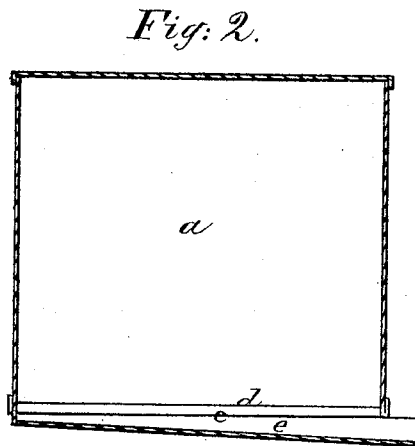
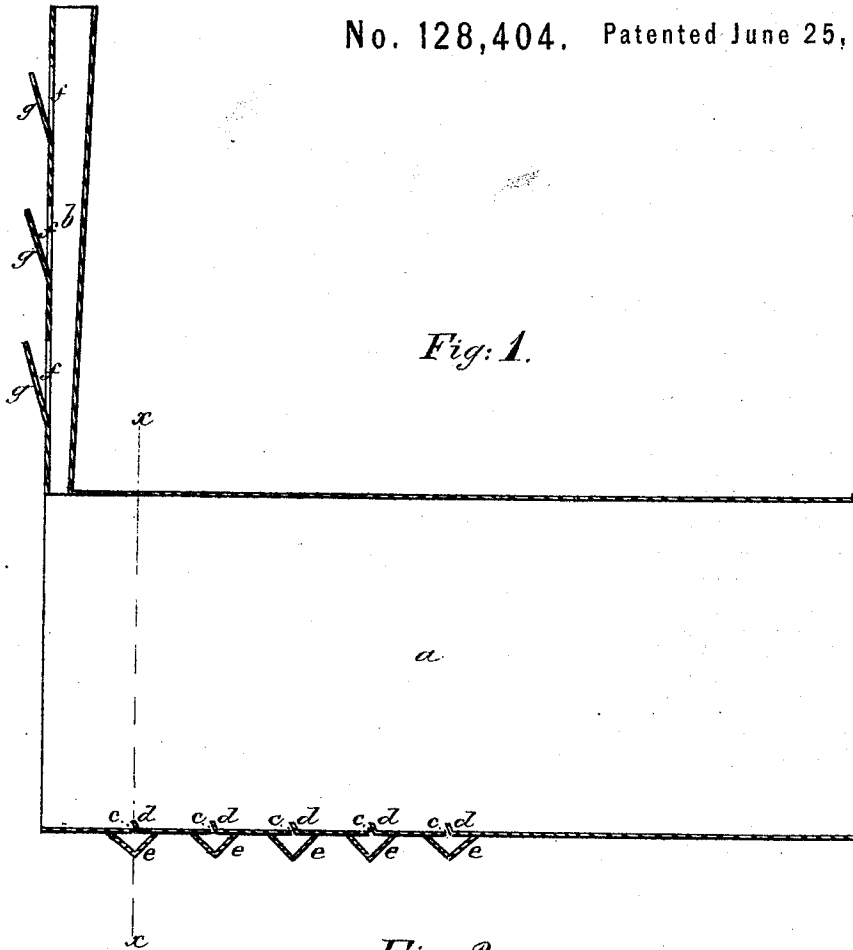


H. W. LATHROP.

Improvement in Apparatus for Separating Metals.

No. 128,404. Patented June 25, 1872.



Witnesses:

Harry M. Phillips
Jm. Wagner.

Inventor:

Harvey W. Lathrop
by
Johnson, Klauke & Co
his Attorneys

UNITED STATES PATENT OFFICE.

HARVEY W. LATHROP, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN APPARATUS FOR SEPARATING METALS.

Specification forming part of Letters Patent No. 128,404, dated June 25, 1872.

To all whom it may concern:

Be it known that I, HARVEY W. LATHROP, of Baltimore, in the State of Maryland, have invented a new and useful Improvement in Apparatus for Separating Metals, of which the following is a specification:

My invention relates to that class of apparatus used for separating the different metals from each other and from the dross after they have been reduced to powder in a stamping-mill; and my said invention consists in making use of the difference in the gravity of the several metals by dropping the powder through a hopper into a box or sluice, through which a gentle current of water is led, and under which box, at suitable distances, side troughs are arranged under openings or slits in the bottom of the box, so that the different metals falling into the current are carried a greater or less distance from the vertical line of their fall, according to their different gravities, before they reach the bottom of the sluice, and are washed through the slits into the different troughs, and are thus sorted according to their different gravities.

In the accompanying drawing, Figure 1 represents a longitudinal vertical section of my improved apparatus for separating the ores or metals; and Fig. 2 represents a vertical cross-section of the same in line *x x*, Fig. 1.

A sluice-box, *a*, of any suitable material and length, is provided at one end with a hopper, *b*, through which the powdered ores are dropped into a current of water led into the sluice-box *a*; or the sluice-box may be placed in a suitable stream having a gentle current. In regions where water is scarce, as is the case in many mining districts, a pump or other mechanism may be used to return the water after it has passed through the box *a* to the end under the hopper, and thus reissue the water over and over again as long as possible. In the bottom of the sluice-box *a* are formed slits or openings *c*, at suitable distances from each other, and of sufficient size to allow the particles of the different metals to pass through them when they reach the bottom; and slight ridges *d* are formed in any suitable manner in the rear of these slits or openings *c*, so as to prevent the particles of metal from being washed over them when they once reach the bottom,

but not high enough to prevent lighter particles of earth, quartz, or dross from being washed away. Secured across the under side of the bottom of the sluice-box *a*, and one under each slit or opening *c*, are inclined troughs *e*, larger at their outer ends, through which the particles of metal are delivered by the water as they are washed through the slits or openings *c*.

The powdered mass of ores, &c., being thrown into the hopper *b*, the different particles of metals, &c., drop quicker or slower, according to their respective gravities, until they come in contact with the current of water, when they deviate from the vertical line of their fall by reason of the force of the current. But even in the current the different gravity of the particles will cause them to come to the bottom of the box nearer to or further from the vertical line of the hopper from which they fell; in other words, the current will carry the lighter particles further along in the box before they reach the bottom and are arrested by the ridges *d* than it will carry the heavier particles, which will reach the bottom sooner than the lighter ones. Supposing gold to be the heaviest ores of the crushed metals, and that it would reach the bottom of the sluice in front of the first ridge *d*; lead, supposing it to be the next heaviest, would go into the next opening *c*; silver, the next; copper, the next; and so on according to their different gravities; and it will be understood that the rapidity and strength of the current will make no more difference in the separation of the metals than that a longer box and longer intervals between the openings would be required, provided always the current is not too strong and rapid to prevent the metals from reaching the bottom at all. The earth, dirt, and other light particles are carried off by the current, and should they come into contact with any of the ridges *d* they pass over them lightly and do not pass into the troughs *e*. In the front side of the hopper I provide openings *f*, shielded by pieces *g*, and formed in any suitable manner, through which openings water may be admitted to clear the hopper if it should be clogged, or to admit the water if the box is used in a stream, and the stream should rise beyond the top of the box *a*.

My improved separator is exceedingly simple and of cheap construction, and can be used with the least possible amount of water, provided there be always water in the box to sufficient height to exert the force of the current on the falling metals. It does not depend on the expensive quicksilver, but may be put up at very little cost, and is certain in its action.

Having described my invention, I claim—

The mineral-separator, consisting of the sluice-box *a* provided with hopper *b*, openings *c* at suitable distances in its bottom, ridges *d*, and troughs *e*, and arranged to be used with

a current of water, the force of the current and difference in gravity of the different metals operating to separate and deliver the several metals separately from each other, essentially in the manner described.

The above specification of my improvement in mineral-separators signed this 28th day of February, 1872.

HARVEY W. LATHROP.

Witnesses:

A. E. H. JOHNSON,

ALEXR. A. C. KLAUCKE.