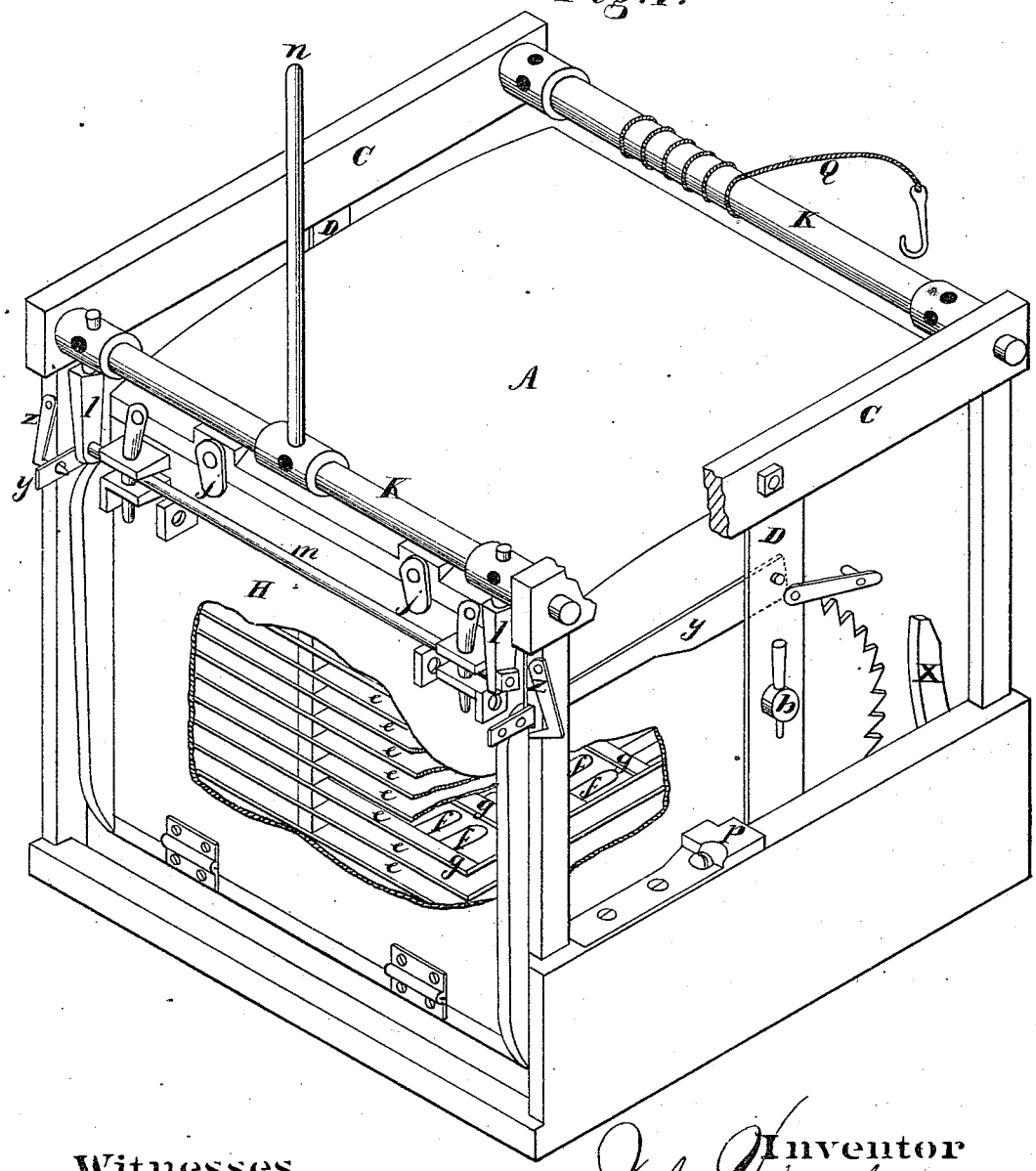
2 Sheets--Sheet 1.

J. VINCENT, Sr.

Ore-Concentrator.

No. 161,460. Patented March 30, 1875.

Fig. 1.



Witnesses
Geo. H. Strong.
Jno. L. Boone

Inventor
John Vincent
by Dewey & Co
Attys

2 Sheets--Sheet 2.

J. VINCENT, Sr.

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Fig. 2.

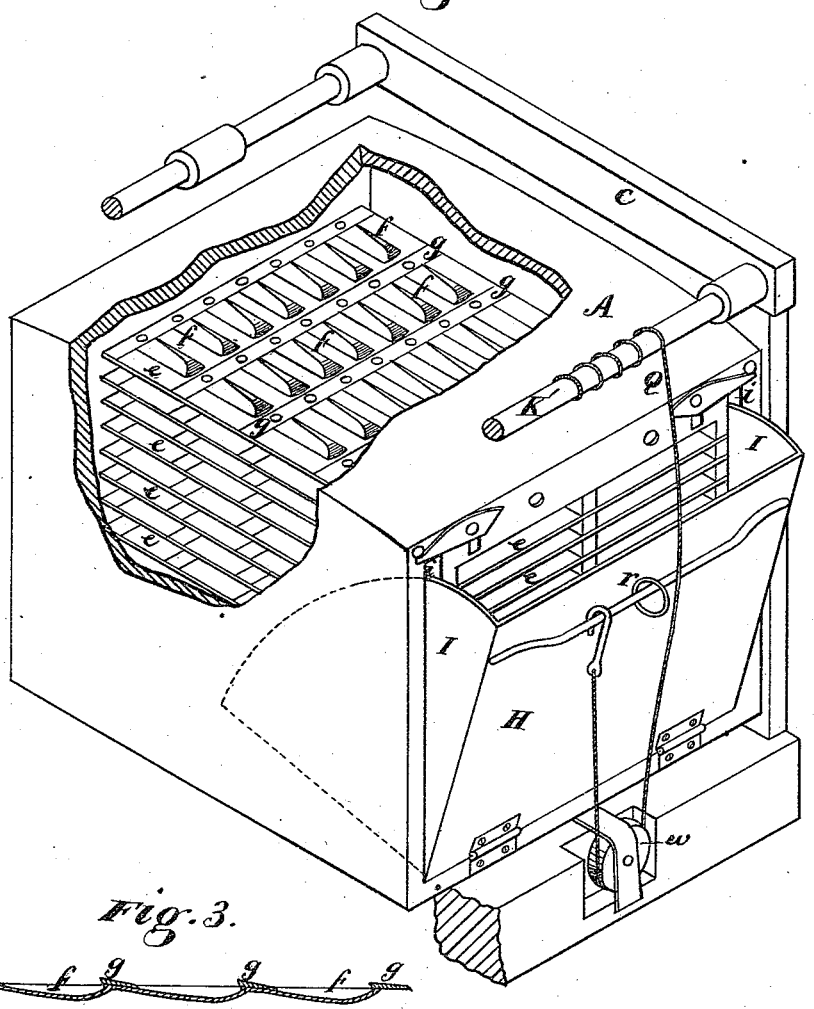

Fig. 3.

Witnesses
Geo. H. Strong.
Jno. L. Orme

Inventor
John. Vincent
by Dewey & Co
Attys

UNITED STATES PATENT OFFICE.

JOHN VINCENT, SR., OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN ORE-CONCENTRATORS.

Specification forming part of Letters Patent No. **161,460**, dated March 30, 1875; application filed February 18, 1875.

To all whom it may concern:

Be it known that I, JOHN VINCENT, Sr., of San Francisco city and county, State of California, have invented an Improved Ore-Concentrator; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvement without further invention or experiment.

My invention relates to an improved machine for concentrating and separating the heavy particles of dry pulverized ore from the light and worthless portion.

My machine consists of a number of peculiarly-constructed plates, which I will call concentrating-trays, placed one above another inside of a closed box. The box is mounted on journals inside of a frame, and the frame is provided with appliances for handling the box and giving it the concentrating motion and concussion.

In order to describe my invention so that others will understand its construction and operation, reference is had to the accompanying drawings, forming a part of this specification, in which—

Figure 1, Sheet 1, is a perspective view of my machine from one corner. Fig. 2, Sheet 2, is a perspective view taken from another corner. Fig. 3 is a section of the plates, showing the depressions and bars.

Let A represent a strong box, which is mounted upon journals *b*, between two sides, C C, of a frame. The journals *b* bear in plates or hangers D, which are suspended from the middle of each side of the frame, so that the box can swing in the frame and be tilted so as to bring either end uppermost, as will be described in the operation of the machine.

Inside of this box I place the concentrating-trays *eee*, one above another, at a short distance apart, as shown. Each tray consists of a plate of metal or other suitable material, having parallel rows of depressions or cavities *f* made in it transversely across the plate. These rows of depressions or pockets are separated by a metal strip, *g*, which is so secured to the plate that one edge will project considerably above the level of the plate, while the opposite edge is fastened closely to it, thus providing an inclined division-plate between the rows. The depressions or pockets *f* serve to receive and retain the heavy particles, which are settled by the motion and concussion given to the box, and the projecting edge of the separating-plate prevents the particles from moving in one direction, while it does not prevent them from moving in the opposite direction. The ends of the box A are closed by hinged doors or ends H and H′. The hinged end H′ has side-boards I, which are made in the form of a quadrant, so that they can move in a narrow slot or space, *i*, at each side of the box when opening or closing the ends. When closed, these doors are fastened by buttons *j*, or equivalent fastenings. Both of the upper corners of the sides C C of the frame are connected by strong rollers or shafts, which pass across above the ends of the box A. The shaft K, at one end of the frame, has a fixed arm, *l*, extending downward near each end, and the lower ends of these arms are attached to the opposite ends of a rod, *m*, which extends across and is secured to the end of the box by detachable fastenings.

By securing a lever, *n*, to the middle of this shaft or roller the box can be given a swinging back-and-forth motion by moving the lever back and forth, so as to rock the shaft or roller, or some suitable driving-power can be applied to give it this motion.

On each side of the frame, a short distance from the hangers D, I secure a stop-bar, *p*, against which the hangers strike when the box moves forward, so as to produce a concussion for settling the heavy particles of ore by gravity.

In operating this machine the rod *m*, to which the arms *l* of the shaft K are attached, is detached from the box A, which is then turned by means of the shaft or rollers K′ and the ropes or chains Q, which are used in the manner of a windlass, so that it will stand on one end inside of the frame. The hinged end or door at the upper end of the box is then opened, and the pulverized ore is shoveled into the box until it has been fully charged, or until the desired quantity has been placed upon each of the concentrating-trays *e*. The door is then closed, and the box is moved

back to its horizontal position in the frame by means of the roller K′ and ropes Q. In this case the hook on the end of the rope Q is attached to the ring *r* on the lower end of the box, and the roller turned until the box is in the proper position. The rod *m* is then again secured to the end of the box, and the lever *n* applied to the shaft, so as to form a handle for operating the box. The lever *n* is then operated back and forth, so as to give the box the proper back-and-forth motion and concussion. This operation will cause the heavy particles of ore to settle through the lighter particles into the cavities or depressions in the trays. The direction of the concussion is such that the heavy particles will be prevented from moving over the plates or trays by the projecting edges of the strips *g*, so that when they once settle into the cavities they will remain there.

After the agitation and concussion has been continued a sufficient length of time to thoroughly concentrate the heavy particles, the rod *m* is again released from the end of the box, and the box is tilted so as to let the top or lighter portion be discharged at the lower end of the machine, while the projecting edge of the strips serves to prevent the heavy particles from leaving the pockets in that direction. After the light and worthless portion of ore has been removed, the box is tilted to an opposite angle, so as to let the contents of the depressions or pockets run out at the opposite end, which they will readily do, as the plates will not interfere with their movement in that direction.

In tilting the box with its load of ore to discharge the light portion, the rope Q must be passed down around a pulley, *w*, at the middle and lower end of the machine, and the hook on its end attached to the ring *r*, so that, by turning the roller K′, the end of the box will be lowered and the box tilted.

By employing concentrating-trays, such as are above described, I am able to thoroughly separate the heavy particles from the light, while my arrangement for operating both the box and the ore renders the handling of the box and the ore quite convenient and simple. A double concussion can be given to the box while concentrating by using double stops or knockers for the pendent arms D to strike against. I have therefore represented a pivoted bar, *x*, similar to a pawl, which is secured to the frame on the side of the hangers D opposite the stop-bar *p*. This bar can be used or not, as desired, and, when not required, it will be thrown back out of the way.

A horizontal plate, *y*, is secured to each of the hangers D, and extends alongside of the box A, and through the corner post of the frame. This plate has two or more holes in its end, into which a hook, *z*, on the corner post can be placed, so as to hold the box stationary in a horizontal position when desired.

Although this machine is especially intended for concentrating dry pulverized ore, it can also be used for concentrating wet ore by submerging the machine, after it is charged, in a tank of still water, and giving it the motion and concussion above described. This would greatly favor the concentration, as the water would keep the particles loosened up, and thus allow the heavy particles to settle more readily.

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

1. The box A, having a series of concentrating-trays, *e*, mounted on journals *b*, and suspended by hangers D, in combination with the rock-shaft K, having arms *l*, which are attached to the box by means of the rod *m*, substantially as and for the purpose described.

2. The box A, provided with the hinged end H′, having side-boards I, said box inclosing one or more concentrating-trays, *e*, substantially as and for the purpose described.

3. A concentrating device, in combination with an external case mounted on journals, whereby it can be turned to any desired position on said journals, for the purpose of charging and discharging the ore and concentrations.

In witness whereof I hereunto set my hand and seal.

JOHN VINCENT, SR. [L. S.]

Witnesses:
GEO. H. STRONG,
JNO. L. BOONE.