C. W. EDGAR.

DRY CONCENTRATOR.

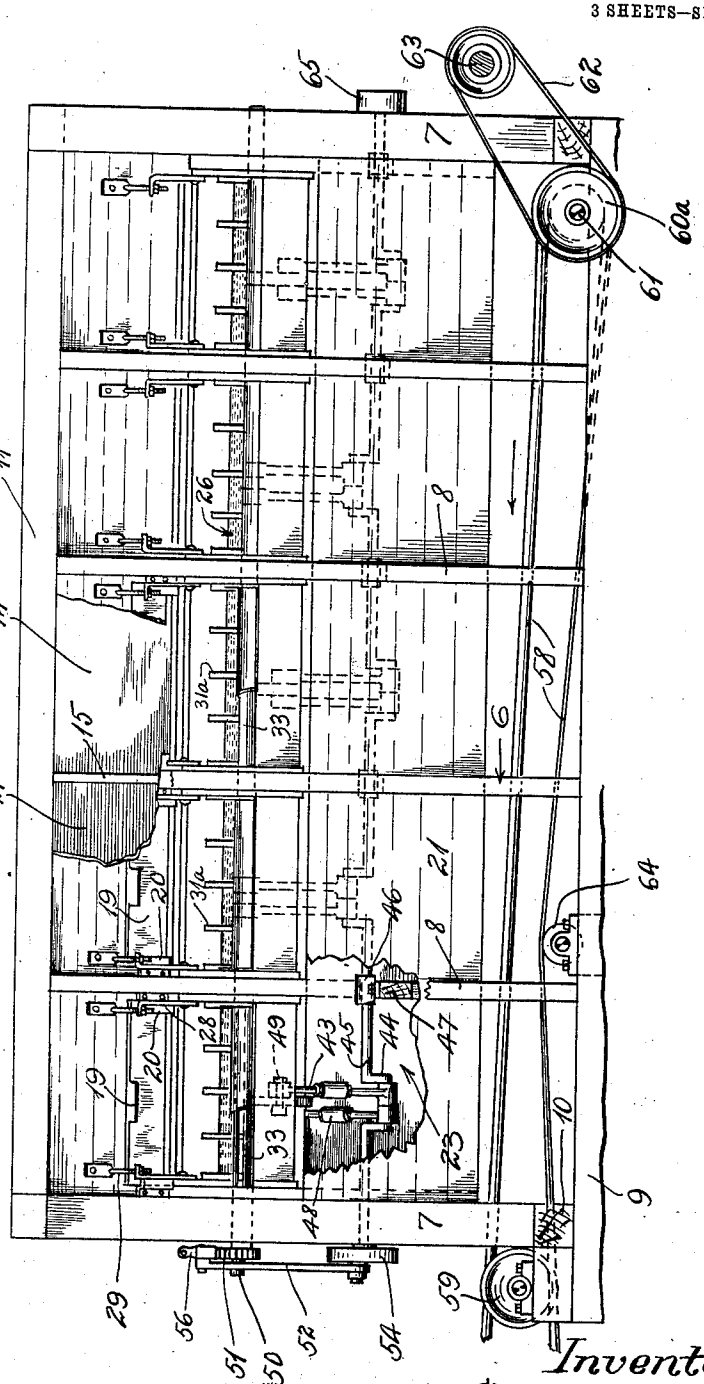
APPLICATION FILED SEPT. 26, 1910.

1,016,680.

Patented Feb. 6, 1912.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses.

E. R. Pollard

F. D. Cummer

Inventor.

Clarence W. Edgar.

By Howard & Howard

Attys.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

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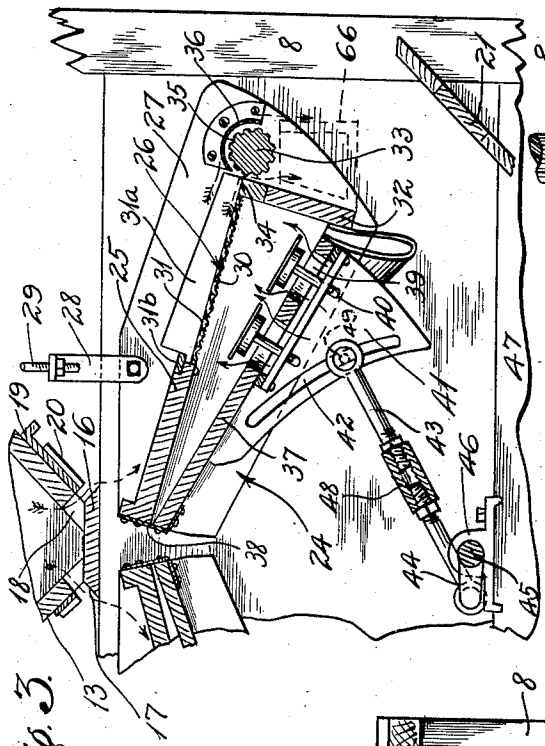

Fig. 3.

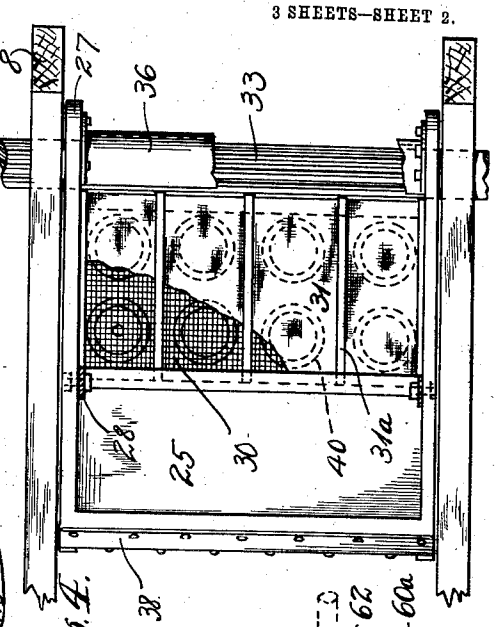

Fig. 4.

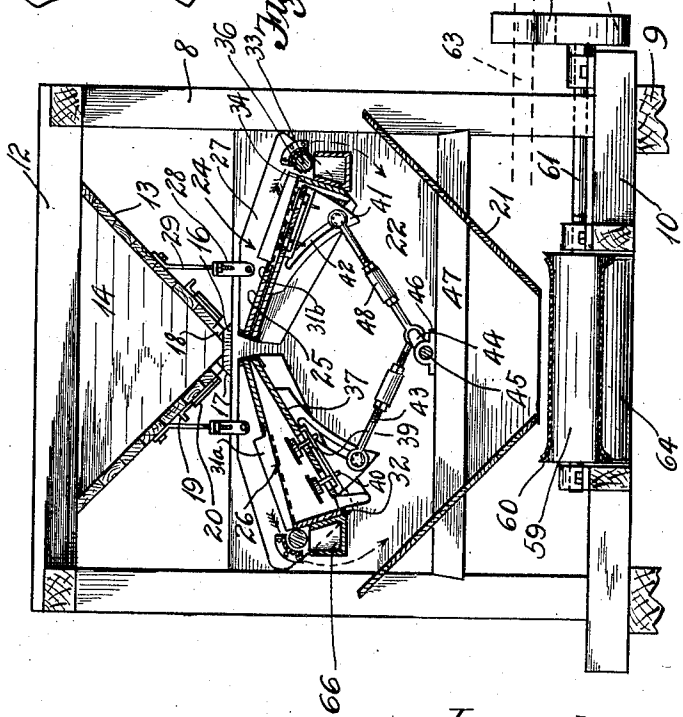

Fig. 2.

Witnesses:

E. R. Pollard

F. D. Crummer

Inventor:

Clarence W. Edgar.

By Hazard & Thacher

Attys.

C. W. EDGAR.

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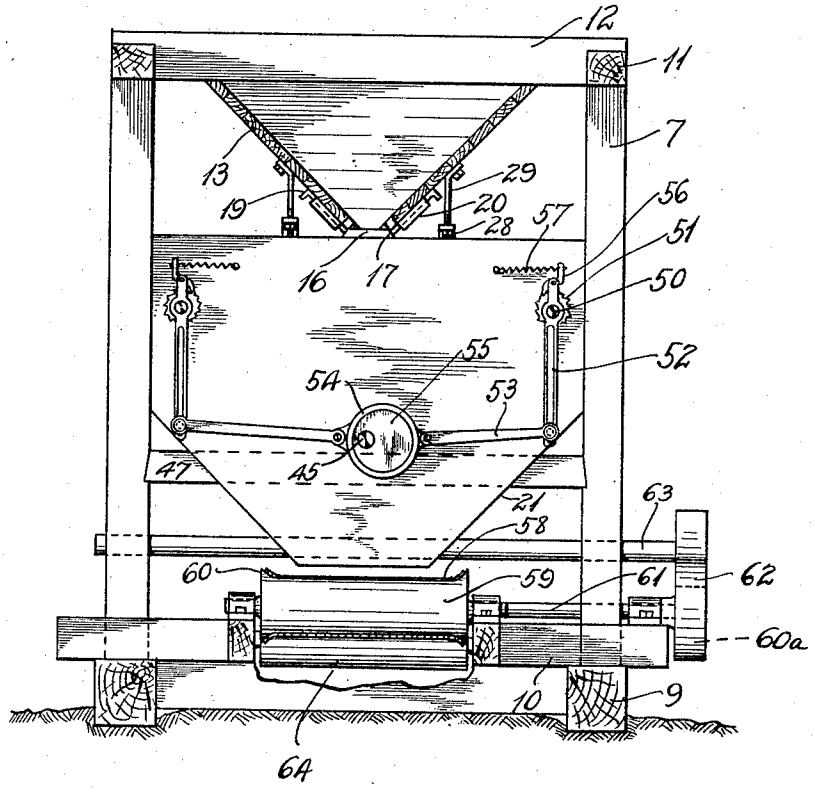
3 SHEETS—SHEET 3.

Fig. 5.



Witnesses.
E. R. Pollard
F. D. Ammen

Inventor.
Clarence W. Edgar.
By Hazard & Thacher
Attys.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CLARENCE W. EDGAR, OF LOS ANGELES, CALIFORNIA.

DRY CONCENTRATOR.

1,016,680. Specification of Letters Patent. Patented Feb. 6, 1912.

Application filed September 26, 1910. Serial No. 583,732.

To all whom it may concern:

Be it known that I, CLARENCE W. EDGAR, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Dry Concentrators, of which the following is a specification.

This invention relates to dry concentrators for separating the values in crushed ore or sand from the gangue.

The object of the invention is to produce a device for this purpose having improved means for regulating the depth of material on the concentrating jig, and to regulate the intensity and rapidity of the concentrating action; and further to provide means for withdrawing the values from the concentrator while it is continuously in operation, and without necessitating the cessation of the concentrating process.

In the drawing forming a part of the annexed specification, Figure 1 is a side elevation of a dry concentrator, constructed according to my invention, certain parts being broken away. Fig. 2 is a vertical section through the device, and further illustrating its general construction. Fig. 3 is a vertical section taken at the right side of the machine, and showing details of the construction of the jigs, the means for actuating the same, and the devices for adjusting the same. Fig. 4 is a plan of the parts shown in Fig. 3, certain parts being broken away, and shown in cross section. Fig. 5 is an end elevation of a concentrator, and illustrating details of the mechanism for regulating the speed of operation of the concentrating jigs. In this view certain parts are broken away and shown in cross section.

Referring more particularly to the parts, 6 represents the frame of the device which comprises corner posts 7, and a plurality of intermediate posts 8, which are stepped upon longitudinal sills 9 and cross sills 10, as shown. The frame comprises longitudinal side stringers 11, which are connected by cross bars or braces 12, as indicated. Under these braces 12 and extending longitudinally of the frame there is provided a hopper 13, which is divided into a plurality of compartments or individual hoppers 14 by means of dividing partitions 15. Running longitudinally under these hoppers 14 there is provided a gate-board 16 having beveled side edges 17, adjacent to which the individual hoppers 14 are provided with openings 18, which are adapted to be closed by gates 19 in the form of side plates, the side edges of which are mounted in guides 20, as shown particularly in Fig. 3. Below this gate-board 16, a discharging hopper 21 is formed. I provide jigs 24, the bodies of which form inclined tables 25, below which screens 26 are provided. These jigs have side bars 27, and by means of these side bars they are supported on hangers 28 in the form of brackets which are adjustably attached to threaded stems 29 which extend down from the hopper 13, the upper ends of said stems being formed into feet which are attached to the hopper, as shown.

The screens 26 are formed of an under layer of wire gauze 30 or similar material, over which there is an upper layer or cover 31 of fabric such as muslin or bolting silk or other suitable material. At the lower end of the screen, a downwardly extending apron 32 is provided and beyond this apron and adjacent to the upper edge thereof, a discharge roller 33 is rotatably mounted. This roller projects slightly above the upper edge 34 of the apron 32 over which the material passes in leaving the screen, and the roller is provided with longitudinal grooves or pockets 35, as indicated. On its upper side the roller is covered by a guard plate 36, which is curved to conform to the curvature of the roller, and substantially covers the upper side thereof. Under each screen bellows are formed by means of a flap board 37, the upper end of which is attached by a flexible connecting strap 38 to the upper end of the table 25, and the sides and lower edges are connected to side bars 27 and apron 32 by canvas, leather or other flexible material, forming a bellows. This flap board is adapted to swing up and down between the side bars 27 of the jig, and near its lower edge is provided with openings 39 having valves 40, which are adapted to open inwardly so as to admit air on the downward stroke and prevent exit of the air on the up stroke.

On the under side of each flap board 37 a fin 41 is provided, and this fin is provided with a circumferentially disposed slot 42. In these slots 42 connecting rods 43 are re-

spectively attached, the inner ends of the said connecting rods being attached to cranks 44 on a crank shaft 45, which crank shaft extends longitudinally over the delivery hopper 21, being suitably mounted in bearings 46 mounted on cross bars 47, as shown. These connecting rods 43 are provided with adjustable turn-buckles 48, and the upper ends of the connecting rods are adapted to be clamped in any position in the slots 42, for which purpose the connection includes a clamping bolt 49, as indicated in Fig. 1. As also indicated in Fig. 1, the connecting rods 43 are attached to the cranks 44 so that the flap board 37 on one side of the machine is in a different phase from the flap board on the other side of the machine, which is in alinement with it.

In the operation of the bellows it should be understood that the aprons 32 and the flexible connections obstruct the outward movement of the air so that the air will be forced up through the screen 26 and through the crushed ore or sand which is on the screen.

Referring especially to Fig. 5, the discharge rollers 33 are provided with reduced necks 50, which project through the end of the receiving hopper and on these reduced necks ratchet wheels 51 are rigidly attached. On the reduced necks 50 ratchet arms 52 are pivotally attached, which arms extend downwardly and are connected by links 53 with an eccentric strap 54, which is mounted on an eccentric sheave 55 rigidly secured to the end of the crank shaft 45, which projects through the end of the hopper for this purpose. The ratchet arms 52 have upward extensions which are provided with pawls 56, said pawls being adapted to engage the ratchet teeth and being held against the ratchet teeth by springs 57 attached to the pawls and attached to the wall of the hopper, as shown in Fig. 5. It will be seen from inspection of Fig. 5 that the teeth of the ratchets 51 project in such a direction that the pawls 56 operate to rotate the rollers 33 inwardly on their upper sides.

Extending longitudinally under the receiving hopper I provide a delivery belt or conveyer 58, which rests upon horizontal transverse rollers 59 having enlarged ends 60 which give the belt a dished shape, as shown in Fig. 5. One of these rollers is continuously driven by means of a pulley 60^a on its shaft 61, said pulley being driven by a belt 62 from the shaft 63, as shown in Fig. 1. The lower run of the belt 58 passes over the guide pulley 64 and the direction of movement of the belt is the same as that indicated by the arrow in Fig. 1.

The crank shaft 45 is provided on one end with a pulley 65 which enables it to be rotated continuously by a belt when the machine is in operation.

It should be understood that this concentrator is intended to be used on dry placer material that has been previously prepared by screening and classifying. In the operation of the device the different grades or classes of crushed ore or sand are placed in the different hoppers 14 and the jigs beneath said hoppers are adjusted so as to suit the quality of the material in that hopper. In this connection attention is called to the fact that the jigs and the bellows are adjustable independently of each other. On account of the adjusting stems 29 the elevation of the inner ends of the jigs can be changed, as desired. This will of course change the inclination of the table 25 and the screen 26. In addition to this, on account of the fact that the curved slots 42 approach the hinge connections 38 of the flap boards, it will be evident that the connecting rods 43 can be adjusted in or out so as to change the stroke or swinging movement at the bellows. In this way a smaller or greater blowing effect of air through the screens can be produced, and the length of the connecting rods can be individually adjusted so as to bring the flap boards as close as desired to the screens as they complete their upward swinging movement.

Against the outer faces of the aprons 32 troughs 66 are removably attached, and these troughs are adapted to catch the valuable material as it passes over the edge 34.

It should be understood that the raw material passes under the edges of the gates and onto the tables 25, and on account of the inclination of these tables, and the movement of the bellows there is a certain vibration and jigging action given to the tables which causes the material to gravitate down the tables onto the screens 26 and down these screens onto the feed rollers 33. As the material passes over the screen, air is blown up by the bellows through the screen and tends to blow the lighter particles away. The metal therefore tends to descend so that when the material arrives at the outer edge 34, the values are at a low level, whereas the gangue piles up on the upper part of the guard shield 36 and passes over this shield so as to fall down into the hopper 21 beyond the troughs 66. The metal and values come against the pockets or flutes of the rollers 33 so that as these rollers are rotated inwardly, valuable material is passed down as indicated by the arrow and collects in the troughs. From time to time the trough of any jig can be removed and emptied without interrupting the operation of the other jigs.

A dry concentrator constructed as described is self-contained and may be readily transported from place to place and set up ready for operation.

As indicated in Figs. 3 and 4 the screens

are provided on their upper sides with hold down strips 31^a, and this construction prevents the cover 31 from blowing up near its middle. The upper ends of these strips 31^a are held down by a batten 31^b, as indicated.

What I claim is:

1. A dry concentrator having an inclined screen down which the raw material may descend, a roller at the lower edge of said screen, means for rotating said roller so as to carry away the concentrates, and means for directing the gangue over said roller.

2. A dry concentrator having a jig with an inclined face down which the raw material descends, a horizontal roller disposed at the lower edge of said face and having flutes adapted to carry away the concentrates, means for rotating said roller, and means adjacent to said roller for guiding away the gangue.

3. A jig having an inclined screen, means for forcing air upwardly through said screen, a transversely disposed roller at the lower edge of said screen having pockets in the surface thereof, means for rotating said roller so as to carry away the concentrates collecting in said pockets, and a guard shield on the upper side of said roller adapted to direct the gangue over the same.

In witness that I claim the foregoing I have hereunto subscribed my name this 16th day of September, 1910.

CLARENCE W. EDGAR.

Witnesses:

F. D. AMMEN,

EDMUND A. STRAUSE.