

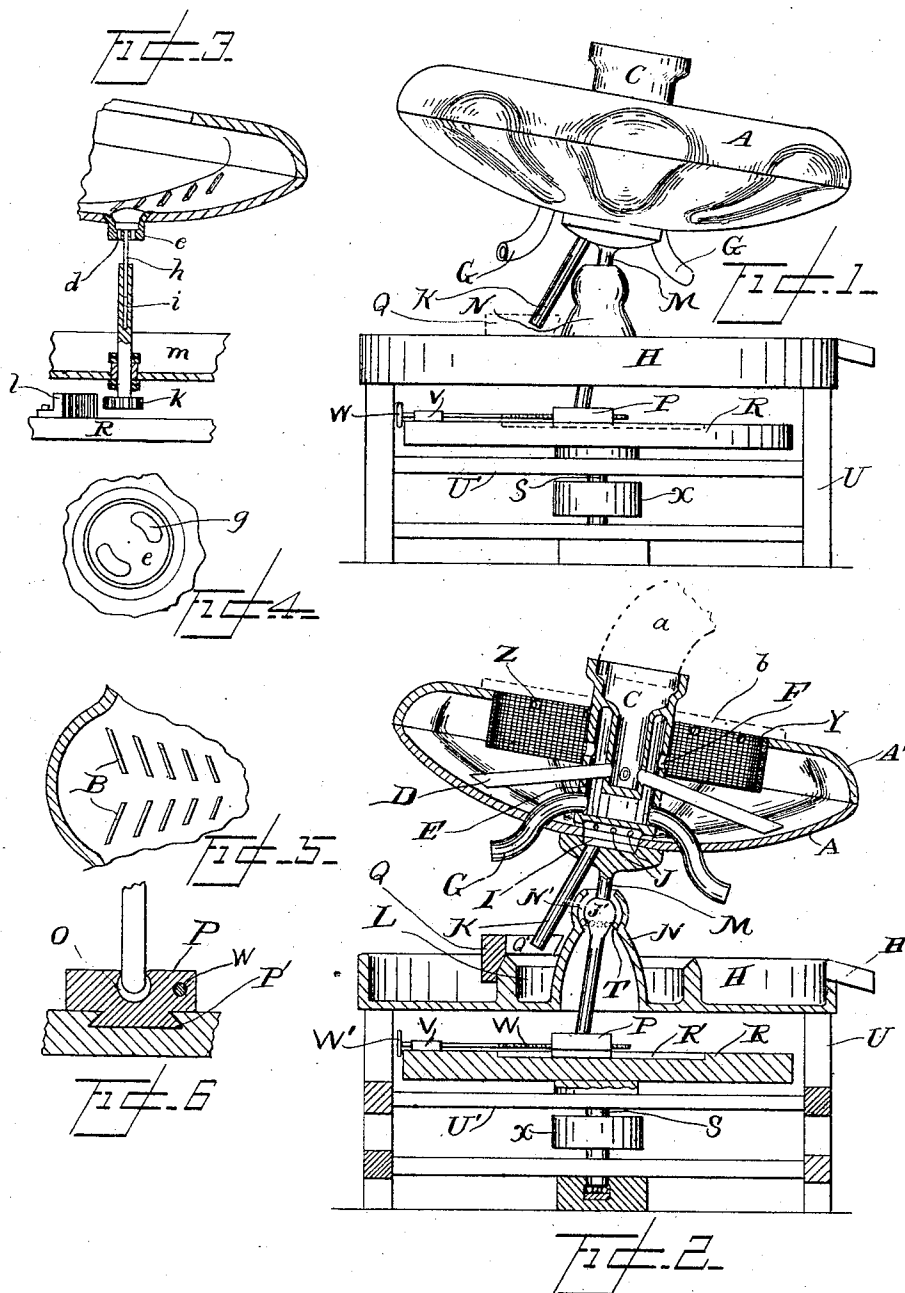
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PATENTED JULY 5, 1904.

C. H. MUHLEMAN.
CONCENTRATOR.

APPLICATION FILED OCT. 7, 1903.

NO MODEL.



Witnesses
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CHARLES H. MUHLEMAN, OF LOS ANGELES, CALIFORNIA.

CONCENTRATOR.

SPECIFICATION forming part of Letters Patent No. 764,197, dated July 5, 1904.

Application filed October 7, 1903. Serial No. 176,151. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. MUHLEMAN, 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 Concentrators, of which the following is a specification.

My invention relates to a machine designed to separate metallic values from gangue; and the object thereof is to provide a machine for that purpose which is practically continuous in its operation and which will save the very fine gold, which usually goes to waste in the slime, as well as the metallic values which are ordinarily saved. I accomplish this object by the concentrator described herein and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a central vertical section of the same with some of the parts shown in elevation. Fig. 3 is a central vertical section of a fragment of the concentrator-pan of a modified form with a valve-gate shown in elevation and showing a different means for the discharge of the concentrates from that shown in Fig. 2. Fig. 4 is a plan view of a valve gate shown in Fig. 3. Fig. 5 is a fragment of the adjacent sides of the radial corrugations, showing the riffles on the sides thereof. Fig. 6 is a vertical cross-section of the adjusting-block and adjacent parts.

In the drawings, A is the concentrating-pan, which is in shape a circular pan, with the top surface of the bottom thereof preferably fluted or corrugated, said fluting or corrugation being radial, a fragment of which is shown in Fig. 5. On the sides of each of the hollows are preferably secured riffles B, which do not reach quite to the lowest depression thereof, but leave a central channel between the riffles for the passage of the concentrates to the center of the machine, as hereinafter explained.

In the center of the pan is secured the feed-tube C, having outlets in which are secured pulp-discharge pipes D, which carry the pulp to the outer edge of the riffles. Surrounding the lower part of the feed-tube and attached thereto, preferably being cast integral therewith, is the gangue-outlet tube E, having

ports F therein, which permits the gangue to flow out of the pan into the tube and thence through the discharge-pipes G, which open out of the gangue-tube and pass through the bottom of the pan and discharge the gangue into trough H, having a spout H', which discharges the gangue into a suitable conduit, (not shown,) which carries it away from the machine. Below the bottom of the gangue-tube is the concentrate-chamber I, which is in communication with the interior of the pan through ports J. This concentrate-chamber is provided with a discharge-tube K, which discharges the concentrates into trough L, from which they may be removed when desired. To the bottom of the concentrating-pan and at the center thereof is affixed a shaft M, the top of which aids in forming the concentrate-chamber. This shaft passes downwardly through a bearing N, and the lower end thereof terminates within a socket O in the adjusting-block P, which adjusting-block is slidably mounted in the balance-wheel R, which is rigidly mounted on shaft S. Bearing N is provided with a ball-race N' at its upper end within which shaft M is enlarged at J', so that the shaft rests upon and is supported by the balls T in the ball-race. This bearing, the concentrate-trough, and the gangue-trough are preferably cast integral and are secured to the timbers U of the frame, to which are also secured the central cross-timbers U', which provide a bearing for the shaft S. Secured to the balance-wheel is bearing V, through which passes rod W, being revoluble, but not longitudinally movable therein and having an operating-wheel W', which rod passes in threaded contact through adjusting-block P. This adjusting-block is provided with a dovetail lug P', which works in a dovetail groove R' in the balance-wheel. Shaft S is provided with a pulley X, by means of which power may be applied to rotate the shaft.

In the operation of my concentrator the pulp is fed into the feed-tube with sufficient water to make it flow freely, it being understood that the pulp is first reduced to the required degree of fineness, which is usually a powder. The pulp passes out of the feed-tube through the discharge-pipes D, which

carry it to the outer side of the riffles. At the same time power is applied to rotate shaft S, and adjusting-block P is moved so as to bring the lower end of shaft M eccentric to shaft S.

5 Now as the balance-wheel revolves it carries the lower end of shaft M around with it, thereby imparting to the concentrator-pan a rotary gyratory motion which causes the pulp to slosh over the corrugated surface of the

10 pan, and thereby cause the heavier or metallic values thereof to settle to the bottom of the pulp upon the riffles, which catch and hold the same and allow the gangue to pass over them. These metallic values gradually

15 work down and out of outlets J into the concentrate-chamber, from which they pass through discharge-pipe K into the concentrate-trough. The gangue being lighter passes through ports F into the gangue-outlet tube,

20 from which it passes through the gangue-discharge pipes G into the gangue-trough H, from which it discharges through spout H'. Should the ore slime, the slime will be carried to the top of the gangue, and in order to save

25 the fine gold contained therein I secure to the top of the pan a depending cloth screen Y, preferably made of flannel, which passes downwardly to a little below the outlet-ports of the gangue-tube. This screen is remov-

30 ably secured to the top of the pan by screws Z, so that when the screen is as full of fine gold as it will reasonably hold it may be removed and another screen put in its place and the gold washed out. It will thus be seen

35 that I have provided an efficient concentrator of simple construction and operation that will save all of the metallic values of the ore.

It will also be seen that in addition to the gyratory movement of the pan it revolves slowly. This rotary motion is caused by the frictional engagement of the lower end of the shaft in the socket in the wheel, which causes the shaft to revolve and with it the pan. With some ores it is desirable to prevent the revolution of the pan. I accomplish this by attaching to the concentrate-pan a catch Q, (shown in dotted lines in Fig. 1,) having arms Q', which straddle the end of the concentrate-discharge pipe, and thereby prevent the pan

50 from revolving. (Shown in Fig. 2.)

Should it be desired to operate my concentrator upon the pulp in a dry state, the same is fed into the feed-tube through pipe *a*, (shown in dotted lines in Fig. 2,) with a suitable quantity of compressed air, and a cover *b*, also shown in dotted lines in Fig. 2, is placed upon the top of the concentrator-pan to prevent the air from escaping out at the top. The operation is then the same as when the pulp is fed into

60 the machine in a wet state.

In Fig. 3 I have shown a slight modification of my concentrator. In this form I dispense with the concentrate-chamber and in the place thereof I provide outlet *c*, having discharge-

65 ports *d*, which ports are held normally closed

by valve-gate *e*, which gate has ports *g*. (Shown in Fig. 4.) This gate is provided with a valve-stem *h*, which is slidable in channel *i*, but non-revoluble therein. Channel *i* is formed in shaft *j*, which carries on its lower

70 end pinion *k*, which pinion is adapted to be engaged by the curved rack *l*, mounted upon balance-wheel R and to be completely revolved thereby, thus permitting the concentrates to pass out of the concentrator-pan as

75 the ports *g* in valve-gate *e* register with ports *z*. These concentrates fall into the trough *m* while the gangue passes out of the discharge-pipes G, which may be connected by a suitable hose (not shown) with the gangue-dump.

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

1. In a concentrator a concentrator-pan mounted upon a shaft; riffles in the bottom

85 of said pan arranged in radial rows; and means to give said pan a rotary gyratory motion comprising a bearing for said shaft intermediate its ends, in which said bearing said shaft is revoluble; a revoluble wheel having a

90 socket into which the lower end of said shaft projects, said socket being at one side of the center of said wheel.

2. In a concentrator a concentrator-pan having the upper surface of the bottom thereof

95 corrugated by radial corrugations; a shaft secured to the bottom of said pan; means to give said pan a rotary gyratory motion comprising a bearing for said shaft intermediate its ends, in which said bearing said shaft is rev-

100 oluble; a revoluble wheel having a socket into which the lower end of said shaft projects, said socket being at one side of the center of said wheel.

3. In a concentrator a concentrator-pan

105 mounted upon a shaft; a feed-tube; pulp-discharge pipes secured to said feed-tube and terminating near the outer edge of said pan; a gangue-outlet tube having ports therein; gangue-discharge pipes secured to said

110 gangue-tube and extending through the bottom of the concentrator-pan; a concentrate-chamber below said gangue-tube in communication with the said concentrator-pan; a discharge-pipe leading out of said concentrate-

115 chamber; means to give said concentrator-pan a rotary gyratory motion comprising a bearing for said shaft intermediate its ends, in which said bearing said shaft is revoluble; a

120 revoluble wheel having a socket into which the lower end of said shaft projects, said socket being at one side of the center of said wheel.

4. In a concentrator a concentrator-pan having the upper surface of the bottom thereof

125 corrugated by radial corrugations; riffles on the sides of said corrugations; a shaft secured to the center of said pan; and means to give said pan a gyratory motion comprising a bearing for said shaft intermediate its ends, in

130 which said bearing said shaft is revoluble; a

revoluble wheel having a socket into which the lower end of said shaft projects, said socket being at one side of the center of said wheel.

5 5. In a concentrator a concentrator-pan having the upper surface of the bottom thereof corrugated by radial corrugations; a shaft secured to the bottom of said pan; a feed-tube; pulp-discharge pipes secured to said feed-tube and terminating near the outer edge of said
10 pan; a gangue-outlet tube having ports therein; gangue-discharge pipes secured to the bottom of said gangue-tube and extending through the bottom of the concentrator-pan;
15 means to discharge the concentrates from the concentrator-pan; means to give said concentrator-pan a rotary gyratory motion comprising a bearing for said shaft intermediate its ends, in which said bearing said shaft is revo-
20 luble; a revoluble wheel having a socket into which the lower end of said shaft projects, said socket being at one side of the center of said wheel.

6. In a concentrator a concentrator-pan
25 mounted upon a shaft; a feed-tube in said pan; pulp-discharge pipes secured to said feed-tube and terminating near the outer edge of said pan; a gangue-outlet tube having ports there-
30 in; gangue-discharge pipes secured to said gangue-tube and extending through the bottom of the concentrator-pan; means to discharge the concentrates from said concentrator-pan; a cloth screen secured in the up-

per portion of said pan around the gangue-tube and extending downwardly therein and
35 having the bottom thereof terminating on a plane which passes below the discharge-outlets of the gangue-tube; and means to give said concentrator-pan a rotary gyratory motion comprising a bearing for said shaft inter-
40 mediate its ends, in which said bearing said shaft is revoluble; a revoluble wheel having a socket into which the lower end of said shaft projects, said socket being at one side of the center of said wheel.
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7. In a concentrator a concentrator-pan mounted upon a shaft; a feed-tube in said pan; pulp-discharge pipes secured to said feed-tube and terminating near the outer edge of said
50 pan; a gangue-outlet tube having ports therein; gangue-discharge pipes secured to said gangue-tube and extending through the bottom of the concentrator-pan; a concentrate-discharge pipe from said concentrator-pan; a
55 catch secured to the concentrate-receptacle having arms passing on each side of the free end of said concentrate-discharge pipe; means to give said pan a rocking motion.

In witness that I claim the foregoing I have hereunto subscribed my name this 1st day of
60 October, 1903.

CHAS. H. MUHLEMAN.

Witnesses:

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