

No. 890,007.

PATENTED JUNE 9, 1908.

E. WURDACK.
APPARATUS FOR CONCENTRATING ORES.
APPLICATION FILED AUG. 16, 1907.

2 SHEETS—SHEET 1.

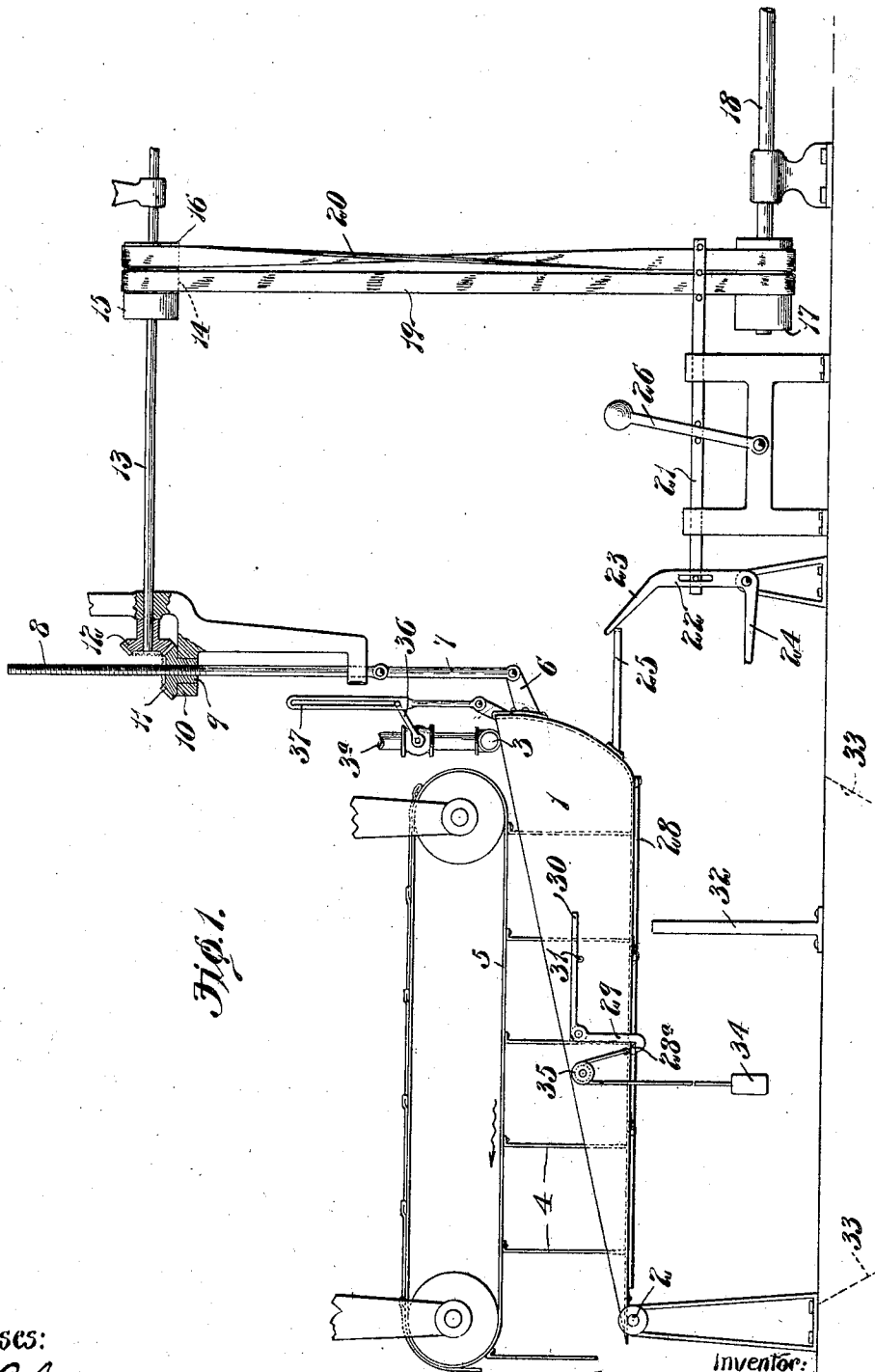


Fig. 1.

Witnesses:

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Inventor:

Ernest Wurdack.

By Bakewell Cornwall Atty's.

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2 SHEETS—SHEET 2.

Fig. 2.

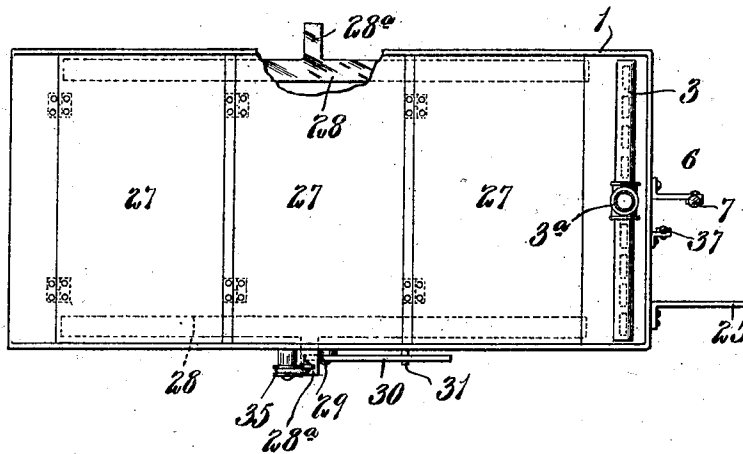


Fig. 3.

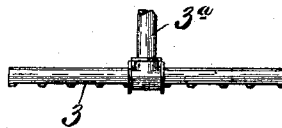
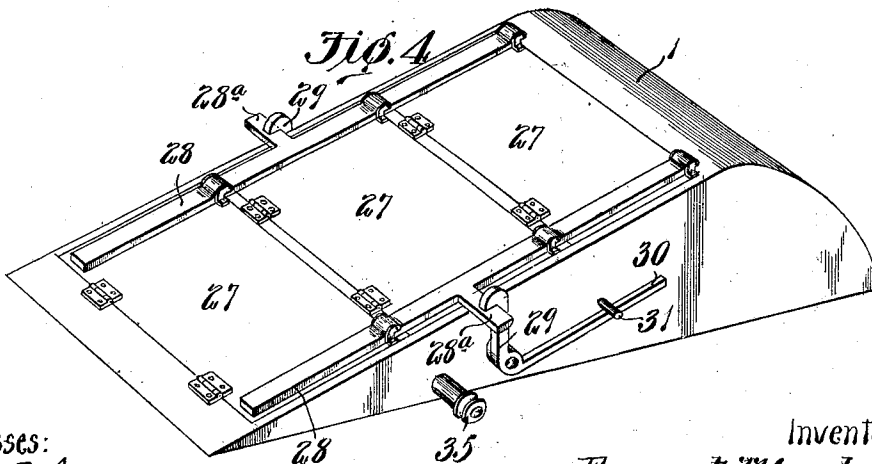


Fig. 4.



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UNITED STATES PATENT OFFICE.

ERNEST WURDACK, OF BAXTER SPRINGS, KANSAS.

APPARATUS FOR CONCENTRATING ORES.

No. 890,007.

Specification of Letters Patent.

Patented June 9, 1908.

Application filed August 16, 1907. Serial No. 388,889.

To all whom it may concern:

Be it known that I, ERNEST WURDACK, a citizen of the United States, residing at Baxter Springs, Kansas, have invented a certain new and useful Improvement in Apparatus for Concentrating Ores, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an elevation of an apparatus constructed in accordance with my invention; Fig. 2 is a top plan view of the receptacle in which the ore is concentrated; Fig. 3 is a detail view of the perforated pipe through which the ore and water flow into the receptacle; and Fig. 4 is a bottom plan view of the receptacle.

This invention relates to the concentration of sludge ores and particularly lead and zinc ores.

The main object of my invention is to provide an apparatus for concentrating sludge ores which is entirely automatic in its operation.

With my improved apparatus, manual labor is eliminated and the ore is separated or washed from the gangue in a better manner than was possible with the apparatuses heretofore in use.

Referring to the drawings which illustrate an apparatus embodying the preferred form of my invention, 1 designates an open-ended trough-shaped receptacle of varying depth, said receptacle being similar in construction to a scoop or shovel and having its front end open and its rear end closed, the front end of said receptacle being pivotally connected at 2 to a stationary support. The sludge mixed with water is introduced into the rear end of this receptacle through a perforated pipe 3 and as the ore and gangue fall onto the bottom of the receptacle they are spread over said bottom by means of agitators 4 formed of flexible material and carried by a belt 5 which travels over the pulleys, the operation of these flaps or agitators 4 being to sweep the gangue toward the front end of the receptacle and permit the metallic particles of the ore, which are of greater specific gravity than the gangue to settle on the bottom of the receptacle adjacent the rear end thereof

where they first fall. The receptacle 1 is so arranged relatively to the agitators 4 that when the apparatus is first put in operation the bottom of the receptacle will be disposed parallel to the belt 5, and as the metallic particles of the ore collect together at the rear end of the bottom of the receptacle where they first fall and said receptacle gradually becomes filled, the rear end of the receptacle will move downwardly automatically and thus present a level surface over which the flaps travel.

The rear end of the receptacle 1 is moved downwardly by the following mechanism: Fastened to a bracket 6 at the rear end of the receptacle is a rod or flexible member 7 connected at its upper end to a threaded rod 8 which passes through a nut 9 mounted in a bearing 10 and provided with a beveled gear 11 that meshes with the beveled gear 12 secured to a shaft 13, said shaft having a fixed pulley 14 and two loose pulleys 15 and 16. Rotary movement is imparted to this fixed pulley 14 and consequently to the shaft 13 by means of belts which pass over a pulley 17 on a driven shaft, 18, there being a straight belt 19 and a crossed belt 20 for this purpose.

Means are provided for automatically shifting the belts 19 and 20 onto and off of the fixed pulley 14, said means consisting of a bar 21 provided with pins for engaging the belts and being connected at its outer end to a lever 22 having arms 23 and 24. When the belt 19 is on the fixed pulley 14 the shaft 13 will be rotated in the direction for causing the receptacle 1 to move downwardly and as said receptacle reaches its lowest position a projection 25 on the rear end thereof will engage the lever 24 and thus shift the bar 21 so as to move the belt 19 onto the loose pulley 15 and the crossed belt 20 onto the fixed pulley 14, thereby causing the direction of rotation of the shaft 13 to be reversed automatically so that the rear end of the receptacle 1 will start to move upwardly. When the rear end of said receptacle reaches its raised position, as shown in Fig. 1, the projection 25 will engage the arm 23 and thus shift the bar 21 in the opposite direction, thereby moving the belt 20 onto the loose pulley 16 and the belt 19 back onto the fixed pulley 14 so that the direction of rotation of the shaft 11 will be again reversed. For imparting a quick or sudden movement to

the bar 21 I have provided a weighted lever 26, the operation of which will be obvious.

The bottom of the receptacle 1 is provided with a number of trap doors 27, said doors being pivotally connected to bars 28, as shown in Fig. 4, and the receptacle 1 being provided with catches 29 which extend under lateral projections 28^a on said bars so as to hold the doors closed. These catches have arms 30, the limit of movement of which is controlled by stops 31, and when the receptacle 1 reaches its lowest position stops 32 will engage said arms and swing the catches so as to release the bars 28 and thus permit the trap doors to open and dump the contents of the receptacle 1 into hoppers 33 from which suitable conduits lead to convey the concentrates away to the dump or to machines which work it over again and the metallic particles of the ore to the place where it is to be stored. As soon as the contents of the receptacle 1 has been dumped and the rear end of said receptacle has started to move upwardly, the doors are returned to their normally closed position by means of weights 34 fastened to ropes or chains which pass over pulleys 35 and are secured to the bars 28, the catches 29 springing into engagement with the lateral projections 28^a on the bars to hold the doors locked.

In order that the supply of water and ore may be cut off automatically when the receptacle has become filled and while the doors are being opened to dump the contents thereof, I have provided the conduit 3^a which leads from the supply hopper to the supply pipe 3 with a valve 36, the stem of which projects into a slot in a link 37 that is secured to the receptacle 1. When the receptacle 1 reaches its lowest position the upper end of the slot in said link will engage the valve stem and close the valve so as to shut off the supply of water and ore, and when the receptacle 1 reaches its elevated position the lower end of said slot will engage the stem and open the valve to turn on the supply of water and ore.

From the foregoing it will be seen that I have provided an apparatus that is entirely automatic in its operation so that manual labor is eliminated and the cost of separating the ore is accordingly reduced. Furthermore, the apparatus operates continuously and does not have to be stopped as was necessary with the apparatuses heretofore in use when the tank or receptacle became filled so that a great saving is effected in this particular. And still another desirable feature of this apparatus is that a larger percentage of the metallic particles of the ore are saved at the first working than with apparatuses of the kind heretofore used, due to the fact that the ore always drops onto a level surface and therefore has not the tendency to

roll or move with the sand and lighter particles of the gangue when the agitators 4 strike it.

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

1. An apparatus for concentrating ores comprising a trough-shaped receptacle pivotally connected at its front end to a support, means for introducing the ore into said receptacle, a member traveling through said receptacle for separating the metallic particles of the ore from the gangue, means for moving the rear end of said receptacle downwardly so that said traveling member will always have a level surface to operate on, and automatic means actuated by the downward movement of said receptacle for cutting off the supply of ore to the receptacle and for discharging the contents of the receptacle; substantially as described.

2. An apparatus for the purpose described, comprising a trough-shaped receptacle pivotally connected at its front end to a stationary support, means for introducing ore into said receptacle, a movable member provided with flexible flaps for spreading the ore over the bottom of the receptacle to separate the metallic particles from the gangue, and means independent of the ore for moving the rear end of said receptacle downwardly so that the spreading member will always have an approximately level surface to travel over; substantially as described.

3. An apparatus of the character described, comprising a trough-shaped receptacle having its front end open and pivotally mounted at its front end on a fixed support, means for introducing ore into said receptacle, a member traveling longitudinally through said receptacle and provided with flexible flaps for spreading the ore over the bottom thereof to separate the metallic particles from the gangue, and automatic means independent of the ore for moving the rear end of the receptacle downwardly so that said spreading member will always have a level surface to operate on; substantially as described.

4. An apparatus for the purpose described, comprising a pivotally mounted receptacle having its front end open, means for introducing ore into the rear end of said receptacle, a belt provided with flexible flaps that travel longitudinally through said receptacle for spreading the ore over the bottom thereof to separate the metallic particles from the gangue, and means for lowering the rear end of said receptacle and cutting off the supply of ore automatically; substantially as described.

5. An apparatus of the character described, comprising a trough-shaped receptacle having its front end open and pivotally connected to a stationary support, means

for introducing ore into the rear end of said receptacle, a belt provided with flexible flaps which travel longitudinally through said receptacle for spreading the ore over the bottom thereof, and means independent of the weight of the ore in said receptacle for moving the rear end of said receptacle downwardly so that said agitators will have a level surface to operate on; substantially as described.

6. In an apparatus of the character described, a pivotally mounted trough-shaped receptacle for receiving ore, a plurality of trap doors in the bottom of said receptacle, means traveling longitudinally through said receptacle for spreading the ore over the bottom thereof, means for moving the rear end of said receptacle downwardly so that said spreading means will have a level surface to operate on, locking means for said trap doors, and automatic means actuated by the downward movement of said receptacle for moving said locking means into an inoperative position to permit the doors to open; substantially as described.

7. An apparatus of the character described, comprising an open-ended receptacle pivotally mounted at its front end and adapted to receive ore, a belt provided with flexible flaps for spreading the ore over the bottom of the receptacle, trap doors in the bottom of the receptacle, catches for holding said doors closed, means for moving the rear end of the receptacle downwardly, and stops for engaging said catches to release the doors when the receptacle has reached a certain position; substantially as described.

8. An apparatus of the character described, comprising a trough-shaped receptacle open at its front end and mounted on a pivot, a supply pipe for feeding ore and wa-

ter into said receptacle, a belt provided with flaps for spreading the ore over the bottom of the receptacle, trap doors in the bottom of said receptacle adapted to be opened automatically to discharge the contents thereof when the rear end of said receptacle has moved downwardly a certain distance, a threaded rod connected to the rear end of said receptacle, a nut through which said rod extends, and means for rotating said nut in one direction for a certain period to move the rear end of the receptacle downwardly and thereafter in the opposite direction to return said receptacle to normal position; substantially as described.

9. An apparatus of the character described, comprising a trough-shaped receptacle open at its front end and mounted on a pivot, a supply pipe for feeding ore and water into said receptacle, a belt provided with flaps for spreading the ore over the bottom of the receptacle, a threaded rod connected to the rear end of said receptacle, a nut through which said rod extends, means for rotating said nut in one direction for a certain period to move the rear end of the receptacle downwardly and thereafter in the opposite direction to return said receptacle to normal position, and automatic means for cutting off the supply of ore and water and discharging the contents of the receptacle when said receptacle reaches a certain position; substantially as described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this second day of August 1907.

ERNEST WURDACK.

Witnesses:

W. C. MORRISON,
L. L. CARDIN.