

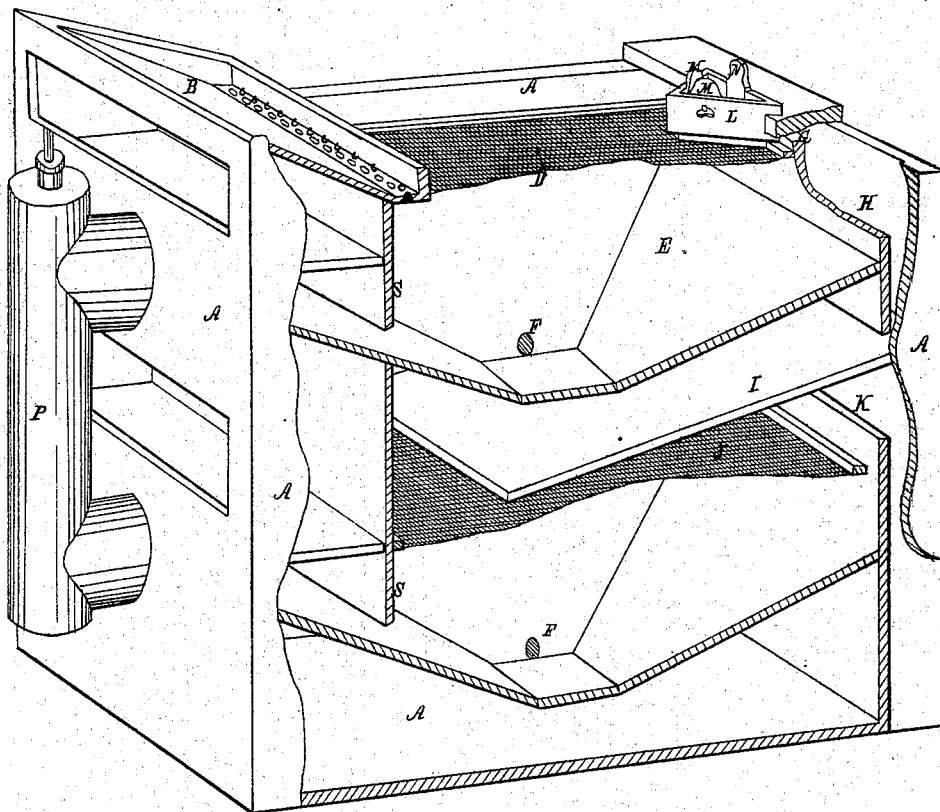
Sheet 1
2 Sheets.

T. Davey.
Ore Separator.

Nº 54697

Patented May 15, 1866.

Fig. 1.



Witnesses.

Wm. G. Brown
Chas. Hadaway

Inventor:

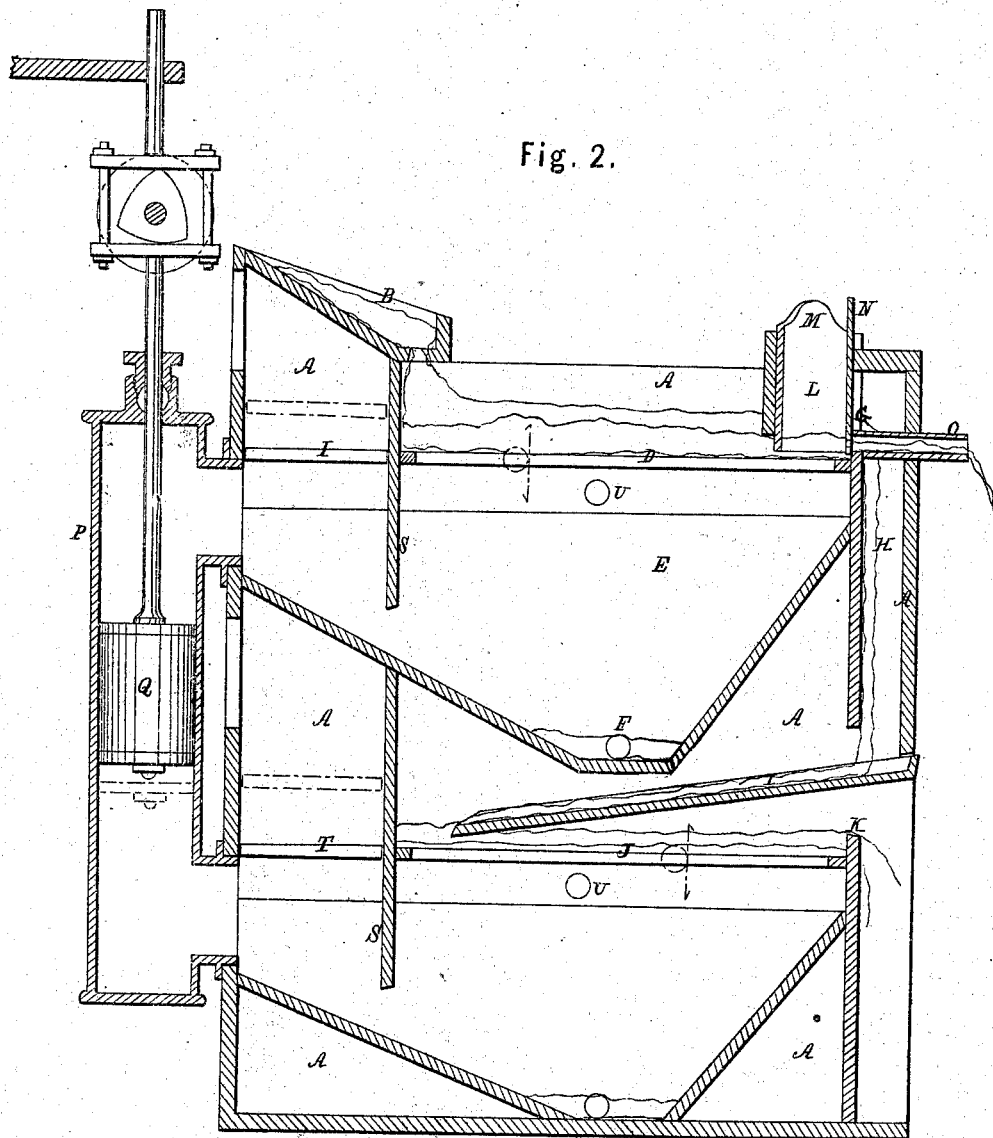
Thos Davey
By his atty
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Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

THOMAS DAVEY, OF HOUGHTON, MICHIGAN.

IMPROVED ORE-SEPARATOR OR JIGGING-MACHINE.

Specification forming part of Letters Patent No. 54,697, dated May 15, 1866.

To all whom it may concern:

Be it known that I, THOMAS DAVEY, of the town and county of Houghton, in the State of Michigan, have invented a new and useful Improvement in Jigging-Machines for Washing and Separating Ore from the Sand with which it is Mixed; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional perspective view of my machine, a portion of the side being broken away to exhibit the interior arrangement. Fig. 2 is a vertical longitudinal section of the same, showing its operation.

My invention relates to that class of jigging or washing and separating machines in which the mixed ore and sand are delivered from the stamping-mill upon sieves more or less fine, and are there caused to separate and become arranged according to their different specific gravities by the pulsations of water gently forced through the sieves at frequently recurring intervals.

The nature of my invention consists, first, in so constructing a jigging-machine that both the forward and backward stroke of the plunger may be utilized by forcing water through a jigging-sieve; second, in arranging in the same machine two or more sieves, one above another, and so connected that the tailings may be reworked without requiring to be rehandled; third, in the manner of delivering the ore and sand to the sieve so that an even distribution is secured; fourth, in a device for securing an effective and regulated discharge of the washed ore; and, fifth, in the general construction and arrangement of the parts of my machine to secure the desired results.

That others may understand the construction and operation of my machine, I will more particularly describe it.

In mining regions generally buildings and machinery are very expensive, and it is therefore a great desideratum to secure compactness and economy in space. This end is attained to the utmost degree by my apparatus.

A is the box or case of the machine. In length and breadth it is somewhat larger than the sieve to be used, so that a space of some inches may be left at each end between said case and the end of the sieve. In height it is sufficient to contain the required number of

sieves with a water-box under each one, in which the particles of ore which pass through the sieves are caught and retained or discharged at pleasure.

At the top of the box A, and situated across one end thereof, is the receiving-hopper B, into which the mixed ore and sand descends from the stamping-mills. This hopper is provided with a narrow horizontal bottom, and through this bottom are the holes C, at regular intervals, so that as the mixed material in the hopper descends through them it may be uniformly distributed upon the surface of the sieve D. If the perforated bottom of the hopper B is constructed of wood and has much thickness the holes C should be conical or larger at the lower than at the upper side, so that sand and ore will not be likely to clog in passing through.

The sieve D is made of wire-gauze, with a mesh ranging from four to sixty to the inch, according to the work it is desired to perform. Beneath the sieve D is the water-box E, which occupies all of the area of the box A beneath the sieve, and, as I prefer to construct it, extends a short distance beyond the front or head of the same, as shown. From the bottom of the water-box the pipe F leads through the walls of the box and opens outside, so that the contents of the box may be discharged at pleasure.

At the side of the box opposite the receiving-hopper B there is a wasteway, G, provided, over which those portions of the sand and ores which work to the top of the mass resting upon the sieve are discharged into the passage H, through which they descend to the chute-board I, and thence are returned to the head of the sieve J, where the same process of separation is continued, and the sand finally discharged at the waste K. The sieve J is provided with a water-box beneath it like that beneath the sieve D.

At the side of the box opposite the receiving-hopper B is the ore-discharger L, through which the separated ore is gradually discharged from the machine. The discharger L consists of a small chamber formed by partitions projected from the inner side of the wall on that side of the sieve. The bottoms of these partitions do not touch the surface of the sieve, but the space between the two may be lessened or increased at will by the sliding

gate M. Into this chamber, by the action of the machine, the separated ore is gradually collected, and as it rises to a certain height it flows out through a hole in the sliding gate N into the discharge-pipe O, which conveys it to any proper place of deposit.

The pump-cylinder P communicates at its upper and lower ends with the water-boxes beneath the sieves. Within the cylinder P is a plunger, Q, which is moved up and down by a plunger-rod moving through a stuffing-box and operated by any suitable power or mode of applying power.

When my machine is in operation the chambers E are filled with water to a point some inches above the level of the sieves. The cylinder P, communicating with the chambers E, is likewise filled, and as the plunger Q is reciprocated it follows, as a matter of necessity, that the confined water, following the movements of the plunger, will be alternately pressed through each sieve in one direction and then in another. In order to secure uniform action over the entire surface of the sieve the partitions S dip into each of the chambers E, and thus insure that the movement of the water shall be from the bottom upward toward the sieve, and not in the direction of the surface, as it might be if the partitions S were not present. The force with which the water is propelled through the sieve may be regulated by making the pressure-board T adjustable vertically, because, in case the pressure-board is raised up above the level of the water, then, as the plunger causes the water to rise, a part of this movement will be consumed in rising to the said board, while if the board be already down the entire movement of the water will be directed against the sieve. The quantity of water beneath the sieve is automatically regulated by the induction-pipes U U, which are provided with valves opening inward.

Operation: Before commencing the operation of separating ore from the sand with which it is mixed when it comes from the stamping-mill, it is customary to cover the surface of the sieve with lumps of clear ore to a depth sufficient to cover the opening to the discharge-chamber L. This is required in order to prevent portions of sand from falling through the meshes of the sieve when first let on. The plunger is then set in motion and the mixed sand and ore admitted. The operation of jigg-ing by means of water operated by a plunger or other means and gently forced through the mass of ore and sand is well known, having been practiced for many years. It therefore needs no further description than to say that in consequence of the gradual reception of fresh material at one end of the sieve a gradual descent of the mass toward the other end of the same ensues, and that during this transit the sand becomes arranged in a layer on top of the ore, and thus passes over the waste G, while the ore, gently traveling along the surface of the sieve, escapes through the chamber L, the height of the discharge and the consequent

thickness of the layer of ore upon the sieve being regulated by the sliding gate N, the orifice through which may be placed at any desired height from the surface of the sieve. The gate M is also correspondingly adjustable, and may be retained in position by set-screws or other convenient means. The chamber L being uncovered and open at the top, the attendant may at all times inspect the process of the discharge of the ore and regulate it at will. It is often found, however, that a small portion of ore will pass over the wasteway G with the sand, and it is therefore generally desirable that the tailings should be rewashed before being finally discharged. This is accomplished in my machine by returning them all to the sieve J, as described.

It is evident, however, that if it be not deemed desirable or economical to rewash the tailings from the upper sieve the lower sieve may be used as a duplicate of the upper one, the only necessary change in my apparatus being the addition of a hopper like B in connection with the lower sieve, J, instead of the passage H; or it may be found to be desirable to arrange a larger number of sieves than here represented, one above another, it being evident that one plunger will operate a larger number of sieves.

It is also evident that this invention may be practiced even without placing one sieve above another, because that arrangement is adopted merely to secure compactness, and my invention not consisting in the operating of two or more sieves with one plunger, but in the operating of sieves in a jigg-ing-machine by each motion of the plunger.

It is still further evident that an upright position of cylinder is not necessary, because it may be horizontal or oblique, and if its two ends are connected to the water-boxes of different sieves it will be equally as effective in one position as another.

Advantages: First, economy of space, by placing two sieves within the area hitherto occupied by one; second, utility of power, by using both forward and backward stroke of the plunger; third, delicacy of adjustment, by using a pump and plunger much smaller than the sieve, and thereby rendering it possible to pulsate the water so delicately that the slime ores may be washed perfectly; fourth, the power of giving different forces to the upper and lower stroke by adjustment of the pressure-boards; fifth, automatic operation, needing but little supervision; sixth, power to inspect and regulate the discharge at will.

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

1. The combination of a double-acting plunger-pump with two sieves of a jigg-ing-machine, so that each motion of the plunger shall force water through one or the other of the said sieves, substantially in the manner and for the purpose set forth.

2. Arranging the jigg-ing-sieves of an ore

washer and separator one above the other, substantially as and for the purpose described.

3. In combination with the sieves of a jigging-machine, the receiving-hopper B, provided with the perforated bottom, as and for the purpose set forth.

4. In combination with the sieves of a jigging-machine, the ore-discharging chamber L, provided with a gate or gates, as described.

5. In combination with the sieve and pump of a jigging-machine, the partition S, as and for the purpose set forth.

6. The adjustable pressure-board T, in combination with the pump and sieve of a jigging-machine.

7. In combination with the sieves D and J of a jigging-machine, the passage H and chute-board I, substantially as and for the purpose set forth.

THOMAS DAVEY.

Witnesses:

R. D. O. SMITH,
EDM. F. BROWN.