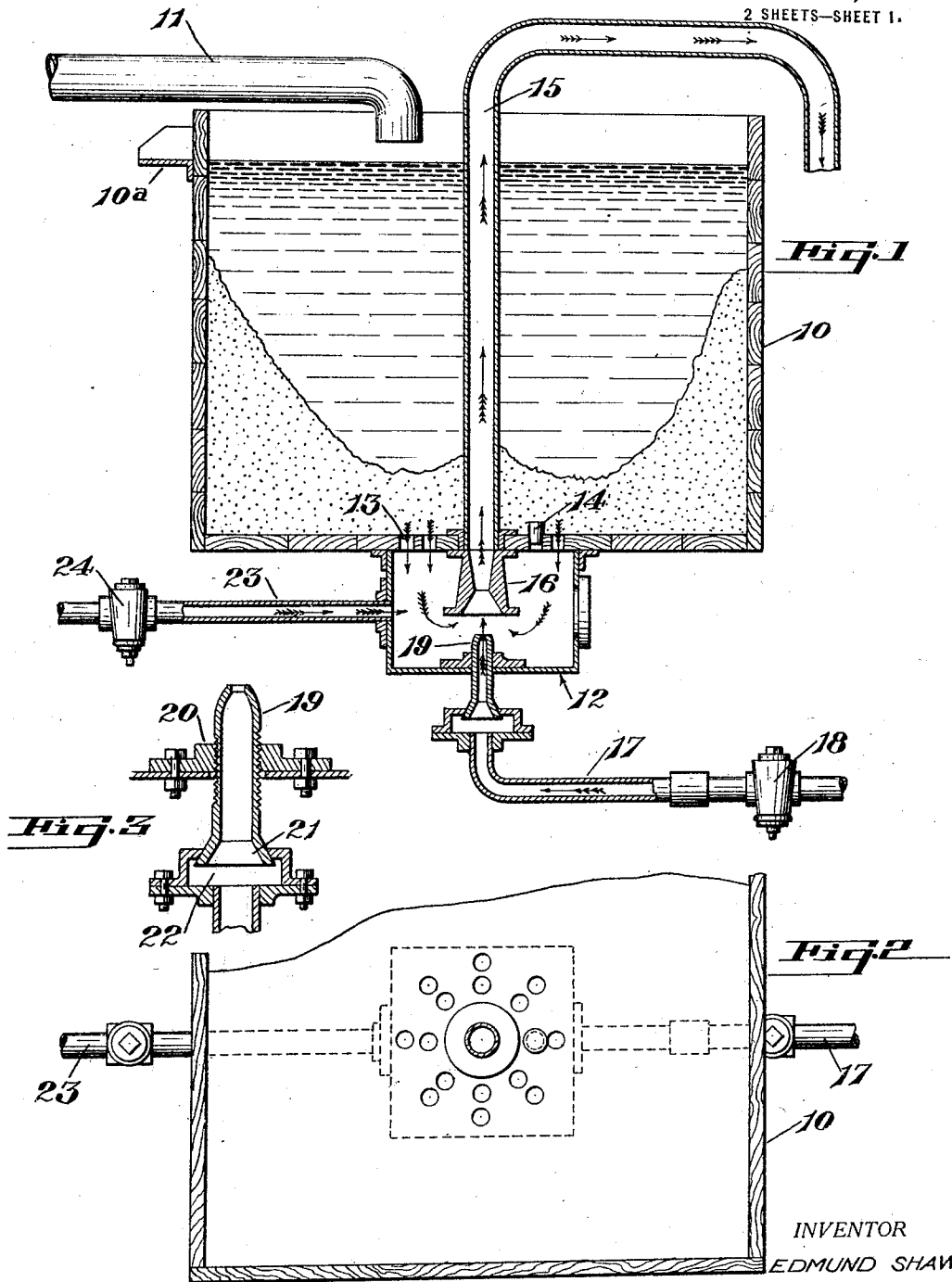


E. SHAW.
SAND WASHING DEVICE.
APPLICATION FILED JAN. 12, 1921.

1,406,291.

Patented Feb. 14, 1922.

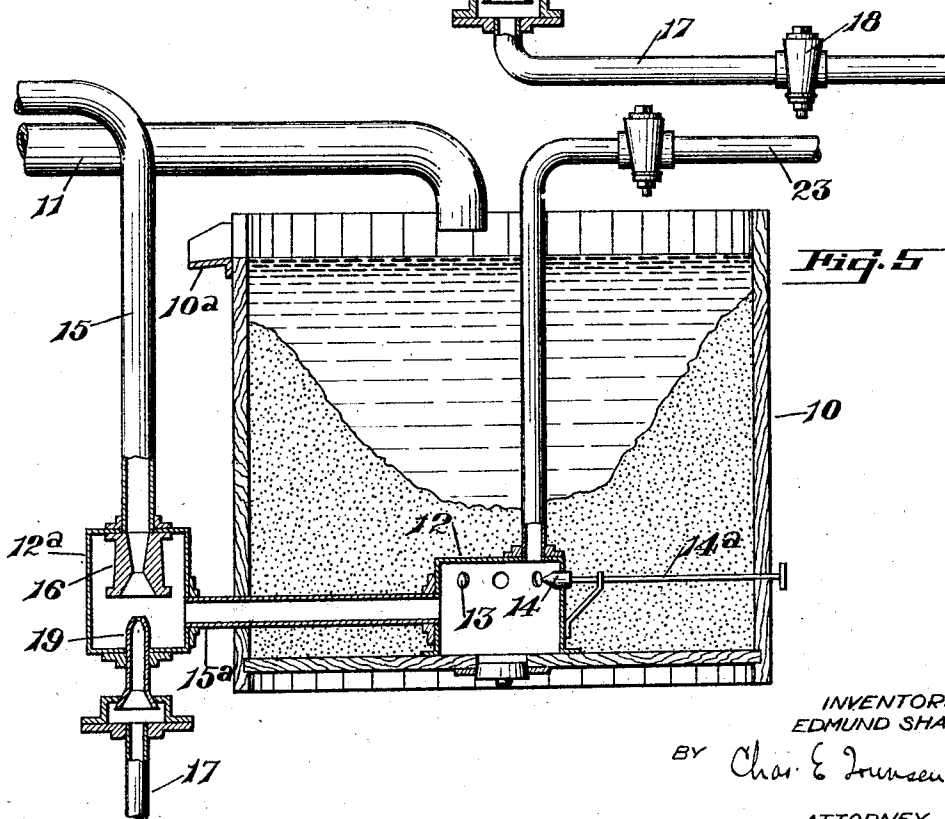
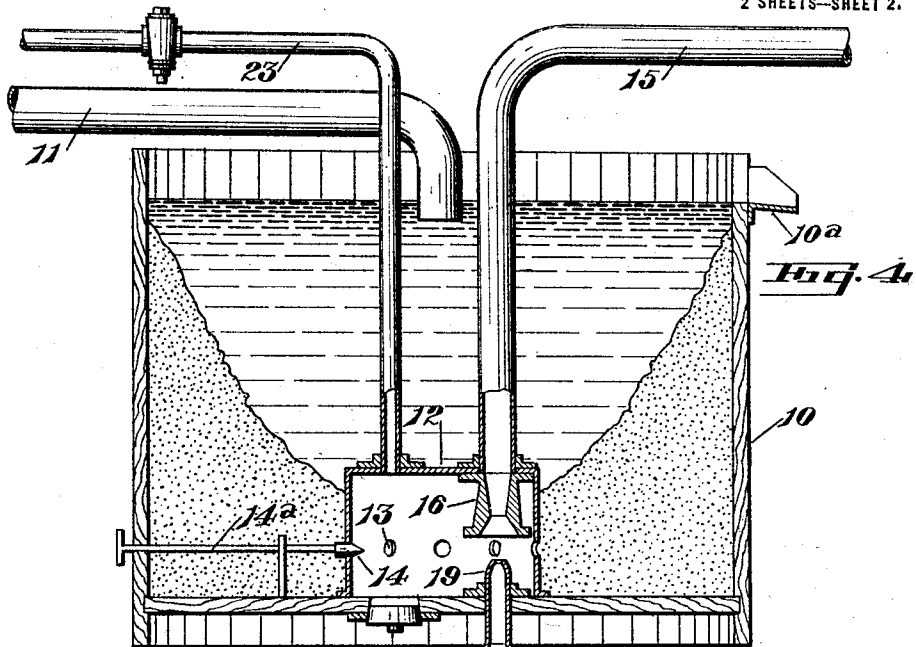
2 SHEETS—SHEET 1.



INVENTOR
EDMUND SHAW.
BY
Chas. E. Townsend
ATTORNEY

1,406,291.

2 SHEETS--SHEET 2.



BY Char. E. Townsend

ATTORNEY.

UNITED STATES PATENT OFFICE.

EDMUND SHAW, OF EL PASO, TEXAS, ASSIGNOR TO THE ALLEN CONE CO., OF EL PASO, TEXAS, A CORPORATION OF NEW MEXICO.

SAND-WASHING DEVICE.

1,406,291.

Specification of Letters Patent. Patented Feb. 14, 1922.

Application filed January 12, 1921. Serial No. 436,666.

To all whom it may concern:

Be it known that I, EDMUND SHAW, a citizen of the United States, residing at El Paso, in the county of El Paso and State of Texas, have invented new and useful Improvements in Sand-Washing Devices, of which the following is a specification.

This invention relates to sand washing devices of the type employing a hydraulic elevator.

The object of the invention is to simplify and improve the construction and operation of a device of this character.

In the accompanying drawings Fig. 1 shows a vertical, central sectional view of one form of device embodying my invention,

Fig. 2 shows a plan sectional view of the same,

Fig. 3 shows an enlarged vertical, central, sectional view of the jet nozzle and adjustable mounting therefor employed in connection with the hydraulic elevator,

Fig. 4 shows a vertical, central, sectional view of a modified form of the device illustrated in Fig. 1,

Fig. 5 shows a similar view of a second modification.

Referring in detail to the accompanying drawings, the device therein shown comprises a tank 10 for receiving the material to be treated, such material being fed into the tank through a feed pipe 11. Beneath the tank 10 is a compartment 12 communicating with the interior of the tank through a series of orifices 13, the area of which orifices is controlled by plugs 14, whereby to compensate for changes in the character or volume of the feed stream. Extending vertically at the center of the tank is a discharge column or hydraulic elevator 15 having an intake or throat piece 16 extending into the compartment 12.

To supply water to the hydraulic elevator I provide a pipe 17 controlled by a valve 18 and having a discharge nozzle 19 disposed within the compartment 12 in line with and below the throat or intake 16 of the hydraulic elevator. To allow the distance between the nozzle 19 and intake 16 to be varied I mount the said nozzle in a screw threaded

bearing 20 arranged on the bottom of the compartment 12. The nozzle connects with the pipe 17 by means of a flared or conical end 21 entering a chamber 22 on the end of the pipe 17.

An auxiliary supply of water is admitted to the compartment 12 through a pipe 23 controlled by a valve 24.

In Fig. 4 I show the compartment 12 inside of the tank 10 and material from the latter is admitted through orifices 13 formed in the sides of the said compartment. These orifices are also controlled by plugs 14 which may be operated by rods 14^a extending through the tank and terminating at the exterior thereof.

In Fig. 5 the hydraulic elevator or discharge pipe is located outside of the tank 10 and a pipe 15^a affords communication between the compartment 12 and a second compartment 12^a which incloses the space around the nozzle 19 and intake 16.

In the operation of the device the tank 10 is supplied with sand and water through the feed pipe 11 and the sand or solids accumulate in the tank near the bottom thereof while lighter particles overflow through a spout 10^a at the top of the tank. The material accumulated in the bottom of the tank enters the compartment 12 through the orifices 13, and if such material should enter too fast these orifices may be partially closed by means of the plugs 14. Within the compartment 12 the material meets with clear water admitted through the pipe 23 and is drawn up through the throat of the discharge pipe 15 by the jet emitted through the nozzle 19. In its passage through the throat 16 the sand is scrubbed and freed from adhering clay. The column 15 discharges outside of the tank 10 where the sand is allowed to pile up on the ground or otherwise dewatered by suitable means. The water flowing away from the pile of sand carries the clay with it so that the sand is left clean.

The means by which the area of the orifices between the tank 10 and compartment 12 may be varied is an important factor in a device of this character. For example,

if the feed be mixed sand and slime, the slime overflowing the tank 10 and the sand passing through the compartment 12 it is evident that the area of the orifices must be sufficient to pass all of the sand since if these orifices be too small the sand will accumulate in the tank and eventually overflow with the slime. On the other hand, if the orifices be too large the slime will pass into the compartment 12 along with the sand. It is also to be noted that the area of these orifices can be changed without interfering with the functioning of the device by employing the rods 14 terminating at the exterior of the tank.

Another feature of importance in connection with the present device is the use of an auxiliary stream of water supplied to the compartment 12 by the pipe 23. In prior devices using hydraulic elevators the whole suction force of the hydraulic elevator is effective on the orifice formed in the partition between the upper and lower compartments. Since all the material elevated must enter the lower compartment through these orifices there is always a downward flow and any particles in the upper compartment that come into the zone in which the suction of the hydraulic elevator causes a downward flow must inevitably pass through and be discharged by the hydraulic elevator. To overcome this I provide an auxiliary supply of water which is just sufficient to neutralize the suction effect of the hydraulic elevator. While the sand from the tank 10 will still pass downwardly through the orifices the force of downward movement will simply be that of gravity. Furthermore the auxiliary water supply will create an upward flowing current through the orifices 13 since all water entering the compartment 12 from the auxiliary supply pipe 23 in excess of that discharged by the hydraulic elevator must pass through these orifices. Thereby these orifices are converted into a sorting column which will act to prevent the downward passage of slime or finer particles than are desired in the hydraulic elevator discharge. In effect this auxiliary supply of water converts a very inefficient classifier into a perfect sand washing device.

To obtain the highest efficiency from the hydraulic elevator the outlet of the nozzle must be properly spaced with relation to the throat piece 16 and this spacing depends on numerous factors such as the velocity head of the flow from the nozzle, the character of the material to be raised and the shape or curvature of the inside of the throat piece 16, which in the present instance is fashioned after a Venturi tube. This adjustment should be made without interfering with the operation of the device

and it will be noted that the present screw threaded mounting permits such adjustment from the exterior of the machine.

Various changes in the construction and arrangement of the several parts of the device as herein shown and described may be employed without departing from the spirit of my invention as disclosed in the appended claims.

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

1. In a sand washing device a receiving vessel, a compartment communicating with the bottom of said vessel into which the material accumulated in the bottom of said vessel passes, a discharge pipe opening into said compartment and extending upwardly to a point above the level of the receiving vessel, said discharge pipe being provided with a flared intake, a jet nozzle extending into the compartment and cooperating with said discharge pipe for elevating the material therethrough and means operable from the exterior of the compartment for adjusting the position of the nozzle with respect to the intake of the discharge pipe.

2. In a sand washing device a receiving vessel, a compartment communicating with the bottom of said vessel into which the material accumulated in the bottom of said vessel passes, a discharge pipe opening into said compartment and extending upwardly to a point above the level of the receiving vessel, said discharge pipe being provided with a flared intake, a jet nozzle extending into the compartment and cooperating with said discharge pipe for elevating the material therethrough, means for adjusting the distance between the nozzle and intake, said adjusting means comprising a screw threaded bearing for the nozzle and an extensible connection between the nozzle and its supply pipe.

3. In a sand washing device, a receiving vessel, a compartment arranged in the bottom of such vessel, controllable orifices between the compartment and vessel for permitting the material accumulated in the bottom of the vessel to enter said compartment, a hydraulic elevator for raising said material to a point above and outside the receiving vessel and means operable from the exterior of the vessel for controlling the size of said orifices.

4. A sand washing device comprising a tank to receive the material to be treated, a compartment in the bottom of said tank having adjustable orifices in its walls to permit the material accumulated in the bottom of the tank to enter said compartment, a discharge pipe extending vertically from the interior of the compartment to a point above and beyond the side of the tank, a Venturi

tube forming an intake for said discharge nozzle whereby to vary the distance between pipe and a nozzle for supplying a jet of the nozzle and intake for the discharge pipe. water to said discharge pipe for raising material therethrough.

EDMUND SHAW.

5 5. The combination set forth in claim 4 including means accessible from the exterior of the tank, for adjusting the position of the

Witnesses:

M. R. HEMLEY,

A. H. SWETT.