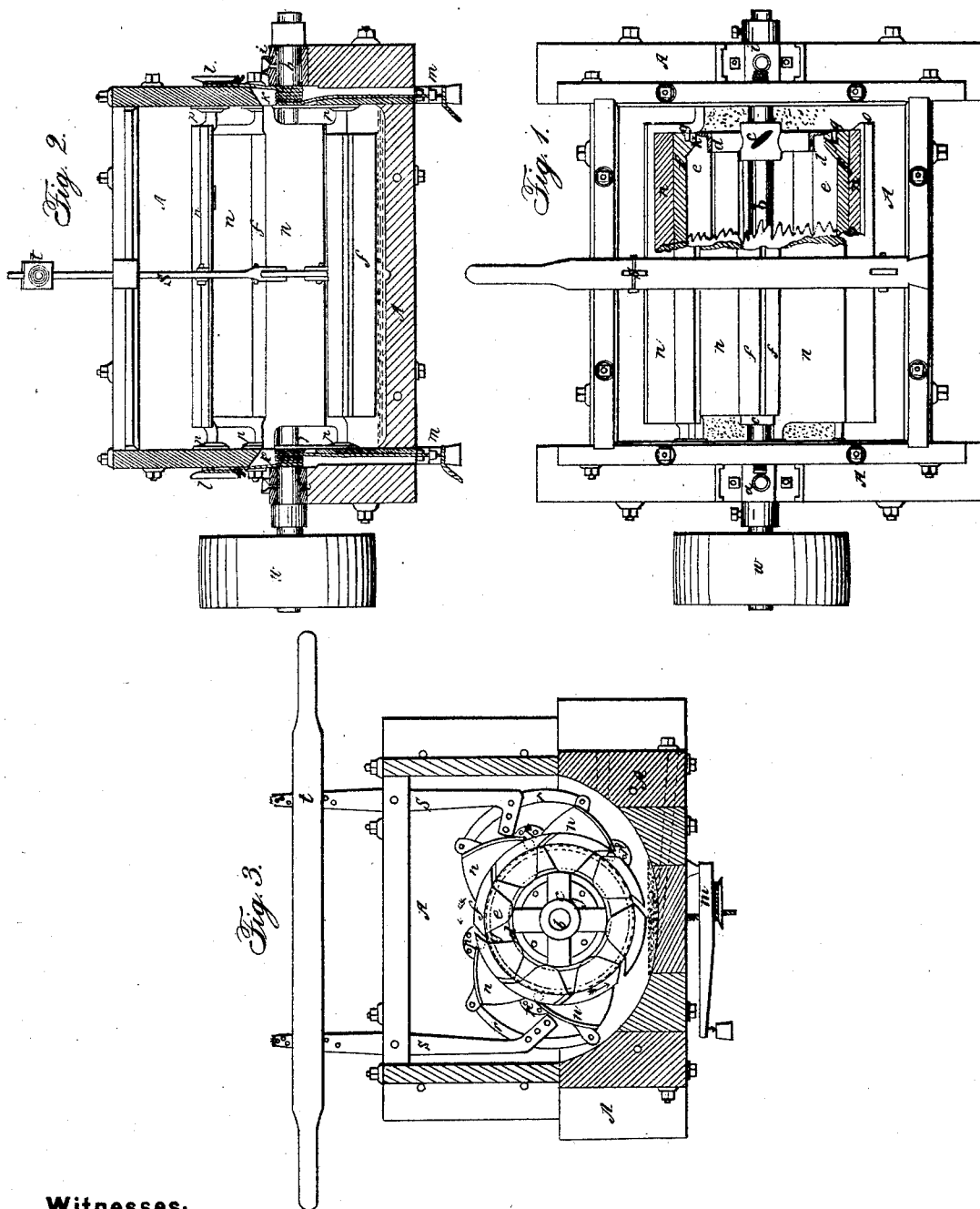


J. M. BEATH.  
Ore Amalgamator.

No. 45,468.

Patented Dec 20, 1864.



Witnesses:

*J. M. Scott*

*W. R. Eckart U.S.N.*

Inventor:

*John M. Beath*

# UNITED STATES PATENT OFFICE.

JOHN M. BEATH, OF SAN FRANCISCO, CALIFORNIA..

## IMPROVED ORE-AMALGAMATOR.

Specification forming part of Letters Patent No. **45,468**, dated December 20, 1864.

*To all whom it may concern:*

Be it known that I, JOHN M. BEATH, of the city and county of San Francisco, and of the State of California, have invented a new and Improved Amalgamator for Working Gold and Silver Ores; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in placing in a suitable receptacle for holding the diluted ore or pulp a horizontal cylinder having its bearings fixed stationary in the sides of the tank which contains it and its periphery covered with hard-iron shoes firmly fastened to the inner shell of my cylinder, the central portion and ends of which I leave open for the admission of the pulp, so that when my cylinder is put in motion the centrifugal force generated by its revolutions will cause the pulp in which it is immersed to be thrown out through openings in its periphery, and thus brought between the convex surface of my cylinder and any convenient or suitable number of dies, which I arrange on its circumference, and distributed so as to leave open spaces between them, and also room for the free circulation of the pulp in the tank around both cylinder and dies, thereby securing a constant circulation, rapid and even grinding, and amalgamation with the quicksilver, which, by its superior gravity, occupies the concave bottom of my tank beneath my cylinder.

To enable others skilled in the art to which my invention belongs to make and use it, I will proceed to describe its construction and operation.

In the accompanying drawings, Figure 1 is a plan and a horizontal section of a portion of my cylinder. Fig. 2 is a vertical section of my tank and a side view of my cylinder and dies. Fig. 3 is a vertical section cutting my tank and cylinder at right angles.

I usually make my tank, marked A A A in the drawings, of wood, and construct it substantially as represented, with concave bottom and the joints firmly drawn together with bolts.

I construct my cylinder by keying on the shaft *b* the cast-iron heads *c c*, setting the arms inclined (one of which is shown in section in Fig. 1) like the blades of a propeller,

so that the flow of pulp into the cylinder will not be obstructed when the cylinder is in motion. To effect this I set the arms right-handed in one head and left-handed in the other. In other respects the two heads are alike, each having a flange, *d d*, projecting inward over the extremity of the arms, which serves as a rest for the wood staves *e e*, upon which the hard-iron shoes *f f* are mounted. Both shoes and staves are firmly held to their place by a wrought-iron band over each head passing over a lug cast on the under side of each end of the shoes. In the section, Fig. 1, the band is marked *g g* and the lug *h h*. The bearings of my cylinder-shaft are in the boxes *i i*, which are bolted to the bottom timbers of my tank. The space between the boxes and the flanges *f f* (which are bolted to the side of the tank) I pack with hemp to prevent the escape of pulp around the shaft. To obviate leakage and the cutting of the shaft, which is liable to occur with an ordinary stuffing-box, I use simply a cord or strand of hemp passed around the shaft until the space is closely filled, and make fast one end at *l l* and pass the other down through the holes in the timbers of the tank and attach a weight through the levers *m m*, thereby keeping the packing uniformly tight and allowing it to vibrate with the shaft.

My dies are shown in section at *n n n n*, Fig. 3. I make them of hard iron, and, that they may be almost entirely worn away and easily replaced, I set them in a back or casing of common cast-iron, fastening them by grooves at the ends, one of which is shown in section at *o*, Fig. 1. The casings of my dies are hinged in the sides of the tank, as shown at *p p*, &c., in the different views. The two dies on each side of my cylinder are connected by the curved bars *r r* and the required pressure applied by the side levers, *S S*, the tops of the levers being pressed apart by drawing the cross-bar *t* down.

In case I wish to use more dies than I have represented, I apply the pressure to those on or near the top of my cylinder by a weight.

Operation: My tank being filled with pulp so as to cover the cylinder, I apply power to the driving-pulley *w*, giving my cylinder usually a velocity of twelve (12) or fifteen (15) feet per second in the direction of the arrows. The front part of my dies, lying in a line with the

centers on which they are hung, is not pressed upon the cylinder, but the pressure uniformly increases from this point to the heel or back part of my dies, where it is greatest. Therefore, as the pulp is forced out through the curved openings between the shoes by the revolution of my cylinder it is drawn under the dies and is gradually reduced as it passes to the heel, while a sufficient quantity passes out unobstructed between the dies to keep the whole mass in circulation outside of the dies and cylinder, and also sufficient to keep a current over and through the quicksilver on the concave bottom of the tank. In case I wish to continue the amalgamation after the grinding is completed, I remove the pressure from the dies, allowing the pulp to pass out unobstructed through all the openings in the cylinder, thereby violently agitating the whole mass and mixing the quicksilver with it. To facilitate the amalgamation, I usually line the bottom of my tank with sheet-copper, as shown in the drawings. For drawing off the charge of pulp, I have holes at different points on the

side; also, a hole in the bottom, shown by the dotted lines at Fig. 3. The holes are closed by wood plugs.

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

1. A cylinder so constructed as to take the pulp in at its ends and discharge it through openings in its periphery, using for that purpose the cylinder above described, or any other that is substantially the same and will have the intended effect.

2. The described method of arranging the dies on the periphery of the cylinder so as to produce a free circulation of pulp in the tank around the dies and cylinder.

3. The described method of hanging the dies so that the wear and pressure increases from the front to the back part, the whole being for the purposes set forth.

JOHN M. BEATH.

Witnesses:

I. M. SCOTT,

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