W. H. LONG.

Gold Separator.

No. 47,557. Patented May 2, 1865.

Fig. 1.

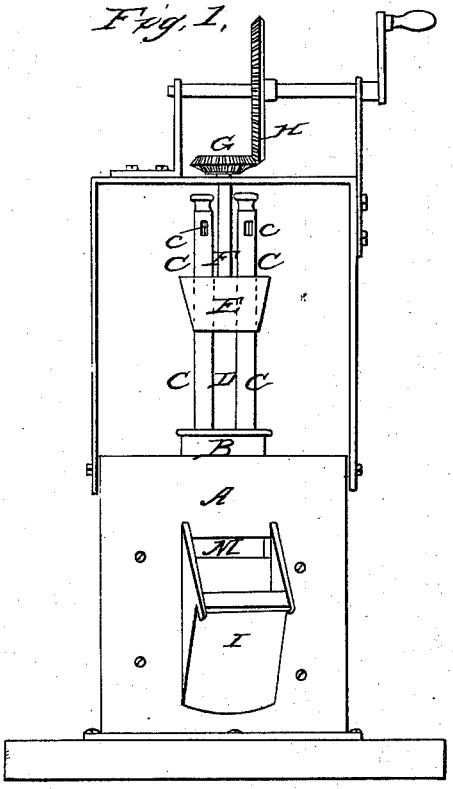


Fig. 2.

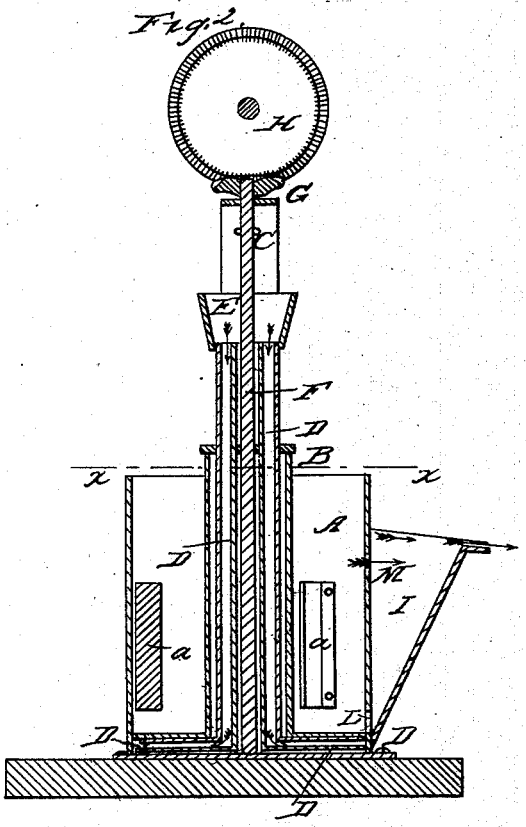
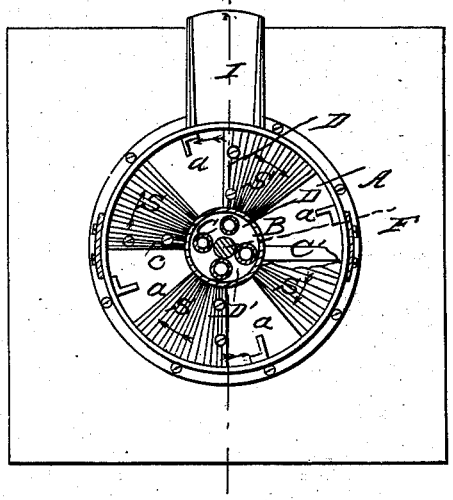


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM H. LONG, OF MOUNTAIN CITY, COLORADO TERRITORY.

IMPROVED GOLD-SEPARATOR.

Specification forming part of Letters Patent No. **47,557**, dated May 2, 1865.

To all whom it may concern:

Be it known that I, WILLIAM H. LONG, of Mountain City, in the county of Gilpin and Territory of Colorado, have invented a new and useful Improvement in Gold-Separators; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and the letters and figures marked thereon, which form part of this specification.

My invention relates to that class of apparatus for separating gold from crushed quartz and other gold-bearing rocks and earths by means of quicksilver or mercury; and it consists in a novel arrangement whereby the entire mass of crushed rock and earths as it is washed from the battery or crushing apparatus is forced down through the mercury and discharged beneath it, the gold from its greater specific gravity, and also from its chemical affinity for the mercury, amalgamating with and remaining in the mercury, while all foreign ores and substances, from their less specific gravity, rise through the mercury and flow off.

To enable those skilled in the art to understand how to construct and use my invention, I will proceed to describe the same with particularity, reference being made, in so doing, to the aforesaid drawings, in which—

Figure 1 represents a side elevation of my invention; Fig. 2, a vertical central section of the same, and Fig. 3 a plan or top view thereof in section at the line *x* in Fig. 2.

Similar letters of reference in the different figures indicate the same parts of my invention.

A represents a cylindrical tub or vessel, of any required dimensions, in the bottom of which at the center, in a suitable box or support, the revolving vertical shaft (marked F) rests, to which motion is imparted by means of the gear-wheels G H, or by any other suitable appliances.

E represents a funnel-shaped pan or vessel, fixed rigidly upon the said vertical shaft, which passes through the center of the bottom thereof.

C C D D represent four vertical pipes or tubes arranged closely about said shaft, as shown, the tubes D D extending from the bottom of said funnel-shaped vessel E to the bottom of the separating-tub A, where they are bent out horizontally and extend radially toward the circumference of the vessel A, the tubes C C being bent in the same way and manner at the bottom of said vessel A, but extending up through the bottom of E and above said vessel, as shown. The upper ends of said tubes C C are closed by a movable cap with vertical sides extending down a short distance in said tubes, through the walls of which and the vertical sides of the aforesaid adjustable caps are cut openings for the admission of air into the tubes, as hereinafter mentioned. By turning the said movable caps slightly the apertures aforesaid may be wholly or partially closed, thereby wholly excluding the air or diminishing the quantity admitted into the tubes, as desired. The ends of the horizontal parts of the said tubes C C D D, which are marked C′ C′ D′ D′, are cut off diagonally with respect to their axes, as shown in Fig. 3. The said vertical tubes and shaft are inclosed within the cylinder B, so as to prevent the agitation of the contents of the vessel A by the rapid rotation of said tubes, as hereinafter mentioned.

Over and upon each of the radially-arranged tubes C′ C′ D′ D′ there is attached a shield or apron, (marked S,) extending outward from the inclosing-cylinder B to the wall of the tub A, one edge of the said apron lying upon said tubes and the other edge extending forward and downward gradually until it lies just at the bottom, so as to revolve freely above it.

a a represent a series of vertical slots fixed radially upon the interior wall of the tub A, extending inward far enough to prevent the contents of the vessel A from revolving around by reason of the revolution of the tubes and shaft, as hereinafter mentioned.

M represents an opening or slot in the vertical wall of the vessel A, through which the refuse substances flow off out from the apparatus, I being an inclosure outside connected with the vessel A at the bottom through the slot L, in order that any particles of gold that might by any possibility flow through the opening M may return into the vessel A and be amalgamated with the mercury and saved.

Having described the construction of my invention, I will now proceed to describe its operation.

In the first place, the bottom of the vessel

A is covered with mercury rising high enough at least to completely cover the radially-arranged tubes C′ C′ D′ D′ and the aprons S S, which are arranged upon them. A rapid motion is then imparted to the shaft F, which communicates a rapid rotating motion to the aforesaid tubes C C′ D D′, the upper ends of the tubes C C being arranged so as to admit air into said tubes. The products of the battery or crushing-mill are then washed, by a current of water through any suitable conveyer, into the aforesaid funnel-shaped vessel E upon the shaft F, whence the crushed rock and earth issuing from the battery pass into and down the pipes D D, and are discharged at the extremities of the radially-arranged pipes D′ D′ beneath the mercury. By the rapid rotation of the apparatus in the direction indicated by the black arrows in Fig. 3, the front edges of the aprons S, moving close upon the bottom of the vessel A, throw the mercury up and back over the tubes and over the ends of the same, and thus a vacuum is created at the end of each of said tubes, and thus the crushed rock and earths from the crushing-mill are forced beneath and into the mass of mercury through the tubes D D, while the air is in like manner forced through the tubes C C into the mercury. The particles of gold, being of greater specific gravity than mercury, remain in and amalgamate with it, while all foreign substances, being of less specific gravity than the mercury, rise though it and pass out of the separator through the opening M, as indicated by the red arrows.

Should any gold by any possibility rise through the mercury and pass out through the opening M, there being an eddy in the compartment I, the gold would be carried down to the bottom of said compartment by its own weight, and enter the separator through the slot L into the mercury, where it remains, and is thus saved.

The object of introducing the currents of air into the mercury is to create a constant agitation by its upward passage and thus prevent the rock and baser minerals from settling upon the surface of the mercury and forming a crust or shell, which would prevent the foreign matter from escaping from the mercury, and retain it with the gold.

The number of tubes for conveying the product of the crushing-mill into and beneath the mercury is immaterial, as also the number of tubes for admitting the air; and, furthermore, the tubes for admitting the air may be omitted entirely, as the apparatus will operate without them, though not so satisfactorily and effectually.

Having described the construction and operation of my invention, I will now specify what I claim and desire to secure by Letters Patent—

1. Conveying the product of the battery through the mercury and discharging it beneath the same, by creating a vacuum at the end of the conveying-tubes D D′, substantially as and for the purposes herein specified and shown.

2. The employment of one or more tubes, D D′, arranged and operating substantially as and for the purposes set forth and described.

3. The combination of one or more air-tubes, C C′, with the tubes D D′, arranged and operating as and for the purposes shown and set forth.

4. The combination and arrangement of the aprons S with the tubes C′ D′, as and for the purposes described.

5. The combination of the shaft F, the funnel E, tubes C C′ D D′, and aprons S, arranged and operating as and for the purposes described.

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