H. BARNARD.

Ore Amalgamator.

No. 19,337. Patented Feb. 16, 1858.

Fig. 2.

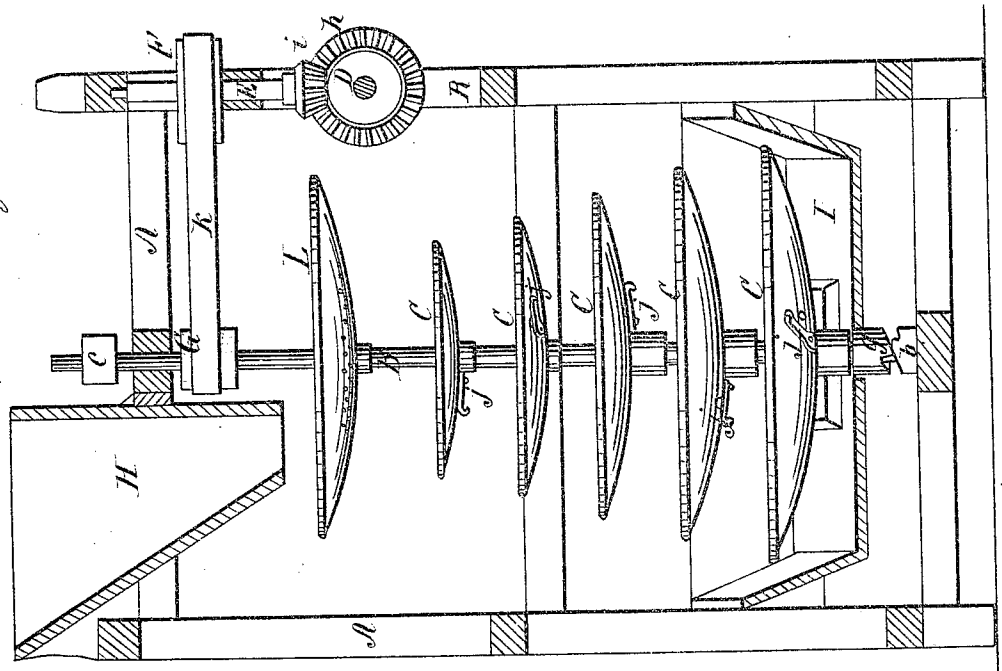


Fig. 1.

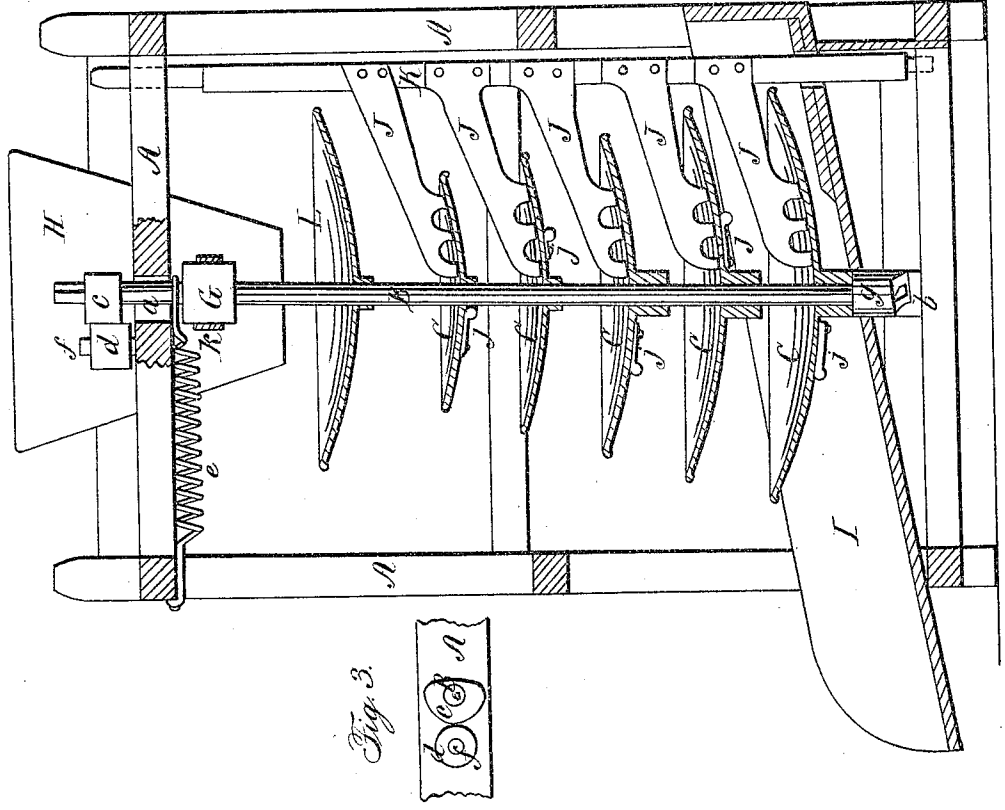


Fig. 3.

AM. PHOTO-LITHO. CO. N.Y. (OSBORNE'S PROCESS.)

UNITED STATES PATENT OFFICE.

HENRY BARNARD, OF MORRISTOWN, NEW YORK.

IMPROVED ORE-WASHER.

Specification forming part of Letters Patent No. **19,337**, dated February 16, 1858.

To all whom it may concern:

Be it known that I, HENRY BARNARD, of Morristown, in the county of St. Lawrence and State of New York, have invented a new and Improved Machine for Washing Ores of Gold and other Metals or other Auriferous or Metalliferous Matters; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figures 1 and 2 are vertical sections of the machine, taken in planes at right angles to each other. Fig. 3 is a detail view, which will be hereinafter explained.

Similar letters of reference indicate corresponding parts in the several figures.

This machine consists of a series of pans attached one below another on an upright shaft, which has a rotary, a vibratory, and a longitudinal motion imparted to it simultaneously by suitable mechanism hereinafter described. The pans are of gradually-increasing size from the top to the bottom of the series, and the substances to be washed being introduced with a stream of water into the top one the overflow of the water from one pan to another, from the top one to the bottom one of the series, combined with the movements of the pans with the shaft and the action of a series of stationary or movable agitators, effect the washing operation in a very thorough and perfect manner, as hereinafter described.

To enable others to make and use my invention, I will proceed to describe its construction and operation.

A is the frame of the machine, which may be of wood or iron.

B is the pan-shaft, the lower end of which is fitted to a stationary bearing *b* in the lower part of the framing, and the upper part of which is fitted to a slot *a* in the upper portion of the framing to permit a vibratory motion. A sliding journal-box should be fitted to the slot *a* to receive that part of the shaft which is within the slot.

C C are the pans, (exhibited in section in Fig. 1,) secured to the shaft B, which passes through their centers. These pans are circular, and may be made concave from the edges to the center, as shown in Fig. 1, or of any other form best suited to the particular substances to be operated upon. The gradual increase of the size of the pans from the top to the bottom of the series is exhibited in Figs. 1 and 2.

Each pan is provided with a small sliding or trap valve *j* near its center or lowest point.

L is a circular screen secured to the pan-shaft B above the highest pan.

D is a horizontal driving-shaft fitted to proper bearings on the frame A, and geared by bevel-gearing *h i* with a vertical shaft E, which is also fitted to bearings on the frame A, and which carries a pulley F, from which a belt *k* runs to a pulley G on the pan-shaft B for the purpose of imparting the rotary motion to the said shaft.

Near the bottom of the pan-shaft is secured a cam *g*, having a spiral-formed lower face, which fits to a face of corresponding form at the top of the stationary lower bearing *b* of the shaft. This cam *g*, rotating in contact with the spiral-formed face of the bearing *b*, gives the shaft a vertical or longitudinal reciprocating motion as it performs its rotary motion. Near the top of the pan-shaft there is secured a cam *c*, which is kept by a spring *e*, applied to the shaft, in contact with a roller *d*, which is fitted to rotate on a fixed stud *f*, secured in the top of the framing at one end of the slot *a*. The cam *c*, by its rotary motion in contact with the roller *d* as the pan-shaft rotates, causes the upper part of the shaft to receive the vibratory motion, which is provided for by the slot *a*.

H is a hopper into which the crushed or other auriferous or metalliferous matter is fed, to be supplied therefrom into the screen L, above the uppermost pan C, along with a properly-regulated quantity of water, which is supplied continuously to the hopper.

I is an inclined chute broader than the lowest and largest pan, arranged below the said pan to receive and convey away the overflowing water and dirt or foreign matter therefrom.

J J are a series of rakes, one for each pan, serving to stir up and assist in the agitation of the solid matter and water in the pan. These rakes, whose form is shown in Fig. 1, are attached to an upright post K, which is represented in the drawings as stationary, but which may have a slight oscillating motion

on its axis to give the rakes a movement. The scrapers are arranged so as to be nearly in contact with the bottoms of the pans.

The operation of the machine is as follows: Rotary motion being imparted to the shaft B by the means provided for that purpose, it is caused to receive at the same time through the cams *g* and *c* the vertical or longitudinal reciprocating and vibratory motions, and thus to impart a corresponding motion to the several pans, and on the auriferous or metalliferous matter and water being supplied from the hopper H through the screen L to the uppermost of the series of pans C C the said matter is caused by the movements of the pans, combined with the action of the rakes, to agitate the said matter and the water together in such a manner that the overflow of water over the sides of the pans from one to the next below it throughout the series and from the lowest of the series to the chute I is caused to wash away the lighter, earthy, and most of the foreign matter that is mixed with the gold or metal, which latter, by reason of its greater specific gravity, subsides to the bottoms of the pans, where it is retained, the heaviest particles being retained in the uppermost pan, and the portions which may be washed from this pan by the greater degree of agitation therein being retained by one or other of the pans below, in which the agitation is less and less intense the nearer they are to the bottom of the series, by which graduated agitation all the valuable particles may be saved, the heavier particles being retained in the higher and the lightest in the lowest pans. The pebbles or lumps of uncrushed ore or other large pieces are retained by the screen L and prevented entering the pans. This operation is continuous for any length of time; but as soon as a sufficient quantity of washed ore or metal has been obtained in the pans the supply of the metalliferous matter to and from the hopper H is stopped and clean water alone supplied to the pans for a short time to effect a more perfect washing of the metal retained in the pans, after which the valves *j j* of all the pans but the lowest one are opened and the metal raked through them from one pan to the other, commencing at the top one, till all is collected in the lower pan, from whence it may be abstracted by shoveling or scooping out or by opening the valve *j* and raking it through into a receptacle placed below, to be subsequently treated by amalgamation or any other process that may be considered desirable. Amalgamation may, however, be performed in the lowest pan by introducing a proper quantity of quicksilver and setting the machine in motion.

What I claim as my invention, and desire to secure by Letters Patent, is—

The series of pans C C, of sizes graduated as described, attached to the upright shaft B, which receives a combined rotary, reciprocatory, and vibratory motion, by which varying degrees of agitation are given to the pans, substantially as and for the purpose herein described.

H. BARNARD.

Witnesses:
W. TUSCH,
W. HAUFF.