J. F. Mc Dougall,

Collecting Precious Metals.

No. 109533. Patented Nov. 22. 1870

Fig. 1.

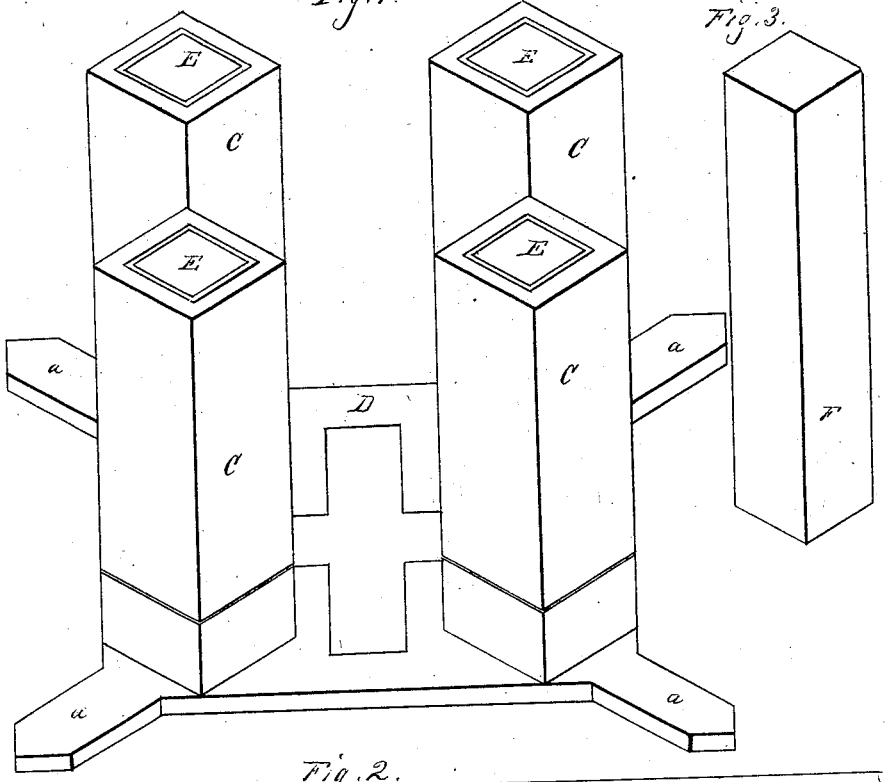
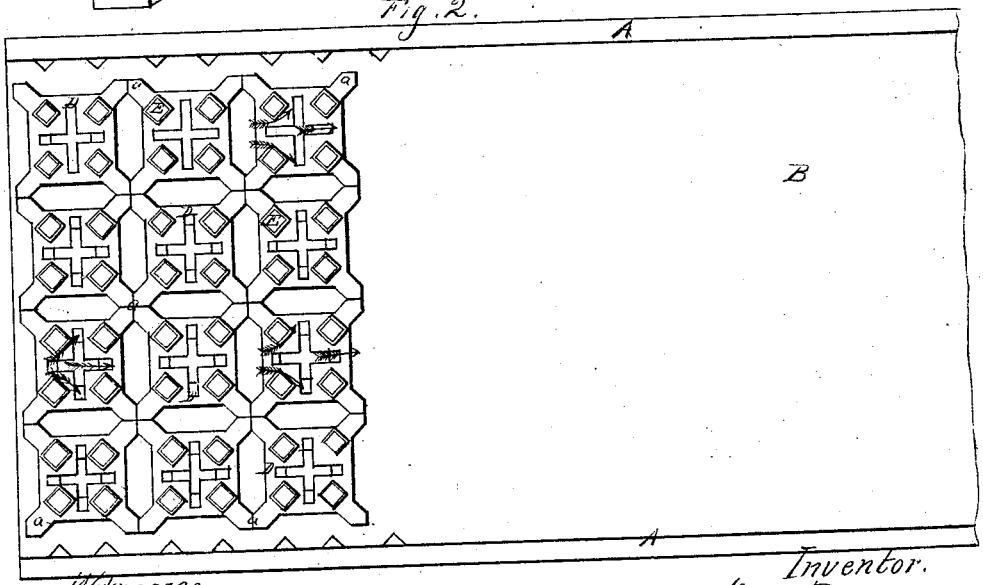


Fig. 3.

Fig. 2.



Witnesses.
Geo. H. Strong
Jno. L. Boone

Inventor.
Jas. F. Mc Dougall
By his attys Dewey & Co.

United States Patent Office.

JAMES T. McDOUGALL, OF SAN FRANCISCO, CALIFORNIA.

Letters Patent No. 109,533, dated November 22, 1870.

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 the Precious Metals; and I do hereby declare the following description an accompanying drawing 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 improvement without further invention or experiment.

My invention relates to improvements on an improved method of collecting the precious metals, for which Letters Patent were granted to me, No. 73,021, dated January 7, 1868, and No. 83,868, dated November 10, 1868.

My former inventions contemplated the use of metallic standards, either separately or united in sections, placed in an ordinary sluice, the bottom of which had previously been covered with one or more amalgamated plates.

The standards were more particularly described as being composed of copper and iron, by which combination of metals a retaining amalgamated surface was presented, and an electrical action was induced, which would serve to collect and precipitate even the finest particles of gold or other metals, (see patent No. 83,868.

My present invention relates—

First, to an improved method of securing the copper in the hollow iron standards in firm contact with the iron, whereby several advantages are gained;

Secondly, in the employment in the sluice of any square obstruction in place of the metallic standards, said obstructions being placed in the sluice in a similar manner to that employed with the metallic standards, in order to impart to the water in the sluice a wave-like or rocking motion, by which the particles of metal are precipitated without the electrical influence; and

Thirdly, coating or covering the metallic plate forming the bottom of the sluice with gold or silver amalgam, or the amalgam of some of the base metals, in order to give a heavier body of quicksilver with less fluidity.

In order to explain my invention so that others will be able to understand its construction and operation, reference is had to the accompanying drawing forming a part of this specification, in which—

A A represent the two sides of an ordinary sluice, and B the bottom.

As before stated, my inventions, as covered by former patents, contemplated the employment of hollow metallic standards, similar to C, placed vertically in the sluice, having slotted sides, through which the water communicated with the interior, which was provided with amalgamated copper slips or bars.

The hollow standards C may be made singly or otherwise, as desired, but I prefer to make them in sections of four, as shown at Figure 1, and connect them together by an open frame-work or metal plate, D, which is provided with projecting corners *a a*.

In order to secure the copper in the hollow standards, I take either strips which shall fit against each side of the square hole which passes through the standards, or use pieces of copper of some other convenient form, and, after properly placing them, drive into the hole a plug or center of dry wood, E, which presses the copper firmly against the iron.

When the standards are placed in the water the wooden plug E will swell, as it becomes saturated, so as to hold the copper in contact with the iron with great firmness, and thus exclude the air and prevent oxidation on the inside of the tube, while sufficient moisture is admitted to sustain chemical action between the metals, by this means causing the exhaustion to take place on the outer surface of the cheaper metal.

In case iron and copper are not used, other combinations of metal, capable of accomplishing the same result, can be substituted for them.

Either end of the set may rest upon the bottom of the sluice, and the riffles or standards are always placed in straight lines across the sluice. With the square of the tube diagonal to the course of the running stream, three lines of discharge or passages are presented at the same time, radiating from the same point, as shown by the arrows, Figure 2.

The effect of this peculiar arrangement of the standards is to give a side-to-side rocking or wave-like motion to the moving water, which not only retards its downward movement, but also holds the solid particles suspended, thus permitting them to settle in order, according to their specific gravities.

This rocking or wave-like motion is not unlike that produced by the ordinary hand-rocker used in mining, and this, together with the electrical charge and the numerous eddies created by the vertical riffles, serves to precipitate the infinitesimally-small particles of metal with a certainty and success heretofore unknown.

For some kinds of mining, and where the circumstances of the case will not justify the expense of metallic riffles, I use square wooden bars, F, or bars or obstructions of some other cheap metal or substance, which may also be a composition of various substances.

In any case, their arrangement in the sluice should be according to the plan above described, so as to produce the same rocking effect.

In this case the obstructions may rest on amalgamated metallic plates, or mercury or amalgam may be retained on the bottom of the sluice by any ordinary riffling, or they may be used without mercury, the

particles deposited being collected in the usual manner.

In the use of my metallic riffles, I prefer wooden sluice-boxes with bottom and two sides, made in the usual way, because of its cheapness; yet, many other substances, such as metal, cement, or stone, may be used, as circumstances require.

The bottom of my sluice-box is usually covered with sheets of copper, or other metal having affinity for mercury, but also having a heavy deposit of the amalgam of mercury and gold, or mercury and silver, or an amalgam of mercury and some of the base metals, which it is important to keep in a soft pasty condition by the occasional addition of mercury, as it will harden by the absorption of the precipitated particles of metal.

Having thus described my invention,

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

1. The wooden bars or centers E, substantially as and for the purpose above described.

2. The standard F, constructed as described, for the purpose of giving the wave-like or rocking motion to the water, as above specified.

3. In combination with the standards or obstructions C or F, the copper bottom B with a soft amalgam of gold or silver, or some of the base metals, substantially as and for the purpose set forth.

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

JAMES T. McDOUGALL. [L. S.]

Witnesses:

G. FITZGERALD,
WM. R. BOONE.