H. P. CURTIS.

DRY PLACER MACHINE OR CONCENTRATOR.

APPLICATION FILED MAR. 2, 1908.

910,992.

Patented Jan. 26, 1909.

4 SHEETS—SHEET 1.

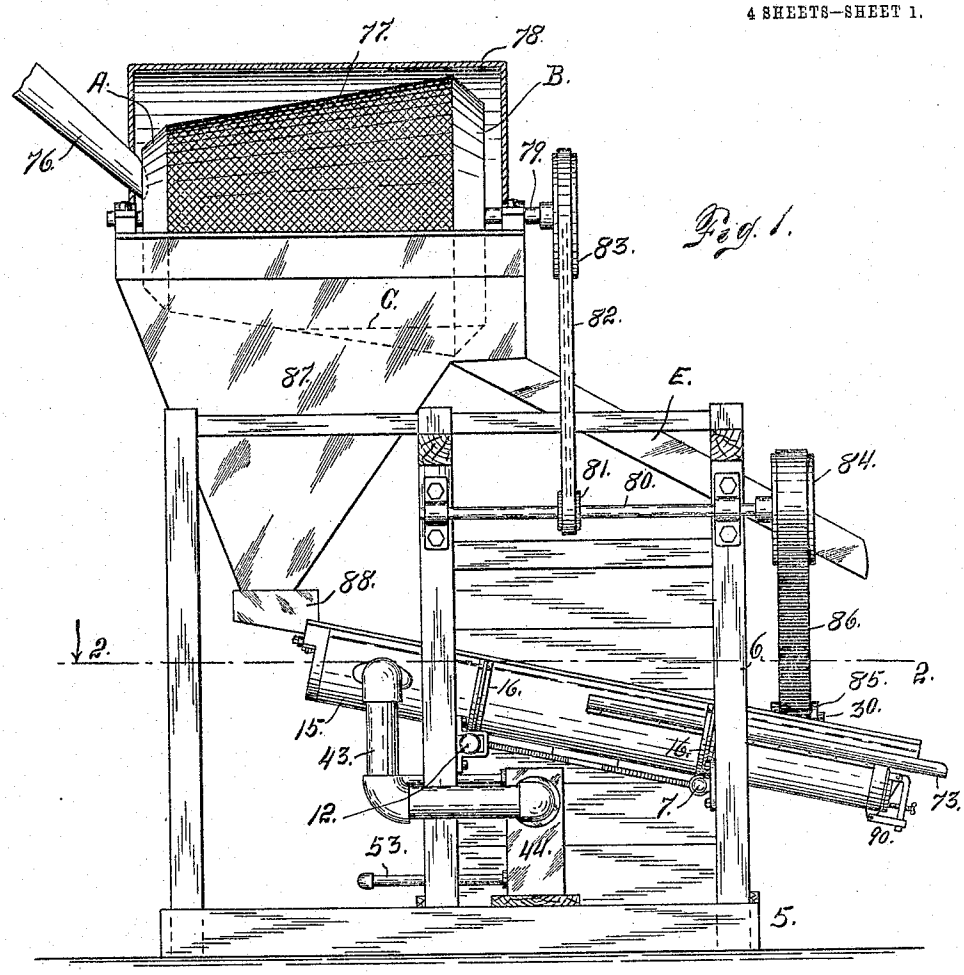

Fig. 1.

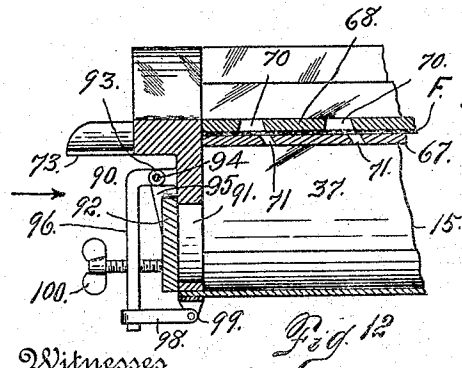

Fig. 12.

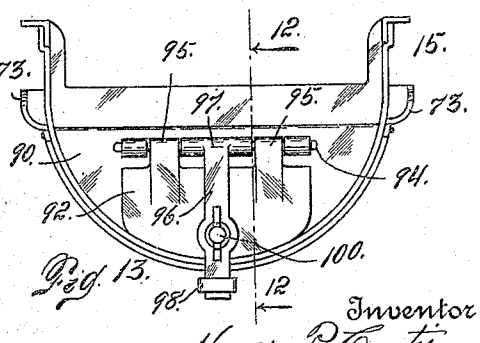

Fig. 13.

Witnesses

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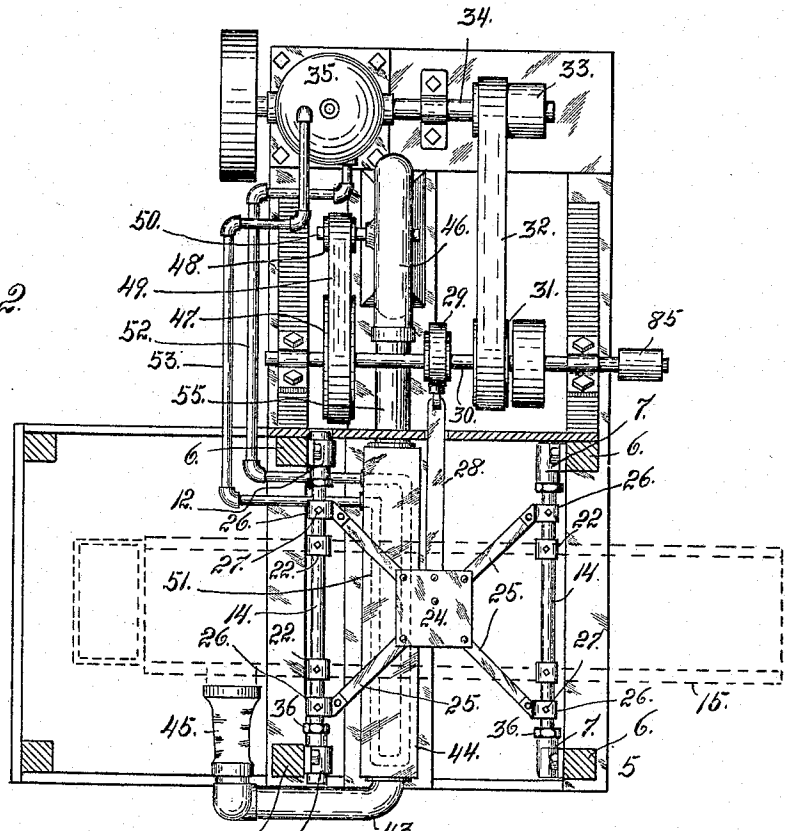
4 SHEETS—SHEET 2.

Fig. 2.



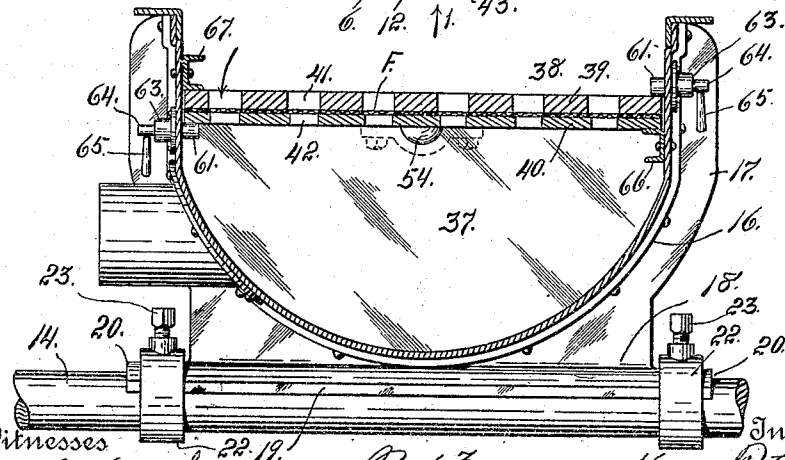


Fig. 3.

Witnesses

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4 SHEETS—SHEET 3.

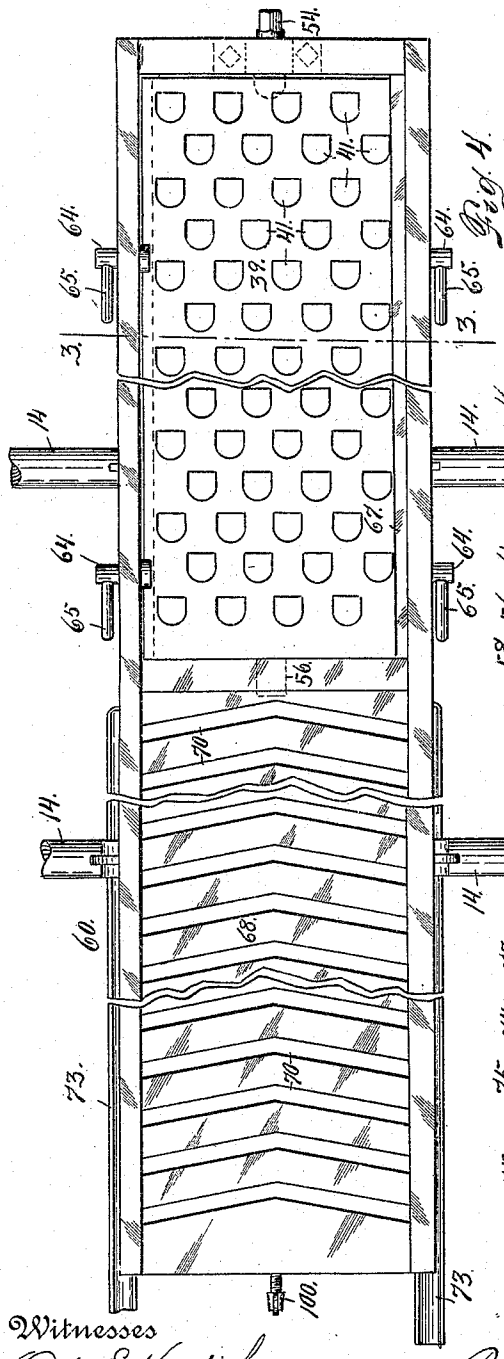

Fig. 4.

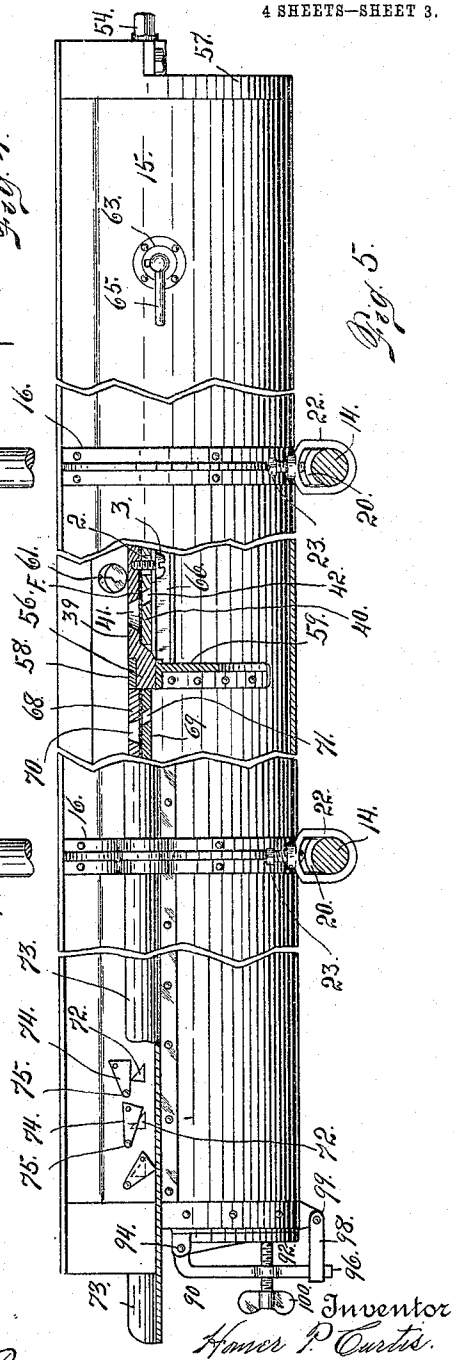

Fig. 5.

Witnesses

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4 SHEETS—SHEET 4.

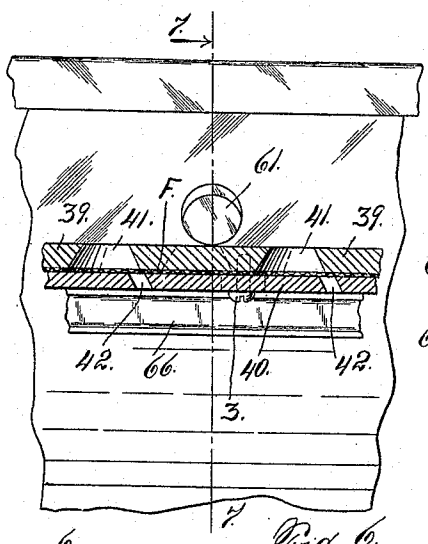

Fig. 6.

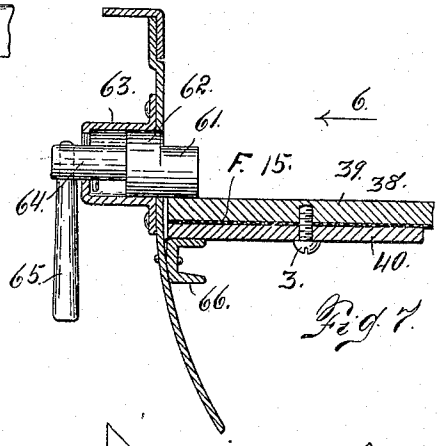

Fig. 7.

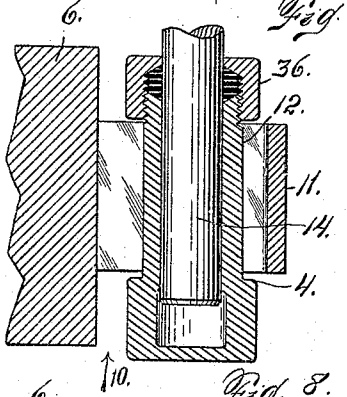

Fig. 8.

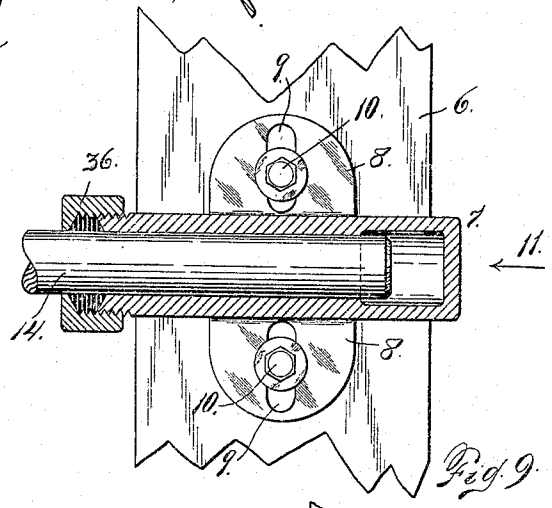

Fig. 9.

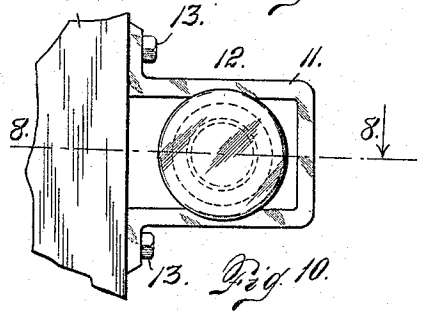

Fig. 10.

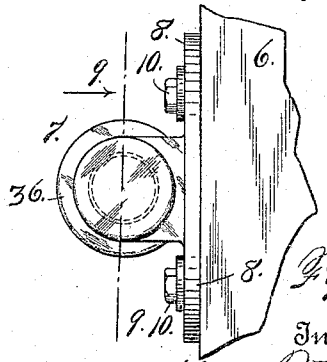

Fig. 11.

Witnesses
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UNITED STATES PATENT OFFICE.

HOMER P. CURTIS, OF DENVER, COLORADO, ASSIGNOR TO THE CURTIS DRY PLACER MACHINE COMPANY, OF DENVER, COLORADO.

DRY-PLACER MACHINE OR CONCENTRATOR.

No. 910,992. Specification of Letters Patent. Patented Jan. 26, 1909.

Application filed March 2, 1908. Serial No. 418,718.

To all whom it may concern:

Be it known that I, HOMER P. CURTIS, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Dry-Placer Machines or 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 letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in dry placer machines or concentrators of the class set forth in my application, Serial No. 375848, filed May 27th, 1907, allowed Nov. 22nd, 1907.

My present construction may be termed an improvement on the construction covered in the aforesaid application, though the chute or trough in which the precious metal values are caught is of substantially the same construction as in my previous application. However, the manner of securing the chute in place as well as the construction whereby it is manipulated for the purpose of discharging its contents into the chamber below when cleaning up, is different from that disclosed in the said application. Furthermore, the chute for catching the precious metal values is provided with an extension for catching the black sand. In my present construction provision is made for imparting the transverse reciprocation to the chute in an inclined plane through the medium of an eccentric mounted on an operating shaft suitably connected with an engine shaft for supplying the necessary power. My present construction also includes an air chamber connected with a blower and through which the air is passed for delivering it to the chamber underneath the concentrating member. Within this chamber are located pipes through which the hot water from the water jacket of the explosive engine passes. This water after passing through the chamber one or more times is returned to the water jacket of the engine, thus keeping up a constant circulation. By virtue of this construction and arrangement the air passing through the said chamber becomes warmed or heated and is in this condition passed to the chamber below the concentrating member and has a tendency to thoroughly dry the material under treatment which in some instances is too damp or moist for proper treatment in a device of this class.

Having briefly outlined my improved construction, I will proceed to describe the same in detail reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a side elevation of my improved machine looking in the direction of the arrow in Fig. 2. Fig. 2 is a top plan view of the apparatus partly in section taken on the line 2—2 Fig. 1 looking downwardly. In this view the concentrating chute is indicated by dotted lines only, in order to make clear the mechanism below whereby the chute is transversely reciprocated. Fig. 3 is a section taken through the concentrating chute on the line 3—3 Fig. 4, the parts being shown on a larger scale. Fig. 4 is a top plan view of the concentrating chute or sluice which is broken in several places to indicate that its length may vary at will or as circumstances may require. Fig. 5 is a side elevation of the same, the chute being partly broken away on one side and sectionized. Fig 6 is a fragmentary longitudinal section taken through the concentrating chute or sluice, the parts being shown on a larger scale than in Figs. 4 and 5. Fig. 7 is a fragmentary cross section taken on the line 7—7 Fig. 6. Fig. 8 is a sectional view taken through one of the bearings in which the shafts carrying the concentrating chute reciprocate. This is a section taken on the line 8—8 Fig. 10. Fig. 9 is a similar view taken through another form of bearing for one of the said shafts. This is a section taken on the line 9—9 Fig. 11. Fig. 10 is an end view of the form of bearing shown in Fig. 8. This view is obtained by looking in the direction of arrow 10 Fig. 8. Fig. 11 is a similar view of the form of bearing shown in Fig. 9. This view is obtained by looking in the direction of arrow 11 Fig. 9. Fig. 12 is a vertical longitudinal section taken through the forward extremity of the concentrating chute or sluice. Fig. 13 is an end elevation of the same or a view looking in the direction of arrow 13 Fig. 12.

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

Let the numeral 5 designate a suitable

stationary frame work provided with four vertically disposed posts or uprights 6. Upon two of these posts 6 are mounted bearings 7 provided with upwardly and downwardly projecting flanges 8 having vertical slots 9 through which are passed securing bolts 10 (see Fig. 9). By virtue of this construction the said bearings are vertically adjustable upon their posts. To the other two posts are attached U-shaped keepers 11 in which are mounted bearings 12 (see Figs. 8 and 10). The U-shaped keepers 11 are secured in place upon their posts by cap-screws 13. The bearings 7 and 12 are each open at one end. The bearings 7 receive the extremities of a reciprocable shaft 14 to which the concentrating sluice 15 is secured. Another shaft 14 engages the bearings 12 and reciprocates freely in the latter. The bearings 12 are permitted a limited transverse movement within the keepers 11 and are therefore loose within the same. They are, however, prevented from longitudinal displacement by a shoulder 4 formed on one extremity, while a stuffing box 36 attached to its opposite extremity forms a shoulder which prevents longitudinal movement in the opposite direction. The concentrating sluice is also secured to this shaft. The manner of securing the concentrating sluice to the shafts 14, is illustrated in Fig. 3.

To the concentrating sluice are secured two metal bands 16 having webs 17 extending at right angles to the body of the bands. The lower part of each of these webs increases in width as shown at 18 and is provided with a curved plate 19 having end extensions 20. The curved plate 19 rests upon the upper part of the shaft 14. These webs are secured to the shaft by means of clamping collars 22 which surround the shaft and the extensions 20 of the plates 19. The upper portion of each collar is provided with a threaded opening in which is inserted a screw 23 which bears against an extension 20. By turning these screws in the right direction, it is evident that the curved plate will be made fast to the shaft 14, thereby securing the concentrating sluice to the said shaft. In this manner the sluice is secured to both shafts 14 and consequently travels therewith.

The central portion of the bottom of the concentrating sluice rests upon a plate 24 connected with the shafts 14 by four arms 25 extending diagonally from the corners of the plate 24 which as shown in the drawing is square. The outer extremity of each arm 25 is provided with a collar 26 through which the shaft 14 passes, the collar being made fast to the shaft by a set bolt or screw 27. Connected with the plate 24 is a rod 28 which is also connected with an eccentric 29 mounted on a shaft 30 provided with a pulley 31 connected by means of a belt 32 with a pulley 33 fast on the crank shaft 34 of an explosive engine 35. Hence when the engine is in operation motion is transmitted from the engine shaft to the eccentric shaft 30, and thence to the plate 24 and the shafts 14 to which the concentrating sluice is made fast. The movement resulting from the eccentric 29 is therefore transmitted to the chute or sluice, imparting a transverse reciprocation thereto, since the shafts 14 move freely within their bearings 7 and 12. Attention is called to the fact that it is important that the last named bearings should be dust proof, hence the open extremity of each bearing is provided with a stuffing box 36.

The concentrating chute or sluice as shown in the drawing is provided with an air chamber 37 above which is located a concentrating member 38 composed of two plates 39 and 40. The plate 39 is provided with pockets 41 which as shown in the drawing are arranged in transverse rows across the plate. These pockets may, however, be arranged in any suitable manner. The plate 40 is provided with an orifice 42 below and in communication with the air chamber 37 into which air under pressure is introduced through the instrumentality of an elbow-shaped conduit 43. One extremity of this conduit communicates with an air box 44 while the other extremity is provided with a flexible member 45 directly connected with the sluice and through which the air under pressure passes to the said chamber. Air under pressure is delivered to the air box 44 from a pipe 55 connected with a blower 46 operated from the shaft 30 by means of pulleys 47 and 48 which are connected by a belt 49. The pulley 47 is fast on the shaft 30, while the pulley 48 is fast on the blower shaft 50.

Within the air box 44 are located pipes 51 which are in communication with pipes 52 and 53 connected with the water jacket of the explosive engine whereby the heated water from this jacket is caused to pass through the pipes in the air box and back again into the jacket thus keeping up a constant circulation of hot water through the air box whereby the air within the latter is heated before passing through the air chamber 37 of the concentrating sluice. This heated air has a tendency to dry the material under treatment in case the latter is sufficiently damp or moist as to interfere with dry concentration or treatment.

The concentrating member 38 composed of the two plates 39 and 40 as heretofore stated, is mounted upon end trunnions 54 and 56 one of which is mounted upon the extremity 57 of the air chamber while the other is formed integral with the member 39 of the concentrating member and engages a bearing 58 formed in a transverse partition 59 located in the air chamber and extending from one side to the other thereof. This partition indicates the transverse plane of division be-

tween the portion of the air chamber located underneath the concentrating member and that portion located below the extension 60 of the said member.

The concentrating member 38 is held in its normal position for operating purposes by four cams 61 having journals 62 engaging bearings 63 attached to the opposite sides of the sluice. Each journal 62 has a reduced extension 64 provided with an exposed operating handle 65, one of these handles being attached to each cam. Two of these cams are located on each side of the sluice. The cams on one side are located above the concentrating member while the cams on the other side are located below the same (see Fig. 3). On one side of the concentrating sluice a channel bar 66 is located below the concentrating member forming a support therefor, while upon the opposite side a similar channel bar 67 is located above the said member and forms a stop to prevent further movement in that direction. On the side where the channel bar is located above the member 38, the cams 61 are located below said member; while on the side where the channel bar 66 is located below the concentrating member, the cams 61 are located above the same. By virtue of this construction and arrangement when the cams are properly adjusted, the opposite edges of the concentrating member are clamped between the cams and the channel bar. When it is desired to clean up or discharge the contents of the pockets 41 into the air chamber below, the cams on both sides of the sluice are adjusted to release the member 38 by giving them a partial rotation from the position shown in Figs. 3 and 7. When this is done each cam may be drawn outwardly into the bearing 63 which is of sufficient length to receive the cam as well as the journal 62. When this is done the concentrating member may be turned upon its trunnions in the direction indicated by the arrow in Fig. 3, until it is in such position as to discharge its contents into the chamber 37 for cleaning up purposes.

The concentrating sluice is provided with a member 60 forming an extension of the member 38 and lying in the same plane therewith. This member 60 is composed of upper and lower plates 68 and 69, the upper plate having slots 70 open at the top; while the lower plate has slots 71 communicating with the rear portion of the slots 70. The slots 70 as shown in the drawing are each composed of two members forming an angle at the longitudinal center of the member and being downwardly inclined slightly as they extend from said angle toward the sides of the sluice which are provided with openings 72 communicating with the extremities of the slots whereby the contents of the latter are allowed to pass into troughs 73 located on the outside of the sluice. The openings 72 are controlled by gates or cut-offs 74 pivoted at 75 and adjustable to occupy the various positions indicated in Fig. 5. By means of these gates the discharge from the grooves 70 into the troughs 73 may be regulated and controlled. The material to be treated as shown in the drawing is delivered through a spout 76 into a rotary screen 77 inclosed in a housing 78 and mounted upon a shaft 79 journaled in said housing. This screen is rotated from a shaft 80 provided with a pulley 81 connected by a belt 82 with a pulley 83 on the shaft 79. The shaft 80 is rotated by connecting a pulley 84 with any suitable source of power. As shown in the drawing this may be accomplished by connecting a pulley 85 on the shaft 30 with the pulley 84 by means of a belt 86.

The housing 78 is hopper-shaped below the screen as shown at 87 and its lower extremity discharges into a box 88 whence the material passes to the upper extremity of the sluice, being delivered directly to the upper end of the concentrating member 38. Air under pressure is delivered to the chamber 37 below this member; while a transverse reciprocating movement is imparted to the entire sluice 15 from the eccentric 29, by virtue of the rod 28 connected with the plate 24, the latter being connected by arms 25 with the shafts 14 whereby these shafts are reciprocated. As the concentrating chute or sluice is secured to these shafts and extends crosswise thereof, a transverse reciprocating movement is imparted to the said sluice. The air delivered to the chamber 37 under pressure, passes upwardly through the orifices 42 of the plate 40, into the rear portions of the pockets 41 of the plates 39 and acts upon the gangue, causing the same to maintain a position upon the upper surface of the plate 39, while the precious metal values being of greater specific gravity, pass downwardly into the said pockets and remain therein. The gangue together with a portion of the black sand, will pass downwardly over the plate 39, to the extension member 60. The air under pressure passes upwardly through the slots 71 of the plate 69 of this member and thence into the slots 70 of the plate 68. The action of the air in this instance causes the lighter gangue to move forwardly over the plate 68 while the black sand being of greater specific gravity enters the slots 71 and passes downwardly into the side troughs 73 from which it may be delivered into any suitable receptacle.

The concentrating chute or sluice is inclined to facilitate the travel of the gangue forwardly, under the influence of the transverse vibration and the action of the air which holds the gangue in suspension whereby it is prevented from settling in the pocket of the concentrating member 38 or the grooves of the extension member 60. This

inclination of the trough may be regulated by the vertical adjustment of the bearing 7 upon one set of vertical posts 6. The U-shaped keepers in which the bearings 12 are mounted, permit sufficient lateral adjustment of these bearings, to compensate for the movement required by the vertical adjustment of the bearing 7 within reasonable limits. In other words the movement of the bearings 12 transversely within the keepers 11, is intended to be sufficient to permit any change of inclination of the chute that may become necessary in the treatment of different materials.

From the foregoing description the use and operation of my improved device will be readily understood. The material to be treated is first fed into the rotary screen 77. This screen is in the shape of the frustum of a cone having inwardly turned flanges A and B at its opposite extremities. The shaft 79 upon which this screen is mounted occupies a horizontal position, and as the material to be treated is fed into the smaller extremity of the screen, the coarse material or that which will not pass through the screen, will travel toward the larger extremity of the screen by virtue of the inclination of the latter and will finally be discharged over the free edge of the flange B. By virtue of the inwardly bent flange B, a quantity of material will be retained within the screen at all times, the depth of this amount being indicated by the dotted line C in Fig. 1. The discharge from the larger extremity of the screen 77, passes into a downwardly inclined trough E by which it is carried from the machine. The material which passes through the screen 77 falls into the hopper-shaped portion of the housing and thence into the box 88 and finally into the concentrating chute or sluice 15 falling first upon the concentrating member 38. The necessary transverse vibration of the sluice is obtained from the eccentric 29 by virtue of the construction and arrangement of parts heretofore described. Air is delivered to the chamber 37 of the sluice from the air box 44 which is supplied by the blower 46. The air passes from the box 44 through a conduit 43 to the chamber 37. The air pressure is so regulated that it virtually holds the gangue in suspension and prevents its entrance to the pockets 41 in which the precious metal values which are of greater specific gravity, are caught. This air blast acts in the same manner upon the material which reaches the extension 60 of the concentrating member. That is to say the air blast holds the gangue in suspension and prevents it from entering the slots 70 which, however, receive the black sand, the latter being of sufficient gravity to cause it to lodge in the slots and maintain its position regardless of the air blast.

After the apparatus has been used for a sufficient length of time to require the cleaning up of the precious metal values caught by the concentrating member, the cams 61 are first adjusted to loosen the concentrating member, and are then drawn out into the bearings 63, to allow the said member a partial rotation upon its trunnions in the direction indicated by the arrow in Fig. 3, whereby the contents of the pockets 41 are discharged into the chamber 37, from which the values may be removed at the forward end of the sluice. The black sand which gathers in the slots 70 automatically discharges into the side troughs 73 and may pass from them into any suitable receptacle (not shown). The manner of heating the air in the air box 44 by virtue of the hot water passing from the water jacket of the engine has been already described. This heated air has a tendency to dry the material under treatment in case the latter is sufficiently damp or moist to require drying.

The forward extremity 90 of the sluice is provided with an opening 91 adapted to be closed by a door 92 hinged at 93 upon a pin 94, the door having two lugs 95 through which the pin passes. This door is locked in the closed position by an arm 96 pivotally connected with the pin at 97. The lower portion of this pin engages a U-shaped keeper 98 hinged at 99. The locking arm 96 is provided with a threaded opening engaged by a screw 100 which bears against the door 92 and causes the lower extremity of the arm to tightly engage the outer extremity of the keeper 98 when the door is in the closed position.

When it is desired to open the door for the purpose of removing the contents of the air chamber when cleaning up, it is only necessary to loosen the screw 100 to allow the keeper 98 to swing downwardly upon its hinge. The arm 96 is then free to move forwardly together with the screw 100 thus leaving the door 92 free to open as will be readily understood.

The plates 39 and 40 of the concentrating member 38, are adjustable to regulate the passage of air through the orifices 42. By the movement of these plates upon each other, the orifices 42 may be partly closed or left wide open as may be desired. They are connected by screws 3 passed through the slots 2 formed in the plate 40, the said screws entering threaded openings formed in the plate 39. It is evident that by loosening these screws, the plates may be adjusted to regulate the passage of air through the orifices 42 as heretofore explained.

Interposed between the plates 39 and 40 is a layer of mesh material F preferably composed of wire cloth. This wire cloth lies in the path of the air when passing from the orifices 42 into the pockets 41, and serves to form a support for the material within the

said pockets and prevents the same from falling downwardly into the air chamber. While the apparatus is regularly in use, there is little or no necessity for this mesh material, but whenever the machine is shut down, the material under treatment will of course fill the pockets 41 and if it were not for this wire cloth, more or less of the material under treatment would pass downwardly through the orifices 42 into the air chamber below which of course is undesirable.

A layer of mesh material F is also interposed between the plates 67 and 68 of the extension member 60 of the apparatus. This mesh material as wire cloth performs the same function in connection with this member, that the element performs in connection with the plates 39 and 40 as heretofore explained.

Having thus described my invention, what I claim is:

1. A dry concentrating chute or sluice whose bottom is provided with a series of pockets whose rear portions are open to permit the introduction of an air blast, the rear portions of the pockets being also open to permit the escape of the air, the portion of the bottom having the pockets being provided with an extension occupying the same plane as the said bottom, and having grooves which are open at the bottom to permit the introduction of an air blast and at the top to permit the escape of the air, the said sluice being provided with an exteriorly located trough with which the said grooves are in communication to permit the discharge of their contents into the trough, substantially as described.

2. A concentrating chute or sluice whose bottom is provided with grooves open at the bottom to permit the introduction of an air blast and at the top to permit the escape of the air, the sluice being provided with an exteriorly located trough with which the said grooves communicate whereby their contents are allowed to pass into the trough, substantially as described.

3. A concentrating chute or sluice downwardly inclined in the direction of its length, a portion of whose bottom is provided with grooves open at the bottom to permit the entrance of an air blast from below and at the top to permit the escape of the air, the said grooves extending outwardly in both directions from the center of the sluice and downwardly, the sluice being provided with troughs on opposite sides in communication with the said grooves whereby the contents of the latter are automatically discharged into the troughs, substantially as described.

4. A longitudinally inclined concentrating chute or sluice whose rear portion is provided with pockets open at the rear to receive an air blast and also to permit the escape of the air, the lower portion of the bottom being provided with grooves extending laterally and downwardly, said grooves being open at the bottom to permit the entrance of an air blast and at the top to permit the escape of the air, the sluice being provided with an exteriorly located trough in communication with the said grooves, substantially as described.

5. A concentrating chute or sluice, the rear portion of whose bottom is provided with pockets whose rear portions are open to permit the introduction of an air blast and at the top to permit the entrance of the precious metal values and to permit the escape of the air whereby the gangue is held in suspension above the pockets, the said bottom portion containing the pockets being trunnioned at its extremities to allow the same to rotate independently of the body of the sluice for cleaning up purposes, substantially as described.

6. A longitudinally inclined concentrating chute or sluice, a portion of whose bottom is provided with pockets open at the bottom to permit the entrance of an air blast and at the top to permit the escape of the said blast whereby the gangue is held in suspension above the pockets, while the precious metal values are caught therein, the sluice being provided with an air chamber below the said bottom, and means for introducing an air blast to said chamber, the portion of the bottom containing the pockets being trunnioned at its extremities to allow the same to be inverted independently of the body of the sluice whereby its contents may be discharged into the air chamber below when cleaning up, substantially as described.

7. A longitudinally inclined concentrating chute or sluice whose rear portion is provided with pockets open at the rear to permit the entrance of an air blast and also to permit the escape of said blast at the top whereby the gangue is held in suspension above the pockets while the precious metal values are caught therein, an air chamber located below the said pocket portion of the bottom, the latter being trunnioned at its extremities and the bottom of the air chamber being curved to allow the said bottom portion to turn upon its trunnions independently of the body of the sluice for cleaning up purposes, substantially as described.

8. A longitudinally inclined concentrating chute or sluice having a bottom provided with pockets whose rear portions are open to permit the entrance and escape of an air blast, the said bottom being trunnioned at its extremities to allow it to be turned for cleaning up purposes, an air chamber located underneath said bottom, means for introducing an air blast to the said chamber, the said bottom of the sluice being provided with

a forward extension under which the air chamber also extends, the said extension having grooves open at the bottom to permit the entrance of the air and at the top to permit the escape of the latter, the said grooves being laterally and downwardly inclined, and a trough attached to the sluice exteriorly and communicating with the said grooves whereby the contents of the latter are automatically discharged into the trough, substantially as described.

9. A longitudinally inclined concentrating chute or sluice whose rear portion is provided with pockets, and trunnioned at its extremities for cleaning up purposes, the forward portion of the bottom lying in the same plane as the rear portion, being fixedly connected with the sluice and provided with laterally and downwardly inclined grooves open at the bottom to permit the entrance of an air blast and at the top to permit the escape of the latter, the sluice having openings at the outer extremities of the said grooves and a trough adjacent the said openings to receive the discharge from the grooves, substantially as described.

10. A longitudinally inclined concentrating chute or sluice, a portion of whose bottom is provided with grooves extending laterally and downwardly from the central portion thereof, the sluice being provided with exteriorly located troughs attached to the opposite sides of the sluice and in communication with the grooves by suitable openings, and gates or valves to control the discharge of the contents of the grooves from the said openings into the troughs, substantially as described.

11. A concentrating chute or sluice whose bottom is trunnioned at its extremities, the sluice having a fixed stop above one of its longitudinal edges and a corresponding stop below its other longitudinal edge, and cams journaled in the opposite sides of the sluice, one above and the other below the trunnioned bottom, whereby the latter may be clamped between the cams and the side troughs, the cams being adjustable to release the bottom whereby it may be turned on its trunnions for cleaning up purposes, substantially as described.

12. A concentrating chute or sluice having a bottom portion trunnioned at its extremities, the sluice having side stops located respectively above and below the opposite edges of the bottom, cams journaled in the sides of the sluice and located respectively above and below the opposite side edges of the bottom, the said cams being rotatably adjustable to release the bottom, and laterally movable whereby they may be removed from the path of the bottom while turning on its trunnions, substantially as described.

13. The combination with a suitable frame work, of shafts mounted to reciprocate on said frame work and connected to move in unison, a concentrating chute or sluice fixedly connected with the said shaft, each of the shafts having bearings in which it reciprocates, the bearings of one of the shafts being vertically adjustable on the frame work to regulate the inclination of the sluice, and keepers mounted on the frame work in which the bearings of the other shaft are laterally movable to compensate for the vertical adjustment of the bearings of the other shaft, substantially as described.

14. The combination with a suitable frame work, of a concentrating chute or sluice, shafts to which the chute is fixedly connected, the sluice occupying a position at right angles to the length of the shafts, each shaft having end bearings in which it is adapted to reciprocate, the bearings of one shaft being vertically adjustable on the frame work, and keepers attached to the frame work and in which the bearings of the other shafts are located, the last named bearings being laterally adjustable in their keepers to compensate for the vertical adjustment of the bearings of the other shaft, means for connecting the two shafts, and means connected with the said shaft-connecting means for reciprocating the latter, substantially as described.

15. The combination with a suitable frame work, of a longitudinally inclined concentrating chute or sluice, a pair of shafts mounted to reciprocate upon the frame work and to which the sluice is fixedly connected, the shafts being adjustable on the frame work to regulate the longitudinal inclination of the sluice, a plate located below the sluice, arms connecting the said plate with both reciprocating shafts, an operating shaft and a connection between the plate and the operating shaft for reciprocating the shafts with which the sluice is connected, the sluice extending at right angles to the length of the shafts, whereby as the latter are reciprocated longitudinally, a transverse vibration is imparted to the sluice, substantially as described.

16. The combination with a suitable frame work, of a concentrating chute or sluice mounted thereon and whose bottom is provided with pockets, the sluice having an air chamber located underneath the said bottom and in communication with the said pockets, a source of compressed air, an air box located between the said source and the air chamber of the sluice, said box being in communication with both whereby the air passes from the source of compressed air through the air box to the said air chamber, and means located within the air box for heating the air as it passes through the box on its way to the air chamber of the sluice, substantially as described.

17. A concentrating chute or sluice whose bottom is provided with transverse grooves

open to permit the introduction of an air blast and to permit the escape of said blast, the said sluice having side walls provided with openings communicating with the outer extremities of the grooves for purposes of discharge, substantially as described.

18. A concentrating chute or sluice whose bottom is provided with transverse grooves open to permit the introduction of an air blast from below and at the top to permit the escape of said blast, the said bottom being composed of two plates, the upper of which is provided with pockets and the lower with orifices communicating with said pockets, a layer of mesh material being interposed between the two plates, substantially as described.

19. A concentrating chute or sluice whose bottom is composed of two plates adjustably connected, the upper plate having pockets, the lower plate having orifices communicating with said pockets, and a layer of mesh material interposed between the two plates, the said concentrating member being trunnioned at its extremities to permit rotation independently of the body of the sluice to facilitate the operation of cleaning up, substantially as described.

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

HOMER P. CURTIS.

Witnesses:

DENA NELSON,

A. J. O'BRIEN.