J. T. McDOUGALL.

Collecting Precious Metals.

No. 83,868. Patented Nov. 10, 1868.

Fig: 1.

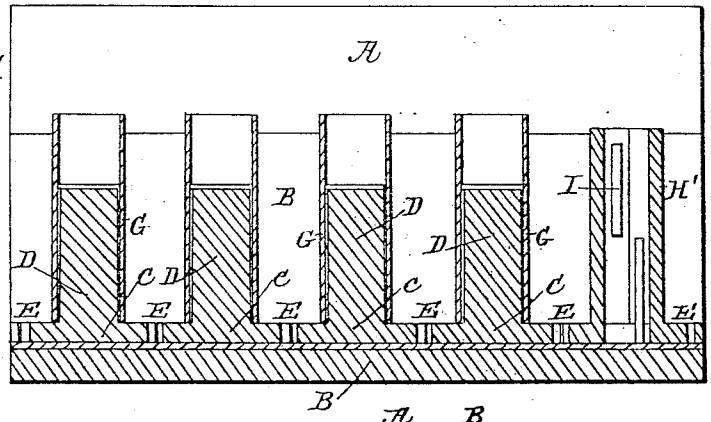


Fig: 2.

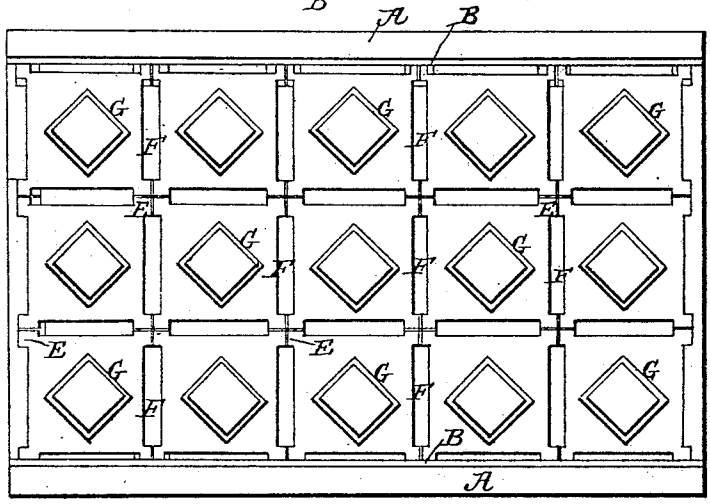
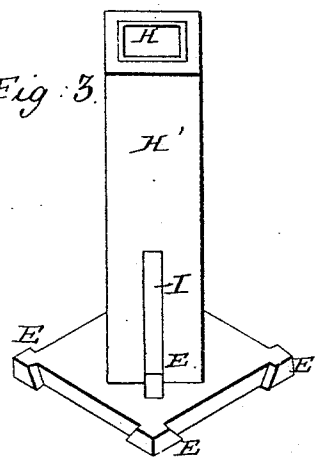


Fig: 3.



Witnesses
Geo. H. Strong.
C. M. Smith

Inventor
Jas. T. McDougall

N. PETERS. Photo-Lithographer. Washington, D. C.

United States Patent Office.

JAMES T. McDOUGALL, OF SAN FRANCISCO, CALIFORNIA.

Letters Patent No. 83,868, *dated November* 10, 1868.

IMPROVEMENT IN APPARATUS FOR COLLECTING PRECIOUS METALS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JAMES T. McDOUGALL, of the city and county of San Francisco, State of California, have invented an Improved Apparatus for Collecting Precious Metals; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains, to make and use my said invention or improvements without further invention or experiment.

The object of my invention is to provide an improved method of constructing sluices for quartz-mills, placer-mining, and other places where water is used for washing the precious metals, so as to bring the gold or silver, or the float gold and silver, or float amalgam of the said precious metals, into contact with metallic copper, or other metals having affinity for mercury, and is intended as an improvement on an apparatus for collecting the precious metals, for which Letters Patent were granted to me, January 7, 1868, and numbered 73,021.

In constructing my improved apparatus, I place in my sluice-box a plate of copper or other metal, the upper surface of which is either amalgamated, silvered, mercurialized, or in its natural condition. This plate is bent at right angles, to form the side plates. Upon the bottom of this plate, I place iron standards, having a square or oblong base, single or in sections, from which one or more stems or bars project upward. On the sides and corners of the bases there are projections, so that, when the standards are placed side by side, there are spaces between them. Loosely-fitting copper tubes, with amalgamated surfaces, are placed over the projecting stems.

To more fully illustrate and describe my invention, reference is had to the accompanying drawings, and letters marked thereon, of which—

Figure 1 is a side sectional elevation.

Figure 2 is a plan of my sluice.

Figure 3 is a view of one of the tubes, having vertical slots or openings.

Similar letters of reference indicate like parts in each of the figures.

A represents a sluice-box, formed, in the usual manner, with a bottom and two side boards.

B is a metal plate, (I prefer to use copper,) bent so as to conform to the shape of the box, with bottom and sides of one sheet.

Along the bottom of this plate, I place iron standards, C C C C, having a square or oblong base, from which one or more stems or bars, D D, project upwards.

On the sides and corners of the bases of the standards are projections, E E, so that, when they are placed side by side, open spaces will be left between them.

Where there is more than one standard, a narrow slit or opening, F, is left midway between the stems, which extends about half way across the base. This opening, having no connecting outlet except below, serves, when filled with mercury, as a fountain of supply for the copper plate on which the stems rest.

It is intended that the standards shall cover the copper plate on the bottom of the box, excepting around the bases, where the interstices left by their peculiar form leave the plate exposed. These open spaces serve as riffles, and may be charged with mercury when desired, the standards being so placed that the squares of the projecting stems will stand diagonally with the course of the running stream.

Loosely-fitting copper tubes, G G G, having amalgamated, silvered, or mercurialized surfaces, are placed over the projecting stems, and should be of sufficient length to reach the surface of the stream. The stems and tubes also serve as vertical riffles, and, when placed in rows across the running stream, convert it into eddies between each series of standards. The particles of metal floating in the water, however buoyant they may be, are driven into the eddies, and, by the well-known whirlpool-movement, are subjected to a double impulse, a downward and outward movement from the vortex of the eddy, and the metal is brought into contact with the amalgamated surface, where it is retained.

When the running stream carries a large amount of stones or gravel, as where the apparatus is employed for placer-mining, so that the abrasion on the copper tubes would be too great, they may be dispensed with on the outside of the stems. In this case, the stems may be solid.

If desired, the copper tubes, bars, or other collecting-apparatus, H, may be placed within the hollow of the stem H', and communicate with the water outside through slots or apertures, I I, in the iron or metal, shown at fig. 3, which exhibits a hollow stem.

When the stems are solid, and without the copper caps or tubes, the collecting-surface relied upon is the copper plate, when exposed in the interstices between the standards. In this case, the stream in the sluice will be very shallow.

For cleaning up, when the copper tubes are employed, they may be removed, and the amalgam collected upon them is removed in the ordinary manner.

In the employment of my sluice-box, as above described, new and important improvements and principles in the art of collecting the precious metals, when they are moving in a stream of running water, are shown; also, the advantages of a vertical riffle will be demonstrated, as well as the highly-important fact that, when iron, or copper and iron in contact, are placed in moving water, and resting on plates of copper, having a mercurialized surface, the mercury on the plate is not oxidized, but remains bright, and seizes the precious metals that come in contact with it with increased avidity. Whether the principle evolved be due to the electrical action incited, or produced by the

contact of metals having different degrees of latent heat, or electricity generated by the friction of the running stream, or the greater affinity that the oxygen has for the iron, are questions not yet determined; but the fine particles of gold or metal and amalgam, that have heretofore run to waste for want of a suitable device for collecting and retaining them, are here saved.

Having thus described my invention,

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

1. Vertical or inclining iron standards C C, with stems or bars D D, resting on a plate or plates of copper, B, or plates of some other metal having affinity for mercury, when used for collecting the precious metals, substantially as described.

2. Iron standards, with a supporting horizontal base, on the edge of which there are projections, E E, so that, when placed side by side, open spaces, F F, will be formed between the said standards, having one or more stems or bars projecting upward, all of which serve as riffles when placed in running water, substantially as and for the purpose specified.

3. Iron stands, with hollow projecting stems, H, containing bars, slips, or tubes of copper, H′, or other metal having affinity for mercury, communicating with the water outside through slits or openings, I I, substantially as described.

4. Copper resting on iron, the iron resting on copper, the copper having amalgamated, silvered, or mercurialized surfaces, when placed in sluice-boxes, or other apparatus, or equivalent device, designed to intercept and collect the precious metals moving with the water, in the manner and for the purposes herein specified.

5. The metallic obstructing and collecting-surfaces, or equivalent device, separately or in combination, whether placed in sluice-boxes, concentrators, or other apparatus for collecting the precious metals moving in running water, substantially as described.

In witness whereof, I have hereunto set my hand and seal.

JAS. T. McDOUGALL. [L. S.]

Witnesses:

GEO. H. STRONG,

C. W. M. SMITH.