(No Model.)

F. M. JOHNSON.

ORE CONCENTRATOR AND AMALGAMATOR.

No. 287,546. Patented Oct. 30, 1883.

Fig. 1.

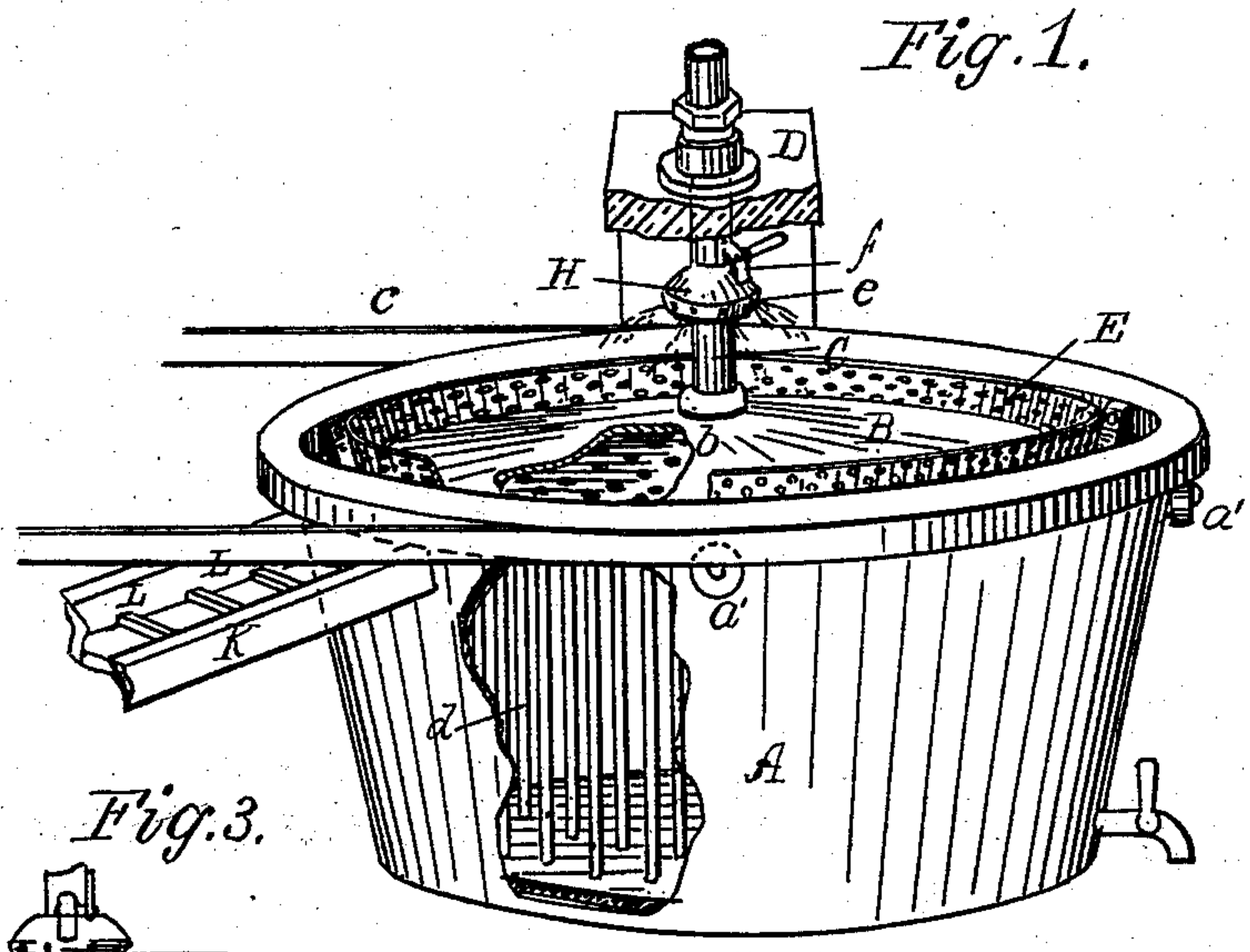


Fig. 3.

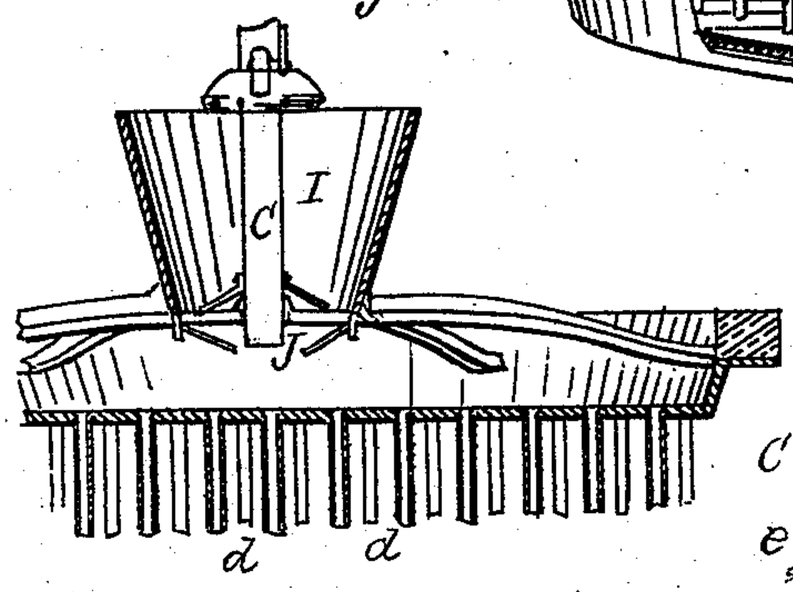
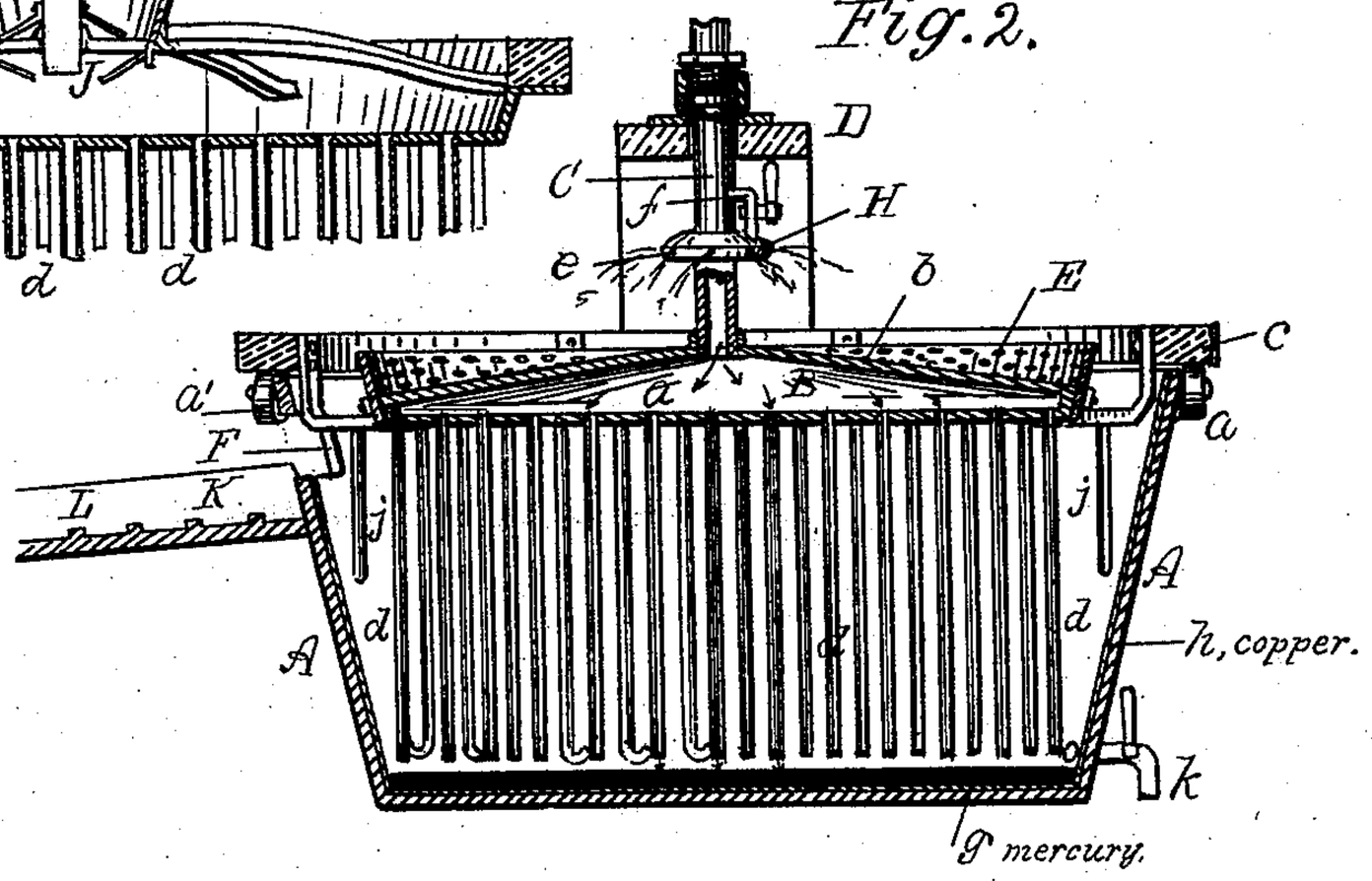


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

FREDERICK M. JOHNSON, OF GARDINER, OREGON.

ORE CONCENTRATOR AND AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 287,546, dated October 30, 1883.

Application filed April 23, 1883. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK MILTON JOHNSON, a citizen of the United States, residing at Gardiner, in the county of Douglas and State of Oregon, have invented certain new and useful Improvements in Ore Concentrators and Amalgamators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to a class of combined ore separators and amalgamators in which the metals to be amalgamated are separated from the sand or ground ores by differences in the specific gravities of their component particles, this operation being carried on in water, which has a current toward the outlet of the machine, to carry off the refuse. In my machine I employ a tank containing water, which is agitated by vanes secured to a revolving head, upon which the ore is dumped, the bottom of the tank containing a small quantity of quicksilver. The vanes are tubes or pipes pendent from the rotary head, and the water supplied to the tank passes down through these pipes. The metals, after being separated by the mechanical action of the machine, are seized by the mercury and amalgamated.

The drawings accompanying this specification represent in Figure 1 an isometric elevation, and in Fig. 2 a vertical section, of a machine containing my invention. Fig. 3 is a view showing a modified construction of the rotary head.

In said drawings, A represents a tank, of any suitable material, and of a size adapted to the requirements of the machine, this tank being circular in cross-section and of larger diameter at top than at bottom, to facilitate the upward flow of the light material under the centrifugal action of the revolving head and vanes.

B represents a rotary hollow head, composed of a flat bottom, *a*, and a shallow conical top, *b*, this head B being secured to the lower end of a vertical pipe, C, which is supported at its upper end in a standard, D, spanning the top of the tank A. The head B is supported upon anti-friction rolls *a' a'*, &c., and is rotated by an endless band, *c*, which travels about its periphery and about a driving-pulley carried by a suitable shaft.

E represents an annular sieve, removable from the head B, and adapted to be secured to the top of said head, in order to provide an inclosure upon the latter to receive the sand or ground ore which is to be treated, and which finds its way gradually through the interstices of the sieve into the tank A below. This sieve is not essential. It may be omitted and the sand or ground ore dumped directly into the tank. The water to supply the tank A is furnished through the pipe C, the lower end of which communicates with the interior of the head B, this water passing downward from the head to the tank through hollow pipes or vanes *d d*, &c., pendent from the bottom of such head. These hollow vanes or pipes in aggregate, when in rotation with the head, serve to agitate the mass of sand or ore and water in the tank, while the centrifugal force imparted to such sand or ore and water by the revolving vanes, aided by the flaring walls of the tank, induces an upward current of the water, which sets toward the outlet F of the tank, this escaping flow of water operating to carry off the lighter waste particles from the sand or ore, while the heavier particles which are to be amalgamated or concentrated are precipitated to the bottom of the tank A. To aid in inducing an upward current of the water flowing through the pipes or vanes, the lower ends of a portion or all of the latter may be turned upward, as shown in Fig. 2 of the drawings. I prefer, in addition to the water supplied to the tank, as stated, to discharge water upon the sand or ground ore as it is dumped upon the top of the head B, and to accomplish this I add to the pipe C a hollow hub, H, containing a series of perforations, *e e*, &c., in its periphery, and I supply the interior of this hub with water by a small branch pipe, *f*, connecting with the pipe, as shown. Water issues from the perforations *e e*, and is discharged in a spray upon the sand or ore upon the head B.

Within the bottom of the tank A, I place a small quantity of mercury, as shown by the black line *g* in Fig. 2 of the drawings. The heavier particles remaining from the washing

of the sand or ore are seized upon by the mercury and amalgamated, and to facilitate the amalgamating process I line the tank A with amalgamated copper, as shown at *h* in the drawings. The particles of gold, for instance, are thrown outward by centrifugal force against the amalgamated-copper lining, and remain there until removed or settle to the bottom.

In Fig. 3 of the drawings I have shown a modified construction of my machine, in which I employ a hopper, I, secured centrally to the top of the head B, which in this case will be a single plate, the hopper surrounding an opening, J, in the center of such head, as well as the pipe C. In this modification the sand or ore is dumped into the hopper, and enters the tank A through the opening J and tubes *d*. K in the drawings represents a trough, or "riffle," as it is termed in miners' parlance, this trough being situated immediately below the outlet F of the tank, and formed with lateral ribs L L, &c., upon its bottom, which serve to confine between them small quantities of mercury, which operate to amalgamate any portions of float gold or other precious metal escaping from the concentrator with the waste water.

In addition to the primary tubes, pipes, or vanes *d d*, &c., shorter auxiliary solid vanes J J, &c., may be employed to enter the upper part of the tank A and utilize the space not occupied by the larger hollow pipes. A gate or faucet, *k*, should be added to the lower part of the tank, to draw off the contents of the latter as occasion requires.

I claim—

1. The combination of tank A with head B, arranged within said tank, means for rotating said head, sieve E, secured on the top of said head to provide an inclosure for the ground ore, and the pipes *d*, which conduct water from said head to the bottom of said tank, and also act as stirrers, substantially as set forth.

2. A hollow head arranged in the upper part of a tank, means for rotating said head, and adapted to receive ground ore on its top and distribute the same to the interior of said tank, in combination with a tube for supplying said head with water, and tubular stirrers which conduct the water from said head to the bottom of said tank, substantially as set forth.

3. In combination, the tank A, rotary hollow head B, supply-pipe C, pipes or tubular vanes *d d*, and hollow hub H, secured to and supplied from the pipe C.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK MILTON JOHNSON.

Witnesses:
H. E. LODGE,
F. CURTIS.