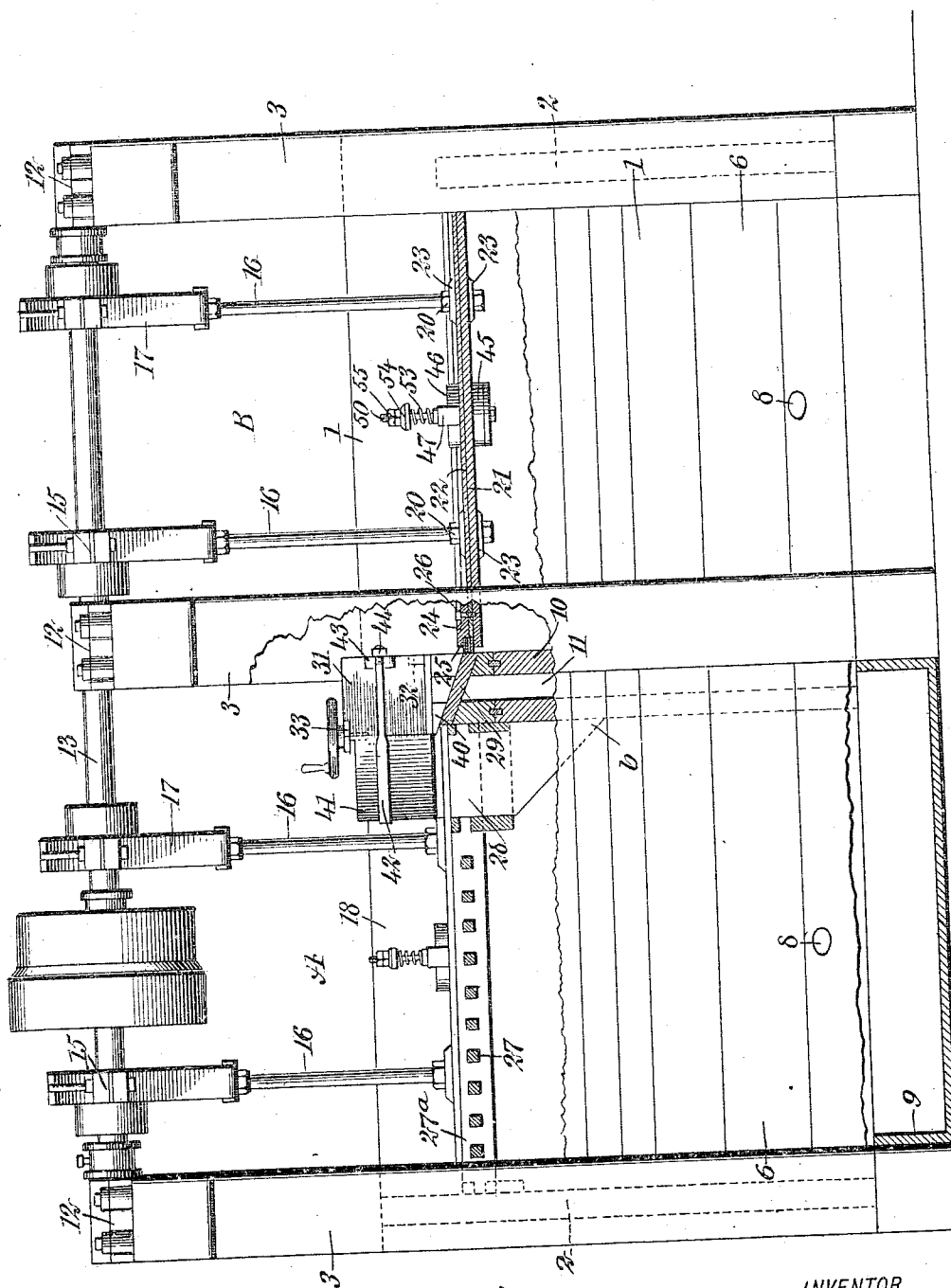


JIG.

Patented May 10, 1910.

4 SHEETS—SHEET 1.

957,648.



WITNESSES

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Fig. 1.

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JIG.

APPLICATION FILED OCT. 23, 1907.

Patented May 10, 1910.

4 SHEETS—SHEET 2.

957,648.

Fig. 5.

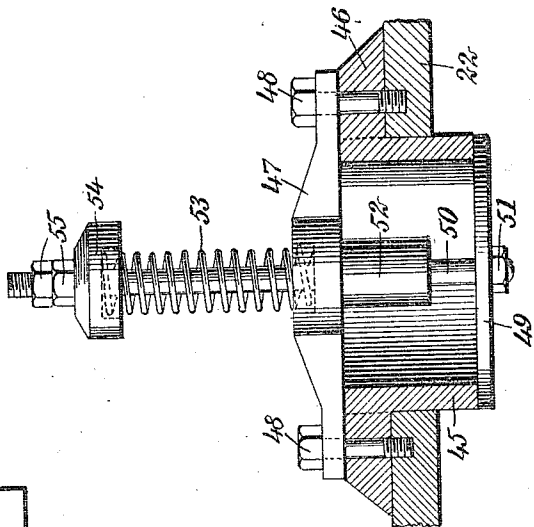
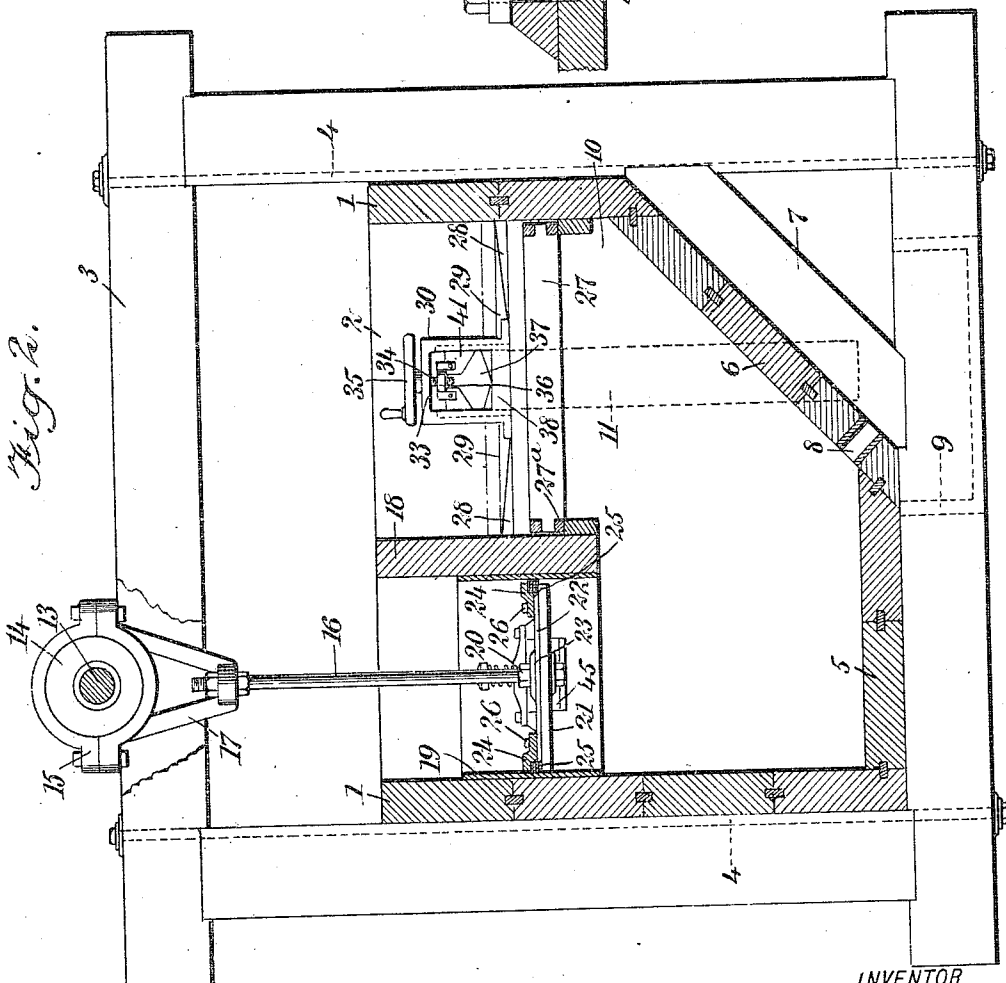


Fig. 2.



WITNESSES

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APPLICATION FILED OCT. 23, 1907.

Patented May 10, 1910.

4 SHEETS—SHEET 3.

957,648.

Fig. 4.

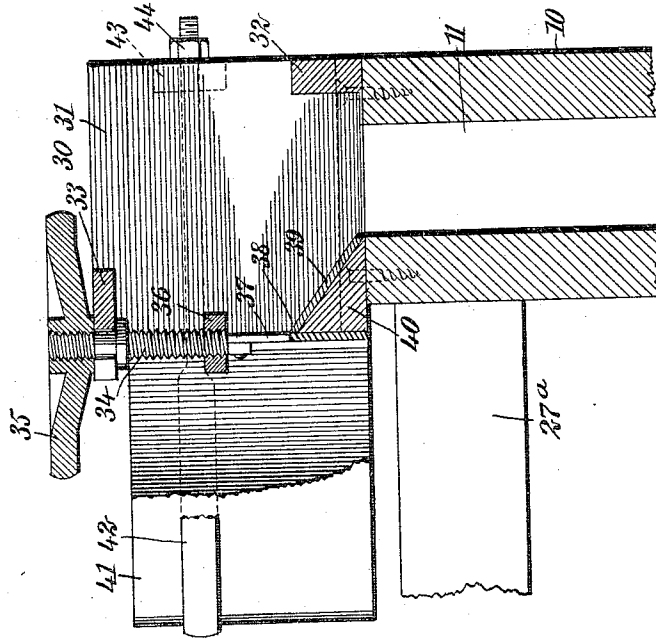
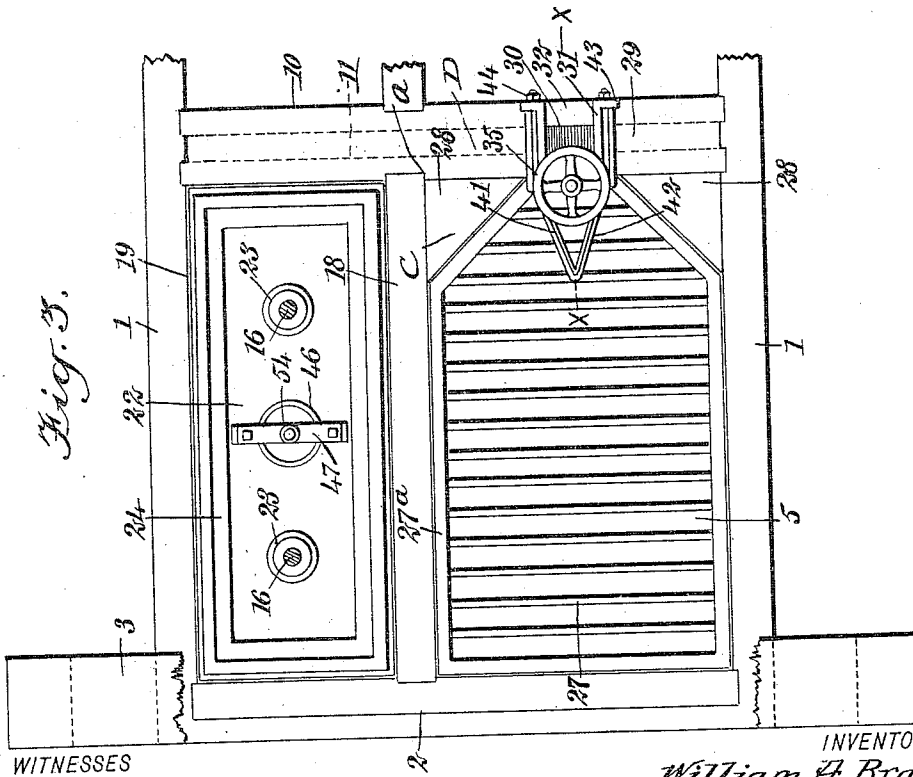


Fig. 3.



WITNESSES

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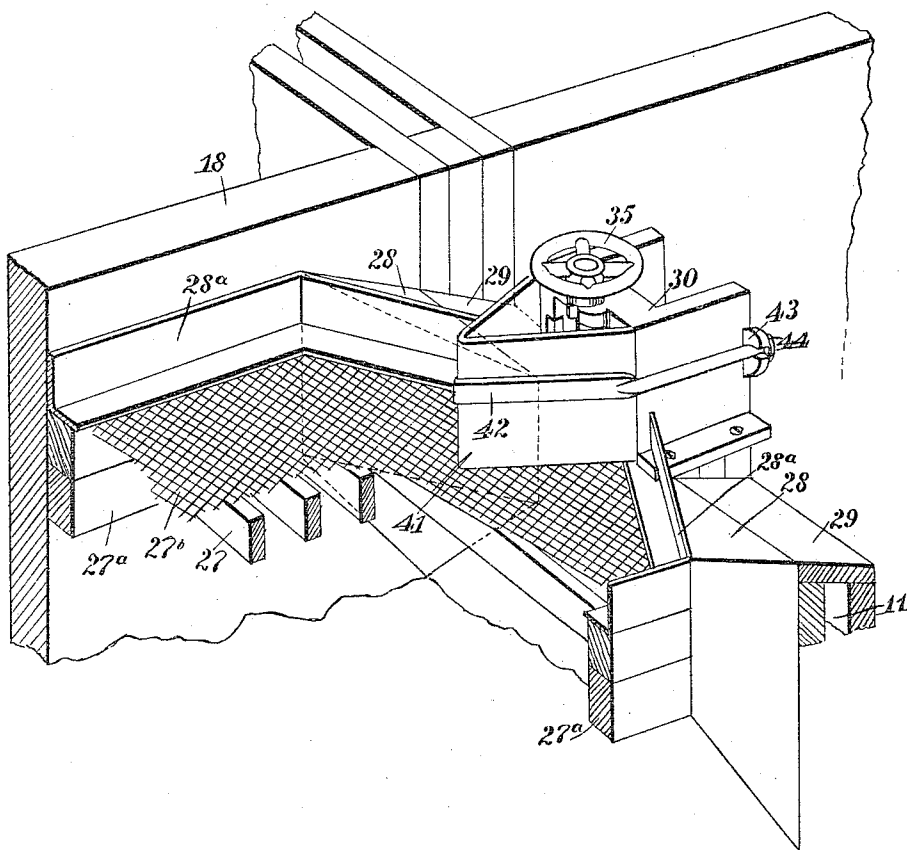
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957,648.

Patented May 10, 1910.

4 SHEETS—SHEET 4.

Fig. 6.



WITNESSES

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UNITED STATES PATENT OFFICE.

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JIG.

957,648.

Specification of Letters Patent.

Patented May 10, 1910.

Application filed October 23, 1907. Serial No. 398,723.

To all whom it may concern:

Be it known that I, WILLIAM A. BRADLEY, a citizen of the United States, and a resident of Spokane, in the county of Spokane and State of Washington, have invented a new and Improved Jig, of which the following is a full, clear, and exact description.

This invention relates to jigs for concentrating crushed ores and the like.

An object of the invention is to provide a simple and efficient device of the class described, for rapidly and thoroughly separating the values from crushed ores, by means of which the gangue or tailings can be reconcentrated, and which provides efficient means for forcing water or other liquid rapidly back and forth through a screen, to assist in the separation of the material.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is an elevation of my jig parts being broken away and parts in cross-section; Fig. 2 is a transverse section through one compartment of the jig showing a part removed; Fig. 3 is a plan view of one compartment; Fig. 4 is an enlarged partial section of the discharge cup showing parts broken away; Fig. 5 is an enlarged transverse section showing a plunger valve; and Fig. 6 is an enlarged perspective view showing the discharge end of one screen compartment.

Before proceeding to a more detailed explanation of my invention, it should be understood that I prefer to combine two units in each jig, the units being substantially similar in construction and operation. The arrangement is such that the tailings from one unit pass to the next unit, where they are reconcentrated, and where further values are separated therefrom. Each unit comprises a screen compartment having a plunger chamber in which a reciprocable plunger is arranged. The latter is driven from a shaft and forces the water or other liquid in the screen compartment, rapidly

back and forth through the screen, thereby separating the values from the tailings in the bed of the material upon the screen.

Among the important features of my invention is the construction of the outlet end of the screen compartment, together with the discharge cup. The overflow end of the screen compartment has a constricted outlet with a center discharge, and the arrangement is such that the valuable particles having a high specific gravity, settle to the surface of the screen below a line diagonal to the flow of water and then enter a discharge cup in the center of the compartment, more rapidly and easily than if the direction of movement of the particles were at right angles to the line of flow of the water.

Referring more particularly to the drawings, A and B represent two units of a jig of my invention. The compartments have common side walls 1 and end walls 2. Frames 3, preferably secured together by means of bolt rods 4, hold the walls of the compartments in position. The bottom of the compartment rests upon the lower frame members and at one side is upwardly disposed, leaving a space between the bottom and the frame. The upwardly disposed or inclined portion 6 of the bottom is supported by diagonal beams 7 of the frames. The portion 6 of the floor has an opening or discharge port 8 for each compartment, and under these are arranged discharge boxes 9 which receive the values. The jig is divided into two units or compartments by a double partition 10, between the walls of which is formed a space 11 permitting the flow of the values therethrough into the discharge box, as will appear more clearly hereinafter.

The frames 3 extend upwardly above the compartments and have suitable bearings 12 in which is revolubly mounted a driving shaft 13. The latter carries a number of rigid eccentric sheaves 14, carrying by means of suitable eccentric straps 15, eccentric rods 16; the latter have threaded ends secured in suitably threaded heads supported by the arms 17 of the eccentric straps. Each of the compartments A and B has a longitudinal partition 18, extending partly to the bottom of the compartment and forming a plunger chamber. Each of the latter has a suitable lining 19, of sheet metal or the like and has arranged therein a reciprocable plunger. The lower ends of the eccentric

rods are secured in openings of the plunger by means of retaining nuts 20. When the shaft is driven, the eccentric rods are raised and lowered and consequently reciprocate the plungers. As the compartments are filled with water, the plungers agitate the water, driving it back and forth through the screen, as will appear more clearly hereinafter.

Each of the plungers preferably comprises a plunger plate 21, having arranged thereupon a second plate 22. At the opposite sides, these plates have similarly located bosses 23, through which pass in suitable openings the lower ends of the eccentric rods, and against which the retaining nuts 20 abut. The plunger plate 21 is somewhat smaller than the inside of the plunger chamber and the plate 22 is somewhat smaller than the plate 21. A frame 24 having an offset shoulder 25, is arranged upon the plunger plate 22. A peripheral space is thus formed between the plate 21 and the shoulder 25, and in this space is arranged suitably formed packing, consisting of strips of rubber or the like. The frame 24 is secured to the plates by means of screws or bolts 26 and firmly jams the packing in position. The latter fits closely against the inner wall of the plunger chamber and renders the operation of the plunger most efficient.

Each compartment has a screen frame 27 upon which rests a screen 27^b of any preferred or common form, and fashioned, for example, from wire netting. The frame 27 is located between the partition 18 and the opposite wall, and is mounted upon suitable cleats or supports 27^a. In the form of the jig illustrated in the accompanying drawings each screen frame comprises preferably, numbers of parallel transverse bars set in the frame proper. The end of the frame adjacent to the double partition 10 is the outlet end, and at this end in each corner of the compartment, is arranged a block 28, the frame having the corresponding corners diagonally formed to permit the positioning of the block, as is shown most clearly in Fig. 3. Each of the blocks 28 has the lower end tapered to a point at the edge which rests in the corner of the compartment. The upper surface or face of each block is inclined with respect to the horizontal in two directions, that is, from the side of the compartment toward the center, and at the same time toward the outlet end, as is shown most clearly in Figs. 1, 2 and 6. The blocks are triangular in cross section, and with the adjacent parts of the liner constitute diagonal overflow guides.

Between the blocks 28 on the double partition 10, is securely mounted a discharge cup 30, fashioned preferably from a material such as cast-iron. The discharge cup 30 has side walls 31, joined by trans-

verse bars 32 and 33. In the latter is arranged a threaded shank 34, having a hand-wheel 35, by means of which it can be manipulated, and extending through a correspondingly threaded opening of a gate-head 36, carrying a controlling gate 37. The latter, when in a depressed position seats against a sill 38, from which an inclined plate 39, leads to the opening 11 of the partition 10. The plate 39 is supported on a suitably formed block 40, mounted upon the adjacent wall of the partition. The ends of the discharge cup are open, and the end adjacent to the screen 27 has a V-shaped extension 41, open at top and bottom, mounted thereupon by means of a strap 42, the ends of which are threaded and arranged in slotted lugs 43, at the sides of the cup. Nuts 44, mounted upon the threaded ends of the strap, serve to bind the latter in position to hold the extension in place. At each side of the discharge cup the double partition is cut away, and has an inclined floor or plate 29, mounted thereupon for directing the overflow from the compartment A to the compartment B. The tops of the blocks 28 are inclined toward each other and with respect to the overflow liner 28^a, which is substantially straight.

The overflow liner rests upon the screen and extends nearly around the compartment. It consists preferably of a metal frame of angular cross section the lower flange of which is substantially horizontal, while the upper flange is substantially vertical. Owing to the provision of the blocks 28 and to the shape of the screen frame, the liner is diagonally disposed from the sides toward the discharge cup, and serves to direct the material toward the same, the particles of heavier specific gravity tending to settle downward and being thus guided into the discharge. In this way it is possible to draw off the concentrates from the screen at the center instead of at one side, as is usually the case.

I prefer to provide each of the plungers with an opening therethrough in which is arranged a sleeve 45, having a laterally extended flange 46, which seats against the upper face of the plunger plate 22. A yoke 47, is arranged across the sleeve with the ends resting upon the flange, and is secured in position by means of screws 48, arranged in suitable openings of the yoke, the flanges and the top plate. The screws at the same time serve to hold the sleeve firmly in position, as is shown most clearly in Fig. 5. A valve disk 49, is arranged to seat against the lower edge of the sleeve and has a valve stem 50, extending through a suitable opening in the yoke and secured to the disk by means of a nut 51. The stem 50 has an enlarged portion 52, abutting against the lower side of the yoke. A helical spring 53, is arranged

upon the valve stem and seats against the top of the yoke in a suitable recess, and an adjustable head 54, mounted upon the stem is held in position by nuts 55. It will be understood that the ends of the stem are suitably threaded to receive the nuts 51 and 55. By means of this spring valve in the plunger it is possible to regulate the back suction on the screen bed by suitably adjusting the tension of the valve springs 53.

The operation of the jig is as follows: The material for treatment passes on to the screen at the end remote from the discharge cup. The values or heavier materials pass over the screen but naturally settle, and if sufficiently small pass through the interstices of the screen and are discharged through the port 8, and pass into the discharge box. The particles that are not of such size that they can pass through the screen, gradually advance to the lower or overflow end of the compartment as the water is forced through the screen. The larger and heavier particles of the values rise within the cup extension 41 and overflow into the cup itself. The gate serves to regulate the flow of the particles into the cup. From the latter, the values pass into the partition or conduit 11 and thence to the discharge box underneath the compartment. The portion of the bed of material in the compartment which is either valueless or has a value of lesser specific gravity, is rejected and passes over the diagonal overflow edge of the liner to the second screen compartment where a reconcentration takes place. Naturally, the product from the second compartment through the corresponding screen and cup will be of an inferior grade, while that which is rejected and which passes over the overflow end of the second compartment constitutes the last tailings.

It will be understood that if so desired, any number of the units can be combined to form a single apparatus. In this case, each of the units is complete and comprises a screen compartment having a plunger chamber and a plunger and an outlet and discharge cup, as in the unit illustrated in the accompanying drawings. The outlet of the last compartment is provided with a spout or other means for carrying the material off. Between adjacent compartments is provided a double partition permitting the flow of the values into the discharge box.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. In a device of the class described, a screen compartment having a diagonally constricted overflow end, a screen in said compartment, a discharge cup in said constricted end of said compartment and centrally disposed, and an overflow liner diagonally disposed at each side of said cup,

said cup being adapted to receive material at a lower level than the overflow level of said liner.

2. In a device of the class described, a screen compartment having substantially triangular blocks arranged at the opposite corners of the overflow end of said compartment, whereby the overflow end is constricted, a screen within said compartment, an overflow liner arranged upon said screen and having parts parallel to the inner faces of said blocks, and a discharge cup positioned between said blocks, said overflow liner having ends terminating at said cup.

3. In a device of the class described, a screen compartment, substantially triangular blocks arranged in opposite corners of said compartment, said compartment having a discharge outlet between said blocks, and an overflow liner having parts parallel to the inner faces of said blocks, and having the overflow edge substantially horizontal, said blocks having the top faces inclined with respect to the horizontal.

4. In a device of the class described, a screen compartment, blocks arranged in opposite corners of the discharge end of said compartment and of substantially triangular cross section, said blocks having the lower ends tapered toward said corners wherein said blocks are located, said blocks further having the top faces inclined from the sides of said compartment toward the center thereof and toward the overflow end of said compartment, a screen within said compartment, a discharge cup between said blocks, and an overflow liner having parts adjacent to the inner faces of said blocks and terminating at said cup, said overflow liner having the overflow edge substantially horizontal.

5. A device of the class described, comprising a screen compartment having a screen, means for forcing water through said screen alternately in opposite directions, diagonal guides near one end of said screen and forming a tapered discharge, a discharge cup arranged at said discharge and having a part extending over said screen, said extending part of said cup being tapered oppositely to said tapered discharge, and being open at the bottom, means for regulating the passage of material through said cup, a discharge box below said screen, means for discharging values into said box, and a conduit from said cup to said box, said guides permitting the overflow of material above said screen at each side of said cup at a level substantially above the lower edge of said extending part of said cup.

6. A device of the class described, comprising a screen compartment having a screen and a plunger casing, a plunger movable within said casing, said screen having diagonal members near one end and forming

a tapered discharge, a discharge cup arranged at said discharge and having a part extending over said screen, said extending part of said cup being tapered oppositely to said tapered discharge and being open at the bottom, means for regulating the passage of material through said cup, said members being arranged to permit the overflow of tailings at each side of said cup, a discharge box below said screen, means for discharging values from below said screen into said box, a conduit from said cup to said box, and an overflow liner arranged to receive tailings from above said screen, said overflow liner being at a level substantially above the lower edge of said extending part of said cup.

7. In a device of the class described, a screen compartment having a screen, diagonal guides at one end of said screen, and forming a tapered discharge, and a discharge cup intermediate said guides, said discharge cup comprising side walls, a V-shaped extension projecting over said screen, a strap adjustably securing said extension to said side walls, a sill between said side walls adjacent to said extension, and an adjustable gate movable toward and away from said sill.

8. In a device of the class described, a screen compartment having a tapered outlet, a screen in said compartment, a conduit at said outlet, and a discharge cup communicating with said conduit and having a part extending over said screen and tapered oppositely to the taper of said outlet.

9. In a device of the class described, a screen compartment having a screen therein, said compartment having a tapered outlet, a conduit centrally disposed with respect to the outlet end of said compartment, a dis-

charge cup communicating with said conduit and having a part extending over said screen and tapered oppositely to said outlet, and an overflow liner at both sides of said cup and arranged to discharge material at a level above the receiving level of said part of said cup.

10. In a device of the class described, a plurality of screen compartments having adjacent walls spaced to form a discharge conduit therebetween, the first of said compartments having a constricted discharge end, an overflow liner having parts parallel to said constricted discharge end, a discharge cup centrally disposed at said constricted end and communicating with said conduit, and inclined floors at the sides of said discharge cup upon said adjacent walls and extending from said liner to said second screen compartment.

11. In a device of the class described, a screen compartment, substantially diagonal blocks arranged in opposite corners of said compartment, a discharge cup between said blocks, an overflow liner having parts parallel to the inner faces of said blocks, a second screen compartment, and floors extending from said blocks to said second compartment, each of said blocks having the top face thereof in the plane of one of said floors, said floors being inclined, said compartments having the adjacent walls forming a conduit to receive material from said cups.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM A. BRADLEY.

Witnesses:

ADOLPH ROSSI,
S. L. GALBRAITH.