

(No Model.)

W. McDERMOTT.  
ORE CONCENTRATOR.

No. 404,011.

Patented May 28, 1889.

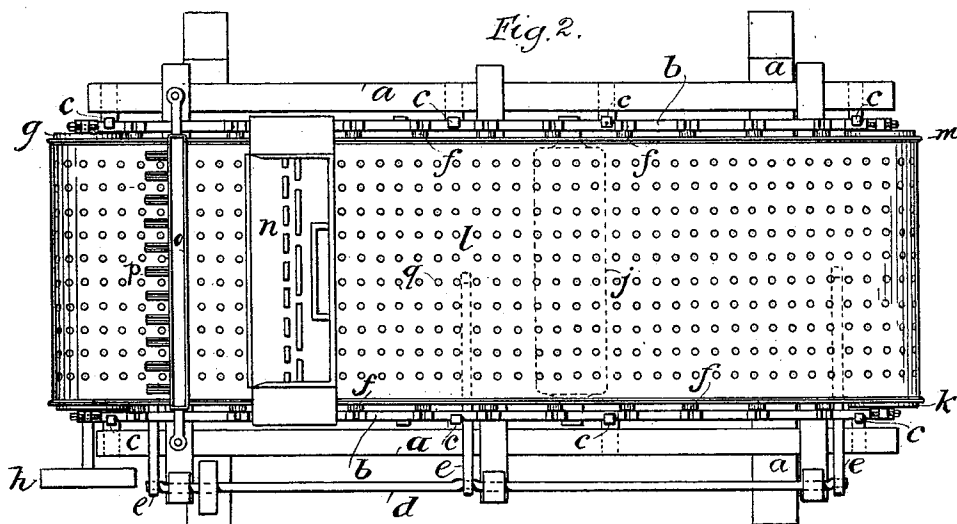
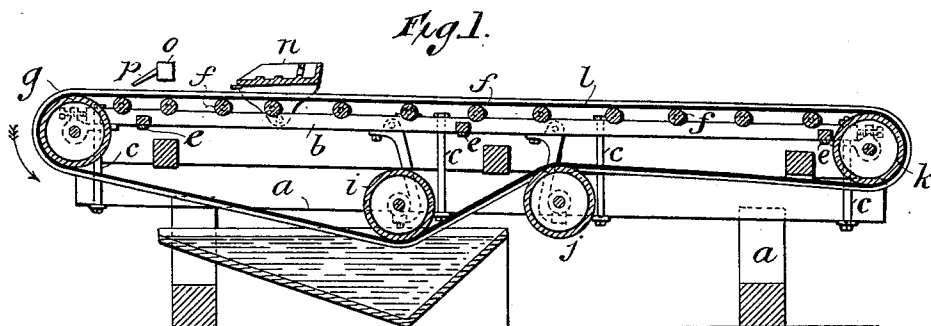
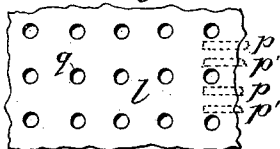
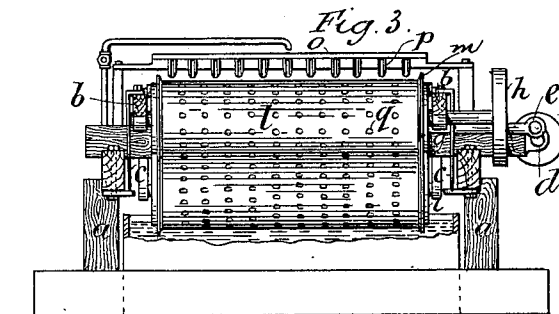


Fig. 6.



Witnesses  
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# UNITED STATES PATENT OFFICE.

WALTER McDERMOTT, OF MORRISTOWN, NEW JERSEY.

## ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 404,011, dated May 28, 1889.

Application filed April 2, 1888. Serial No. 269,228. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER McDERMOTT, of Morristown, New Jersey, have invented a new and useful Improvement in Ore-Concentrators, of which the following is a specification.

This invention relates to improvements in the construction of endless traveling belts as used in concentrating-machines for the washing of ores and separation of the heavier valuable particles of mineral from the lighter worthless rock.

The function of the traveling belt in this class of machines is to carry up an inclined plane against a descending current of sand and water such heavy particles of mineral as are settled on its surface, and from their greater specific gravity are capable of resisting the downward flow of water, which carries the lighter material down the incline. For the most perfect work on such concentrators a shaking or oscillating motion is given to the belt in addition to its traveling motion, which assists materially in settling the heavy particles, while the lighter sand is kept in suspension in the stream of water.

My invention consists in certain features of construction and combinations of parts, as will be hereinafter described and claimed.

I am aware that cleats or riffles have been used on such belts and that corrugated surfaces have been employed; but in all these forms the great objection is in the fact that when in use the increased resistance offered to the downward flow of the light sand more than compensates for any advantage in the increased capacity for holding the settled heavy mineral, and as a consequence greater inclination of belt and more water have to be used, both of which are detrimental to a close saving of the very fine particles of mineral. Another very serious objection to such belts is the fact that in passing the water-jets at the head of the incline, (which effect the final cleaning of the mineral by washing back any light attached sand,) the plowing up of the collected bed of mineral by the force of the jets tends to stir up the finest particles, which are carried off in the descending sheet of water and lost with the light sand waste.

In my invention the arrangement of the

depressions in longitudinal lines between the water-jets prevents both the first and last defects of ruffled and corrugated belts, because the water streams strike the plane surfaces between depressions, and it is simply a gentle surface-wash which passes over the material collected in the depressions—the exact condition most perfect for skimming off any light surface-coating of sand without agitating the fine mineral below.

Figure 1 of the accompanying drawings is a vertical longitudinal section of the machine. Fig. 2 is a plan. Fig. 3 is an end view at the upper end of the belt. Fig. 4 is a cross-section of a portion of belt, showing the pits or depressions. Fig. 5 is a plan view of a portion of the belt, showing a modification consisting in the use of projections instead of depressions. Fig. 6 shows the relative arrangement of the water-distributers and the depressions.

*a* is the main frame of the machine.

*b* is a supplemental shaking-frame supported by the resilient bearers *c c c c*, by which it will be permitted to receive a sidewise shake.

*d* is a shaft at one side of the shaking-frame, to which it is connected by the rods *e e*. These rods have eccentric bearings on the shaft, and are therefore reciprocated by the rotations of the same. The upper supporting-rollers are lettered *f*.

*g* is a roller mounted in the shaking-frame and driven from the pulley *h*.

*i j k* are other rollers having their bearings sustained by the shaking-frame. The endless belt *l* is preferably of rubber, and provided with the side flanges, *m*. It passes around the rollers, as shown in the drawings, and is driven by the roller *g*.

*n* is an ore-distributor of ordinary construction, discharging upon the surface of the belt, which continually moves up the incline.

*o* is a water-distributor containing a series of short spouts, (lettered *p*), which discharge the water upon the surface of the belt. The water-distributor preferably does not shake with the belt.

The belt is of ordinary construction, except that its surface is broken by the pits, (lettered *q*.) These pits are arranged so that the spouts *p* will discharge water between them and not

into them, which is accomplished by making them in rows a sufficient distance apart, so that in the travel of the belt the intervals between the pits will come beneath the spouts, and since the belt will be shaken sidewise the interval should preferably be as wide as the sidewise stroke of the belt. Thus in Fig. 6 the dotted lines *p* will show the position occupied by the spout with reference to the belt-pits at one end of the belt-stroke, and the dotted lines *p'* the position at the other end of the belt-stroke.

In Fig. 5 I have shown a modification in which for the pits are substituted short projections on the surface of the belt, behind which the mineral may lodge and be protected from the currents flowing down the avenues between every two series of projections. These projections will have the same arrangement with reference to the spouts as the pits. Whether the surface of the belt be roughened by pits depressed in its surface or by projections above the surface, retaining-pockets will be formed, in which the fine particles of ore find lodgment.

The crushed ore to be treated falls onto the inclined belt *l* from ore-spreader *n* and flows slowly down the incline, being subjected to the shaking motion of the crank-shaft *d*. The heavy particles of mineral settle onto

the surface of the belt and collect mostly in the shallow depressions or behind the projections by displacing any lighter particles of sand. The slow upward travel of the belt carries the same under the water-jets *p*, which strike midway between the line of depression or projection *q*. The water on striking the surface spreads in gentle circular waves, which pass over or between the material collected in the depressions or behind the spurs and effectually skim off the upper light sand surface without agitating the mineral below, and the cleaned charges of mineral are carried on by the belt to be washed off and collected in the concentration-tank below, which is filled with water, into which the reversed belts dip in passing around drum *i*.

Having described my invention, what I wish to claim, and for which I desire Letters Patent, is as follows:

In an ore-concentrating machine, the combination, with the water-distributor, of an endless traveling belt presenting a smooth surface in the lines of the water-jets and ore-retaining pockets between them, substantially as described.

WALTER McDERMOTT.

Witnesses:

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