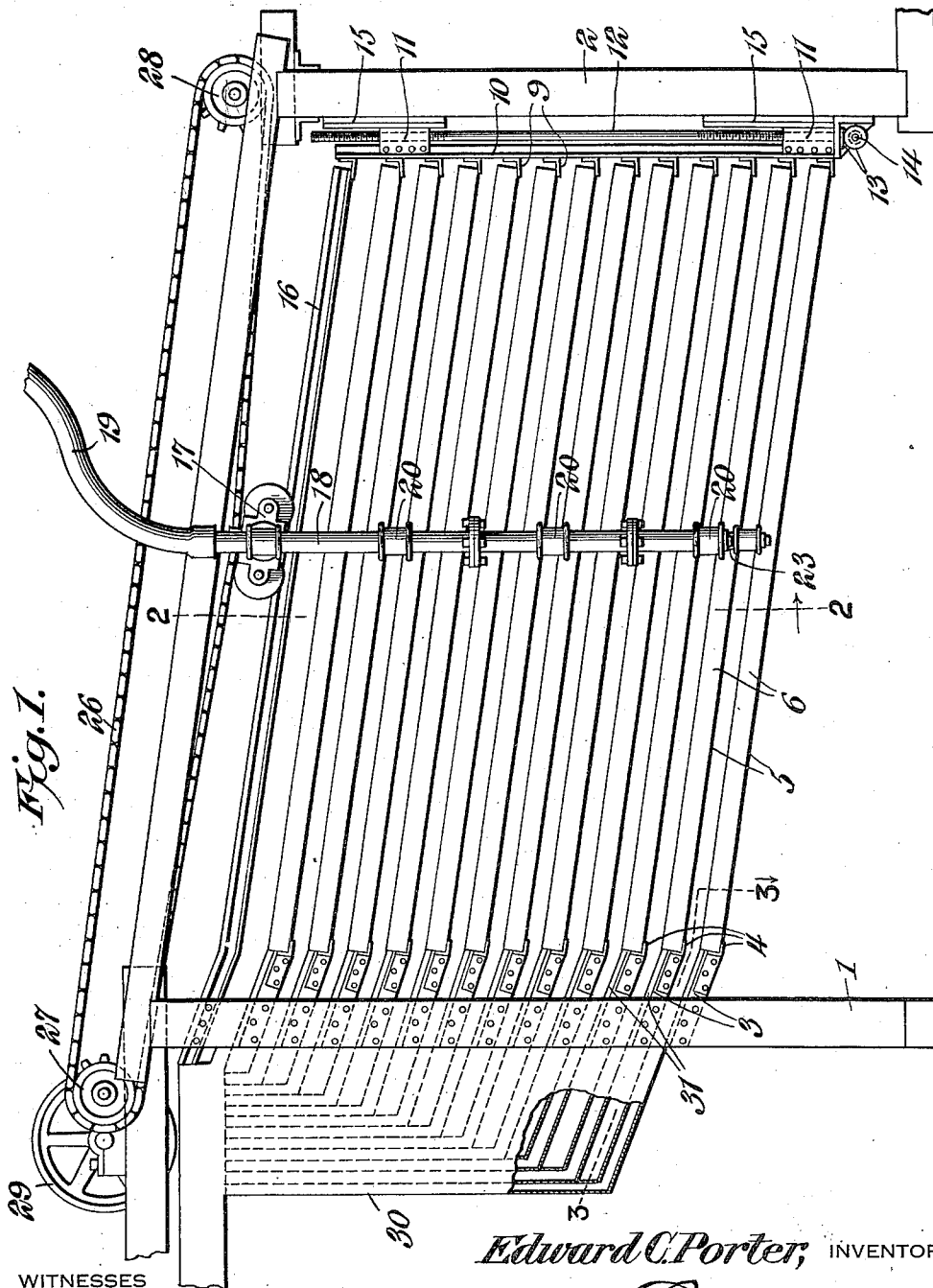


1,024,359.

E. C. PORTER.
SLIME CONCENTRATOR.
APPLICATION FILED MAR. 2, 1911.

Patented Apr. 23, 1912.

2 SHEETS—SHEET 1.



WITNESSES

Howard D. Orr.
H. T. Chapman.

Edward C. Porter, INVENTOR,

BY

E. J. Siggers.

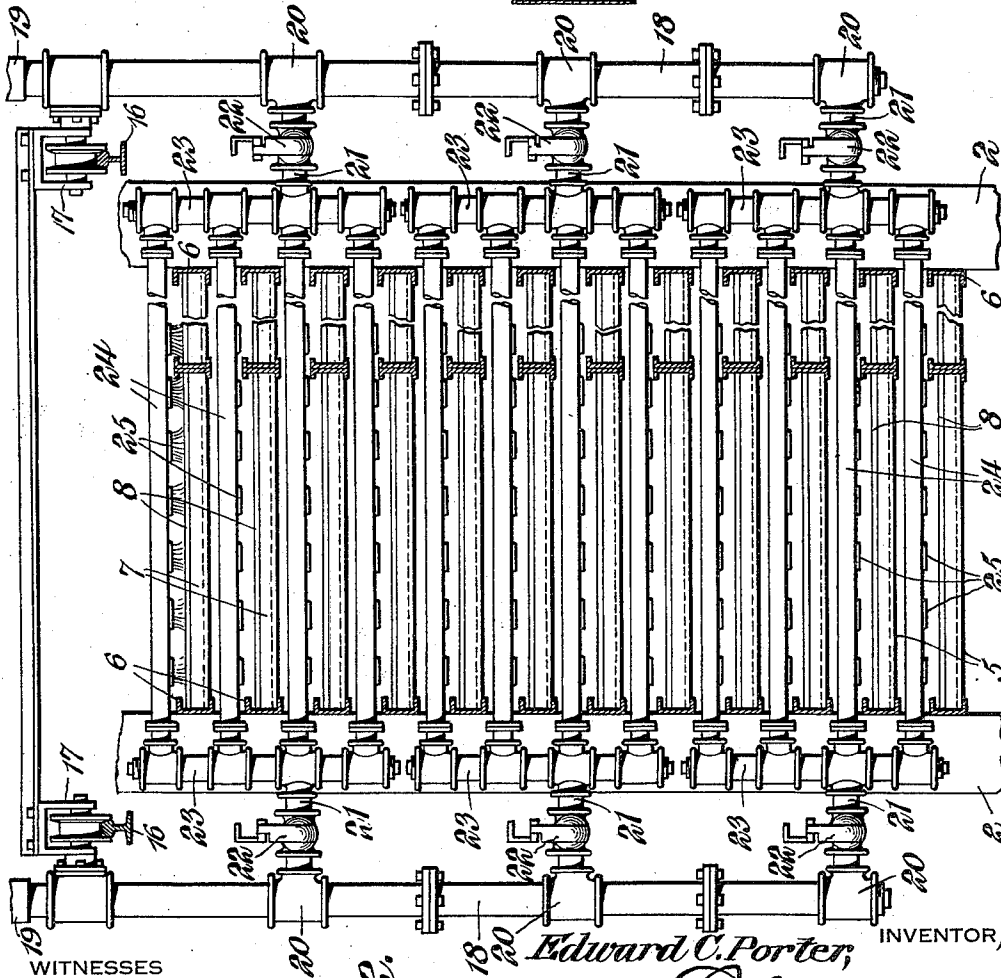
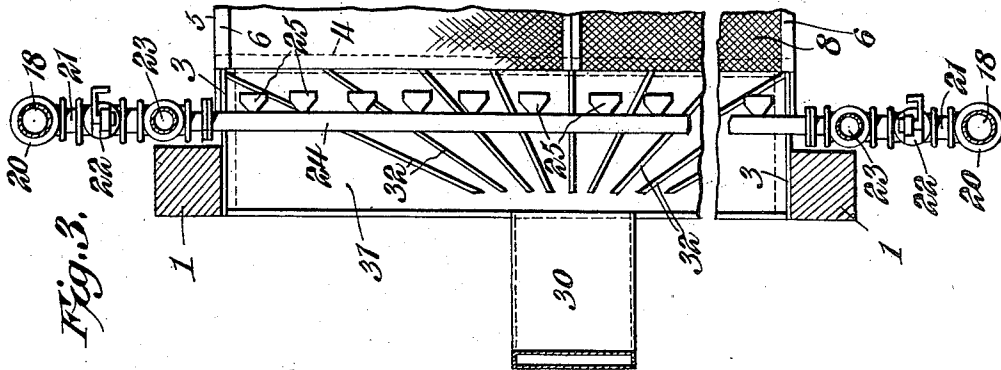
ATTORNEY

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2 SHEETS-SHEET 2.



WITNESSES

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J. T. Chapman.

Fig. 2.

Edward C. Porter,

BY

E. J. Siggers.

INVENTOR,

ATTORNEY

UNITED STATES PATENT OFFICE.

EDWARD CARPENTER PORTER, OF MORENCI, ARIZONA.

SLIME-CONCENTRATOR.

1,024,359.

Specification of Letters Patent.

Patented Apr. 23, 1912.

Application filed March 2, 1911. Serial No. 611,887.

To all whom it may concern:

Be it known that I, EDWARD C. PORTER, a citizen of the United States, residing at Morenci, in the county of Graham and State of Arizona, have invented a new and useful Slime-Concentrator, of which the following is a specification.

This invention has reference to improvements in slime concentrators, and particularly to improvements upon the slime concentrator shown and described in Letters-Patent No. 874,433, granted to me on December 24, 1907.

The object of the present invention is to provide an apparatus of this kind, wherein the machine is balanced, the tables are readily removable, the header pipes and spray pipes are so arranged that the upper ends of the tables may be washed, and the number of valves may be reduced with a corresponding reduction in the actuating mechanism for the valves, while the machine is particularly adapted for use in localities where there is a comparatively low head of water available.

To this end the invention comprises a series of superposed tables set at an incline, so that slime introduced at the upper ends of the tables will gravitate to the lower ends thereof, while these tables may be readily withdrawn from their supports without the necessity of dismantling any part of the machine. In order to balance the machine, header pipes are provided on both sides of the tables, and these pipes are connected up in groups, each of two or more spray pipes moving between the tables, each header being connected to the corresponding end of each group through a branch pipe provided with a valve, so that water from the headers may enter any one or more of the groups of spray pipes from both ends simultaneously, this being especially advantageous where the head of water is low, so that the water flow under low pressure quickly reaches and passes out through the spraying nozzles. Furthermore, the invention contemplates supports for the upper ends of the tables so arranged that the header pipes and the spray pipes may be carried beyond the upper ends of the tables, so that the latter are entirely free from obstruction and may be withdrawn from their supports without the necessity of removing the headers or other carriers for the spray pipes.

The duplication of the apparatus on opposite sides of the tables balances the moving parts of the structure, thus contributing materially to the steady running and by connecting up the spray pipes in groups with the pipes of each group in multiple with the water inlets to the group, the number of valves may be greatly reduced and likewise the size of the valves may be reduced, thus economizing in the construction of the machine.

The invention will be best understood from a consideration of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification, with the understanding, however, that while these drawings show a practical form of the invention, the latter is susceptible of other practical embodiments retaining the salient features of the invention, and, therefore, the invention is not limited to the exact structure and arrangement of parts shown.

In the drawings:—Figure 1 is a side elevation, with parts broken away, of the improved slime concentrator. Fig. 2 is a section on the line 2—2 of Fig. 1 with some parts omitted, and drawn to a larger scale. Fig. 3 is a section on the line 3—3 of Fig. 1.

Referring to the drawings, there are shown uprights 1, 2, at the respective head and tail ends of the machine, and these uprights are in the completed machine connected by suitable framing which, however, is omitted from the drawings as unnecessary for an understanding of the structure.

Attached to each upright or post 1 is a series of superposed brackets 3 declining toward the posts or uprights 2 and these brackets may be, and usually are made of angle steel. The lower ends of the brackets 3 of one post 1 are connected to the similar ends of the like brackets of the other post 1 by angle bars or strips 4 each constituting a support for the head end of a table 5 designed to receive the pulp and which tables may be constructed in any suitable manner, as, for instance, they may be formed of longitudinal U-beams 6 of structural steel and cross beams 7, the latter being of suitable number and spacing, and the beams 6 also being of suitable number and disposition. Each table framework carries a blanket 8 of canvas or other suitable material. The particular structure of the table is, however, not

material to the present invention, and need not be further referred to.

The tail ends of the table are supported upon angle strips or bars corresponding to the bars 4 and these angle bars 9 are carried by terminal angle bars 10 in substantially parallel relation to and adjacent the end uprights or posts 2. Each bar 10 has fast thereto a slide 11 having a nut traversed by the threaded portion of a threaded shaft 12 driven by gearing 13 on another shaft 14 traversing the machine and operated in any suitable manner. Each slide 11 is carried by guides 15 fast to the corresponding post 2, so that on a suitable actuation of the shaft 14 the threaded shafts 12 will be turned and the slides 11 will be actuated in the proper direction to elevate or lower the tail ends of all the tables 5 at one time.

On each side of the machine above the tables is a track 16 having mounted thereon a carriage 17 supporting a header 18 which is continued downward from the carriage past the corresponding sides of the tables 5, the header 18 being of sufficient length for a purpose which will presently appear. Each header 18 is in communication with a suitable source of water supply by means of a flexible pipe 19. Each header 18 is provided at suitable intervals with T's 20 or other suitable means for the attachment of branch pipes 21, in each of which there is included a valve 22 preferably of the quick acting type, so that by a comparatively small movement of the valve stem the valve may be fully opened or fully closed. Such valves are readily obtainable in the market and consequently need no particular description, and, in fact, the construction of these valves does not enter into the present invention.

Each branch pipe 21 at the end remote from its header 18 is connected to a sub-header 23 located between the main header 18 and the corresponding side of the series of tables 5. Each header 18 carries similar sub-headers 23 and each pair of sub-headers is connected by pipes 24 extending from one header to the other and provided with an appropriate number of nozzles 25 of the type set forth in the aforesaid Letters-Patent, that is, each nozzle is flattened and provided with a narrow mouth or slot directed toward the corresponding table at a suitable angle to throw thereon a broad stream of water. Each pipe 24, which because of the nozzles 25 carried thereby may be termed a spray pipe, is in overlying transversing relation to a corresponding table 5 and at both ends is connected to corresponding sub-headers 23. Each pair of headers 23 is designed to carry two or more spray pipes 24 and in the particular arrangement shown in the drawings four of such spray pipes are carried by each pair of sub-headers, and each

sub-header is fed from a main header 18 through a single branch pipe 25 in which is interposed a valve 22.

The machine shown in the drawings is a twelve table machine, and the spray pipes are assembled in three groups of four spray pipes each, a group comprising in addition to the spray pipes the sub-headers connecting them at the ends and the branch pipes 21 connecting the sub-headers to the main headers 18.

The entire battery of spray pipes is supported by the two headers on opposite sides of the series of superposed tables by means of the carriages 17 traveling upon the rails 16 and these rails or tracks are in parallel relation to the tables 5, which latter are in parallel relation one to the other. It will be observed that the brackets 3 are not only at an angle to the horizontal but are also at an angle to the corresponding tables 5, although the latter are also at an angle to the horizontal, but the brackets 3 have a steeper inclination than the tables. Moreover, the brackets project at a considerable distance from that side of the posts 1 toward the tail end of the machine, so that the battery of spray pipes may be moved into such close relation to the posts 1 that the spray pipes will overlie the brackets 3 with the headers between the angle bars 4 and the posts 1, thus permitting the unobstructed withdrawal of the tables 5 or any of them without the necessity of dismantling any part of the structure.

The carriages 17 are actuated by a sprocket chain 26 carried around sprocket wheels 27, 28 at the respective head and tail ends of the machine, and these sprocket wheels may receive motion from a pulley 29 in any suitable manner, but as this part of the structure does not enter into the present invention no detailed description or showing is deemed necessary.

The pulp is received into a distributor or launder 30 which may be similar to the launder shown in the aforesaid Letters-Patent and this launder discharges upon as many distributing boards 31 as there are tables 5, these boards being supported by the brackets 3 and extending laterally as wide as the width of the tables with their lower or discharge ends in overlying relation to the corresponding ends of the tables, and each board is provided with suitable distributing ribs 32 as is customary.

It will be observed that the headers and connecting parts are duplicated on opposite sides of the machine, so that the movable members are well balanced, thus contributing to the smoothness of action of such moving parts. Also, the water is delivered into the spray pipes from opposite ends simultaneously and, therefore, acts more uniformly through the nozzles than would be

the case were the water fed at one end only of each spray pipe. Again, the elongation of the supports for the head ends of the tables, these supports comprising the brackets 3 and cross bars 4, permits the withdrawal of the nozzles wholly from the tables, so that they may readily wash the entire surface of the table instead of leaving a small margin at the head end of the table untouched by the water streams. It is unnecessary in this case to consider the means for operating the valves, since such means may be similar to that shown in the aforesaid Letters-Patent or any other suitable means may be employed.

The employment of valves at both ends of the groups of spray pipes admits of the use of smaller valves than would be the case were the water admitted to the spray pipes at one end only and the use of a plurality of spray pipes in multiple arrangement in groups very materially reduces the number of valves needed. This contributes quite markedly to the reduction of the first cost of the structure and also to the simplifying of the valve operating mechanism, which also contributes toward the reduction of the first cost of the structure.

In the operation of the machine, the pulp is flowed over the blankets and the ore deposited is subsequently swept off by clear water issuing from the nozzles. The grid of spray pipes is moved to the head end of the machine near the posts 1 with the nozzles in overriding relation to the distributing boards 31, the general position being indicated in Fig. 3, and on reaching this point the valves are turned to the open position, that is, the valve operating mechanism may be set to open all the valves simultaneously or to open only predetermined ones of the valves in the manner and for the purpose set forth in the aforesaid Letters-Patent, and where it is desirable to conserve the water because of limited supply thereof, only certain pairs of the valves are opened at any one time, and then on the next return movement of the spray pipes another pair of valves may be opened. When the valves are opened the grid of spray pipes because of its travel toward the tail end of the machine until it reaches the limit of travel when the valves open at the head end of the machine are moved to the closed position and the return movement of the grid of spray pipes is an inactive movement, no water then flowing from the jets. So far as the operation is concerned, it may be practically the same as set forth in the aforesaid Letters-Patent, except that the opening of any pair of valves causes the issuing of water from the nozzles of a plurality of spray pipes, so that a machine of large capacity may be operated on a comparatively limited amount of water, or

where the head is small. Of course, the number of spray pipes included in one group will depend upon the conditions present in the particular locality where the machine is installed.

What is claimed is:—

1. In a slime concentrator, a series of superposed tables for extracting the values from pulp flowed thereon, and means for washing off the deposit from said tables comprising headers on opposite sides of the tables, travelers supporting said headers, and spray pipes connecting said headers and arranged to receive water from both headers simultaneously.

2. In a slime concentrator, a series of superposed tables, and a reciprocable grid of spray pipes in transverse relation to said tables, said grid being composed of a plurality of sets of spray pipes, each set comprising a plurality of spray pipes connected in multiple at both ends by headers.

3. In a slime concentrator, a series of superposed tables, and a reciprocable grid of spray pipes in transverse relation to said tables, said grid being composed of a plurality of sets of spray pipes each set comprising a plurality of spray pipes connected in multiple at both ends by headers, each connection between a set of spray pipes and a respective header including a valve.

4. In a slime concentrator, a series of superposed tables, the several tables being in substantially parallel relation one to the other, tracks above the series of tables in parallel relation thereto, travelers adapted to said tracks, a header pipe structure on each side of the series of tables supported by and in depending relation to the respective traveler, a plurality of sub-headers for each main header, a valved connection between each sub-header and the respective main header, and spray pipes each extending transversely of a table and connected at each end to a respective sub-header, each sub-header carrying a plurality of spray pipes.

5. In a slime concentrator, a series of superposed tables, a grid of spray pipes in traversing relation to the tables and adapted to be moved lengthwise of the tables, and extended supports for the head ends of the tables into relation to which the grid of spray pipes is movable to leave the tables free from obstruction to their removal.

6. In a slime concentrator, a series of superposed inclined tables, feed boards at the head ends of said tables, said feed boards being elongated in the direction of the length of the tables, supports for the feed boards and the head ends of the tables, and a grid of jet or spray pipes movable lengthwise of the tables with the spray pipes in traversing relation to the tables, the extent of movement of the grid of spray

pipes being sufficient to carry them into operative relation to the feed boards to wash the extreme upper ends of the tables and permit the removal of the tables without interference from the grid of spray pipes.

7. In a slime concentrator, supporting posts, inclined brackets fast thereto and extending beyond the posts toward the tail end of the machine, inclined tables supported at the head ends by the brackets, tracks upon the tables, travelers adapted to the tracks, and a grid of spray pipes carried by the travelers in traversing relation to the tables, said grid of pipes being movable into coincidence with the brackets and out of interfering relation to the tables.

8. In a slime concentrator, supporting posts, inclined brackets fast thereto and extending beyond the posts toward the tail end of the machine, inclined tables supported at the head ends by the brackets, tracks above the tables, travelers adapted to the tracks, and a grid of spray pipes carried by the travelers in traversing relation to the tables, said grid of pipes being movable into coincidence with the brackets and out of interfering relation to the tables, the tables and brackets having different degrees of inclination and the tracks being in parallel relation to both the tables and the brackets and conforming in inclination thereto.

9. In a slime concentrator, supporting members, inclined brackets fast thereto and extending therefrom toward the tail end of the machine, angle bars connecting corresponding brackets on opposite sides of the machine, inclined tables supported by the angle bars, and a grid of spray pipes with each spray pipe in traversing relation to a corresponding table and the entire grid movable lengthwise of the table and into relation to the brackets and out of interfering relation to the tables.

10. In a slime concentrator, a series of superposed tables, inclined brackets extend-

ing in the direction of the length of the tables and provided with means for supporting the head ends of the tables, a support for the tail ends of the tables movable for varying the inclination of the tables simultaneously by lifting or lowering the tail ends, and a grid of spray pipes with each pipe in traversing relation to a respective table, said grid of spray pipes being movable lengthwise of the tables and past the head ends of the tables into adjacent relation to the brackets, said grid of spray pipes participating in the adjustment of the tables for inclination.

11. In a slime concentrator, a series of superposed tables and a reciprocable spray pipe grid provided with terminal headers, intermediate sub-headers each having a valved connection to a respective terminal header, and a group of spray pipes connected at each end to respective sub-headers and extending over respective tables in a direction transverse to the direction of travel of the grid.

12. In a slime concentrator, a series of superposed tables and a reciprocable spray pipe grid composed of a plurality of spray pipes assembled in a plurality of groups each including a plurality of spray pipes extending over respective tables in a direction transverse to the direction of travel of the grid, terminal sub-headers for the pipes of each group and having free communication with the ends of said pipes, main headers at each end of the grid, and valved connections between each main header and each sub-header adjacent thereto.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

EDWARD CARPENTER PORTER.

Witnesses:

W. F. KEATING,
I. CABALLERO.