(No Model.)

J. W. BAILEY.

ORE CONCENTRATOR OR SEPARATOR.

No. 302,816. Patented July 29, 1884.

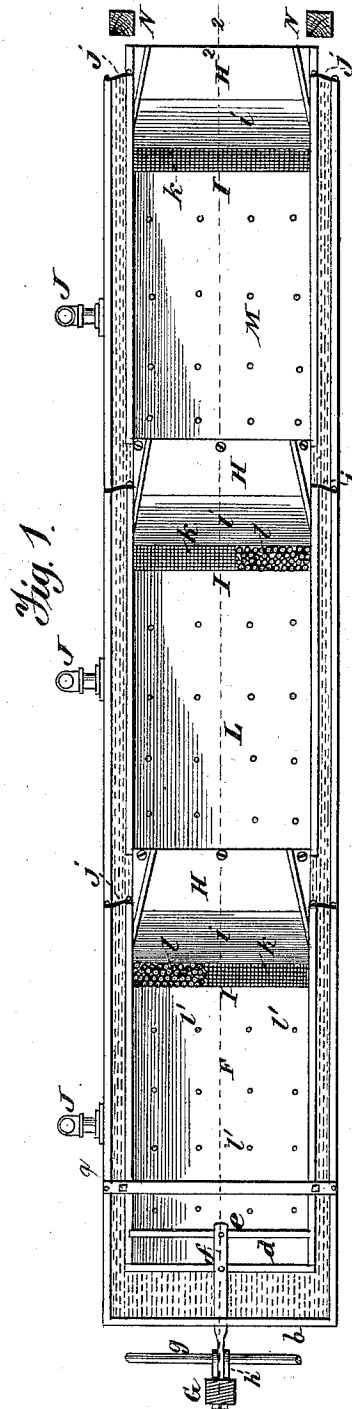


Fig. 1.

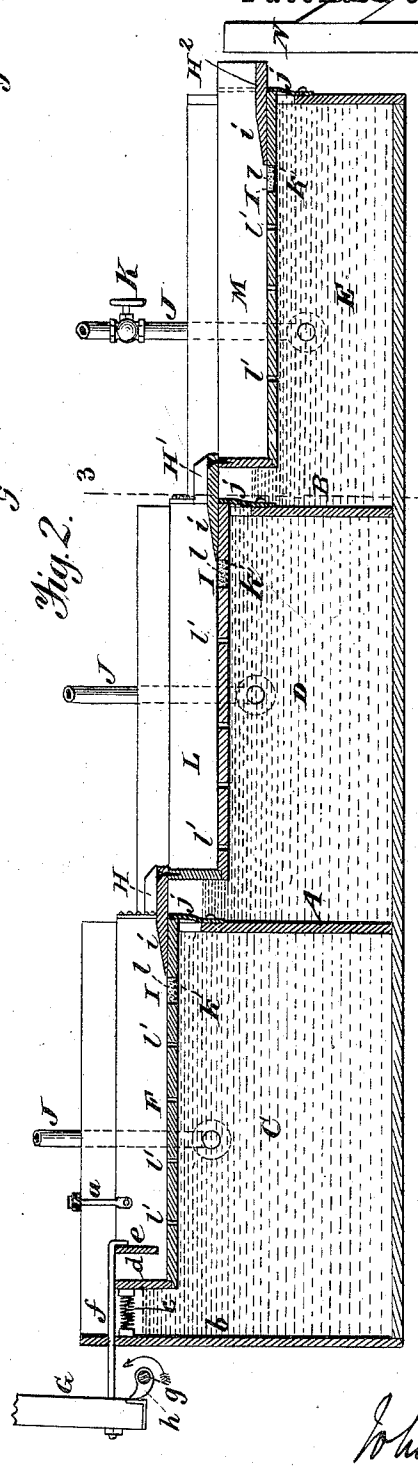


Fig. 2.

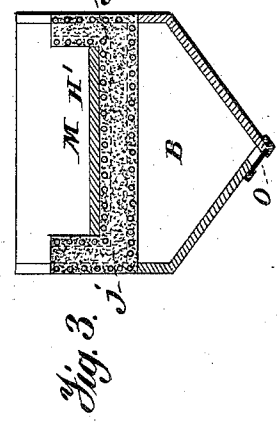


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN W. BAILEY, OF DENVER, COLORADO.

ORE CONCENTRATOR OR SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 302,816, dated July 29, 1884.

Application filed November 21, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. BAILEY, of Denver, in the county of Arapahoe and State of Colorado, have invented certain Improvements in Ore Concentrators or Separators, of which the following is a specification.

My invention relates to ore concentrators or separators; and it consists in the improvements described and claimed hereinafter, whereby the separation of the ore is effected with dispatch, and the ore obtained with regularity in different grades.

In the accompanying drawings, Figure 1 is a plan view of an ore-separating apparatus constructed in accordance with my improvements, and adapted to carry my improved method into effect. Fig. 2 is a longitudinal section of Fig. 1, taken on the line 1 2; and Fig. 3 is a transverse section of Fig. 2, taken on the line 3 4.

Like letters of reference refer to like parts throughout the specification and several figures of the drawings.

In carrying out my invention, I preferably employ a large rectangular tank divided by partitions A B into three compartments, C D E. The height of the compartment C is greater than that of either the compartments D E, the height of the compartment E being less than that of the compartment D. Longitudinally within the upper portion of the compartment C is suspended by rods *a*, Figs. 1 and 2, a tray, F, which is normally maintained a short distance from the wall *b* of the tank by an expanding spring, *c*, said spring being attached to the end *b* of the tank and to the end *d* of the tray F. A partition, *e*, is secured within the tray F, parallel with end *d* of the same, a space being left between the bottom edge of the partition and the bottom of the tray. A rod, *f*, is attached at the center of the upper edge of the partition *e*, and passes through an opening therefor in the end *b* of the tank, and is secured at its extremity to the end of a pendent bar, G, pivotally secured at any suitable point above the tank. A shaft, *g*, arranged between the end *b* of the tank and the depending bar G, and transverse to the length of the tank, carries a cam, *h*.

The tray F extends along the compartment C and terminates at an opening formed in the partition A, and much larger in dimensions than the end of the tray F. At the end of the tray F, and to the upper face of the bottom thereof, is secured a riffle-bar, H, which is beveled on one edge, *i*, and projects for a short distance through the opening in the partition A into the compartment D.

A flexible partition, *j*, of rubber cloth or duck, Fig. 3, is secured to the upper edge of the partition A, to the sides of the tank, to the edge of the bottom of the tray, and to the sides thereof, thus making a flexible, but water-proof connection between the tank, partition, and tray.

The tray F is provided, near its connection with the riffle-bar H, with a transverse rectangular opening, I, which is covered with a coarse screen, *k*, at the bottom, and contains a quantity of coarse shot or sand, *l*, for a purpose to be described hereinafter.

A pipe, J, communicates with each of the compartments C D E, so as to admit water thereto, the flow of the water being regulated by cocks K.

A tray, L, similar to the tray F, is located in the upper part of the compartment D, the end of said tray being attached to the projecting portion of the riffle-board of the tray F, while the other end of said tray L carries a beveled riffle-board, H′, which projects through the partition B, and is secured to one end of a third tray, M, arranged in the upper part of the compartment E. The other end of the tray M carries a beveled riffle-board, H^2, which projects through the end of the tank. Flexible connections are made between all the trays and the partitions of the tank, similar to that of the tray F and the partition A. Posts N N are arranged at the end of the tank, so that the end of the riffle-bar H^2 is normally in contact therewith. The bottoms of the trays are each provided with a series of perforations, *l′*, at considerable distance apart. The water is admitted to the different com-

partments at different pressures, that of the compartment C being the most powerful, and that of the compartment E the least. The pressure of the water in the compartment C is of such degree that it will be overcome by the gravity of the metal that is to be separated from the stock while in the tray F, the pressure of the water in the other compartments, D E, being decreased correspondingly with the gravity of the metal sought to be precipitated while the stock is in the trays L M.

The separating operation is as follows: The stock being fed into the tray F, between the partition *e* and the end thereof, the shaft *g* is caused to slowly revolve by any suitable means in the direction of the arrow, Fig. 2, causing the cam *h* on the said shaft *g* to intermittently come in contact with the pivoted depending bar G, thus forcing said bar outward on its pivot, and, by the rod-connection *f*, moving all three trays slowly in the direction in which the shaft *g* is located, the expanding spring *e* meanwhile becoming compressed. As the cam *h* passes from contact with the depending bar, the compressed spring reacts and quickly throws the trays back into their first position, causing the riffle-board H^2 of the tray M to come violently in contact with the posts N N, thereby imparting a shock to all the trays, and causing the stock to be thrown from between the partition *e* and end *d* of the tray F, and passing under said partition *e* be spread upon the bottom of said tray. Repeated shocks cause the contents of the tray F to gravitate toward the riffle-board H, the holes *l'* in the bottom of the tray F permitting small streams of water to flow upward therethrough, and thus prevent the stock from packing. As the stock reaches the transverse opening I, the gravity of the first grade of ore overcomes the pressure of the water and passes into the said opening, and, working its way among the shot or sand therein, finally passes through the interstices of the sieve *k* thereof, and drops into the bottom of the compartment C. The remainder of the stock with the ore it contains is floated over the riffle-board H, and drops into the tray L of the second compartment, D, the current of the water therein being only of such force as will enable the same to be overcome by the gravity of the second grade of ore, which works its way into the compartment D through a sieved opening, I, in the tray L, similar to that in the tray F. What is now left of the stock is floated over the riffle-board H', and passes onto the tray M, where the foregoing operations are repeated, the third grade of ore being finally separated, and the residue stock floated off over the riffle-board H^2.

From the foregoing description it will be apparent that by my improvements the ore is effectively separated from the stock and assorted out according to its grade, and that the operations are carried out with a small expenditure of time and power. Moreover, the particular apparatus herein set forth is effective in operation, simple and durable in construction, and easily worked. What is more, the arrangement of the flexible connections *j* enables the free longitudinal vibrations of the respective trays, and affords a water-tight partition between the several compartments, which it is important to maintain.

An eduction-gate, O, Fig. 3, is located in the bottom of each of the compartments C D E, for drawing off the precipitated ore.

It will be seen that the number of compartments may be increased or diminished proportionately with the number of grades of ore to be separated.

I do not limit myself to the precise construction shown and described, as the same may be subject to modification and change without departing from the essentials of my invention.

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

1. The combination, in an ore-concentrator, of a compartment or tank, a water-pipe communicating therewith, and a pivotally-suspended tray having a sieved opening near one end, a riffle-board in close proximity thereto, and devices for imparting a concussive blow to said tray, substantially as set forth.

2. The combination, in an ore-concentrator, of a compartment or tank, a water-pipe communicating therewith, a pivotally-suspended tray having a sieved opening near one end, a riffle-board in close proximity thereto and connected to the tray and projecting through a flexible partition, and devices for imparting a concussive blow to said tray, substantially as described.

3. The combination, in an ore-concentrator, of a compartment or tank, a water-pipe communicating therewith, and a pivotally-suspended tray having a sieved opening containing shot or its equivalent, a riffle-bar connected to the pivoted tray, and devices for effecting the movement of the stock across the tray, substantially as set forth.

4. The combination, in an ore-concentrator, of a compartment or tank, a water-pipe communicating therewith, a pivotally-suspended tray having a perforated bottom, a sieved opening near one end thereof, containing shot or its equivalent, a riffle-bar connected to the pivoted tray, and devices for vibrating the tray, substantially as set forth.

5. The combination, in an ore-concentrator, of a series of compartments, water-pipes communicating with each compartment and supplying water under different degrees of pressure, a series of trays arranged in the compartments and having perforated bottoms, riffle-bars connected to the trays, and devices for vibrating the said trays, substantially as set forth.

6. The combination, in an ore-concentrator, of a compartment or tank provided with an

eduction-gate in its bottom, a water-pipe communicating with the tank, a tray suspended in the tank and provided with a partition forming with the end of the tray a hopper for the stock, a sieve in the tray, a riffle-board connected to the tray, and devices for longitudinally vibrating the tray, substantially as set forth.

In testimony whereof I have hereunto set my hand and seal this 15th day of November, A. D. 1883.

JOHN W. BAILEY. [L. S.]

Witnesses:
L. D. STOCKING,
JAMES C. STARKWEATHER.