

T. WILLMA.
SEPARATOR.

APPLICATION FILED NOV. 13, 1911.

1,035,930.

Patented Aug. 20, 1912.

2 SHEETS—SHEET 1.

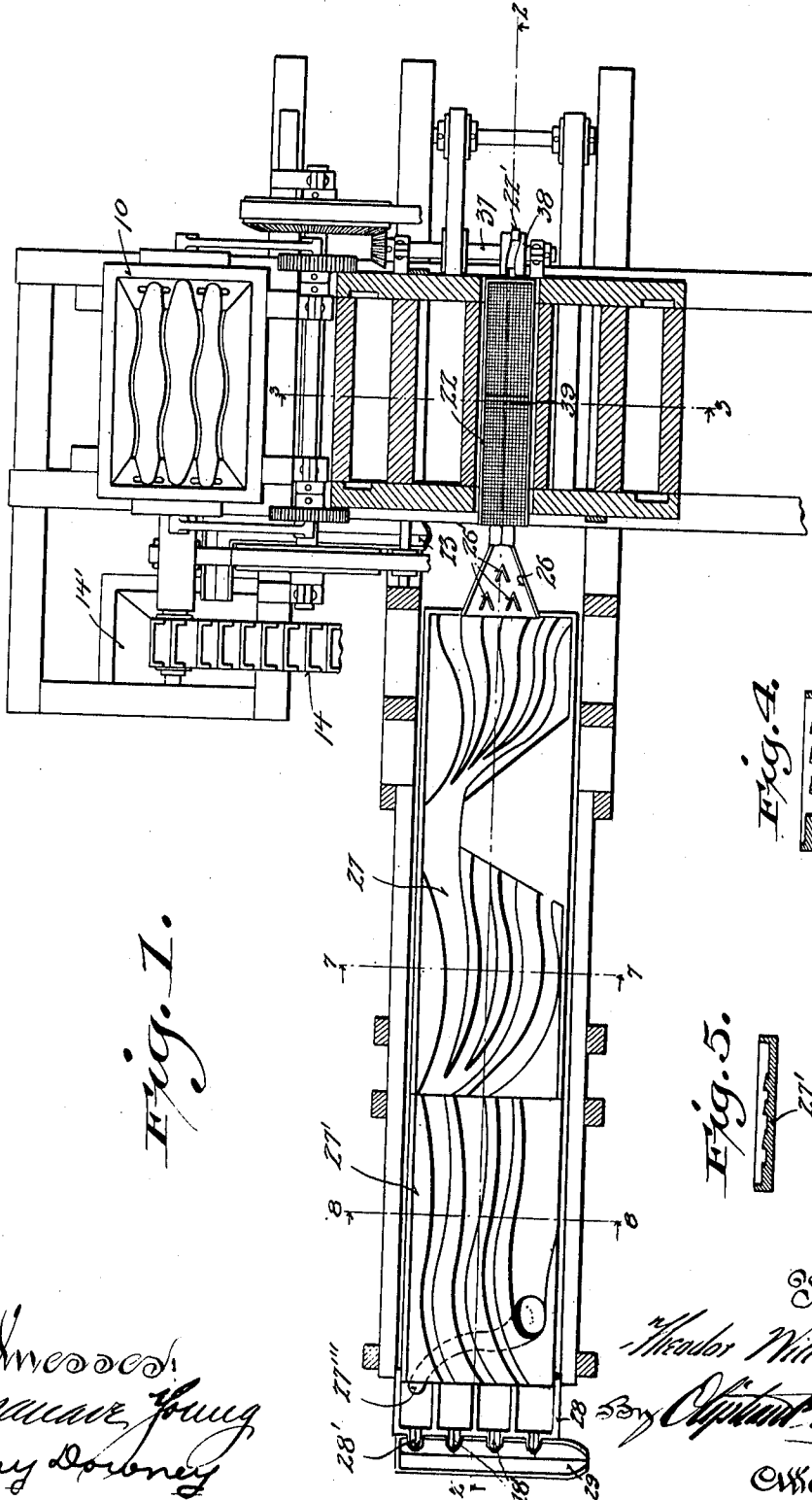


Fig. 1.

Fig. 4.

Fig. 5.

*Witnessed:
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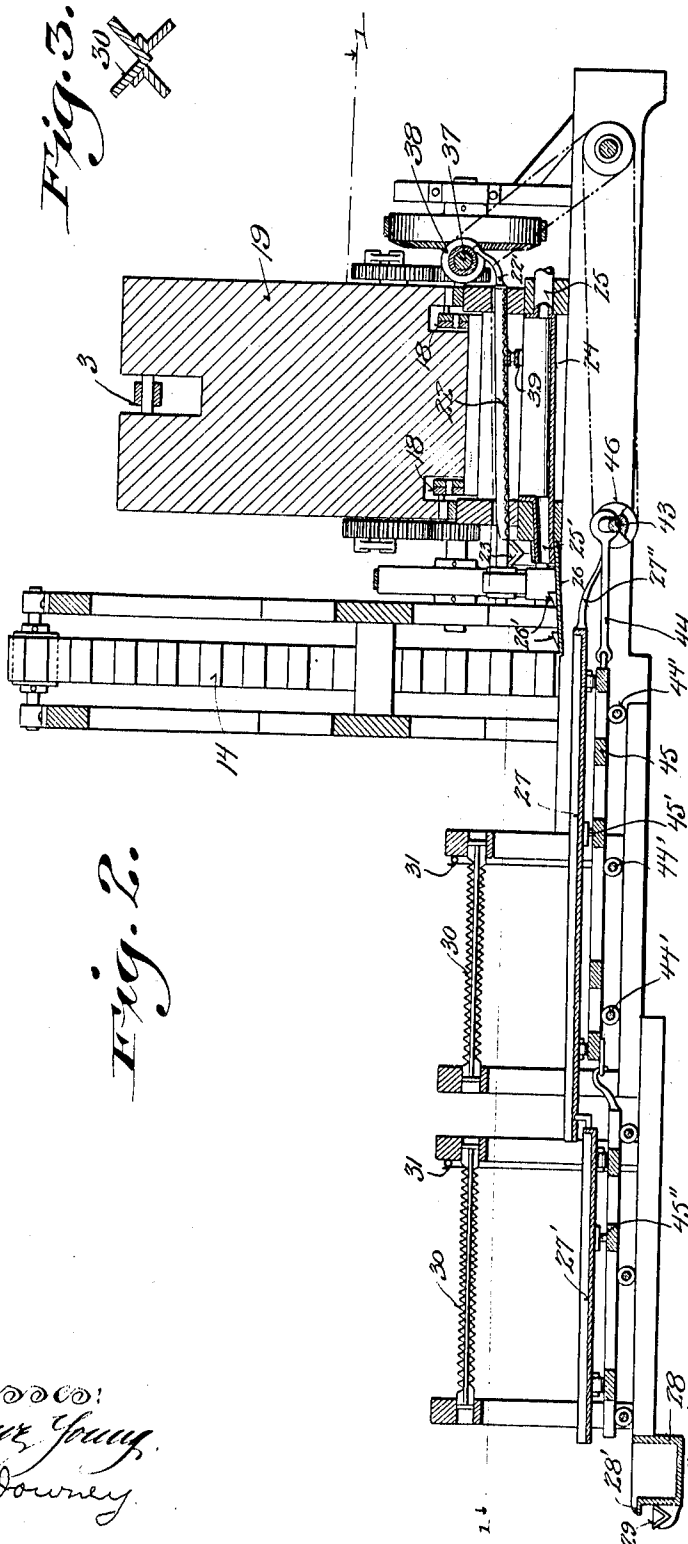
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UNITED STATES PATENT OFFICE.

THEODOR WILLMA, OF MILWAUKEE, WISCONSIN.

SEPARATOR.

1,035,930.

Specification of Letters Patent. Patented Aug. 20, 1912.

Application filed November 13, 1911. Serial No. 659,943.

To all whom it may concern:

Be it known that I, THEODOR WILLMA, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Separators; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention consists in what is herein particularly set forth with reference to the accompanying drawings and pointed out in the claims of this specification, its object being to provide simple, economical and efficient means for hydraulic separation of minerals from other materials crushed therewith, this application being for the most part a division of one filed by me Feb. 16, 1911, Serial No. 608,952, since patented November 14, 1911, No. 1,009,004.

Figure 1 of the drawings represents a plan view partly in section of a separator machine comprising means in accordance with my invention for the hydraulic separation of minerals from other material crushed therewith; Fig. 2, a sectional view of the machine on the plane indicated by line 2—2 in Fig. 1; Fig. 3, a cross-section of a spray-trough in the machine, and Figs. 4 and 5, similar views of shaking tables of the machine respectively indicated by lines 4—4 and 5—5 in Fig. 1.

The framework of the herein described machine is of any suitable material and construction, and as specified in my previous patent it preferably embodies, a primary crusher, from which to feed crushed material to an elevator 14 from which it is discharged to tilt-sections 18 of the bed-box of a secondary crusher that also comprises a rocker-block 19. Means for regulating the feed and for operating the rocker-block, as well as for alternate dumping of the tilt-sections of said bed-box of the secondary crusher, are clearly shown and described in said previous patent. Material discharged from each tilt-section of the aforesaid bed-box falls upon a vibratory screen 22, and the tailings from this screen have gravity descent in a conductor 23 from which they may be fed back to the secondary crusher. Like in said previous patent, the screen is provided with an arm 22' that engages a cam-wheel 38 on a driven shaft 37, and said screen has pivotal connection with a support 39 with which the frame of the

machine is provided. The fine material that finds its way through the screen 22 falls into a receptacle 24 and is mingled with water admitted to said receptacle through a feed-pipe 25 to form a semi-liquid substance or mud that escapes through a nozzle 25' of the aforesaid receptacle onto an inclined distributor plate 26, that in turn discharges onto the first of a series of pivotally coupled shaking-tables 27, 27' on different planes and arranged to feed one to another, these tables being preferably spirally grooved to trap mineral from which other material has been washed away, said grooving being hereinafter more particularly specified. The aforesaid distributor plate is triangular in plan and provided with suitably arranged projections 26' by which to scatter the flowing material from the aforesaid nozzle. The outermost shaking-table 27' discharges into compartments of a preferably partitioned settling-box 28 having overflow-spouts 28' that empty into a lead-off trough 29, mineral particles being trapped in said settling-box from which the lighter material is washed away by water fed to said tables from spray-troughs 30 suspended over the same centrally thereof, the water being supplied to said troughs through pipes 31. Each of the spray-troughs herein shown has divergent and serrated sides and flanges, and the serrations of the flanges break joints with those of the sides. The general construction of the spray-troughs has particular reference to a fine distribution of the water to have the same fall in the grooves of the shaking-tables herein specified, said spray-trough having been especially designed for that purpose.

A driven crank-shaft 43 of the machine is connected by a link 44 with a grid 45 supported on rollers 44', reciprocative motion being imparted to said grid, and said crank-shaft is provided with a cam-wheel 46 engaged by an arm 27'' of the table 27 that is in pivotal connection with said grid at 45', and is supported by rollers 45'' thereon. Hence it will be observed that the table has compound reciprocating and vibratory motion. The other table 27' is also shown roller-supported on a grid to which it is pivotally connected at 45'', this grid being roller-supported similar to the one first aforesaid. The two grids as well as the two tables being coupled, as herein shown, they have the same reciprocative and vibratory

motion. The grids and tables may be indefinitely continued in the same manner as herein specified.

The grooving of the shaking-table 27 is preferably such as is shown in Fig. 1, there being a convergence of one series of grooves thereof to a single groove of another series, and from this groove of the second series, the material under treatment is flooded laterally to the other grooves in the same series, the ridges between grooves in said second series being beveled as shown in Fig. 4. The grooving of the shaking-table 27' is preferably that shown in Fig. 1, and for a portion of the length of this table, back of the settling-box 28, the ridges between grooves are beveled, as shown in Fig. 5, to permit lateral flooding of material under treatment from one to another of said grooves, the tailings finding their way from one of the aforesaid grooves through a spout 27''' to a compartment of said settling-box, as shown in said Fig. 1.

I claim:—

1. In a separator, the combination of a primary spirally grooved shaking-table, there being a first series of spiral grooves in said table converging to a single groove in a second series of similar grooves and a beveling of ridges between the grooves of the second series to provide for lateral flooding of the material under treatment from groove to groove; and means for spraying water on the table.

2. In a separator, a water-spraying trough having divergent serrated sides and flanges, the serrations of the flanges breaking joints with those of the sides.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee in the county of Milwaukee and State of Wisconsin in the presence of two witnesses.

THEODOR WILLMA.

Witnesses:

J. H. SANNENBURG,
JULIUS WILCOX.