

(No Model.)

2 Sheets—Sheet 1.

W. HUSELTON & N. MOORE.
ORE CONCENTRATOR.

No. 551,826.

Patented Dec. 24, 1895.

Fig. 1.

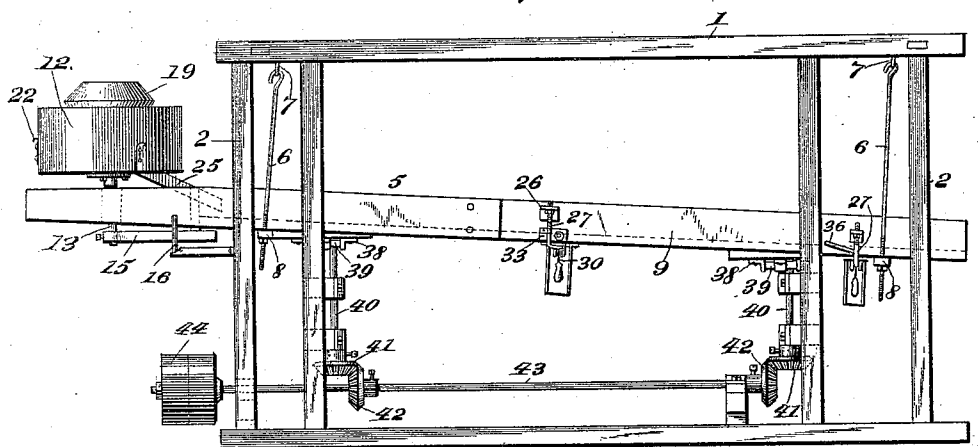


Fig. 2.

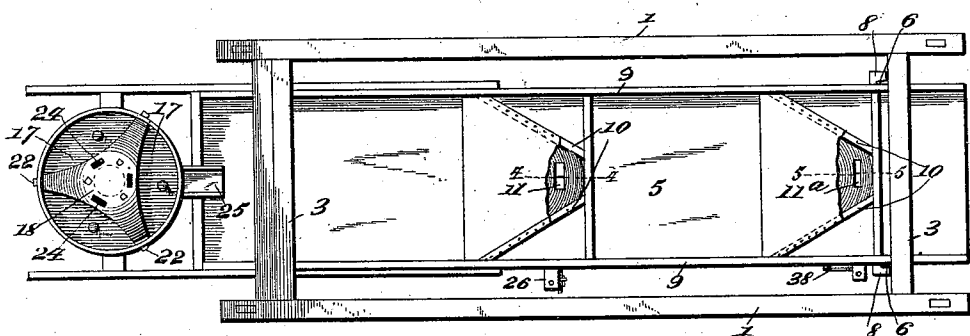
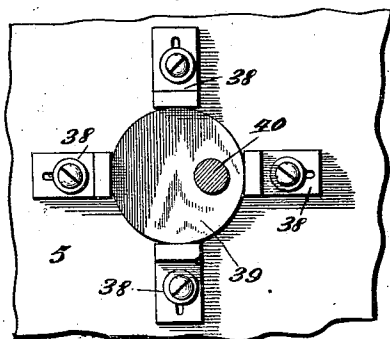


Fig. 6.



Witnesses

Thos. J. Gatchel.
W. P. Wilson.

Inventors
*William Huselton &
Nelson Moore*
by *Philip W. Arnett*
their Attorney.

(No Model.)

2 Sheets—Sheet 2.

W. HUSELTON & N. MOORE.
ORE CONCENTRATOR.

No. 551,826.

Patented Dec. 24, 1895.

Fig. 3.

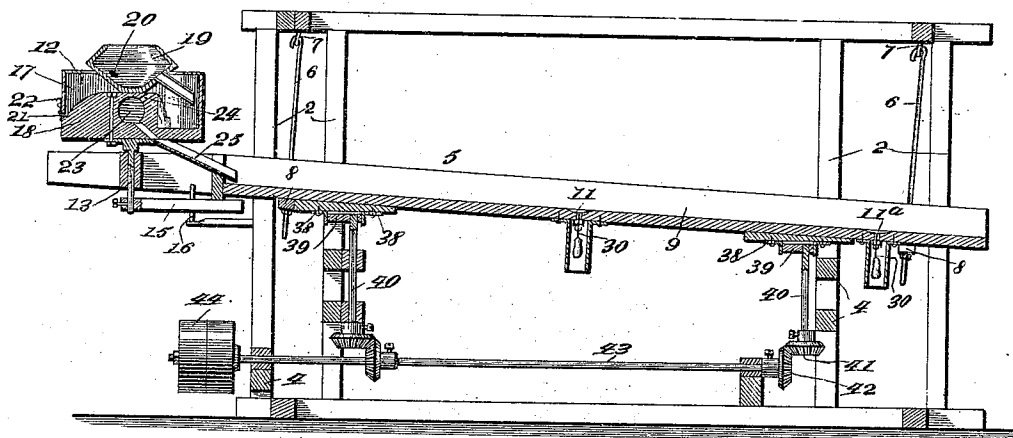


Fig. 4.

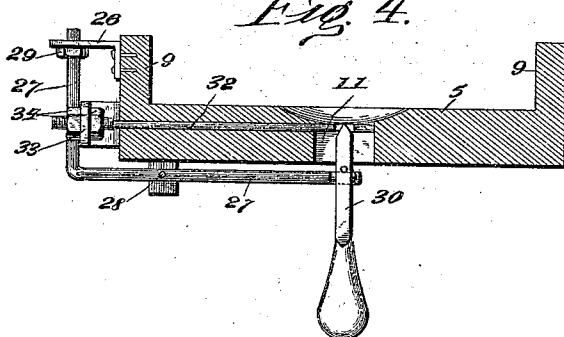
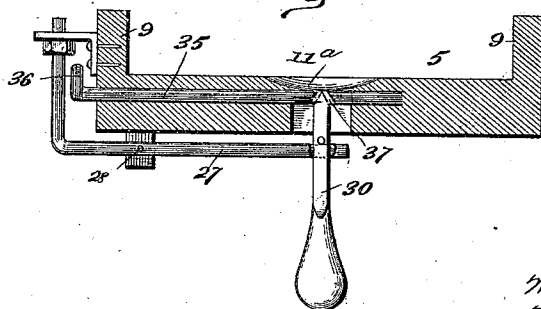


Fig. 5.



Witnesses

Theo. L. Gatchel.
W. P. Wilson.

William Huselton and
Nelson Moore

by Philip W. Aivett
their Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM HUSELTON AND NELSON MOORE, OF BUTTE, MONTANA.

ORE-CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 551,826, dated December 24, 1895.

Application filed May 21, 1895. Serial No. 550,054. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM HUSELTON and NELSON MOORE, citizens of the United States, residing at Butte, in the county of Silver Bow and State of Montana, have invented certain new and useful Improvements in Ore-Concentrators; and we 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.

Our invention relates to improvements in ore-concentrators, the same being especially designed to treat mill-tailings in order to save all the precious metals contained therein and separate the same from the refuse matter.

The invention also consists in details of construction and combinations of parts, which will be more fully hereinafter described and claimed.

In the drawings, Figure 1 represents a side elevation of our device. Fig. 2 is a plan view of the same with the hopper, which is normally attached to the concentrating-pan, removed. Fig. 3 is a vertical longitudinal section through the same. Fig. 4 is a cross-section through the reciprocating table on the line 4 4 of Fig. 2. Fig. 5 is a similar section on the line 5 5 of Fig. 2. Fig. 6 is a bottom plan view of a portion of the reciprocating table, showing the eccentric and lugs by means of which said table is reciprocated.

Like reference-numerals indicate like parts in the various views.

The framework of our device is made up of longitudinal beams 1 1, uprights 2 2, secured to said longitudinal beams connected at their upper ends by transverse beams 3 3.

5 represents our reciprocating table supported from the upper transverse beams through rods 6, connected to screw-eyes 7 7 at their upper ends and to the outer end of bars 8 8, secured to the under side of said table 5. This table is set at an angle, as clearly shown. It is formed with side pieces 9 9 and riffles 10 10, which are covered with a sheet of canvas for the purpose of settling the slimes, if there should be any. Between the riffles 10 10 are slots or openings 11 11^a, for a purpose which will be hereinafter described. On the upper end of the reciprocating table 5 is supported a concentrating-

pan 12, mounted upon a suitable shaft 13 extending downwardly through the outer cross-beams of said shaking-table and having secured thereto a rod or pitman 15 moving between guide-pins 16 secured to a permanent part of the framework. By this construction it will be seen that the reciprocation of the table 5 will cause a partial rotation of the concentrating-pan 12 at each stroke. This concentrating-pan 12 is circular in cross-section and is divided off into three compartments 17 by means of a substantially triangular block 18 having angular sides and a convex upper surface. In the compartments 17 we place a series of agitating-balls, preferably three, and centrally of the pan 12 we secure to the block 18 a hopper 19 having discharge-outlets 20 20 therein, through which the tailings from said hopper are distributed equally into the three compartments 17 of the pan. In the compartments 17 we place mercury for amalgamating purposes.

At points adjacent to the apices of the triangular block 18 we provide discharge-openings 21 provided with suitable hand-regulating valves 22. These openings are slightly above the bottom of the compartments 17 and prevent loss of the mercury contained therein. The block 18 is preferably made up of a series of boards placed one upon the other and is formed with a central cavity 23, into which lead the passages 24 from the upper surface of said block 18. Through these passages 24 the tailings are discharged and are led thence through a single passage 25 upon the upper end of the shaking-table 5. The reciprocating and partially rotary movement which is imparted to the pan 12, in connection with the agitating-balls contained in the compartments 17 of said pan, causes a thorough commingling of the material fed from the hopper 19 with the mercury in said pan. Almost the entire quantity of gold contained in this material is amalgamated, and the concentrates, being heavier than the remaining tailings, are drawn outwardly by centrifugal force and discharged through the openings 21 in the sides of the pan 12. These openings may be regulated according to the quality of the ore being treated. The tailings left after this concentration being lighter are conducted through the passage 24 into the cavity 23 and

out through the passage 25 upon the reciprocating table 5. The bottom of this reciprocating table, it should be stated, is covered with copper plates and the tailings fed thereon are further concentrated thereby. The canvas covering the riffles 10 in the bottom of said table settles all slimes which may be formed, and the concentrated ore being heavier than the refuse material is fed downwardly through the opening or slot 11, the lighter particles passing over additional copper plates in the bottom of said table being further concentrated thereby and the concentrate discharged from the opening 11^a in said table.

Secured to one side of the reciprocating table 5 at a point adjacent to the slot or opening 11 is a bracket 26, which is perforated at its outer end, and in this perforation is the upper threaded end of the vertical arm of an angle-lever 27 fulcrumed at 28 to a bracket on the under side of the table 5. A nut 29 fits over the threaded portion of said angle-lever, by means of which the same may be adjusted for a purpose which will appear later. The horizontal arm of said angle-lever 27 extends inwardly to a point just beneath the opening 11 in the bottom of the table 5. This end of said lever is slotted, as shown, and supports pivotally a feed-rod 30 having a knife-edge at its upper end which fits said slot 11. The reciprocation of the table 5 will cause a vibration of the feed-rod 30, which will prevent clogging of the opening 11 and causes a constant feeding of the concentrated ore therethrough. The extent to which the knife-edge of the feed-rod projects through the opening 11 may be regulated by screwing or unscrewing the nut 29 on the upper end of the lever 27. The size of the opening 11 may be regulated by means of a rod 32 which passes transversely through the bottom of the shaking-table 5, is threaded at its outer end, passes through a perforated bracket 33, and is provided with a pair of adjusting-nuts 34 34 thereon.

The opening 11^a is provided with a feeding device corresponding exactly with that described with reference to the opening 11, but the means for regulating the size of the opening varies somewhat. This means consists of a cylindrical rod or bar 35 extending laterally through the bottom of the table 5 and provided with an operating-handle 36 upon its outer end by means of which said rod or bar may be rotated. It is further provided at a point adjacent to the opening 11^a with an angular notch 37, as clearly shown in Fig. 5. In this notch, slightly separated from the sides thereof, fits the upper knife-edge portion of the feed-rod 30. By turning the bar 35 in one direction or the other the size of the opening 11^a may be regulated in an obvious way.

The under side of the table 5 is provided at two points with a series of adjustable lugs 38 38, between each set of which moves a disk 39 eccentrically mounted upon the upper end

of each one of the shafts 40 mounted in suitable bearings in the stationary part of the framework. The lower ends of these shafts are provided with beveled gear-wheels 41 meshing with corresponding gear-wheels 42 upon a horizontal shaft 43 mounted in suitable bearings in the lower part of the framework and provided with a drum or pulley 44 upon its outer end, by means of which power is transmitted to operate the machine. The rotation of this shaft will obviously cause a rotation of the vertical shafts 40, which through the eccentrics 39 on the ends will cause a reciprocating motion to be imparted to the table 5.

Having thus described the invention, what is claimed as new is—

1. The combination with a suitable framework, of a table flexibly mounted from the upper part thereof, a concentrating pan mounted upon a suitable shaft passing through a cross-beam at the upper end of said table, a lever connected to the lower end of said shaft and moving between guides secured to a permanent part of the framework and means for giving said table a rotary reciprocation, substantially as and for the purpose described.

2. The combination with a suitable framework, of a table flexibly mounted from the upper part thereof, a concentrating pan mounted upon a suitable shaft passing through a cross-beam at the upper end of said table, a lever connected to the lower end of said shaft and moving between guides secured to a permanent part of the framework, adjustable lugs on the under side of said table, vertical shafts mounted in suitable bearings in said framework and eccentrically secured to the upper ends of said shaft and moving between each set of adjustable lugs, and means for rotating said shafts, substantially as and for the purpose described.

3. In an ore concentrator, the combination with a reciprocating table whose bottom is covered with copper plate and is provided with riffles and discharge openings therein, of a concentrating pan pivotally mounted at one end of said reciprocating table and means for oscillating the same, said pan being divided off into a series of compartments adapted to be filled with mercury, a feed hopper secured therein having openings for discharging the crushed ore or tailings evenly to each of said compartments, the said pan being provided with discharge openings for the concentrates at points slightly above the bottom of said pan and with discharge openings for the tailings leading from points near the upper part of said pan into the upper end of said shaking table, substantially as and for the purpose described.

4. In an ore concentrator, the combination with a reciprocating table whose bottom is covered with copper plate and is provided with riffles and discharge openings therein, of a concentrating pan pivotally mounted at one end of said reciprocating table and means for

oscillating the same, said pan being divided off into a series of compartments formed by a polygonal block having angular sides and a convex upper surface, said compartments
5 being filled with a series of agitating balls, a feed hopper secured to said block centrally of the pan, provided with a series of discharge openings for feeding the crushed ore or tailings evenly to all of the compartments in said
10 pan, the said pan being provided with a series of discharge openings for the concentrates, located slightly above the bottom of said pan and at points adjacent to the vertices of the angles formed by the adjacent sides
15 of the polygonal block, said block being provided with a central cavity having discharge passages for the tailings leading thereinto from the upper surface of said polygonal block and a single passage leading therefrom to the
20 upper end of said shaking table, substantially as and for the purpose described.

5. In an ore concentrator, the combination with a reciprocating table, provided with copper plates, riffles and discharge openings for
25 the concentrates therein, of a discharging device located beneath said opening, consisting of a rod having a knife-edge at its upper end projecting through said opening pivotally mounted upon a rigid part of said shaking
30 table whereby the same is vibrated during the reciprocation of said table, substantially as and for the purposes described.

6. In an ore concentrator, the combination with a reciprocating table, provided with copper plates, riffles and discharge openings for
35

the concentrates therein, of a discharging device located beneath said opening, consisting of a rod having a knife edge at its upper end projecting through said opening pivotally
40 mounted upon the inner end of the horizontal arm of an angle lever fulcrumed in a bracket upon the lower side of said table having the upper end of the vertical arm thereof threaded and passing through a perforation in the outer
45 end of a bracket secured to the side of the reciprocating table, and a nut engaging the threaded portion of said angle lever, substantially as and for the purpose described.

7. In an ore concentrator, the combination with a reciprocating table, provided with copper plates, riffles and discharge openings for
50 the concentrates therein, of means for regulating the size of said openings consisting of a cylindrical bar extending transversely through the bottom of said table and having
55 an operating handle upon its outer end and an angular notch in one side thereof adjacent to said opening, a feeding rod having a knife edge at its upper end fitting the notch in said
60 cylindrical rod, substantially as and for the purpose described.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

WILLIAM HUSELTON.
NELSON MOORE.

Witnesses:

DAN JAEGER,
FREDERICK KOHL.