

I. F. MONELL.
CONCENTRATOR.
APPLICATION FILED SEPT. 28, 1911.

1,033,260.

Patented July 23, 1912.

3 SHEETS-SHEET 1.

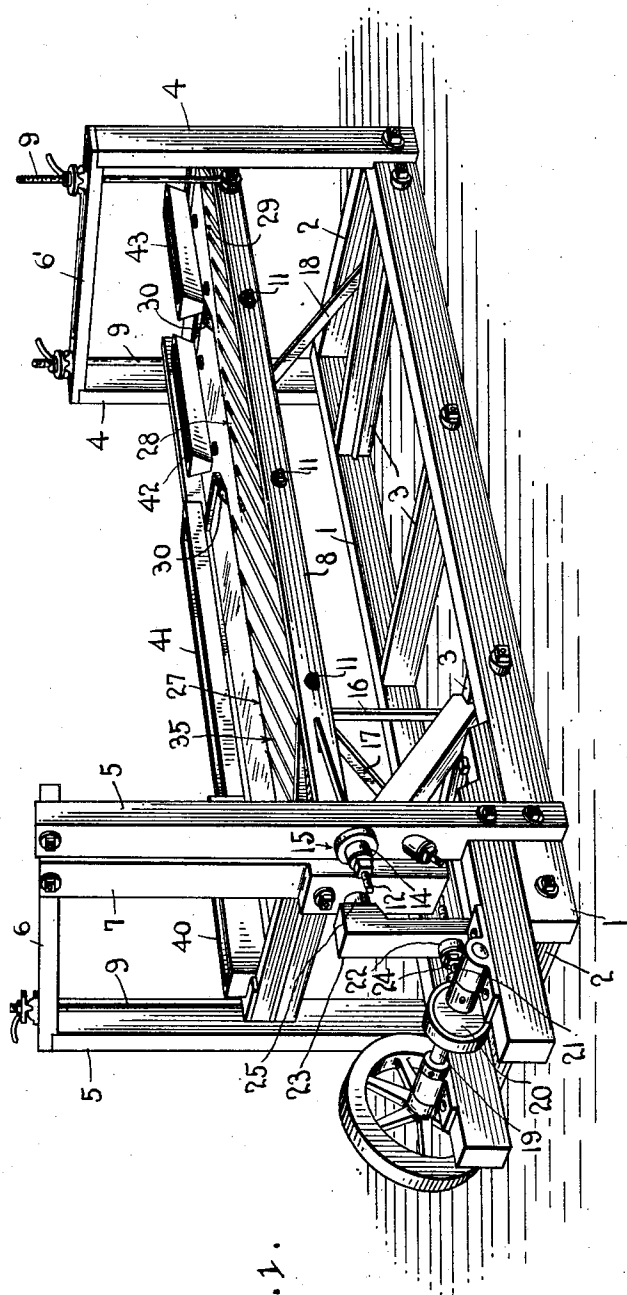


Fig. 1.

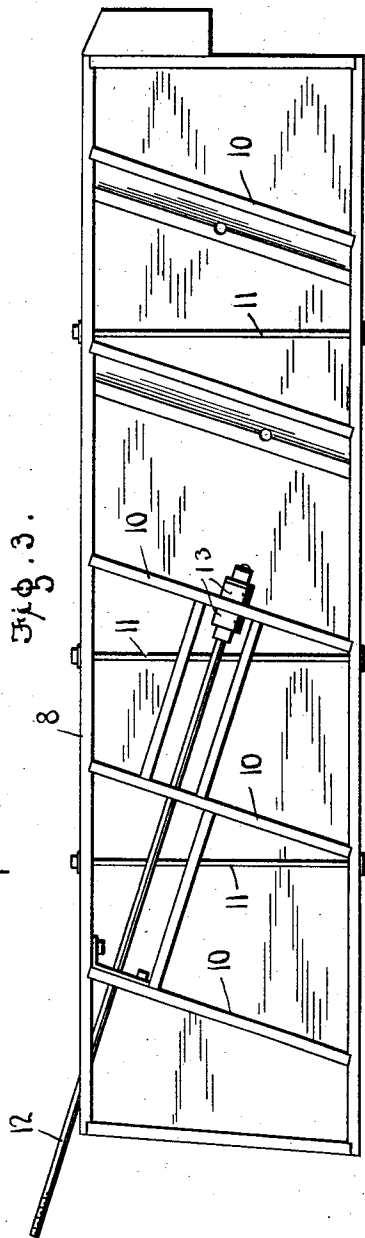


Fig. 3.

Witnesses

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3 SHEETS—SHEET 2.

Fig. 4.

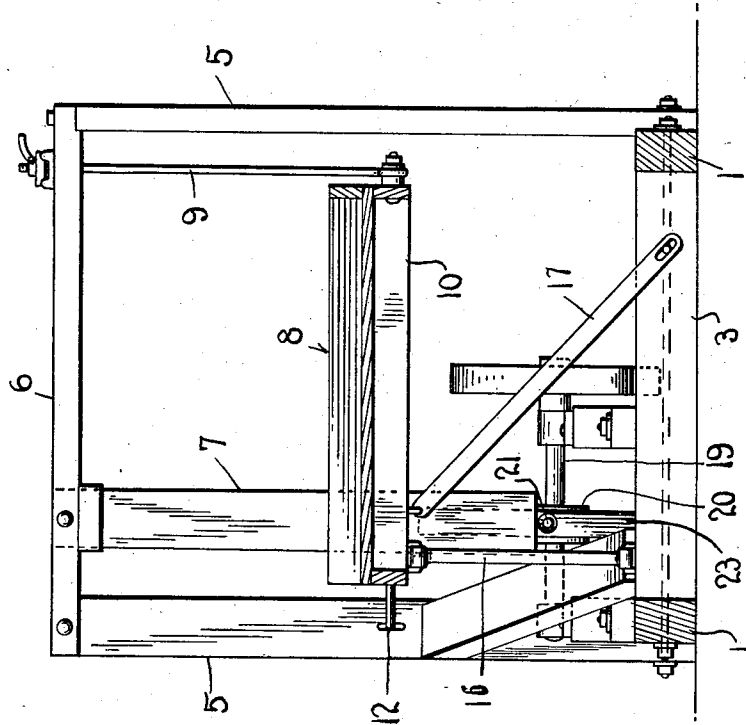
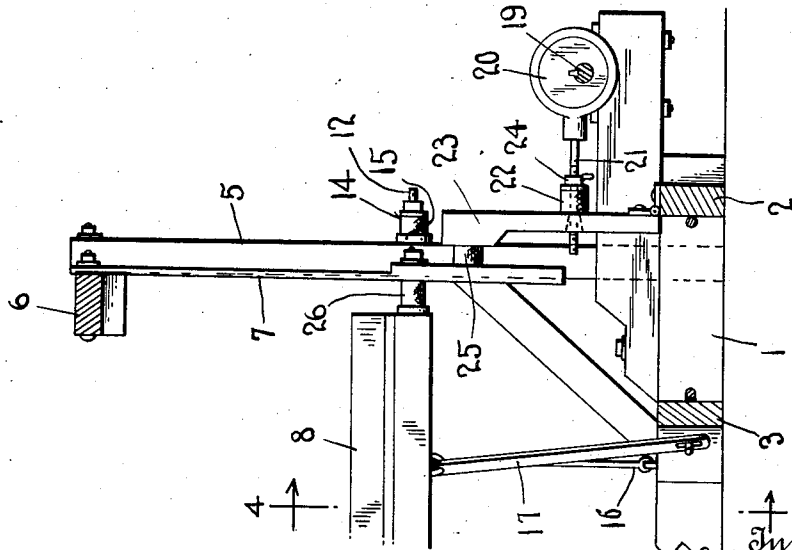


Fig. 2.



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3 SHEETS-SHEET 3.

Fig. 7.

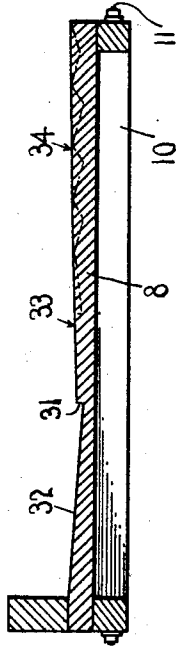


Fig. 6.

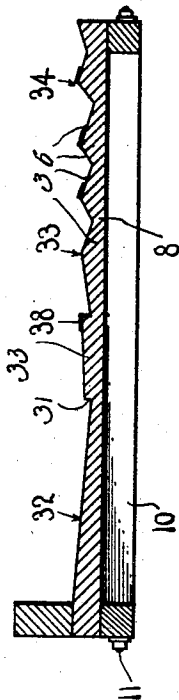


Fig. 9.

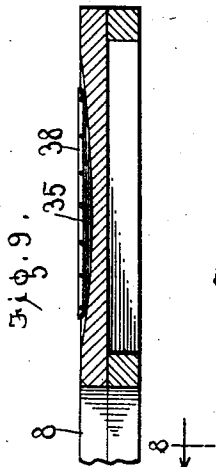


Fig. 8.

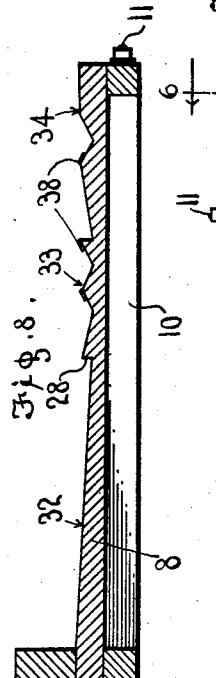
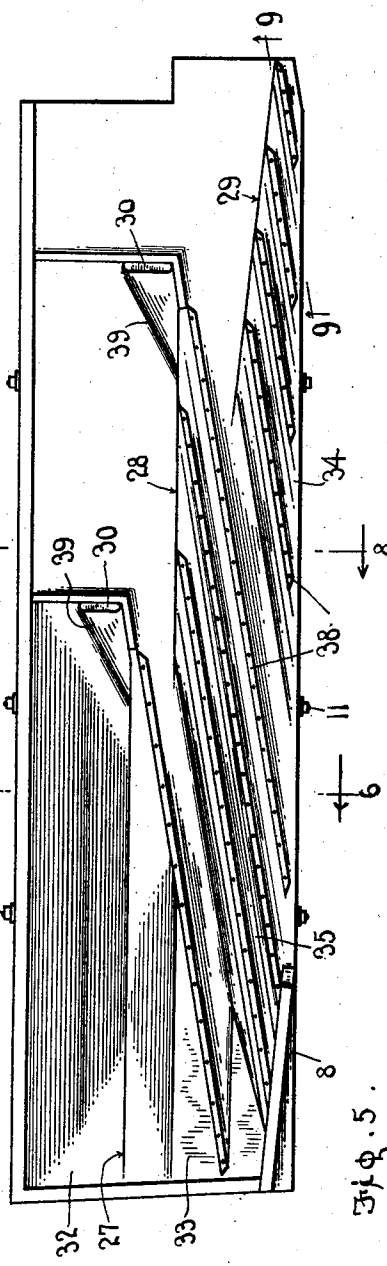


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

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1,033,260.

Specification of Letters Patent.

Patented July 23, 1912.

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To all whom it may concern:

Be it known that I, IRA F. MONELL, a citizen of the United States, residing at Boulder, in the county of Boulder and State of Colorado, have invented certain new and useful Improvements in Concentrators; and I do 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.

This invention relates to improvements in ore concentrating tables.

One object of the invention is to provide a concentrating table which will effect efficient separation of the mineral from the sand and ore pulp and which will cause the sands to drift continuously and rapidly off the side of the table top, while the mineral is held on said top and driven forward longitudinally on the table.

Another object is to provide a table of this character having riffles constructed to prevent the mineral from packing against the walls thereof and to cause the lighter mineral to settle therein.

Another object is to provide means for causing the table top to move diagonally and thereby economize space, a plurality of concentrating tables when so constructed being adapted to be set with or at right angles to the driving shaft.

With these and other objects in view, the invention consists of certain novel features of construction, combination and the arrangement of parts as will be more specifically pointed out and afterward specifically claimed.

In the accompanying drawings: Figure 1 represents a perspective view of an ore concentrating table constructed in accordance with this invention; Fig. 2 represents a longitudinal section of one end thereof; Fig. 3 represents a bottom plan view of the table removed from its supports; Fig. 4 is a transverse section taken on the line 4—4 of Fig. 2; Fig. 5 is a top plan view of the table removed from its supports. Fig. 6 is a transverse section taken on the line 6—6 of Fig. 5; Fig. 7 is a similar view showing the table before the grooves are cut, said grooves being shown in dotted lines; Fig. 8 is a similar view taken on the line 8—8 of Fig. 5; Fig. 9 is a longitudinal section taken on the line 9—9 of Fig. 5.

In the embodiment illustrated, a support-

ing frame is shown comprising side sills 1, end sills 2, cross bars 3, connecting said side sills, and pairs of vertical supports 4 and 5 arranged at opposite ends of the main frame. The supports 5 at the front end of the frame extend above the supports 4 a suitable distance and are connected by a cross bar 6 and the supports 4 by a bar 6' for a purpose to be described. A resilient bar 7 is secured at one end to the cross bar 6 near one of the vertical supports 5 said bar being preferably composed of hickory or other similar wood and is designed for a purpose to be described.

A table 8 is suspended from the cross bars 6 and 6' of the end supports 4 and 5 preferably by means of three rods 9 and the resilient bar 7 above referred to, the rear end of the table being connected at opposite sides to the rods 9 and one side of the front end thereof being connected to the rod 9 which depends from the cross bar 6, the other side of said front end being connected to the lower free end of the bar 7 for a purpose to be described. This table comprises a rectangular frame which is braced below the top thereof by diagonally disposed cross bars 10 and also by metal rods 11 which extend transversely across the lower face of the table through the side bars of the frame thereof. A concussion rod 12 extends obliquely through one side bar of the table frame and through the diagonal braces 10 thereof and is provided with cushioning means as 13 at its inner end, said cushioning means being preferably in the form of rubber bumpers. The outer end of this rod 12 extends through the upright 5 at the front of the table which is located adjacent the spring bar. Rubber bumpers or cushioning devices 14 are arranged on the outer end of this rod and a rubber cushion 15 is secured to the post through which said rod passes and is adapted to be engaged by the bumper 14 when the table is reciprocated. A leg 16 preferably composed of three-inch strap iron is hinged at one end to the main frame preferably on one of the cross bars 3 thereof at right angles to the line of movement of the table the upper end of said leg being connected with the lower face of the table. Braces 17 and 18 connect the opposite ends of the main frame with the opposite ends of the table and are designed to limit the lateral movement of the table.

Means for agitating the table are disposed

at the front end thereof and preferably comprise a drive shaft 19 having an eccentric 20 secured thereto. An eccentric rod 21 is connected with said eccentric 20 and the free end thereof passes through a hinged lever 23 and is provided with a tail nut 24 for adjusting the stroke of said rod a cushion 22 being arranged on said rod 21 between the nut 24 and lever 23. This lever 23 bears at its free end against the bar 7 and has a bumper 25 arranged between them and this lever operates to move the table in one direction when the eccentric 20 moves forward, the table top being held or supported to move in a diagonal line by means of the hinged leg 16, and braces 17 and 18 which latter are preferably provided with a longitudinal slot at the end which is connected with the supporting frame of the table as is shown clearly in Fig. 4. When the lever 23 bears against the free end of bar 7, the table top is moved in a diagonal line. This movement of the table economizes in room or mill space and permits a number of machines to be set in alinement or at right angles to the mill line or drive shaft. The table is moved forward by the lever 23 on the turning of the eccentric 20 until the cushion 14 on the rod 12 engages the cushion 13 on the standard or upright 5 at which point in the operation of the machine a cushion 26 secured to the inner face of the bar 7 and said bar 7 take the rebound and the spring bar 7 returns the table top to normal position ready again for operation by the movement of the eccentric 20 on the shaft 19.

The concentrating surface of the table is provided with a plurality of longitudinally disposed troughs 27, 28 and 29, each of which extends a portion of the length of the table and terminates at its inner end in a mineral pocket 30. These troughs divide the surface of the table into three planes 32, 33 and 34, as shown in Fig. 7, and each plane is shown in transverse section in said figure, with a shoulder 31 at the inner edge of the plane 32 between it and the second or intermediate plane 33 to permit the settling or bedding of the mineral, the plane 32 being inclined downwardly and outwardly transversely of the table, the intermediate plane 33 inclined upwardly and outwardly and the plane 34 downwardly and outwardly inclined with respect to the plane 33. When the concentrator is in operation, the table top is inclined sidewise which causes the plane 32 to be inclined sidewise at a greater inclination than normally, which permits the sands to drift rapidly downward on to the plane 33, which when the table is tilted lies in a substantial horizontal plane and the outer plane 34 is inclined downwardly and outwardly to provide for the continual and rapid drifting of the

sands off of the table top while the mineral is held on the level plane 33 and against the plane 34 by the diagonal motion of the table and is guided into the mineral pockets 30. The lighter mineral which escapes the first pocket is carried on to the second and the quartz or middlings to the third.

A plurality of diagonally disposed grooves 35 are formed on the intermediate planes of the various troughs see Fig. 5 and the bottom of these grooves will always connect with a trough which provides a greater space for the mineral to settle in. These grooves, as shown in Fig. 6 have inclined surfaces or walls 36 as shown. This structure of these grooves prevents the mineral from packing against the walls of the groove and assists in settling the lighter minerals. These grooves are preferably provided on their edges with a lead strip 38 to protect them against wear. These strips while preferably constructed of lead may be of iron, copper, or any suitable material, and of any suitable or desired thickness, being preferably one-sixteenth or one-thirty-second of an inch.

In front of each of the pockets 30 is a grooved triangular portion 39 which begins at the point of the first grooved pocket and widens out to the width of the pocket in substantially triangular form. This grooved portion inclines downward to the pocket and causes the mineral to pass easily and quickly into the pocket.

A feed box 40 is disposed near the front end of the table at one side thereof and a fresh water pan 41 is arranged adjacent said feed box at the same side of the table for supplying water to dress the second section of the table. Another water pan 42 is disposed midway the width of the table in position to dress the third section of the table, and a similar pan 43 is arranged near the rear end of the table to furnish water for dressing that end thereof.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention as claimed.

I claim as my invention:

1. An ore concentrating table having a three-plane top the first plane inclining from one side edge of the table downwardly with a shoulder formed at its lower end, the second plane inclining upwardly from the lower end of said first plane, and the third plane extending from the outer edge of the second or intermediate plane and inclining downward to the other side edge of the table

with a series of troughs extending longitudinally thereof, a mineral pocket at the end of each trough, and means for directing the ore into each pocket.

5 2. An ore concentrating table having a three-plane top with a series of troughs extending longitudinally thereof, a mineral pocket at the end of each trough, and an inclined triangular portion in front of each
10 pocket.

3. An ore concentrating table having a series of troughs extending longitudinally thereof, a mineral pocket at the end of each trough, and a triangular portion in front of
15 each pocket inclined toward the pocket.

4. An ore concentrating table having a three-plane top with a series of troughs extending longitudinally thereof and grooves running diagonally into said troughs, said
20 grooves being deepest at their center portions and gradually decreasing in depth toward their ends.

5. An ore concentrating table having a series of troughs extending longitudinally thereof, and grooves running diagonally into said troughs, said grooves having one
25 vertical side wall, one side wall inclined upwardly and outwardly, and with the bottom inclined transversely.

30 6. In an ore concentrator, a supporting

structure, a table suspended to swing therein, means for reciprocating said table, means for controlling the extent of movement of said table comprising a rod, extending diagonally
35 through one side of said table and secured to the table and extending through said supporting structure, cushioning means on the outer end of said rod and on the outer face of said structure through which said rod
40 passes.

7. An ore concentrating table having a three-plane top, the first plane inclining from one side edge of the table downwardly and having a shoulder formed at its lower end, the second plane inclining upwardly
45 and outwardly from said shoulder, and the third plane extending from the outer edge of the second or intermediate plane and inclining downwardly to the edge of the table, means for differentially reciprocating the
50 table in a direction transverse to the inclinations specified, and means for feeding pulp to the table at the first mentioned edge.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.
55

IRA FERRIS MONELL.

Witnesses:

JOHN R. WOOD,

WILLIAM H. EDWARDS.