A. BARING-GOULD.

CONCENTRATOR.

APPLICATION FILED MAR. 28, 1918.

1,296,737.

Patented Mar. 11, 1919.

2 SHEETS—SHEET 1.

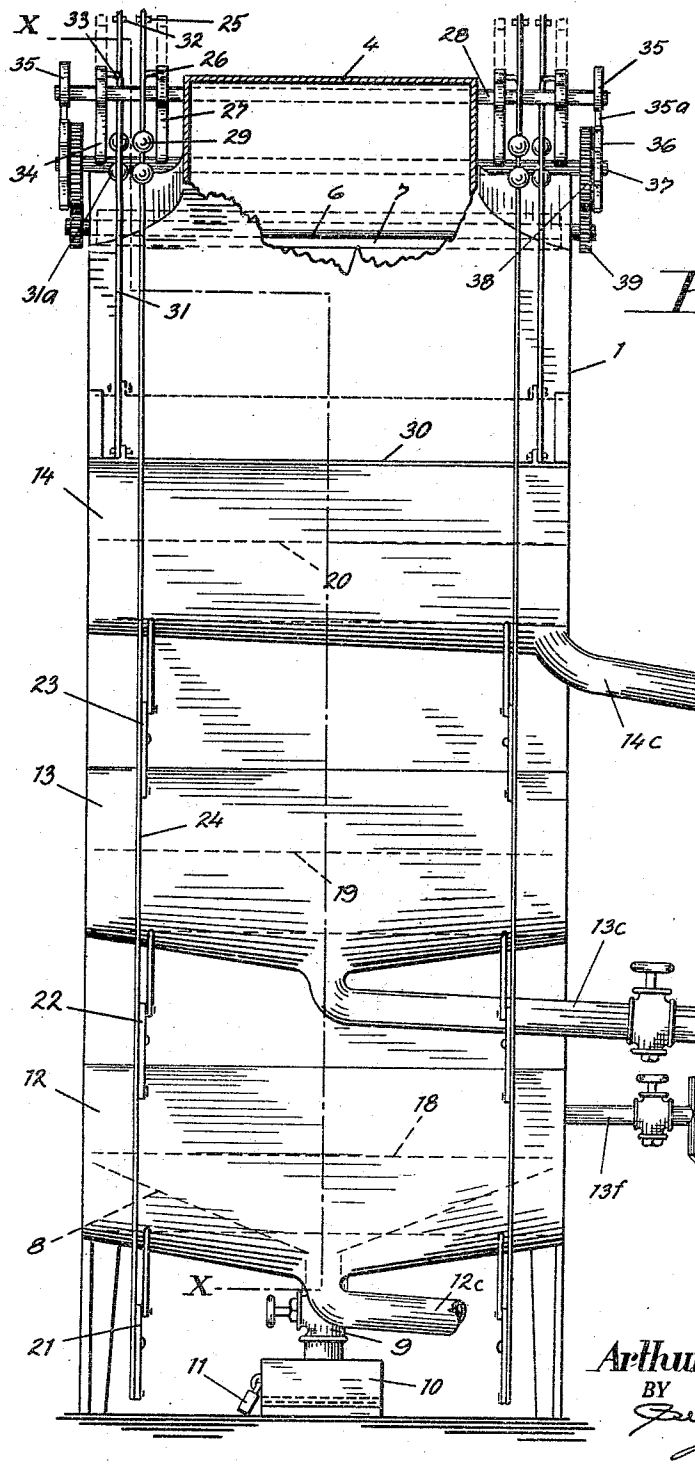

Fig. 1

INVENTOR.

Arthur Baring-Gould

BY

Jerry C. Webster

ATTORNEY.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

A. BARING-GOULD.

CONCENTRATOR.

APPLICATION FILED MAR. 28, 1918.

1,296,737. Patented Mar. 11, 1919.

2 SHEETS—SHEET 2.

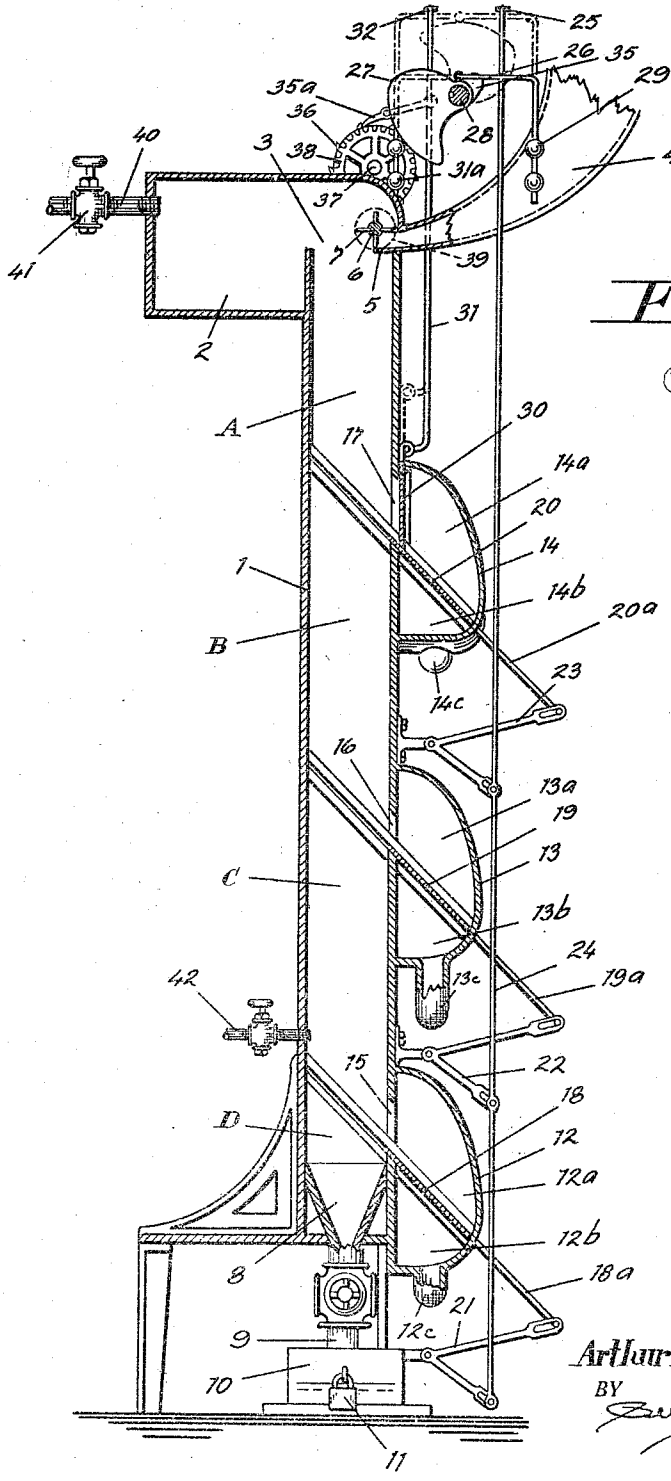

Fig. 2

INVENTOR.
Arthur Baring-Gould
BY
Berry S. Webster
ATTORNEY

UNITED STATES PATENT OFFICE.

ARTHUR BARING-GOULD, OF PLACERVILLE, CALIFORNIA.

CONCENTRATOR.

1,296,737. Specification of Letters Patent. Patented Mar. 11, 1919.

Application filed March 28, 1918. Serial No. 225,353.

To all whom it may concern:

Be it known that I, ARTHUR BARING-GOULD, a subject of Great Britain, residing at Placerville, in the county of Eldorado and State of California, have invented certain new and useful Improvements in Concentrators; and I do declare the following to be a clear, full, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in concentrators used for separating precious metals from slime or similar material. The object of the invention is to provide an efficient means for separating the precious metals from the dross by a gravity process, whereby the specific gravities of the several elements will be the main contributing cause of the separation thereof. By such a means, I aim to handle the slimes without subjecting the same to a wash, since this always entails a certain amount of loss of the precious metals.

My improved invention embodies a gravity concentrator whereby the material drops a total distance through still water sufficient to allow the metal of the greatest specific gravity to separate itself from the balance and be caught in a receptacle at the base of the concentrator. I also provide catch receptacles arranged at successively lesser distances to catch the material having lesser specific gravities. The dross, which of course has the least specific gravity of any of the material, is drained off at a point above all the other receptacles.

In order to accomplish the functions of catching the material of different specific gravities, I interpose a system of catch gates which are timed to close in on the several materials of different specific gravities at spaced points, and in this manner insure the separation of the same.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects, I accomplish by means of such structure and relative arrangement of the parts as will fully appear by a perusal of the following specification and claims.

On the drawings, similar characters of reference indicate corresponding parts in the several views.

Figure 1 is a front elevation of the complete concentrator, partly broken out and in section.

Fig. 2 is a vertical section of the same taken on a line X—X of Fig. 1.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 designates the concentrating tank which is made of a total depth desired to properly handle material of the specific gravities to be worked upon. At the upper end of this tank 1 I provide a water reservoir 2 having an overflow opening 3 into the tank 1. The discharge spout 4 leads from the receptacle containing the slimes or other material and projects a short distance into the tank 1, as at 5. Here it is provided with a push gate consisting of a shaft 6 having a plurality of projecting flanges 7. These flanges successively form the closure for the end of the spout, while all of them are arranged to move through the spout in successive order to push a predetermined amount of the material from the spout into the tank 1, all in a manner as will presently appear.

The tank 1 is provided with an inclined bottom discharge chute 8 which empties through a valve controlled pipe 9 into the collecting box 10, which may be normally sealed by a lock or other means 11.

On the front end of the tank 1 are three or more collecting receptacles 12, 13 and 14, respectively, each being in communication with the tank 1 through the door openings 15, 16 and 17, respectively. The receptacles 12, 13 and 14 are normally divided into separate compartments 12^a and 12^b, 13^a and 13^b, and 14^a and 14^b by means of sliding gates 18, 19 and 20, respectively. When these gates are operated to open communication between their respective chambers they, at the same time, move across and close communication through the tank 1 whereby said tank is then divided into subdivisions A, B, C and D for a purpose as will be presently noted.

These gates 18, 19 and 20 are all operated at one time by means of the following mechanism, namely: Bell cranks 21, 22 and 23 are mounted below the said gates outside of the receptacles. One end of these bell cranks is connected with vertical rods 24 and the opposite ends are connected with push rods 18^a, 19^a and 20^a connected with the gates 18, 19 and 20, respectively.

The upper ends of the rods 24 are guided

through any suitable support 25 and are provided with arms 26 engageable with lifting cams 27 mounted on a driven shaft 28. Weights 29 are connected with the rods 24 to hold them normally in their lowermost position to maintain the gates 18 to 20, respectively, within the receptacles 12 to 14, respectively, as shown in Fig. 2. A gate 30 normally closes the opening 17 from the tank 1 into the receptacle 14. Said gate is slidable vertically and is provided with vertical rods 31 guided through upper supports 32 and provided with arms 33 engageable with cams 34 on the shaft 28. The rods 21 have return weights 31^a.

On the rear end of the shaft 28 is a bushing cam 35. These cams are operable to push the dogs 35^a, which engage ratchet wheels 36, on shafts 37. On these shafts 37 are pinions 38 which engage pinions 39 on the shaft 6. Thus with the revolution of the driven shaft 28, the shaft 6 is rotated intermittently to operate the gate flanges 7. Water is admitted to the reservoir 2 and tank 1 by means of an inlet pipe 40 controlled by a catch valve 41 whereby the level of the water may at all times be slightly above the inlet 5.

In practice, power is applied continuously to the shaft 28 whereby it operates the various mechanism so connected therewith. The operation of the device is as follows, namely:

The gate flanges 7 operate at predetermined times and push a small quantity of the material from the inlet 5 into the tank 1. This material drops through the water in the tank 1 by gravity, that having the greatest specific gravity, such as gold for instance, drops faster than the balance of the material and reaches the box 9 very quickly. The rotation of the shaft 28 is timed so that after the gold or other precious metal of the greatest specific gravity has had a chance to pass completely through the tank 1, the cams 27 and 34 are operated to lift their respective rods 24 and 31. This action, through the medium of the bell cranks and other construction, so forces the gates 18, 19 and 20 into the tank 1 to separate the same into the respective chambers A, B, C, and D. Thus the material of different specific gravities is separated within the tank. Hence, that of lesser specific gravity than the gold or other precious metal which is passed into the box 10, but greater than other material is caught in the compartment C and diverted through the opening 15 into the receptacle 12 where it, together with any other material which has accumulated in the compartment 12^a, passes into the compartment 12^b and out through an outlet pipe 12^c to any catch receptacle, bin or bucket similar to that shown at 13^d (the particular one which connects with said outlet 12^c not being shown for lack of room on the drawing). The next grade of material is shut off by the gate 19 in the compartment B and is diverged through the opening 16 into the receptacle 13. Here it, together with what has accumulated in the compartment 13^a passes into the compartment 13^b and out through the outlet 13^c to the catch bin 13^d. Such catch bin is provided with a draw-off valve 13^e whereby the material therein may be handled in any desired manner. A wash may be applied to such bin by means of a valve controlled water inlet pipe 13^f. The dross, such as slimes, muddy water and non-valuable material, will be confined by the gate 20 in the compartment A. The gate 30 will simultaneously open and such dross, and dirty water will drain off through the compartments 14^a and 14^b and a discharge pipe 14^c which may discharge at any desired point. After this dirty water has drained off, the compartment A will be refilled with fresh water from the pipe 40. When this is done, the cams have released the lifting rods of the gates and the weights pull them back to normal position. This clears the vertical passageway through the tank 1 and shuts off the collecting receptacles. Thereupon, the device functions again in the same manner as shown.

The lower end of the tank may be washed by means of a valve controlled water inlet pipe 42.

From the foregoing description, it will readily be seen that I have produced such a device as substantially fulfils the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice, such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention as defined by the appended claims.

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

1. A concentrator comprising a tank filled with water, a receptacle for the precious metals positioned at the bottom of the vertical tank, a material delivery spout projecting into the upper end of the tank, a shaft turnable adjacent the spout, gate flanges on the shaft each alternately forming a closure and a material measure and pusher for the spout, power actuated means controlling the alternate action of the gate flanges whereby a positive quantity of material will pass from the spout into the tank at predetermined times and fall by gravity therethrough, and power actuated means for separating materials of different specific gravities during the fall thereof through the tank, the operation of such means synchronizing

with the action of the gate flanges and the passage of the heaviest element through the tank whereby the materials of lesser specific gravities are separated from each other after the heaviest element has reached the bottom of the tank.

2. A concentrator comprising a vertical tank arranged to be normally filled with water, means for intermittently delivering the material to be separated into the upper end of the tank whereby it will drop by gravity through the water, and means for diverting the material at different points in its travel whereby materials of different specific gravity may be separated, such means including gates movable across the tank to divide it into separate compartments, the moving of such gates being timed, with the intermittent feed and catch receptacles arranged to be then placed into separate communication with each compartment.

3. A concentrator comprising a vertical tank arranged to be normally filled with water, means for delivering the material to be separated at intermittent intervals into the upper end of the tank whereby it will drop by gravity through the water, and means for diverting the material at different points in its travel whereby materials of different specific gravity may be separated, such means including a plurality of catch receptacles arranged at spaced points along the vertical length of the tank, the tank having openings communicating therewith, and inclined gates arranged to intermittently move across the tank adjacent the openings in predetermined relation with the material delivering means and divert the material through the openings into the receptacle.

4. A concentrator comprising a vertical tank arranged to be normally filled with water, means for delivering the material to be separated into the upper end of the tank whereby it will drop by gravity through the water, and means for diverting the material at different points in its travel whereby materials of different specific gravity may be separated, and means operable in conjunction with the aforementioned means for intermittently draining the dirty water and non-valuable material from the upper end of the tank.

5. A concentrator comprising a vertical tank arranged to be normally filled with water, means for delivering the material to be separated into the upper end of the tank whereby it will drop by gravity through the water, means for diverting the material at different points in its travel whereby materials of different specific gravity may be separated, and means for intermittently draining the dirty water and non-valuable material from the upper end of the tank, this including a drain gate and a gate to close across the tank below the drain gate, with means for closing said closure gate and opening the drain gate simultaneously therewith.

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

ARTHUR BARING-GOULD.

Witnesses:
VERADINE WAINER,
BERNARD PRIVAT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."