No. 669,038.

Patented Feb. 26, 1901.

S. W. TRAYLOR.

CONCENTRATOR.

(No Model.)

(Application filed June 2, 1900.)

3 Sheets—Sheet 1.

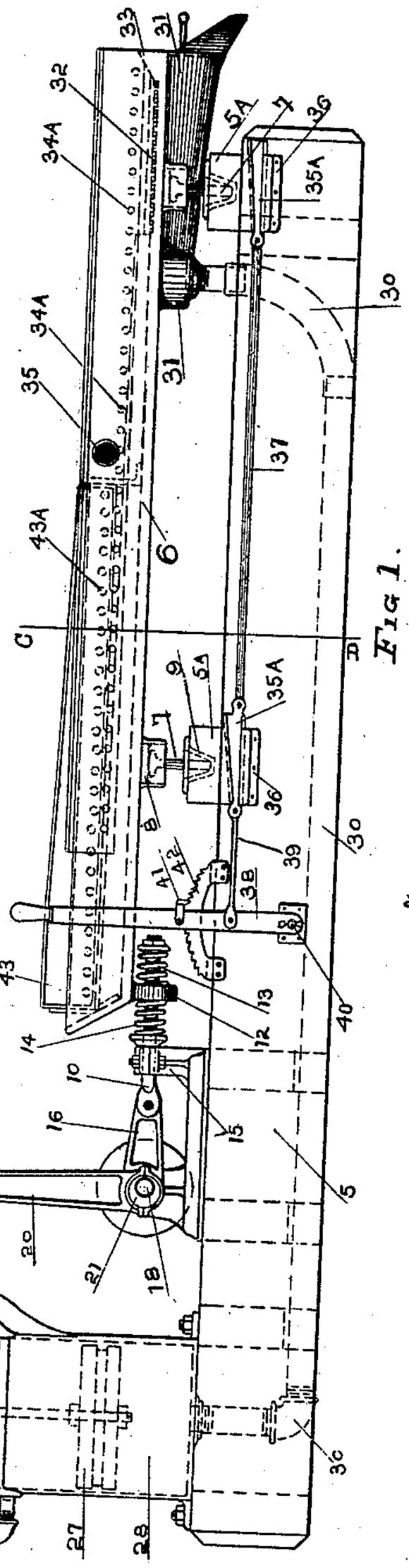

FIG 1.

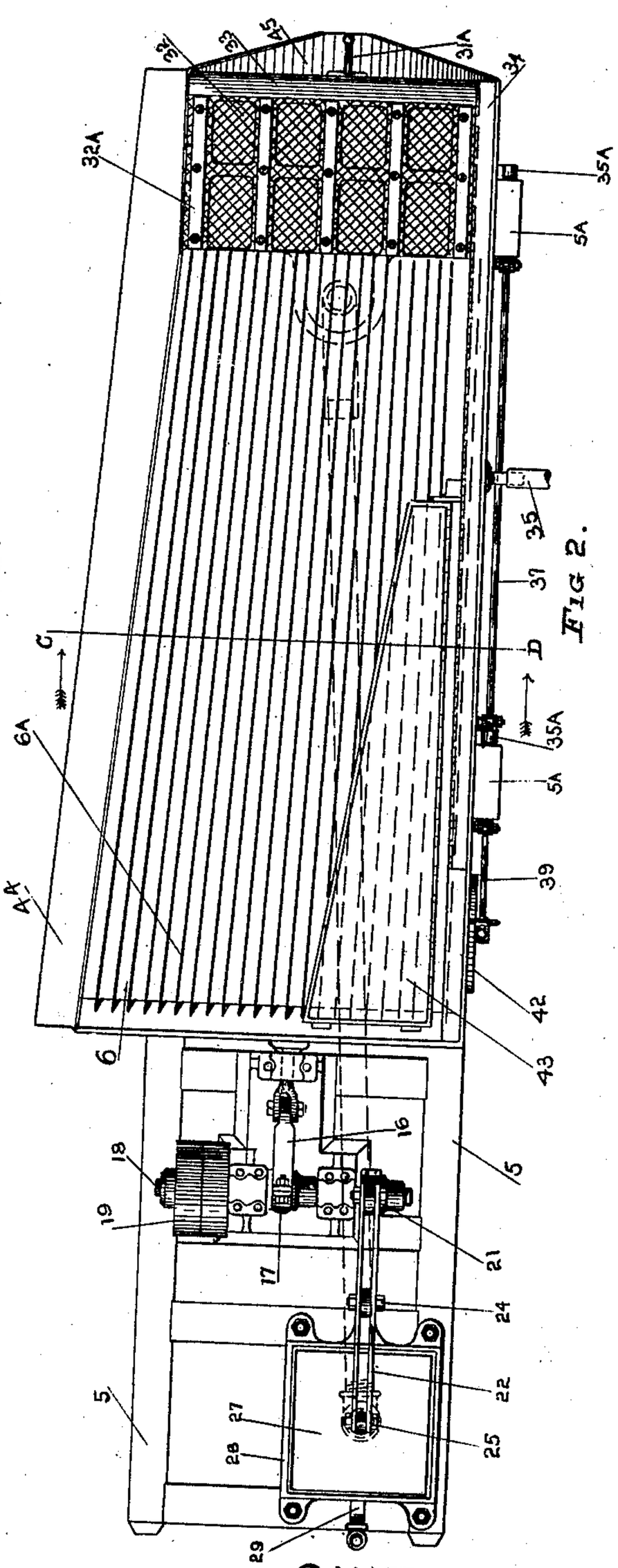

FIG 2.

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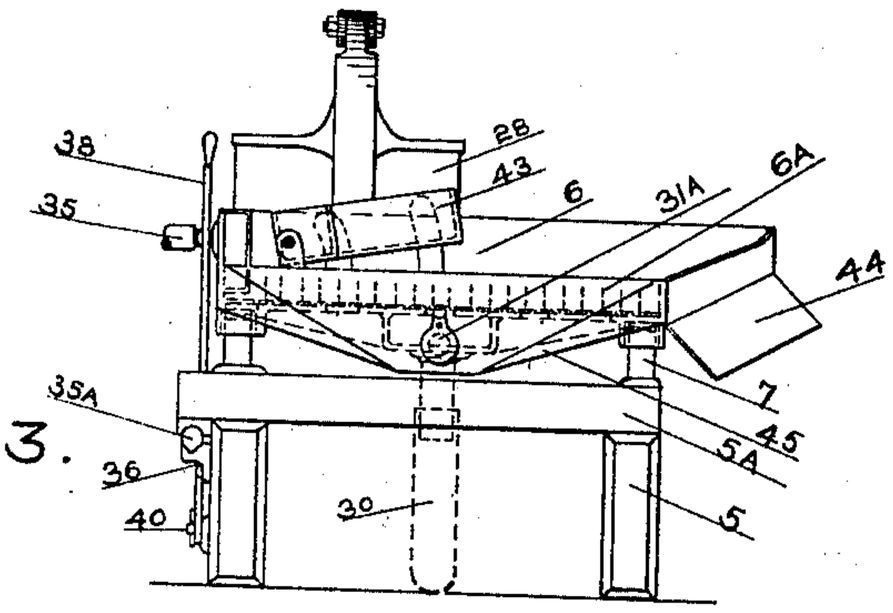

FIG 3.

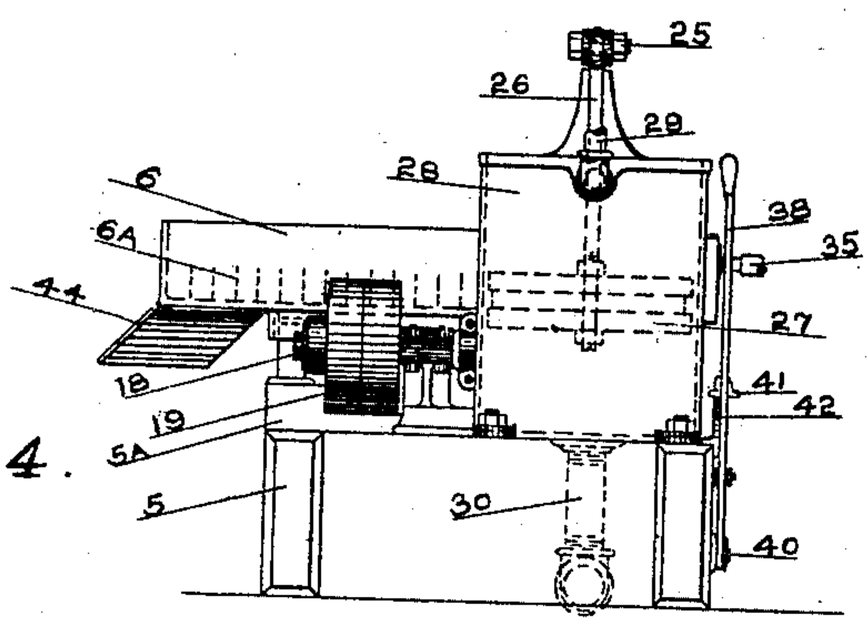

FIG 4.

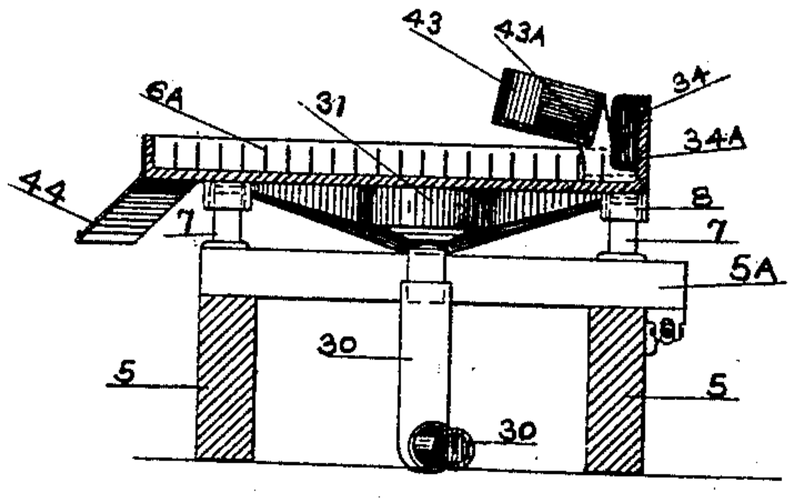

FIG 5.

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(Application filed June 2, 1900.)

(No Model.) 3 Sheets—Sheet 3.

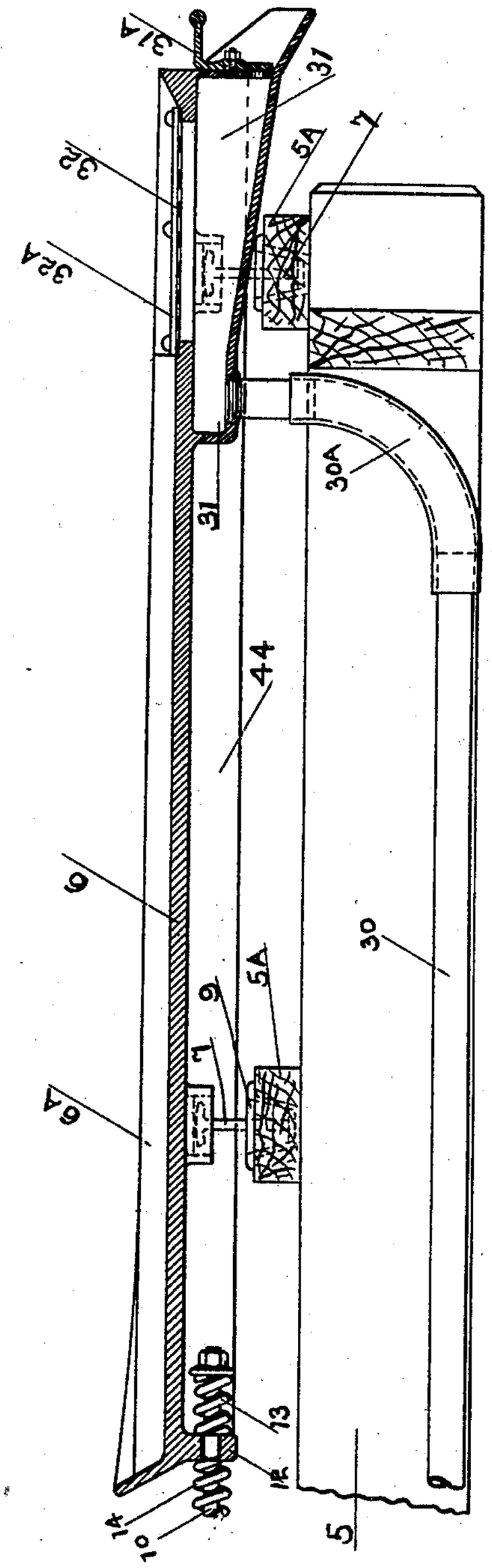

Fig. 6.

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SAMUEL W. TRAYLOR, OF DENVER, COLORADO.

CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 669,038, dated February 26, 1901.

Application filed June 2, 1900. Serial No. 18,912. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL W. TRAYLOR, a citizen of the United States of America, residing at Denver, in the county of Arapahoe 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in concentrators, my object being to provide an apparatus of this class capable of simultaneously saving both fine and coarse mineral. Ordinarily concentrating-machines are capable of advantageously saving but one class of mineral—that is to say, either the coarse or fine values; but so far as I am aware no machine heretofore produced has been capable of performing both of these functions at the same time. Under ordinary conditions the tendency of the fine mineral is to pack underneath, while the coarse values remain on top and are discharged with the gangue. I overcome this difficulty by combining a jigging apparatus with a concentrating-table, whereby the mineral, both fine and coarse, caught by the riffles of the table passes to the screen of the jig, where the fine values, located underneath, are continuously removed by the action of the water from below and carried downwardly with the water and saved, while the coarse mineral on top passes off from the screen over the discharge extremity of the table and is also saved. By virtue of this construction it becomes practicable to maintain a suitable depth of mineral upon the table and the screen of the jig.

My improved concentrator will now be described in detail, reference being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a side elevation of my improved machine. Fig. 2 is a top or plan view of the same. Figs. 3 and 4 are rear and front end elevations, respectively. Fig. 5 is a section taken on the line C D, Figs. 1 and 2. Fig. 6 is a vertical longitudinal section taken through the concentrating-table, the parts being shown on a larger scale, the operating mechanism being broken away.

Similar reference characters indicate the same parts in all the views.

Let the numeral 5 designate a suitable stationary framework upon which the operating parts of the machine are mounted. The table 6 is supported upon legs 7, whose extremities engage bearings 8 and 9, respectively, attached to the table and cross-beams 5^A of the frame. The bearings 8 and 9 are so constructed as to permit the table to reciprocate longitudinally in the performance of its function. During the movement of the table the legs oscillate. The reciprocation movement of the table may be imparted by any suitable mechanism. As shown in the drawings, a draw-bar 10 passes through an opening formed in a depending lug 12, secured to the front end or head or the table. Buffer-springs 13 and 14 surround the draw-bar and are located on opposite sides of the lug 12. The draw-bar passes through an upright projection 15, mounted on the frame. Its forward extremity is pivotally connected with a pitman 16, connected with an eccentric 17 of an operating-shaft 18, provided with the usual pulleys 19. An upright pitman 20 is connected with an eccentric 21 of the shaft 18 at one extremity and with one end of a walking-beam or lever 22 at the opposite extremity. This walking-beam is fulcrumed on a bracket 23, as shown at 24, while its opposite extremity is pivotally connected at 25 with a rod whose lower extremity is connected with a plunger 27, located in a reservoir 28, which is supplied with water by way of an inlet-pipe 29. From the bottom of the reservoir or tank 28 a conduit 30 leads to a water-chamber 31, supported on the bottom of the table near its rear extremity. Mounted on the table above this water-chamber is a screen 32, supported from below by a checkered framework constructed to allow the water to pass up through the screen freely from the water-chamber under the influence of the plunger 27 in the reservoir 28. The screen is held down or secured in place from above by strips 32^A, secured to the portion of the table between the screen-covered openings. This screen is located on a level with the face

or top surface of the table, which is provided with an upwardly-projecting ledge 33 in the rear of the screen, adapted to maintain a bed of material on the screen of suitable depth. The normal level of the water in the reservoir 28 is in the same plane, or approximately the same plane, as the screen, so that as impulses are imparted to the water in the reservoir by the reciprocation of the plunger 27 these impulses are transmitted to the water in the chamber 31, causing the water therein to rise and fall successively. During this wave motion the water passes back and forth vertically through the meshes of the screen, whereby the fine concentrates or mineral values which have accumulated on the screen are removed and pass into the water-chamber. In this manner these fine mineral values are prevented from packing on the screen.

The table is provided with longitudinal riffles 6^A, which extend from the head thereof to the screen 31. These riffles preferably diminish slightly in height from the head of the table, where they are highest, to the screen, where they are of minimum height. The ledge 33 is of the same height, or approximately the same height, as the riffles, whereby the bed of material on the screen is substantially of the same depth as that on the body of the table.

The wash-water is supplied to the table from a trough 34, having perforations 34^A, from which the water escapes to the table. The trough 34 receives its supply from an inlet-pipe 35. This trough extends longitudinally along what may be termed the "upper" edge or side of the table, since the table is supposed to be laterally inclined downwardly from the wash-water trough, though in the drawings it is shown as occupying a horizontal position. The degree of the table's inclination may be regulated in any suitable manner. As shown in the drawings, the lateral inclination of the table is regulated by means of wedge-shaped blocks 35^A, which rest upon suitable stationary supports 36, secured to the framework of the machine. The upper inclined faces of these blocks engage cooperating faces formed on the extremities of the transverse beams 5^A, whereby as the blocks 35^A are actuated the corresponding edge or side of the table may be raised and lowered at will. The two blocks 35^A are connected by a rod 37. The forward block 35^A is connected with a controlling-lever 38 by a rod 39. The lower extremity of this lever is fulcrumed on the frame, as shown at 40. The lever carries a dog 41, which engages a ratchet-bar 42, mounted on the frame. The blocks 35^A are actuated through the instrumentality of this lever.

The material to be treated is first discharged in the form of pulp into a box 43, supported above the right-hand corner or portion of the head of the table. (See Fig. 5.) This pulp-box is perforated on one side, as shown at 43^A, to allow the pulp to escape to the riffled surface of the table. As shown in the drawings, (see Figs. 3 and 5,) the pulp-box is tilted toward the wash-water trough to facilitate the escape of the pulp. The lower edge of the table, or that remote from the trough 34, is provided with a downwardly-inclined flange 44, forming a splash-board over which the gangue is discharged. The rear extremity of the table is provided with a discharge-apron 45, over which the concentrates are discharged.

When the machine is in operation, the rotation of the shaft 18 imparts a longitudinally-reciprocating movement to the table through the instrumentality of the draw-bar 10, the pitman 16, and the eccentric 17. The operating mechanism is so arranged that this movement has a tendency to carry the material on the table rearwardly toward the screen 31, the wash-water from the trough 34 in the meantime carrying the gangue downwardly in a transverse direction and discharging it over the splash-board 44. The material containing the values, both coarse and fine, is caught by the riffles, the fine portion naturally assuming the lowest position. This material after it leaves the riffles passes to the screen 31, forming a bed thereon equal to the height of the riffles. The rotation of the shaft 18 also imparts a reciprocating movement to the plunger 27 in the reservoir 28 through the instrumentality of the pitman 20, the walking-beam 22, and the rod 26. The reservoir 28 is supplied with water from any suitable source through the agency of the pipe 29. The plunger fits loosely in the reservoir, so that the water passes freely around its periphery to a position below. The function of the plunger is to impart regularly-timed impulses to the water in the chamber 31, whereby the water is made to rise and fall alternately through the meshes of the screen 32, whereby the material is prevented from packing on the screen and the fine concentrates forming the lower stratum of the bed next to the screen carried downwardly into the water-chamber 31, from which they may be drawn at intervals or continuously through a spout 31^A, connected with the rear extremity of the water-chamber, which is normally closed against the escape of water except at the top, where it passes out through the screen, as heretofore explained. The final removal of the gangue from the top of the bed of material on the screen is effected by the wash-water from the trough 34, this remnant of the gangue being also discharged over the splash-board 44, while the coarse concentrates are carried over the ledge 33 to the discharge-apron 45.

The discharge extremity of the conduit 30 is connected with the water-chamber 31 at a point forward of the screen, whereby there is no tendency on the part of the concentrates to enter and clog the conduit. Moreover, the tendency of the table's movement is to carry the concentrates rearwardly in the water-chamber. The forward extremity 30^A of the

conduit 30 is flexible to permit the necessary movement of the table.

Having thus described my invention, what I claim is—

1. The combination of a vibratory concentrating-table provided with an opening in its rear portion, a screen covering said opening, a water-chamber attached to the table below the screen, and means independent of the table for imparting impulses to the water in said chamber whereby it is adapted to pass upward and downward alternately through said screen.

2. In a concentrator, the combination of a vibrating table, a water-chamber mounted on the table, a screen attached to the table above the water-chamber and arranged to receive the material from the concentrating-surface of the table, and means independent of the table for imparting pulsations to the water in the said chamber whereby the water is made to pass up and down alternately through the screen.

3. The combination of a riffled concentrating-table, means for imparting a vibratory movement thereto whereby the material is made to travel toward the tail of the table, a screen attached to the tail of the table at the extremities of the riffles, and covering an opening in the table, a water-chamber attached to the table below said screen and opening, and means independent of the table for imparting pulsations to the water in the chamber, whereby it is made to pass up and down alternately through the screen.

4. A concentrating apparatus comprising a vibrating riffled table having an open screen-covered portion located at the rear extremities of the riffles, a water-chamber mounted on the table below the screen, a water-containing reservoir mounted independently of the table, a conduit connecting the reservoir with the said water-chamber, and a reciprocating plunger in the reservoir for imparting a wave motion to the water in the chamber, the construction and arrangement of the conduit leading from the reservoir to the water-chamber being such as to permit the movement of the chamber with the table while the reservoir remains stationary.

5. A concentrating apparatus comprising a vibratory riffled table having an open screen-covered portion located at the rear extremities of the riffles, a water-chamber mounted on the table below the screen, a water-containing reservoir mounted independently of the table, a conduit connecting the reservoir with the said water-chamber, a reciprocating plunger in the reservoir for imparting a wave motion to the water in the chamber, an operating-shaft, and a suitable connection between said shaft and the table and between the shaft and the plunger, whereby as the shaft is rotated the table and plunger are simultaneously actuated.

6. The combination of a vibratory concentrating-table having an opening in its rear extremity, a screen covering said opening and adapted to receive the concentrates from the concentrating-surface of the table, a chamber mounted on the table below the screen-opening, a stationary reservoir suitably located with reference to the table, a conduit connecting said reservoir with the chamber on the table, and arranged to permit the movement of the table, and a plunger located in the reservoir and adapted to impart regularly-timed impulses to the water in the chamber, whereby it is adapted to pass up and down through the screen.

7. The combination of a vibratory concentrating-table having an opening at its rear extremity, a screen covering said opening and adapted to receive the concentrates from the concentrating-surface of the table, a chamber mounted on the table below the screen-opening, a stationary reservoir suitably located with reference to the table, a conduit connecting said reservoir with the chamber on the table, and arranged to permit the movement of the table, a plunger located in the reservoir, and suitable means for simultaneously imparting the necessary movement to the table and a reciprocating movement to the plunger, whereby pulsations are imparted to the water in the chamber causing it to pass up and down through the screen.

8. A concentrating apparatus comprising a longitudinally-reciprocating riffled table having an open screen-covered portion located at the extremities of the riffles, and suitable means independent of the table for passing water in impulses through the screen from below.

9. A concentrating apparatus comprising a longitudinally-reciprocating table having longitudinal riffles, an open screen-covered portion located at the extremities of the riffles and movable with the body of the table, a water-chamber attached to the table below the screen, a stationary reservoir located in suitable proximity to the table, a connection between said reservoir and said water-chamber, permitting the chamber to move with the table, and a reciprocating plunger located in the reservoir for imparting pulsations to the water in the chamber.

10. The combination of a table mounted to permit a vibratory movement, having a screen-covered opening at its rear extremity, and a chamber below said opening and communicating therewith, a relatively stationary water-containing reservoir, a conduit leading from said reservoir to said water-chamber and having a flexible portion, a plunger located in the reservoir, and means for simultaneously operating the table and imparting a reciprocating movement to the plunger whereby pulsations are imparted to the water in the chamber.

11. The combination of a table mounted to permit a vibratory movement and having an

opening in its rear portion, a screen covering said opening, a water-chamber mounted on the table below the screen, a relatively stationary water-containing reservoir located in suitable proximity to the table, a plunger in the reservoir, a conduit connecting the reservoir with the chamber and permitting the latter to move with the table, a shaft, a connection between the table and the shaft and between the shaft and the plunger, whereby the rotation of the shaft operates both.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL W. TRAYLOR.

Witnesses:
GRACE MYTINGER,
A. J. O'BRIEN.