprising a plate slidable over the perforate member, a sheath in the table surface for said plate, a rack on the plate, and a pinion engaging said rack.

3. In an ore concentrator, a table having a plane surface, an opening in the plane surface of the table extending transversely thereof, a perforate member in the opening, a plate slidable over the perforate member to vary its effective area, a sheath for said slidable plate formed beneath the surface of the table and extending transversely thereof in juxtaposition to an edge of said perforate member.

4. In an ore concentrator, a table having a plane surface, an opening in the plane surface of the table extending transversely thereof, a perforate member in the opening, a plate slidable over the perforate member to vary its effective area, a sheath for said slidable plate formed beneath the surface of the table and extending transversely thereof in juxtaposition to an edge of said perforate member, a rack fixed on the slidable plate, and a pinion engaging said rack.

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