

H. L. ORR.
ORE SEPARATOR AND CONCENTRATOR.
APPLICATION FILED AUG. 20, 1908.

937,325.

Patented Oct. 19, 1909.
2 SHEETS—SHEET 1.

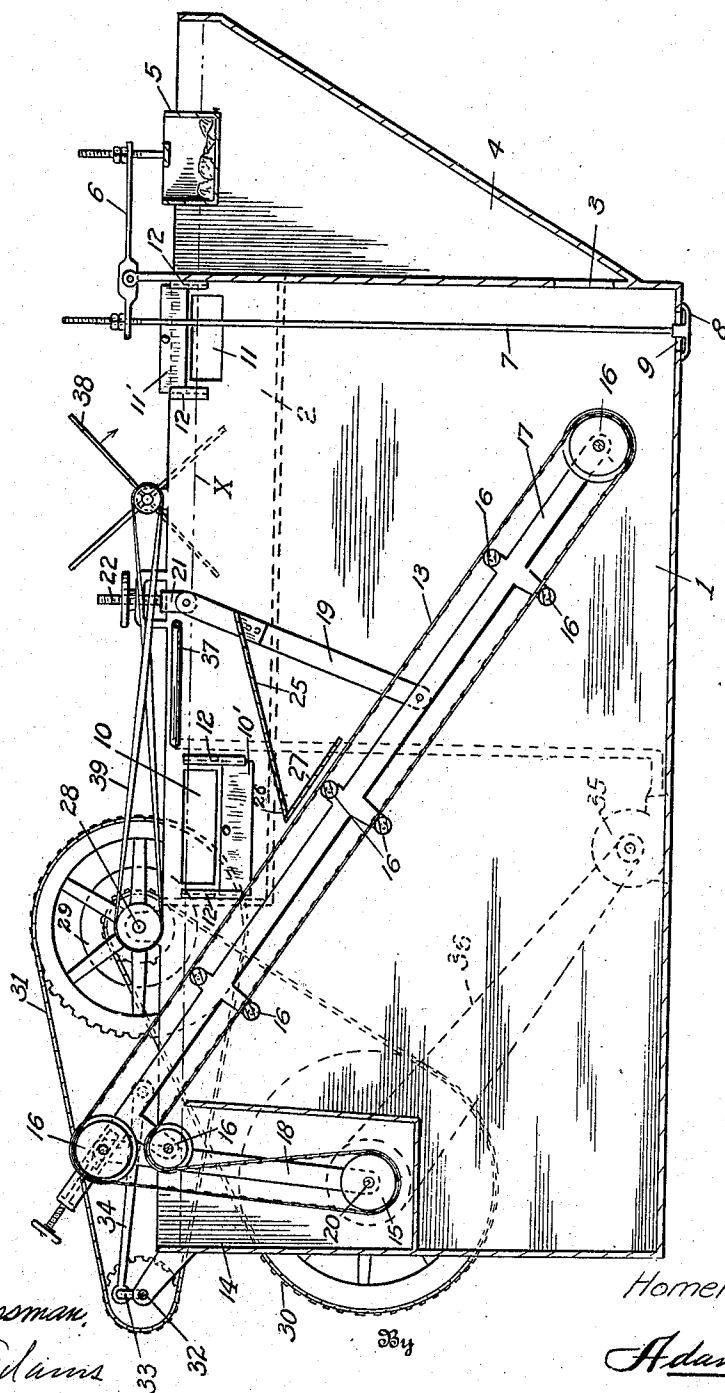


Fig. 1

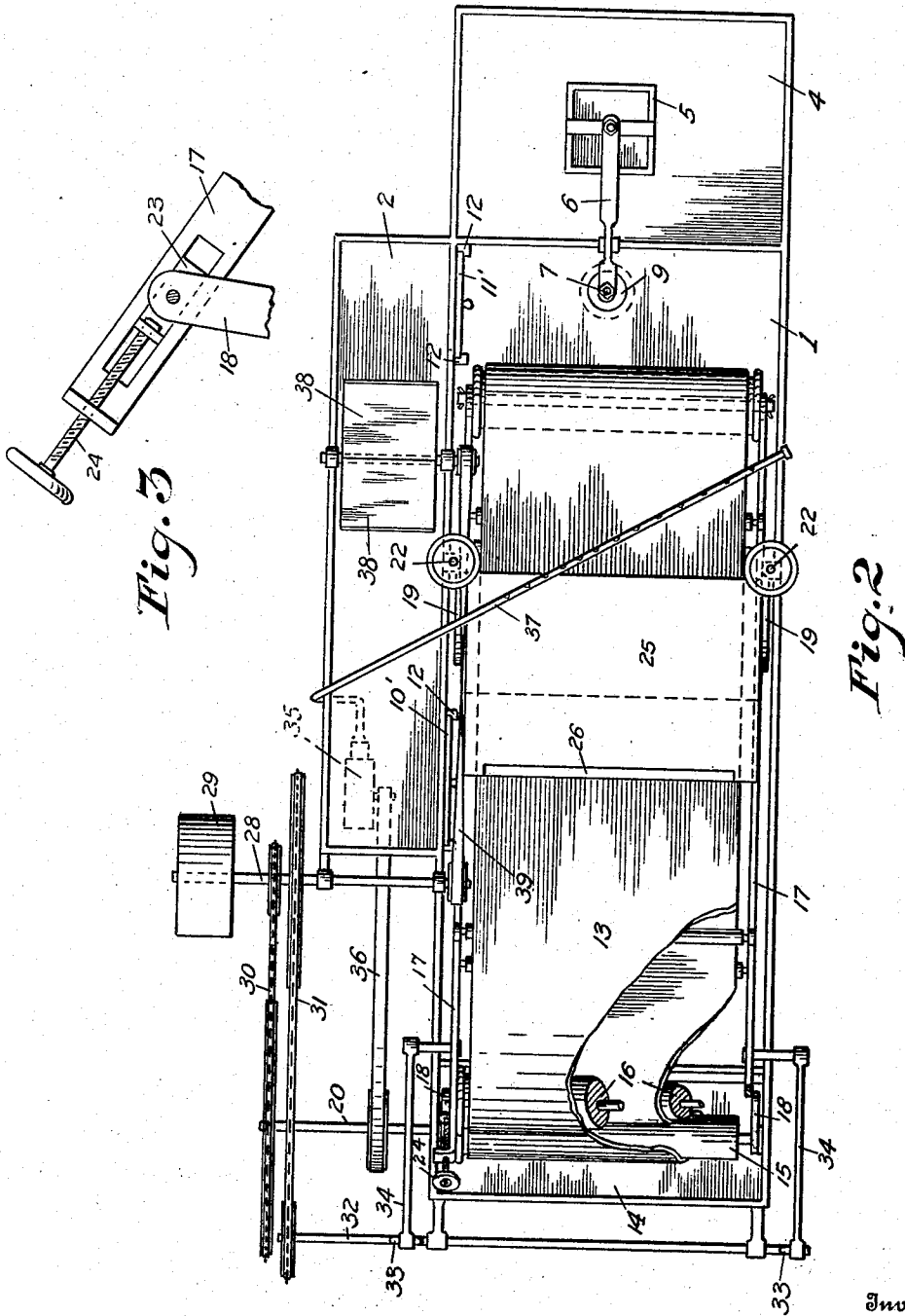
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UNITED STATES PATENT OFFICE.

HOMER L. ORR, OF GEORGETOWN, WASHINGTON.

ORE SEPARATOR AND CONCENTRATOR.

937,325.

Specification of Letters Patent.

Patented Oct. 19, 1909.

Application filed August 20, 1908. Serial No. 449,544.

To all whom it may concern:

Be it known that I, HOMER L. ORR, a citizen of the United States of America, and a resident of Georgetown, county of King, and State of Washington, have invented certain new and useful Improvements in Ore Separators and Concentrators, of which the following is a specification.

My invention relates to apparatus of the above type and aims primarily to provide a construction wherein separation for its major part is effected entirely below the surface of a body of water.

Other objects will be set forth as the description progresses and those features of construction, arrangements and combination of parts in which my invention resides, succinctly defined in my annexed claims.

Referring now to the accompanying drawings in which like numerals of reference indicate like parts throughout: Figure 1 is a view in longitudinal section of an apparatus embodying my invention in a form now preferred by me. Fig. 2 is a top plan view thereof with parts broken away, and Fig. 3 is a fragmentary view, on large scale, illustrating more particularly one of the table adjusting devices.

In carrying out my invention receptacles or tanks 1 and 2 are provided, the former being the larger and having communication, as through an opening 3, with a comparatively small tank 4 in which is provided a float 5, connected by a lever 6 to the stem 7 of a downwardly opening valve 8 which controls the discharge of the tailings or other materials not concentrated by the apparatus, through an opening 9, formed in the bottom wall of receptacle or tank 1.

While receptacles or tanks 1 and 2 can obviously be otherwise arranged, I preferably so construct them that they are separated by a single wall, in which are formed openings 10 and 11, controlled by gates 10', 11' supported for vertical sliding in suitable guides, as 12.

Reference numeral 13 indicates an inclined table extending from a point in proximity to the discharge opening 9, upwardly to the opposite end of tank 1 and then into a suitable compartment 14. The table 13, as now considered, is in the form of an endless apron

which passes over a suitable drive roller 15, and guide rollers 16, the latter of which are journaled in a swing frame 17. Swing frame 17 which comprises suitably spaced side members, is supported for swinging by legs 18 and arms 19, the former being journaled on a shaft 20, having fixed thereto drive rollers 15, and having pivotal connection with the upper portion of frame 17, as will be hereinafter more fully set forth. Arms 19 are pivotally connected with the lower portion of frame 17 and with carriers 21, the latter being controlled by suitable means, as screws 22, mounted on opposite walls of tank or receptacle 1, whereby said frame can be adjusted to vary the inclination of table 13. As now considered, the pivotal connection between legs 18 and frame 17 is afforded by the end portions of the shaft of the uppermost guide roller 16 being mounted in suitable blocks 23, slidably mounted in slots, formed in the side members of said frame, (see Fig. 3,) which blocks are engaged by adjusting screws 24, through the medium of which the said blocks can be adjusted and the tension of table 13 thereby regulated.

Reference numeral 25 indicates an amalgamated plate which is arranged a suitable distance above the middle portion of the table 13 and inclined downwardly toward the same. This amalgamated plate 25 is secured to arms 19 so as to swing herewith and is formed in its lower portion with a discharge opening 26, directly beneath which is an auxiliary amalgamated plate section 27, fixed to move with plate 25 and extending downwardly at an acute angle thereto so as to lie in a plane substantially parallel with the active run of the table.

Reference numeral 28 indicates a drive shaft to which power is applied, as by a belt (not shown) passing over pulley 29. Power is transmitted from drive shaft 28 by chains 30 and 31, which pass over suitable sprocket wheels, as shown, to shafts 20 and 32 respectively, the latter being provided with cranks or eccentrics 33 to which links 34 are connected. Links 34 are also pivotally connected to frame 17, whereby upon rotation of shaft 32 said frame will be reciprocated.

Reference numeral 35 indicates a fan or blower, operated from shaft 20 by a belt 36, which forces air through a pipe to the head 37, which head is arranged diagonally across the top of tank or receptacle 1 and formed with a plurality of apertures (see Fig. 2) arranged to direct the air for discharge toward opening 11.

In tank or receptacle 2, I mount for rotation what I term "a raker" 38, the same being driven from shaft 28 by a belt 39.

In operation gates 10 and 11 are closed and water from any suitable source (not shown) is allowed to flow into tank 1 and through opening 3 into tank 4 until a level indicated at X (see Fig. 1) is reached which as will be observed, is considerably above the amalgamated plates. The mechanism is set in operation, table 13 being run at a slow rate of speed while the reciprocation of frame 17 is comparatively rapid. The material to be treated, received, as for example, from a stamp mill, is now fed in any desired manner from a point over plate 25, so as to before reaching said plate, be compelled to travel to a fair depth into the water. During this step of the operation any substances of a greasy or oily nature will float with the flaky and rusty gold and not reach the amalgamated plates, the heavier ingredients however falling by gravity with the exception of the free gold which will be caught by one or the other of plates 25 and 27, travels over plate 25, through opening 26 onto plate 27 and then onto table 13, which traveling upwardly will carry the heavier concentrates for discharge into chamber 14. By inclining the amalgamated plates, as described, and supporting the same for swinging, the water is agitated and will wash any foreign substances from the collected free gold, and also wash the lighter substances from table 13. Further, it will be observed that amalgamated plate 25, being inclined downwardly toward table 13, will during its movement so act on the water as to produce waves which will travel well upon the upper portion of the table, and serve to further cleanse the concentrates being conveyed to chamber 14. Air discharged from head 37 forces the "float" toward gate 11', which may be opened upwardly when desired to permit the "float" to flow into tank 2, where it is moved by raker 38 from about the gate 11 to the opposite end portion of the tank. In tank 2, the float is allowed to stand until the precious ingredients fall and collect at the bottom. Then by opening gate 10' downwardly, the oily substances can again be permitted to enter tank 1. Sand, gravel and any other foreign substances falling from the lower end portion of table 13 will collect about the discharge opening 9, where

they will discharge with the outflowing water upon the opening of valve 8.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States of America, is:

1. An ore separator comprising a tank adapted to contain water, a frame mounted for reciprocation in said tank, an endless apron mounted on said frame in an inclined position, means to operate said apron so that the upper run thereof will move upwardly during movement of said frame, and amalgamating means comprising reversely inclined members arranged one above the other, the upper of said members being formed in its lower portion with a discharge opening and the lower of said members being fixed to the lower edge portion of said upper member beneath the discharge opening thereof.

2. An ore separator comprising a tank adapted to contain water, a frame mounted for reciprocation in said tank, an endless apron mounted on said frame in an inclined position, means to operate said apron so that the upper run thereof will move upwardly during reciprocatory movement of said frame, and amalgamating means connected for movement with said frame, comprising reversely inclined members arranged to be normally submerged and positioned one above the other, the lower of said members being positioned to receive material from the upper one and to discharge onto the upper run of said apron.

3. An ore separator comprising a tank adapted to contain water, an endless apron arranged in an inclined position and supported for swinging in said tank, said apron being disposed so as to have its upper portion normally arranged out of the water, and an inclined amalgamating plate arranged in said tank and connected to be moved during swinging of said apron for forcing water upwardly onto the unsubmerged portion thereof.

4. An ore separator comprising tanks having a pair of communicating openings, vertically slidable gates for the openings of said tanks, said gates being supported for sliding in relatively opposite directions for movement to their open positions, amalgamating means arranged in one of said tanks so as to be normally submerged, and means for forcing matter floating on the water in said last named tank toward one of the openings thereof for discharge into the other tank.

5. An ore separator comprising tanks having a pair of communicating openings at their upper portion, gates for the openings of said tanks, amalgamating means arranged in one of said tanks so as to be normally sub-

merged, means for directing air for discharge toward one of the communicating openings of said tanks for impelling the float therethrough, and means in the other
5 tank for causing the float received therein to travel toward the other communicating opening of said tanks and collect thereabout, whereby upon opening of the gate controlling said opening, the oily substances

will be impelled back into said first named tank.

Signed at Georgetown, Washington, this
10 day of August 1908.

HOMER L. ORR.

Witnesses:

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