H. BREVOORT.

GOLD AMALGAMATOR.

No. 25,242. Patented Aug. 30, 1859.

Fig. 1.

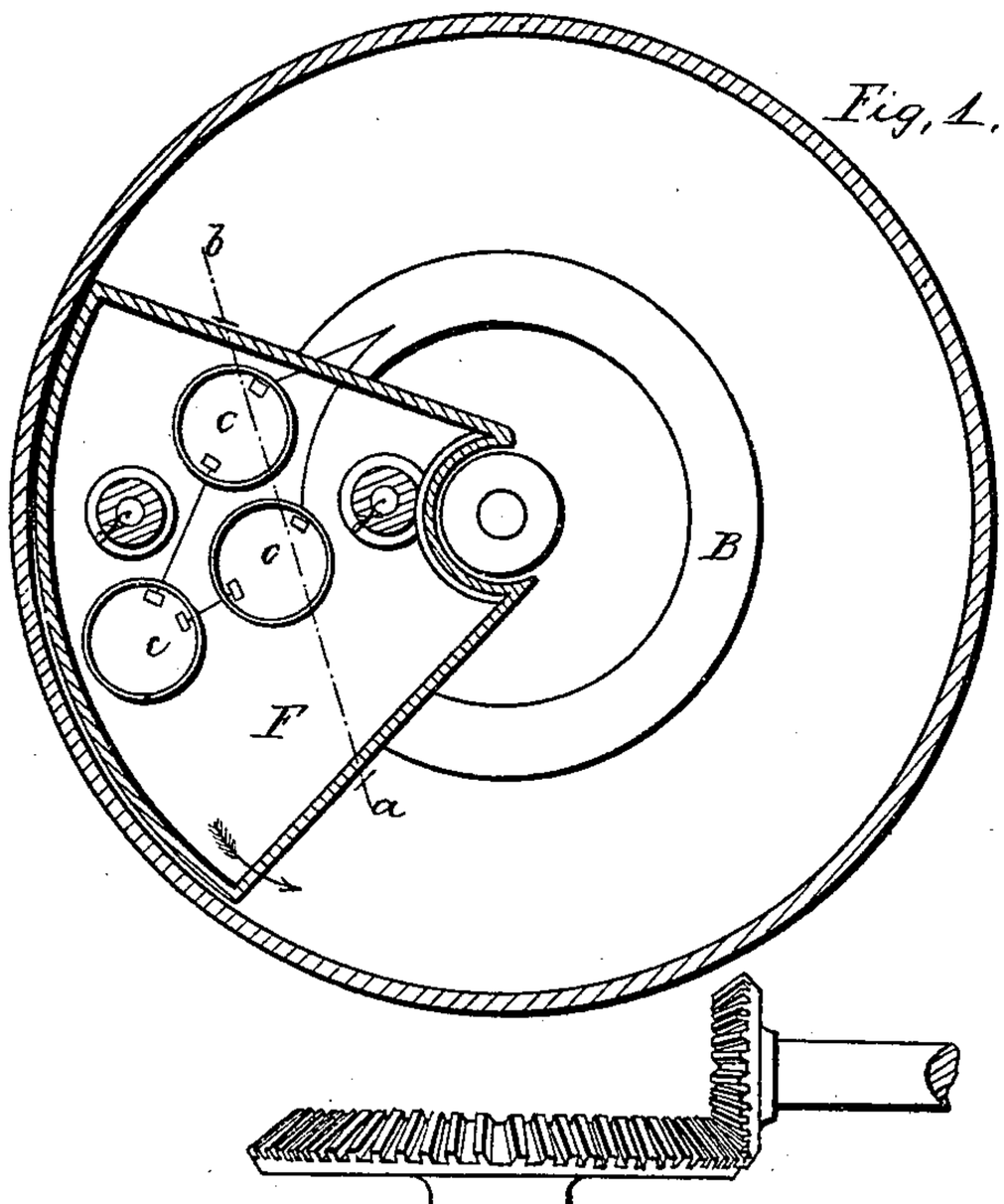


Fig. 3.

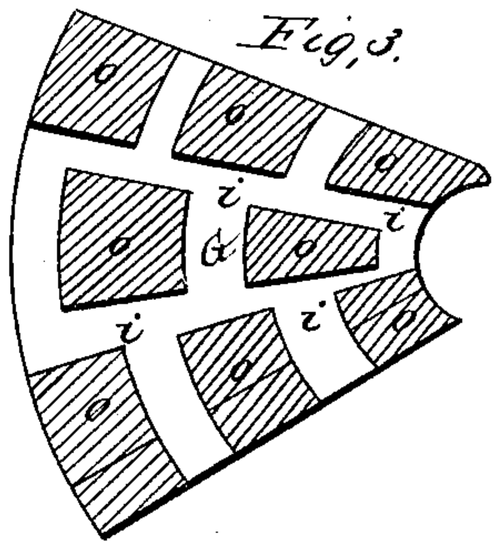
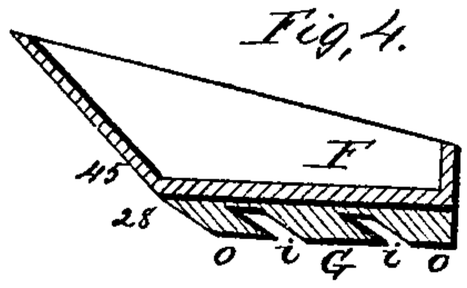


Fig. 2.

Fig. 4.



Witnesses;

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HENRY BREVOORT, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN GOLD-AMALGAMATORS.

Specification forming part of Letters Patent No. **25,242**, dated August 30, 1859.

To all whom it may concern:

Be it known that I, HENRY BREVOORT, of the city and county of San Francisco and State of California, have invented certain new and useful Improvements in the Method and Machinery for Amalgamating the Gold that exists in Auriferous Materials; and I do hereby declare that the following is a full, clear, and exact description of my said invention, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figure 1 represents a plan of my improved amalgamator. Fig. 2 represents a vertical section through the pan and shoe of the same. Fig. 3 represents a horizontal section of the bottom of the amalgamator drag or shoe; and Fig. 4 represents a transverse section of the same at the line *c d* of Fig 1.

Auriferous materials in a pulverulent state have been treated with mercury for the purpose of amalgamating the gold in an arrastra or pan-formed vessel in which a flat-bottomed drag is caused to revolve. Such arrastras are objectionable on account of the oxidation of the mercury which arises from the continued rubbing of it by the surface of the drag, hence their employment is attended with a great loss of mercury.

The object of the first part of my invention is to obviate this defect; and it consists in constructing the bottom or shoe of the drag in the form of a series of blocks and rubbing-surfaces or channels reciprocally arranged in such manner that the mercury is alternately spread out by the blocks into thin layers and permitted to collect again in mass before a second spreading.

The object of the second part of my invention is to gather together the mercury in mass after each passage of the drag and to impede it from remaining in the form of fine particles disseminated in the material under treatment; and it consists in combining with a revolving shoe a circular pan, whose bottom has the sectional form of two inclined planes terminating at a place intermediate between the center and the periphery in a circular trough, in which the mercury is gathered in mass after each passage of the shoe to be respread into thin layers at the succeeding passage thereof.

The object of the third part of my invention is to enable me to apply a galvanic current to the mercury during the amalgamation, to facilitate this operation; and it consists in combining a galvanic battery with the revolving shoe of an arastra in such manner that every part of the mercury is successively subjected to the influence of the galvanic current.

The object of the last part of my invention is to facilitate the amalgamation of the gold of auriferous materials, particularly those containing undecomposed metallic sulphurets and arsenurets; and it consists in treating the material while in the arrastra with a solution of the nitrate of mercury while it is subjected to the action of a galvanic current, whereby the amalgamation is greatly facilitated, arising, it is believed, from the continued decomposition of the nitrate and the deposition of the mercury upon the gold and the continued reformation of nitrate from the free mercury in the pan by the nitric acid set free by the decomposition.

The amalgamator represented in the annexed drawings is designed to operate with all my improvements.

The pan A of the amalgamator is circular and is formed of cast iron, its dimensions being thirty inches in diameter and ten inches in depth, this being a convenient size for practical operation. At one side of this pan there are three openings, 1 2 3, for the discharge of the spent material. The bottom of the pan inclines from its center toward the periphery, and from its periphery toward its center, so as to form two circular inclined planes which meet in a circular trough, B, situated about midway between the center of the pan and the periphery thereof. The pan has an orifice, 4, leading from the trough B for the discharge of the mercury therein. It has also a hub, C, at its center in which the lower end of an upright shaft, D, is stepped, the upper end thereof being supported by a suitable frame. This shaft is fitted with a driving-arm, E, from which two drivers, *a a*, depend, that give motion to the drag F. The drag has the form of a pan whose sides are sufficiently high to prevent the auriferous material under treatment from lodging upon its upper surface. It has two sockets, *f f*, in which the drivers *a a* fit loosely, so that the drag can rise and fall; and its lower face is shod with a shoe, G, which is caused to move with the drag by means of projections *e e*, which enter in the sockets of the latter. The lower

face of this shoe is formed into a series of blocks of rubbing-surfaces, *o*, and of channels *i*, the two alternating, as shown at Fig. 3, and the front extremities of the blocks are inclined, as shown at Fig. 4, so as to enable them to conduct the material under treatment beneath the rubbing-surfaces. The drag carries the jars *c c c* of the galvanic battery, whose conducting-wires are carried down behind the drag and terminate in poles in the circular trough. Motion is imparted to the drag by means of the central shaft, D, which should be caused to revolve at a speed of about fifteen revolutions per minute.

When the amalgamator thus described is to be used the discharge-orifices are closed and the circular trough is charged with about twelve pounds of mercury. From twenty-five to thirty pounds of finely-pulverized auriferous material are then placed in the pan, together with a sufficient amount of water to make it into a pasty mass, which is moistened with about a pint of weak solution of the nitrate of mercury. The drag is then put in motion and is kept in motion until complete amalgamation takes place, which generally requires from thirty to sixty minutes. During the operation the material is alternately subjected to the action of the rubbing-surfaces and is permitted to collect in the channels between them, and the mercury is alternately spread into thin layers and is permitted to recollect in the channels and flow back into the trough, where it collects in mass. During the amalgamation the mass is traversed by the galvanic current, and as the conducting-wires are carried round by the revolving shoe, every part of the material in succession is subjected to its action. When amalgamation has taken place water is conducted into the pan and the discharge-orifices at the side are opened in succession. By the action of this water the lighter particles of the spent material are washed off through the upper two orifices. Subsequently the motion of the drag is arrested and the lowest orifice, 3, in the side of the pan is opened, when a final discharge of the material takes place nearly down to the surface of the mercury. The orifices are then closed, the machine is charged with a fresh quantity of auriferous material and nitrate, and the operation is conducted as before. When by a succession of operations the mercury has become sufficiently charged with gold, it is permitted to flow out of the orifice 4 in the trough and is replaced by fresh mercury.

Having thus described my invention, I wish it to be understood that I do not claim the amalgamation of auriferous material in a pan or arastra fitted with a revolving shoe, nor do I confine myself to the use of all parts of my invention simultaneously in the same machine; but

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

1. The drag having upon its lower surface or shoe the combination of the blocks of rubbing-surfaces *o* and channels *i*, the two being arranged reciprocally, in the manner herein described.

2. Combining with a revolving drag, F, a pan, A, whose bottom is inclined and has the form of a circular trough, as represented in the drawings, so as to collect the mercury in mass.

3. Combining an amalgamating-pan and revolving drag with a galvanic battery arranged in such manner that its poles are extended into the mass of material in the pan and that the parts of the material are subjected in succession to the action of the galvanic current.

4. The employment of a solution of the nitrate of mercury in connection with a galvanic battery and a friction-amalgamator containing mercury, substantially as herein set forth.

In testimony whereof I have hereunto subscribed my name.

HENRY BREVOORT.

Witnesses:
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