(No Model.)

2 Sheets—Sheet 1.

J. J. DROUGHTON.

CONCENTRATOR.

No. 383,284. Patented May 22, 1888.

Fig. 1.

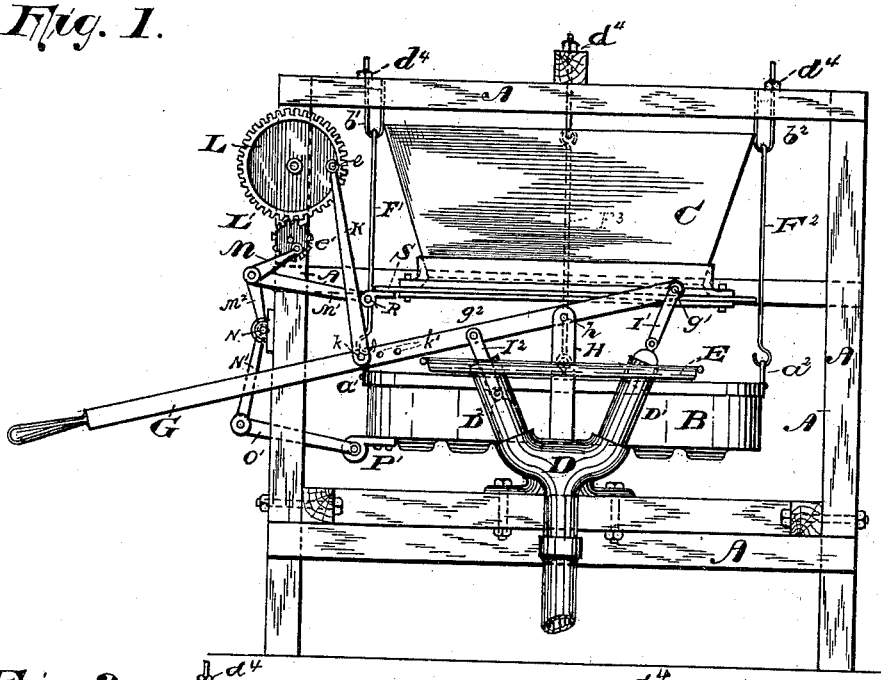
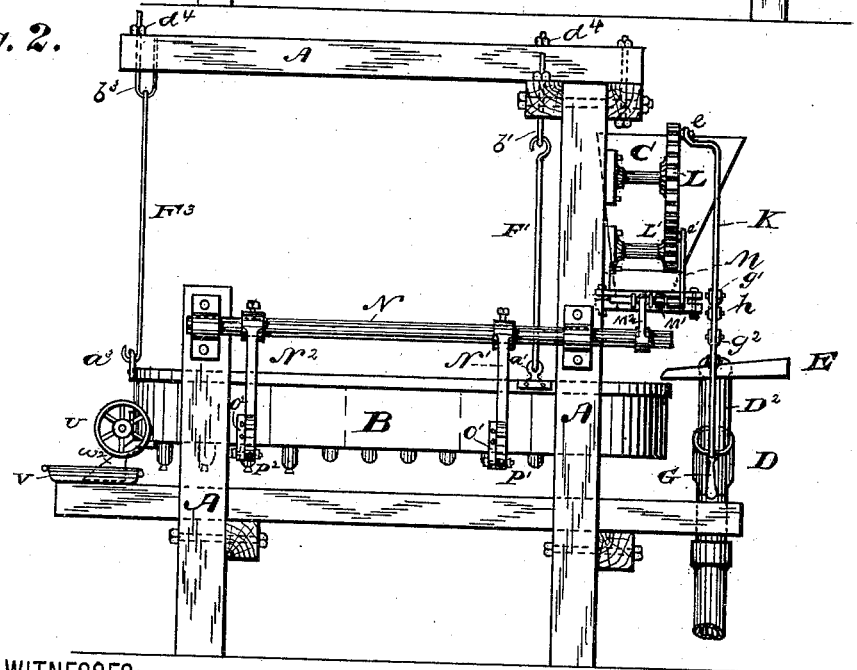


Fig. 2.



WITNESSES:

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Horace C. Reeve.

INVENTOR

John J. Droughton,
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(No Model.) 2 Sheets—Sheet 2.

J. J. DROUGHTON.

CONCENTRATOR.

No. 383,284. Patented May 22, 1888.

Fig. 3.

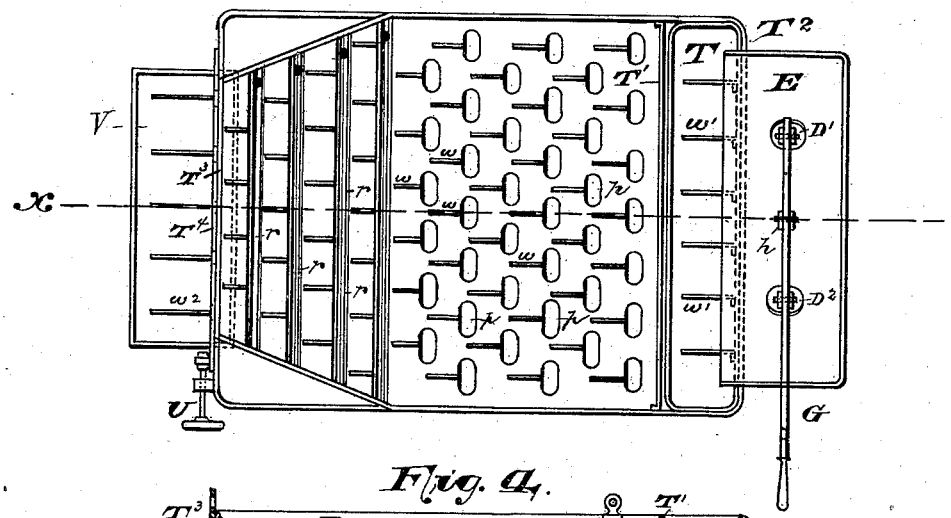
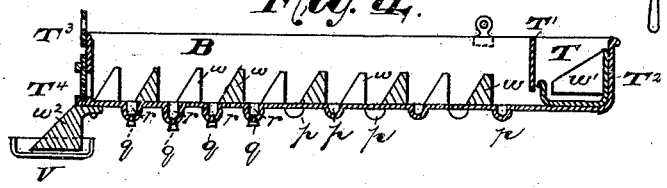


Fig. 4.



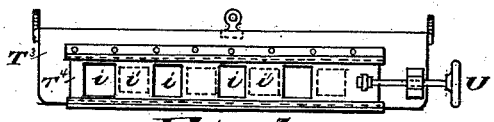


Fig. 5.

Fig. 6.

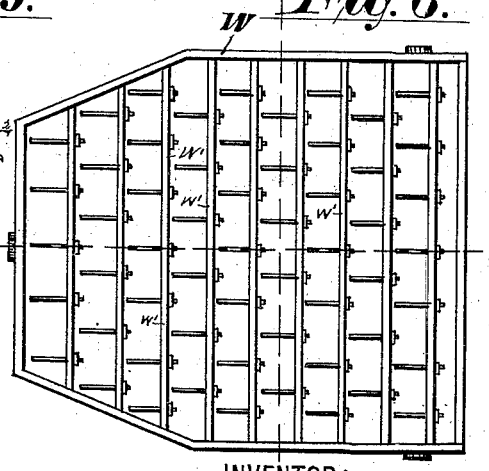
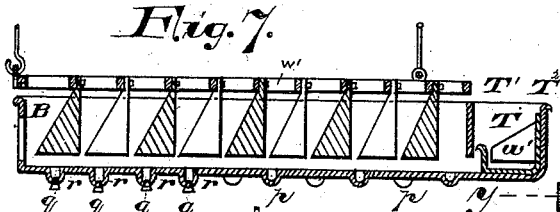


Fig. 7.



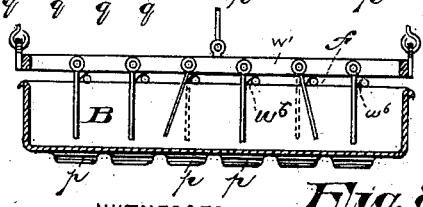


Fig. 8.

WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN J. DROUGHTON, OF EAST NEWARK, NEW JERSEY.

CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 383,284, dated May 22, 1888.

Application filed July 8, 1886. Serial No. 207,425. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. DROUGHTON, a citizen of the United States, residing at East Newark, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Concentrators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention has for its object the more perfect separation of precious metals—such as gold or platinum—from alluvial matter or ground quartz through the agency of water under motion, and the accomplishment of this result with greater facility and at a reduced expenditure of power.

The invention consists in the construction and combinations of parts, substantially as will be hereinafter set forth, and finally embodied in the clauses of the claim.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several figures of the two sheets, Figure 1, Sheet 1, is a rear elevation of the machine, and Fig. 2 a side elevation of the same. Fig. 3, Sheet 2, is a plan of a concentrating-pan. Fig. 4 is a section of the same, taken through line x, showing more clearly certain wings or fans secured therein; and Fig. 5 is a front elevation of said pan. Figs. 6, 7, and 8 illustrate certain modifications in construction of the pan which will be duly explained, Fig. 7 being a section taken on line y, and Fig. 8 a section through line z, Fig. 6.

In said drawings, A A designate a frame, preferably of wood; B, a concentrating-pan suspended or supported therein, and C a hopper or suitable receptacle for the auriferous sand and gravel or ground quartz, which is so arranged as to feed the same to the concentrating-pan gradually and uniformly or in limited quantities in quick succession, the said hopper being arranged above said pan to allow said sand or gravel to gravitate into said pan automatically.

D is a pump having two open cylinders, D' D^2, which are soldered or otherwise connected to a chute, E, preferably of copper, which allows the water to flow in a constant stream to the concentrating-pan B, the water passing into the pan at one end or side thereof and flowing across the face thereof and flowing from the pan at the opposite side. The quartz or gravel is also fed into the pan with the water, and is washed by the water, so that it also passes off at the opposite side, depositing the greater portion of the gold in its course. Said pan B is preferably carried by rods F' F^2 F^3, which are preferably hooked into the pan, as at a' a^2 a^3, and to suitable hooks, bolts, staples, or eyes, b' b^2 b^3, of the frame, which are capable of being raised or lowered by adjusting nuts or devices d^4 d^4 on the threaded ends of said parts b' b^2 b^3, so that the operator may be enabled to raise or lower the concentrating-pan at will. Thus suspended, reciprocating motion may be given to the concentrating-pan as follows: A lever, G, fulcrumed, as at h, to a standard or fixture, H, has pivoted thereto, as at g' g^2, connecting-rods I' I^2, which operate the valves of the respective cylinders of the pump D. A connecting-rod, K, is pivoted to the lever G at k and to a gear-wheel, L, at e', motion from the lever being thus transmitted to said gear-wheel, which in turn transmits motion to the pinion L', a rod or arm, M, pivotally secured thereto, as at e', arms M' M^2, and a shaft, N, the latter adapted to reciprocate in bearings on the frame A. Said shaft N is provided with arms N' N^2, which are pivotally connected with rods O' O^2. These latter are movably secured to the concentrating-pan B, as at P' P^2, and give said pan a reciprocating movement. The motion of the pan is at right angles to the direction of flow of the water, so that the latter is prevented from having a direct or straight flow from the pan, but is given a lateral wash or sweep back and forth as it slowly moves toward its exit.

In order to regulate the movement of the pan B, the handle G may be provided with a series of pin-holes, k' k', so as to change the leverage of the connecting-rod K.

The arm M' is secured, as at R, to a suitable slide, S, of any well-known construction,

adapted to open and close the bottom or base of the hopper alternately by means of the reciprocating movement of the slide produced through the medium of the parts M′, M, L′, L, K, and G. The amount of sand and gravel admitted to the portable accumulating-box T, Figs. 3 and 4, in the pan B, is thus regulated and controlled.

The concentrating-pan B is provided with vertical stops or arresters *w*, which may be either soldered or riveted or otherwise formed or affixed to the bottom of said pan, as in Fig. 4, or they may be pivotally secured to cross-pieces W′ of an independent frame, W, as indicated in Figs. 6, 7, and 8, the wings in the latter case preferably being prevented from being broken or bent when struck or striking a stone by moving on the pivots. Springs w^6 serve or may serve to hold the movable plates in a proper normal position. Said wings, stops, or arresters are disposed on the bottom of the concentrating-pan in lines parallel or approximately parallel with the direction of flow of the water from the inlet to the outlet, so that as the water sweeps laterally under the influence of the laterally-reciprocating pan it is broken up into a large number of eddies at the edges of the said wings, stops, or arresters. At said edges, or at least one of them—preferably the ones nearer the inlet of the water—are formed in the bottom of the pan the depressions *p*, which are preferably slightly oblong in the direction of the lateral sweep of the water. Said depressions are thus beneath the eddies produced by the laterally-moving water washing against the wings, stops, or arresters, and are effective in catching the gold separated by the peculiar movement of the water from its ore. It will be observed that while the water passes slowly through the pan the same is kept in very thorough and peculiar agitation, so that the gold is allowed to settle before the ore is swept from the pan.

I am aware that reciprocating pans, pumps for supplying the same with water, means for operating the two simultaneously, and irregular or pocketed bottoms for the concentrating-pans are not broadly new in connection with concentrators, and I do not claim the same, broadly, herein.

At one end of the concentrating-pan B is a small compartment formed by a partition or wall, T′, and the end T^2 of said pan, to receive a portable accumulating-box, T, said box being provided with stops or arresters *w*′. The other end, T^3, of the said pan is provided with a slide, T^4, said slide being provided with perforations *i i*, Fig. 5, corresponding with similar perforations, *i*′ *i*′, in the end of the pan. This slide, by being provided with a screw and hand-wheel, U, or similar mechanism, is adapted to be adjusted so as to regulate and control the flow of water through or from the concentrating-pan. All detritus passing through the said openings *i i*′ falls into a receiver or amalgamating-pan, V, preferably of wood or cast-iron, having therein a thin film of mercury, with which any fine gold which may have been washed through the pan may amalgamate.

The concentrating or separating pan B is provided with depressions *p p* and grooves *r r* for the heavy settlings, the latter, *r r*, being provided at one end with discharge-openings, which are closed by stoppers or plugs *q q*.

The operation of the device is substantially as follows: When the lever G of the pump is worked reciprocally upward and downward, the slide S of the hopper opens and closes the openings in the base thereof, and the sand, gravel, or ground matter bearing the precious metal is fed into the accumulating-box T. By the same movement of the lever, water from the pump flows from the cylinders D′ D^2 over the chute E and into the said accumulating-box, T, and from thence into the concentrating-pan B, and out through the openings in the slide into the receiver V. During these operations a reciprocating movement of the concentrating-pan is kept up by means of the lever G and the system of arms, rods, and gear-wheels, so that the water and metal-bearing matter is thoroughly mixed, the stops or arresters preventing a direct movement of the water, but breaking it up into eddies, so that the gold has sufficient opportunity to settle. Before the sand and water enter the larger chamber of the pan B they are thoroughly mixed in the portable box or pan T by the stops or arresters *w*′, the heavier particles or grains of metal settling therein, while the lighter particles are washed into the larger chamber through the aperture beneath the partition T′. This said box or pan T may be removed with its settlings without disturbing the other parts of the device. The water in the amalgamating-pan V is also agitated by wings w^2, depending from and moving with the pan B. By these wings the fine float or flour gold is brought more certainly into contact with the mercury. To remove the settlings the concentrating-pan is slightly tilted by drawing upward the hook holding the rod F^2, the plugs *q q* are drawn from the grooves *r r*, and the metal is washed into a suitable receiver.

In the device thus described I have provided means that may be easily operated by a single workman at but a slight expense and under conditions that would otherwise require a large outlay in preparing for the washing or concentrating process. As I am able to make the machine of very light material, I can place the same on a wagon provided with a water-tank supplied with water, and when at the diggings or other point at which the sand, gravel, or ground ore is found I can in the washing or concentrating process pump the water from the tank, and after having used it lead it again to the tank. Thus where water is scarce I am enabled to use my machine with great economy.

I am aware that many changes may be made in the construction of the machine without de-

parting from the spirit or scope of the invention. The pan, for example, may, with suitable modifications as respects its size and shape, be employed in hand-washing in the ordinary manner.

Having thus described the invention, what I claim as new is—

1. In a concentrator, the combination of a reciprocating pan having stops or arresters and depressions or pockets and grooves *p* and *r*, a pump, and a hopper, arranged and operating substantially as and for the purposes set forth.

2. In a concentrator, the combination of a reciprocating pan having a pocketed or recessed bottom, and stops or arresters arranged laterally adjacent to the pockets therein, to produce a whirl or eddy over the pockets, substantially as set forth, and a pump for providing said pan with water, and a lever connected with said pump and pan for actuating the two simultaneously.

3. In a concentrator, the combination of the reciprocating pan having wings w^2 and an amalgamating-pan receiving said wings, substantially as and for the purposes set forth.

4. In combination, a concentrating-pan, reciprocating water and ore supply devices disposed at one end of said pan, exits for water and washed ore disposed at the opposite end, the bottom of said pan being provided with a series of pockets or recesses and stops, arresters, or wings disposed on or above said bottom laterally adjacent to said pockets at right angles to the line or direction of motion of said pan, whereby an eddy is produced directly over each of the said pockets, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of June, 1886.

JOHN J. DROUGHTON.

Witnesses:
OLIVER DRAKE,
CHARLES H. PELL.