

H. HALVORSON.
AMALGAMATOR.

No. 50,534.

Patented Oct. 17, 1865.

Fig. 2.

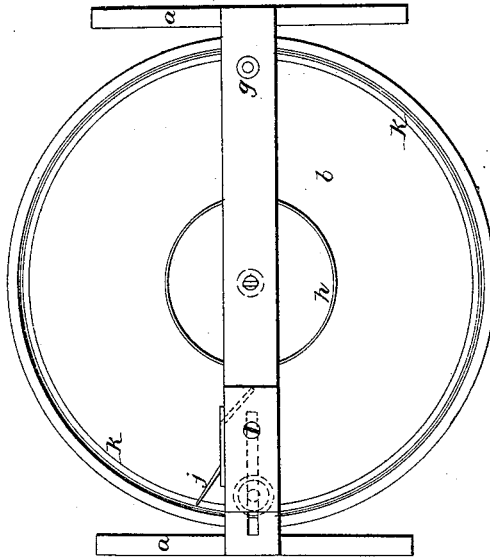
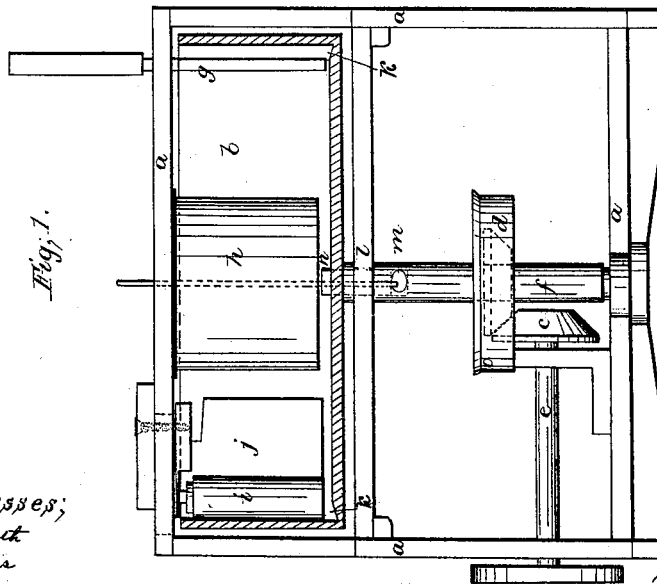


Fig. 1.



Witnesses;
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By Atty. Gen. D. C. Smith

UNITED STATES PATENT OFFICE.

HALVOR HALVORSON, OF NORTH CAMBRIDGE, ASSIGNOR TO HIMSELF
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AND LEVI L. CUSHING, JR., OF CAMBRIDGE, MASSACHUSETTS.

IMPROVED AMALGAMATOR.

Specification forming part of Letters Patent No. 50,534, dated October 17, 1865.

To all whom it may concern:

Be it known that I, HALVOR HALVORSON, of North Cambridge, in the State of Massachusetts, have invented a certain new and useful Improvement on Gold-Amalgamators; and I do hereby declare that the following is a full, clear and exact description of the construction and operation of the same, reference being had to the accompanying drawings, and to the marks and letters thereon.

The drawings forming part of this specification represent an amalgamator constructed under my invention, Figure 1 thereof being a view in elevation with a portion of the sides of the tub or pan removed, so as to show the parts within, and Fig. 2 being a top view, or a view had by looking down upon the amalgamator. In both of these figures, where like parts are shown, like marks and letters are used to indicate the parts.

A suitable frame, *a*, supports the revolving tub or pan *b* and the other parts of the machine. The tub or pan may be made of any sufficiently strong and durable material. The insides of the vertical sides should be copper. Sheet-copper lining in an iron pan or tub answers very well. The pan can be put in motion by beveled gearing *c* and *d* on suitable shafts, *e* and *f*, with belts and pulleys, or by any other appropriate mechanical means. The copper lining should be amalgamated or covered with mercury. When the pan is put in motion a soluble salt of mercury in solution should be put in, containing metallic mercury enough for the amalgamation. Continuing the rotation of the pan with the mercurial solution in it, the pulverized ore is added, and then sulphurous-acid gas is introduced by the glass tube *g*. This will decompose the mercurial salt, liberating metallic mercury, which seizes upon the gold and is carried by centrifugal force against the mercurialized copper lining, which will retain it. The oxygen of the mercurial salt will go to the sulphurous acid introduced, which, besides aiding to keep the mercurialized surface of the interior of the pan bright and clean, will also act upon a zinc ring, *h*, surrounding the shaft of the pan, rendering

it the positive element for a galvanic current toward the copper lining as the negative element, aiding the centrifugal force much in the deposition of the gold amalgam.

Were the centrifugal force undisturbed it would pile the contents of the tub up on the sides without further action. To prevent this an elastic roller, *i*, and a dasher, *j*, are applied to break this, the dasher throwing the mass back toward the center. This makes agitation, which polishes the particles of gold, without which mercury will not touch it. A bright metallic surface is *sine qua non* for amalgamation.

The object of the elastic roller, aside from aiding to break the piling up, is to knead the mass on the mercury on the copper, and thus crowd a contact of gold amalgam with the copper lining. A brush with the bristles pressing against the copper or a piece of sheet rubber or any soft material answers very well, but the roller presents the least friction.

At the lower edge of the copper lining is a recess, *k*, in the bottom of the pan. The object of this is to catch gold amalgam that may have been deposited upon the copper beyond the amount which the vertical sides will hold. The roller or brush aids in crowding this off to fall into the recess, where the gold amalgam is easier collected than from the sides. When the mass has been exhausted of gold, the shaft or tub being hollow and supplied with apertures *l* and *m* above and below the bottom, with a plug or cock, *n*, or valve between them, this valve is lifted up to a point above the inside aperture, when the mass will run out over the shield *o* underneath, which is placed there upon the shaft to prevent the débris from the pan running into the gears that revolve the pan. This may be done when the pan is at rest or while its rotation is gradually diminishing.

The dasher *j* should be made, preferably, of glass or some good non-conducting material, so as to take up none of the gold amalgam, which all ought to fly to the periphery; but if it is made of metal it should be of one which can be mercurialized like the copper sides.

The interior copper lining might be corrugated for the purpose of catching more of the gold amalgam, as the recesses would prevent the easy escape that would occur on a plain surface in the same diameter machine. It is true that in this case the kneading action of the rubber would be confined to the points of the corrugations; but it would still keep the mass in the recesses while passing under it, and force an adhesion of gold amalgam to the sides of the recess more than would occur without it.

It is obvious that this machine may be used as a separator alone, where amalgamation has been performed in a Tribough pan, or it may be used with metallic mercury.

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

1. The ring *h*, for the purposes herein recited.

2. The elastic roller *i*, either alone or in combination with the dasher *j*, as described.

3. The recess *k*, for the purposes herein set forth.

4. In a rotating tub or pan, the amalgamated-copper lining, for the purpose set forth.

5. The arrangement of the shield *a* in relation to the shaft and the gearing, as described.

6. The arrangement of the apertures *l* and *m* and valve *n* with the hollow shaft, as described.

This specification signed this 8th day of May, 1865.

HALVOR HALVORSON.

Witnesses:

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