(No Model.)

L. M. WAER.

ORE CONCENTRATOR.

No. 588,252. Patented Aug. 17, 1897.

FIG. 1.

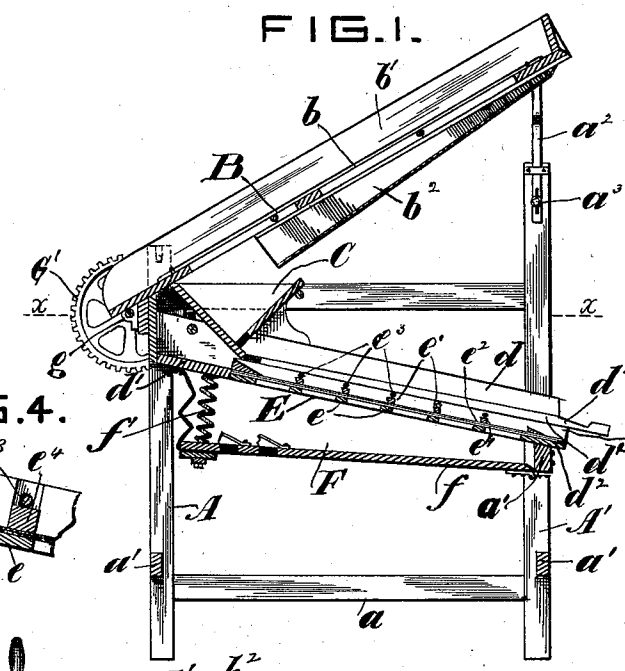


FIG. 4.

FIG. 5.

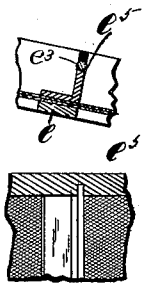


FIG. 6.

FIG. 2.

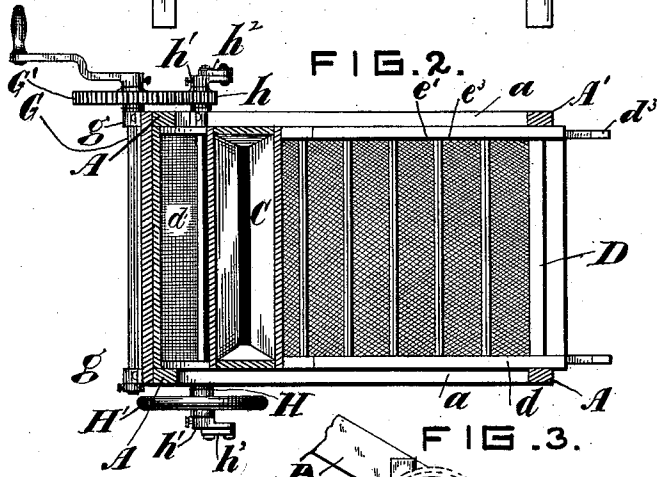
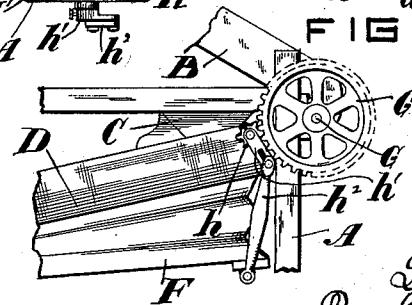


FIG. 3.



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UNITED STATES PATENT OFFICE.

LUIS M. WAER, OF TUCSON, ARIZONA TERRITORY, ASSIGNOR OF SEVEN-TENTHS TO AMOS G. WOOLLEY, OF SAME PLACE, AND WARREN GARRETT AND RICHARD WOOLLEY, OF SAN ANTONIO, TEXAS.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 588,252, dated August 17, 1897.

Application filed August 23, 1894. Serial No. 521,087. (No model.) Patented in Mexico March 28, 1895, No. 679.

To all whom it may concern:

Be it known that I, LUIS M. WAER, a citizen of the United States, and a resident of Tucson, in the county of Pima and Territory of Arizona, have invented certain new and useful Improvements in Ore-Concentrators, (patented in Mexico, No. 679, dated March 28, 1895,) of which the following is a specification.

My invention relates to machines for separating ores of precious metals, and particularly to that class of machines known as "dry concentrators or separators," used for separating gold ore by means of an air-blast over dry sand, gravel, quartz, &c., found in dry placers.

The object of the invention is to provide a simple machine which is easily constructed and requires no skill to operate it and keep it in repair. This object is attained by the means illustrated in the accompanying drawings, in connection with which the invention will be first fully described, and then particularly referred to and pointed out in the claims.

Referring to the drawings, in which like parts are indicated by similar reference-letters wherever they occur throughout the various views, Figure 1 is a vertical longitudinal sectional view of a machine embodying my improvements. Fig. 2 is a horizontal sectional view taken through line $x\ x$ of Fig. 1, showing the parts below the section-lines and parts of the actuating mechanism in plan view. Fig. 3 is a detail view, in side elevation, of the head end of the machine. Figs. 4, 5, and 6 are detail views, upon an enlarged scale, illustrating different forms of magnetized riffles adapted for use with my machine.

The frame of the machine, as illustrated, is built up of timber and consists of four upright posts A and A′, braced at the proper distances apart by the side rails a and end rails a', which are mortised or gained into the uprights A and A′ and secured to them in any suitable manner. Between the posts at one end is pivoted a screen-frame B, the opposite end of which is supported upon vertically-adjustable rods a^3, which are fitted to slide in the uprights A′ and adjustably held in position by set-screws a^3. The object of this arrangement is to adjust the receiving-screen B to a greater or less inclination, depending upon the quality or grade of the material to be sifted.

The screen B is provided with a coarse-wire-meshed sifter b between the side boards b', and below the wire screen for a certain distance is secured across the under side of the screen a sheet-metal funnel-shaped trough b^2 to conduct the material sifted through the screen b to a hopper C, which conducts the sifted material and spreads it upon the riffle or separator frame support D, which is secured, as shown, rigidly to the uprights A and A′. This frame consists of the side boards d and the transverse boards d' d^2. The transverse board d' is rabbeted upon its inner edge to support one end of the separator-frame E, and the opposite end is supported upon one of the transverse braces a'.

The sides d are grooved to receive wedge-shaped keys d^3, which removably secure the separator-frame in place. The bottom of the separator-frame E forms the top of the bellows F, the bottom f of which is hinged to the under side of the transverse brace a'. The sides of the separator-frame E are braced apart by transverse strips e, over which is stretched a woven-wire cloth, and upon the cloth is stretched burlap or other suitable material, and upon the top of the burlap is stretched a coarse muslin or other suitable material capable of retaining the finer particles of the ore, while permitting air to pass freely through it.

The sifting material is held in place by riffles e', which are narrower than the transverse strips e, and secured over said strips above the edges nearest the discharge end, so as to leave dead-spaces at e^2, into which the finer particles of the ore will collect without any liability of being blown over the riffles. Upon top of the riffles e' are secured sections of ropes e^3, made of hair, rawhide, or other fibrous material, to catch the finer particles of ore that may be blown with the gangue over the riffles.

The driving-shaft G is journaled in bearings g, secured to the uprights A. It is provided with a gear-wheel G′ on one side of the

frame that meshes with the pinion h, secured upon shaft H, which has its bearings in sides d of the riffle-frame support D. Upon the same end of the shaft with the pinion h is secured a crank-arm h'. Upon the opposite end of the shaft H is secured a fly-wheel H', and outside of it upon the shaft is secured a similar crank-arm h'. The wrist-pins of the crank-arm are connected to the bottom of the bellows F by pitman-rods h^2. Within the bellows are arranged one or more spiral springs f' to counterbalance the weight of the bellows-bottom f.

As shown in Figs. 1 and 2, the riffles e' and strips e, upon which they rest, may be of wood, and this is the form that will be used in material that is not charged with iron, but the riffles may be made of magnetized bars of iron to collect the iron ore and retain it while the gold or other non-magnetic ore is removed. These provisions I have shown in Figs. 4, 5, and 6. In Fig. 4 the riffle is a rectangular bar e^4, let into a corresponding groove in the side of the riffle-frame, and in Figs. 5 and 6 the riffle or dead-spaces over the strip e is formed by an angle-iron bar e^5, one web of which is cut away at the end to leave projecting tenons from the vertical web to enter grooves in the frame sides, the shorter web fitting snugly between the sides of the riffle-frame. These bars are of soft iron and magnetized to collect and hold the iron dust and ore which is in the gangue passing over the riffle-board. The tops of these magnetized riffles are also supplied with the hair ropes e^3, as in Figs. 1 and 2.

In operation the gold-bearing gangue is thrown upon the screen B, the lumps being broken by the act and the finer and heavier portions passing through the screen into the chute b^2, thence into the hopper C, while the gravel and larger particles, which contain little or no precious metal, pass over the tail end of the screen. The gangue passes from the hopper over the riffle-board, and while so passing is subjected to intermittent blasts of air from the bellows, driving the lighter portions over the riffles and collecting the gold upon the canvas and in the angles e^2. When the riffle-board is charged with the precious metal, the keys d^3 are drawn out, the riffle-board removed from the frame, and the gold collected upon the riffle-board removed.

When the magnetized bars are used, the iron-dust will adhere to them and they may be removed, the gold or heavy metal thrown off, and replaced after being properly cleansed of the iron that has adhered to them.

I have found by experience that with my machine it is not necessary in placer-mining to impart a vibratory motion to the riffle-board, as the rapid and intermittent blasts of air carry the gangue over the riffle-board with sufficient rapidity and thoroughly settle the gold and other precious metals to be removed, as above described.

It is obvious that there may be many mere mechanical changes made in the parts of the device without departing from the spirit or scope of my invention, and hence, without limiting myself to the specific details of construction shown,

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

1. In an ore-concentrator of the character described, the combination of the inclined riffle-supporting frame, D, the riffle-frame removably secured thereon and forming the top of the bellows, the textile fabric covering the riffle-frame, the transverse strips, e, to support the fabric on the under side the riffles, e', narrower than the under supporting-strips and secured above the fabric, forming dead-air spaces, e^2, hair rope e^3, secured upon top of the riffles, the bellows, F, having its bottom, f, forming the air-chamber underneath the riffle-frame and hinged to the cross-bar, a', of the frame, the crank-shaft the pitman connecting the crank-shaft and the bottom of the bellows, the driving-shaft journaled in the frame of the machine, the pinion secured upon said shaft, and pinions secured upon the crank-shaft meshing with said pinion, for the purpose of operating the bellows, and the hopper, C, to feed the gangue to the riffle-frame, substantially as shown and described.

2. In a riffle-frame for dry ore-concentrators, the combination of the surrounding frame, transverse strips secured near the bottom edge thereof, an air-chamber secured underneath said frame, riffle-bars, narrower than the lower transverse strips, secured over the same, leaving a dead-air space above the lower strips for the collection of the ore, fibrous cords or ropes secured on top of the riffle-bars, the textile material secured to the ends of the frames and supported by transverse strips and riffle-bars, said material consisting of a lower layer of woven wire, an intermediate layer of burlap and a top layer of coarse muslin, substantially as shown and described.

3. In a dry ore-separator, the combination of the riffle-frame covered with textile fabric, transverse strips underneath the fabric supporting the same, and removable magnetized riffle-bars secured on top of the fabric for the purpose of attracting and retaining the iron ore contained in the gangue passing over the riffle-board, substantially as shown and described.

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