(No Model.)

C. FABER.

ORE WASHER.

No. 489,797. Patented Jan. 10, 1893.

Fig 1

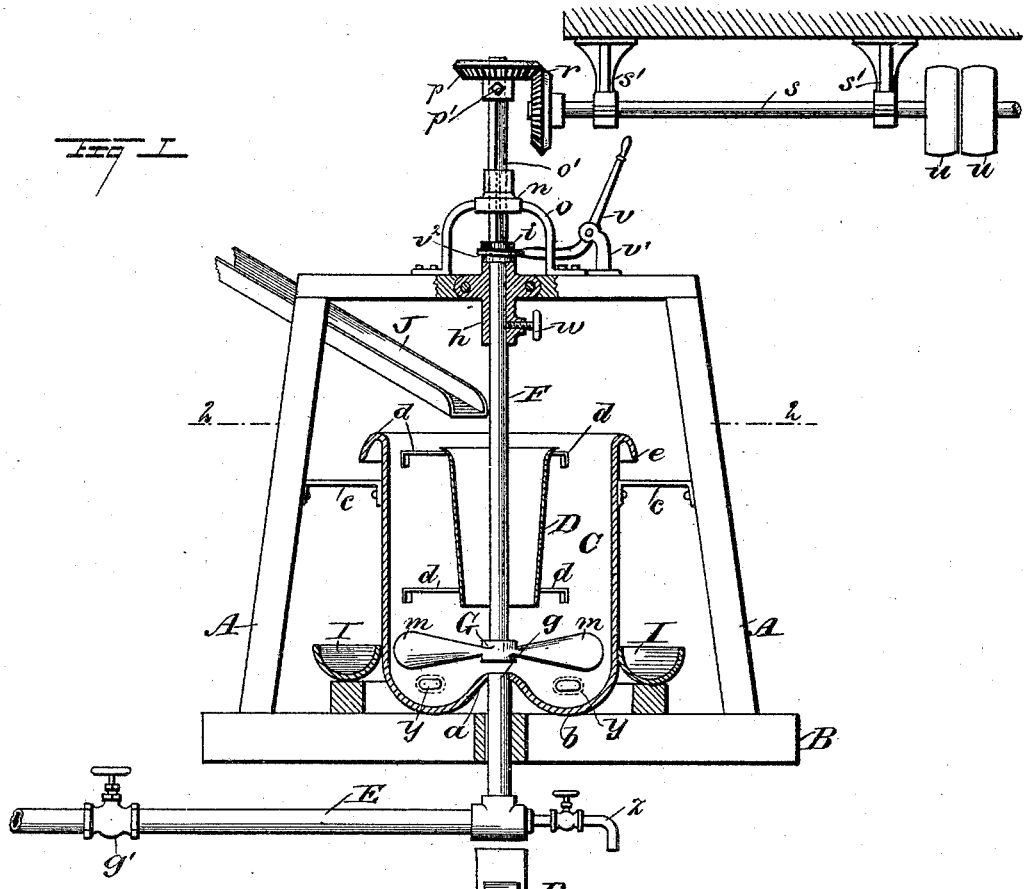
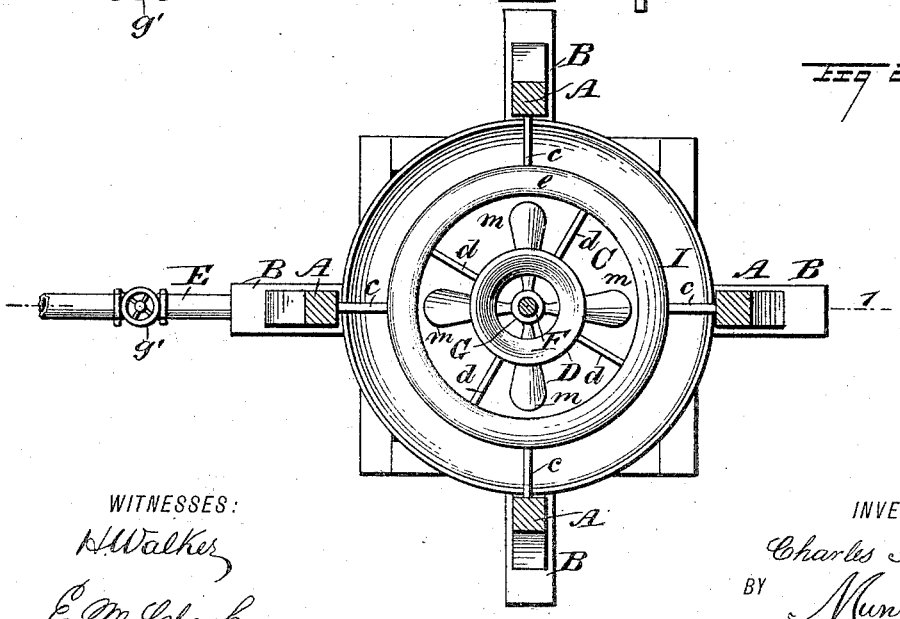


Fig 2



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CHARLES FABER, OF RIVERSIDE, NEW JERSEY.

ORE-WASHER.

SPECIFICATION forming part of Letters Patent No. 489,797, dated January 10, 1893.

Application filed August 31, 1891. Serial No. 404,245. (No model.)

To all whom it may concern:

Be it known that I, CHARLES FABER, of Riverside, in the county of Burlington and State of New Jersey, have invented a new and useful Ore-Washer, of which the following is a full, clear, and exact description.

This invention relates to an improved device for the separation of metals from sand, earth or gravel by a current of water, and has for its object to provide a simple, inexpensive and effective apparatus which will rapidly and thoroughly separate gold, silver, platinum, or other precious metals from sand, crushed rock, or earthy matter with which said metals are mixed.

To this end my invention consists in the peculiar construction and combination of parts, as is hereinafter described and claimed.

Reference is to be made to the accompanying drawings forming a portion of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 is a side elevation partly in section, taken on the line 1—1 in Fig. 2; and Fig. 2 is a plan view in section, taken on the line 2—2 in Fig. 1.

A substantial and preferably rectangular frame A, is erected on a base B of proper dimensions to receive and sustain the other parts of the machine.

On the base B a cylindrical receiver C, is located and secured, which is proportioned in dimensions to suit the capacity desired for the machine. The bottom wall of the receiver C, is raised in the center as at *a*, and curved in convex form, the portion intervening between the high center and side wall of the receiver being reversely curved, thus producing an annular concave channel *b* around the bulbous center *a*. The receiver C, is supported laterally by the braces *c* that are secured to the exterior of the same, and also to the frame A, and centrally within the receiver a feeding hopper D, is sustained concentrically by the stay bars *d*. Preferably there is an outwardly-curved flange *e*, formed on or secured to the upper edge of the receiver C, so as to cause an even and proper distribution of water overflow from this edge, as will be further explained. There is a water supply pipe E provided, which is extended from any proper source that will furnish water under pressure, and is introduced at a central point *g* in the bottom of the receiver, as shown in Fig. 1, a valve *g'* in said pipe affording means to control the flow of water through it. The hopper D, is by preference made coniform, and is so relatively proportioned in height and diameter to the dimensions of the receiver C as to allow a proper space to intervene between the sides and bottoms of these concentric chambers.

A vertical shaft F, which is in alignment with the supply pipe E is rotatably supported in an elongated box *h*, so as to depend from the frame A whereon the box is affixed and have a central position within the hopper D; the radial collar *i* on said shaft resting upon the true upper edge of the box, limits the depression of the shaft. Upon the lower end of the depending shaft F, a wheel G, is secured, which consists of a center hub and a series of radial wings or blades *m*, which latter cross the concavity *b* and are all inclined in the same direction, causing the wheel to assume the form of a screw propeller. There is a suitable length given to the portion of the shaft F that extends above the collar *i*, which extension is laterally sustained by a box *n* that is located upon the yoke *o*, which seats upon a cross beam of the frame A, and is thereto secured. The shaft extension mentioned is longitudinally grooved as at *o'*, and a bevel wheel *p*, is mounted on it and adjustably secured thereto by a set screw bolt *p'*, the inner end of which is designed to engage the groove *o'* and adapt the shaft to slide in the wheel and receive motion therefrom when said wheel is rotated by an engaging bevel gear wheel *r* that is secured on a driving shaft *s*, which is hung in bracket boxes *s'* and provided with fast and loose pulleys *u*, whereby rotary motion may be transmitted from an adequate source of power to the vertical shaft F and wheel G.

Near the lower end of the receiver C an annular, supplementary receiver I, is supported from the base B, which is concave in cross section as shown in Fig. 1, said annular pan or receiver being designed to catch the material and liquid that are over-washed from the receiver C, and to this end is located directly below the flanged edge *e* of the latter.

For the proper operation of the apparatus it is essential that means be provided for the elevation of the vertical shaft F, so as to remove the wheel G away from the receiver bottom. Any suitable mechanism may be employed, that shown consisting of a lever v, pivoted on a bracket stand v', and furnished with a bifurcated end piece at v^2, which loosely engages a circumferential groove in the collar i, the elevation of the shaft produced by a depression of the free end of the lever being retained by tightening the set screw w that penetrates the sleeve-like box h, as represented in Fig. 1.

As before indicated, the purpose of this device is to separate heavy mineral from dross or refuse matter with which the metal is mixed, and is particularly well adapted to extract gold or silver in a native condition from sand, fine gravel or earth with which it is mixed.

The operation is as follows: The ore in comminuted condition, which may be sand or earthy matter intermingled with the particles of metal, is fed into the hopper D, preferably through a chute J, so as to fall in a sheet upon the wheel G. Simultaneously the shaft F, is caused to rotate, and the valve g' of the water supply pipe E is opened so as to introduce a current of water under pressure below the blades or wings of the wheel G. The volume and force of the water current projected from the pipe E, are proportioned to the amount of material introduced on top of the wheel G, so that a thorough mixing agitation of the liquid and solid matter will be effected, causing the sand, fine rock fragments and earthy matter to be forced upwardly along with the current of water and flow over the top edge of the receiver C and thence into the supplementary receiver I. The removal of the lighter, non-metallic parts of the pay-dirt or sand will free the metal grains or dust, which by superior gravity will be deposited in the concave channel b; and at proper intervals the washing operation is suspended, the shaft and wheel elevated, and the metallic deposit removed through apertures that are normally closed by hand hole plates as at y in Fig. 1. As there may be some of the finer particles of metal pass over the edge of the receiver C along with the refuse washings, these will be caught and retained by the annular receiver I, and can be removed from its bottom when an accumulation is formed thereon.

To facilitate the abstraction of metallic deposit from within the receiver C, a drain valve z, is placed in the supply pipe E, which valve is opened and the valve g' closed when such a removal of material is desired, the feeding of ore or pay-dirt into the hopper being suspended a sufficient length of time prior to the stopping of the rotation of the wheel G, and flow of water through the pipe E, to allow all the material to be washed over the top of the receiver C.

A comparatively low percentage of power is required to operate this apparatus, from the fact that the current of water entering below the wheel G aids in its rotation; and as all parts are capable of being readily produced and made comparatively light so as to be transportable, the plant may be constructed and erected at desirable points for operation without excessive cost; and it is claimed that with this apparatus, tailings having some metal commingled with the mass, may be profitably washed for the extraction of contained metal if this be gold or other precious mineral. The rapid rotation of the shaft F and the pitch of the blades m, on wheel G, will throw the ore fed through hopper D outwardly and disintegrate it. A strong water current through the pipe E, out of discharge end g at the center of the wheel G, below it, will be laterally deflected by contact with the inclined blades m and the liquid mass of ore and water will be thoroughly incorporated by the co-action described. A continuation of the operation and proper graduation of ore supply, will allow the force of the water to carry upwardly and discharge the lighter matter pervading the mineral in the ore, which latter will fall into the lower part of the chamber bottom wall.—

The elevation of shaft F serves the two fold purpose of arresting motion of the wheel G and removing it so as to permit free access through the hand holes y to the low part b of the bottom, and thus facilitates the removal of metallic deposit from this receptacle.

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

1. The combination, with an upright receiver, of an upright rotatable shaft therein, a radial winged wheel thereon below, and a water supply pipe tapping the receiver bottom, in alignment with the axis of the wheel and discharging upward against said wheel substantially as described.

2. The combination, with an upright receiver having a centrally convex and marginally concave bottom wall, and a water supply pipe entering the convex center of said bottom, of a vertical shaft, in alignment with said pipe a wheel thereon having radial screw blades, crossing said concavity and mechanism adapted to rotate the shaft, substantially as described.

3. The combination, with a frame, an upright receiver thereon and a feeding hopper therein, of an upright, rotatable shaft, extending down through the hopper a screw-bladed wheel on the lower end thereof, mechanism adapted to rotate the shaft, and a water conduit pipe tapping the bottom of the receiver, and discharging upward against the wheel substantially as described.

4. An ore separator, comprising the frame, the stationary receiver C having a convexity in its bottom forming an annular concavity b, an open ended concentric feeder D, the water pipe discharging upward through the center of the convexity, the vertically sliding

shaft extending down into the receiver in vertical alignment with the water pipe and having a horizontal winged wheel on its lower end crossing the concavity *b* below the feeder, bearings for the upper end of the shaft, means for raising the shaft and securing it and the operating gearing, substantially as shown and described.

5. In an ore washer, the combination, with an upright cylindrical receiver, a feeding hopper concentric therein, a rotary upright shaft, and a screw-bladed horizontal wheel below on the shaft, of a water supply pipe, and an annular supplementary receiver adapted to catch the overflow of the main receiver, substantially as described.

6. The combination, with a frame, an upright cylindrical receiver thereon, a concentrically-supported feed hopper within, and a water supply pipe tapping the bottom of the receiver, of a vertically-adjustable shaft supported to revolve centrally in the hopper, a screw-bladed wheel on the shaft within the main receiver below the hopper, and an annular exterior receiver adapted to catch the overflow of the main receiver, substantially as described.

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Witnesses:
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