H. H. EAMES.

Apparatus for Separating, Concentrating and Amalgamating Ores.

No. 139,556. Patented June 3, 1873.

Fig. 1.

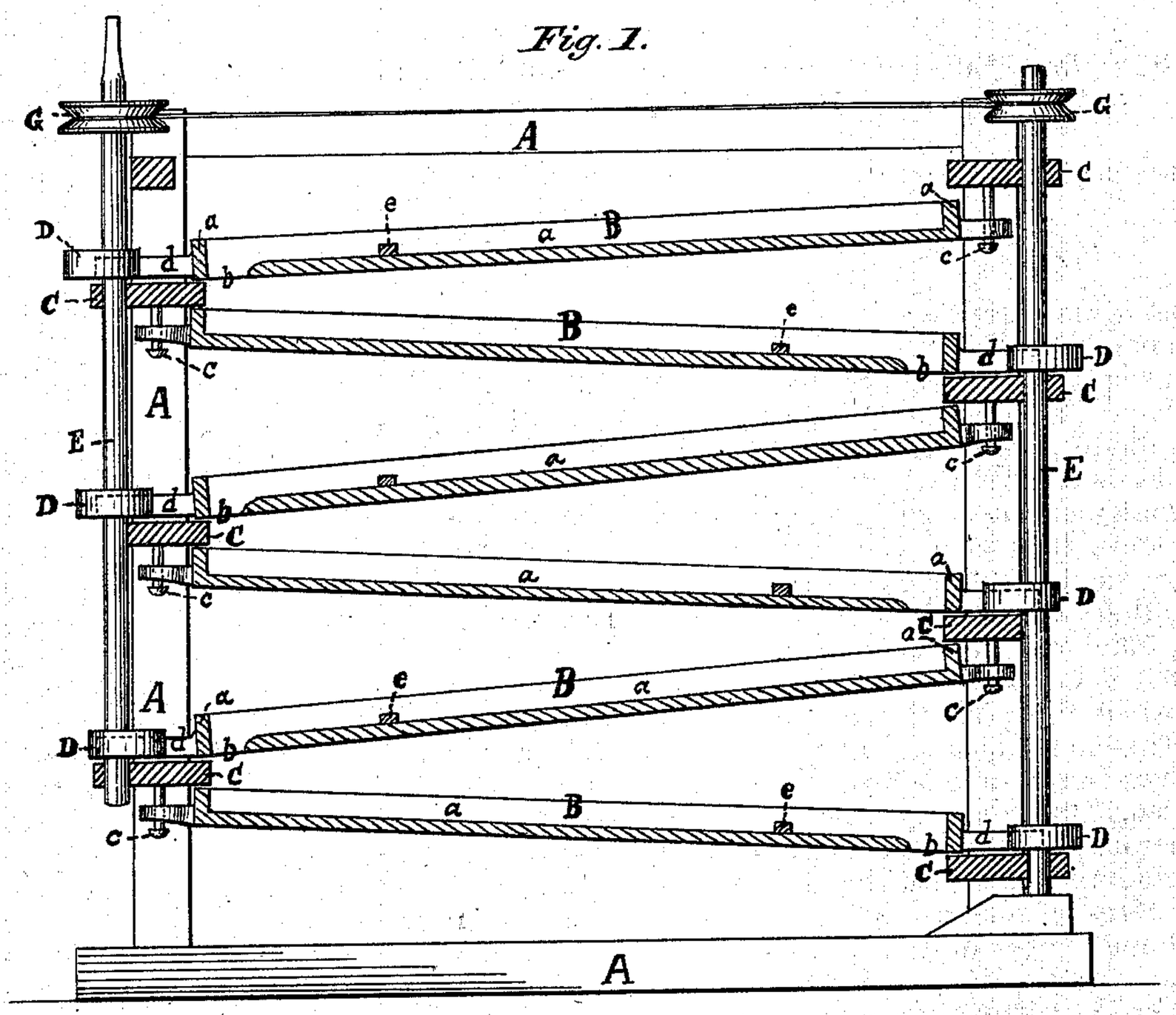
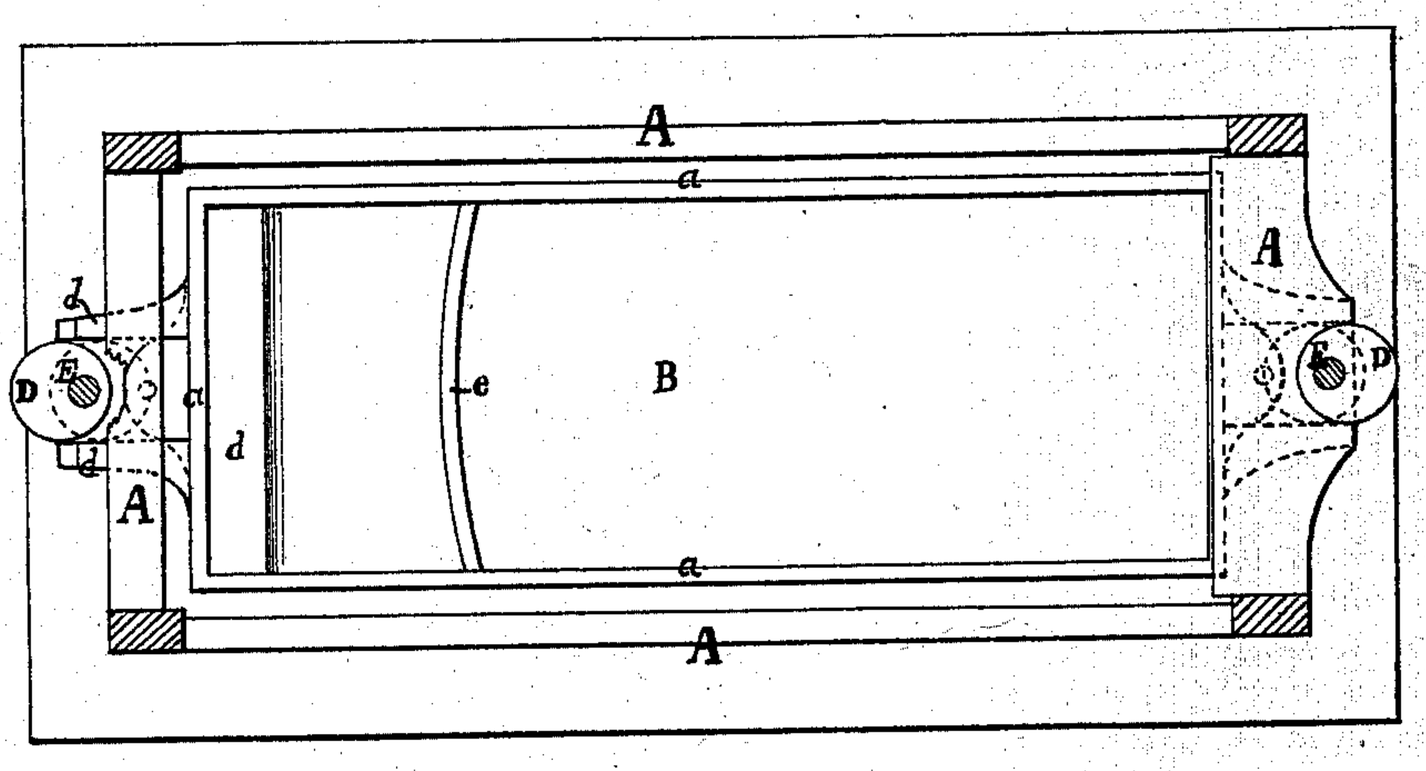


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

HENRY H. EAMES, OF GOLD HILL, NORTH CAROLINA.

IMPROVEMENT IN APPARATUS FOR SEPARATING, CONCENTRATING, AND AMALGAMATING ORES.

Specification forming part of Letters Patent No. **139,556**, dated June 3, 1873; application filed April 10, 1873.

To all whom it may concern:

Be it known that I, HENRY H. EAMES, of Gold Hill, county of Rowan, State of North Carolina, have invented a Combined Separator, Amalgamator, and Concentrator, of which the following is a specification:

In the amalgamation of gold and silver ores it is well known that when mercury and gold or silver are amalgamated by the attrition of sand and other particles in the "slime" with which the amalgam was mixed it is broken up into what is known to the art as "floured mercury," which is as valuable, and is difficult to save. The chief object of my invention is to construct a simple and efficient apparatus for separating this mercury from slime, but which apparatus may also be used both for amalgamating and concentrating sulphurets, and other ores of metals, by means of a tier of inclined chutes or tables which rests within a stout frame, the lower end of each chute, except the bottom one, just above the highest point of the one below it, with which it communicates through means of an opening, thus forming a continuous zigzag inclined plane, each chute so hung as to be gently oscillated horizontally by a cam on one of the shafts at either end of the apparatus; the chutes to be made wholly of wood when used in a separator or in a concentrator, while one or more of the chutes are to be copper-lined when used in an amalgamator; and each chute to have a ledge across its bottom to break and equalize the velocity of the current, as well as collect the particles with the most gravity; the said ledges to serve as dams for the mercury to be used in the amalgamator, as will more fully hereinafter appear.

To enable those skilled in the art to make and use my invention, I will proceed to more specifically describe its construction and operation.

In the drawings, Figure 1 is a side elevation, and Fig. 2 a plan view, of my invention when constructed as a separator.

A is a simple compactly-built frame of any suitable material; B, the inclined chutes, made of poplar wood, and preferably about six feet long, two feet wide, sides and ends *a* two inches high, with an incline of about four inches, and provided with an opening, *b*, at their lower ends. Each chute B has the center of its upper end secured to, and oscillates horizontally on, the head of a screw-bolt, *c*, that is secured to a head-block, C, made of iron, each of which, C, except the lowest one, serves as a cross-tie for frame A, and also has the rest for the lower end of a chute, B. The lower end of each chute is provided with two spokes, *d*, that form a yoke or fork to fit and be horizontally oscillated by an eccentric cam, D, on an upright shaft, E. There are two shafts, E, one at each end of the apparatus, connected by bands on pulleys, G, and driven by spur-wheels and counter-shaft, or other suitable means, at a velocity of about one hundred revolutions per minute. On the bottom of each chute, about two-thirds its length from its head or highest point, I fasten slightly curved ledge *e* (see Fig. 2) about an inch in height and beveled off on both sides, so as to permit the slime to flow without too much retardation.

To operate my separator, thus constructed, I take the slime containing the mercury and cause it to flow with a stream of water into the highest end of the top chute B. The slime and water thence flow slowly down the continuous zigzag inclined plane, their velocity checked and equalized by the ledges *e*, at which points the mercury and other particles of like specific gravity accumulate conveniently for collection, the worthless slime passing from the machine at the lowest opening *b*. The shafts E having been set in motion at the same moment that the slime and water were let in, their cams D, through forks *d*, give a horizontally oscillating movement very similar to that obtained in panning, and so greatly aid the action of gravity to separate the mercury and heavy particles from the slime.

When I desire to adapt my invention to a concentrator for separating copper or other ores, I use the machine as above constructed, excepting that I make sides and ends *a* of the chutes B about four instead of two inches high, and the ledges *e* two instead of one inch high, the crushed ore and water being poured in as the slime and water, as above described.

My invention is adapted to an amalgamator by constructing the machine as above, when

used as a separator, excepting that the second and third chutes B from the top are lined with copper on their inside, and have placed on them at the ledges *e*, on said chutes, the mercury to be used in amalgating. The water and ores to be amalgamated are then flowed into the chutes and amalgamate with the copper-lining and the pools of mercury dammed up by the ledges *e* as they flow down through the tier of chutes.

The machine may have the features of my invention all combined, so that it may be readily adapted to act as a separator, as a concentrator, or as an amalgamator, by constructing the sides and ends *a* of the chutes B four inches high, by having two sets of ledges, *e*, that may readily be interchanged: one set of two inches in height for the machine when used either as a separator or as an amalgamator, and the other set four inches in height when the machine is used as a concentrator, and by having two copper troughs made to fit the second and third chutes from the top, wherein they will be placed when the machine is used as an amalgamator, and from whence they can easily be removed when it is desired to employ the machine either as a separator or as a concentrator.

The chutes B are made adjustable to various degrees of inclination by means of the screw-bolts *c*, which can be raised or lowered to or from the head-block C. The chutes B may be hung on each side, instead of on the head-blocks C.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The inclined zigzag plane formed of adjustable chutes or tables B, ledges *e* with or without copper lining or troughs, and supported in and by frame A, head-block C, and screw-bolt *c* having the "panning" movement, and constructed and operating substantially in the manner and for the purposes set forth.

2. The shafts E and cams D for giving a horizontally-oscillating movement to the chutes or tables B, constructed and operating substantially in the manner and for the purposes specified.

3. The adjustable screw-bolts *c* for adjusting the chutes or tables B to different degrees of inclination, constructed and operating substantially in the manner and for the purposes described.

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Witnesses:
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