J. A. MILLER & C. S. WALLACE.

DREDGE.

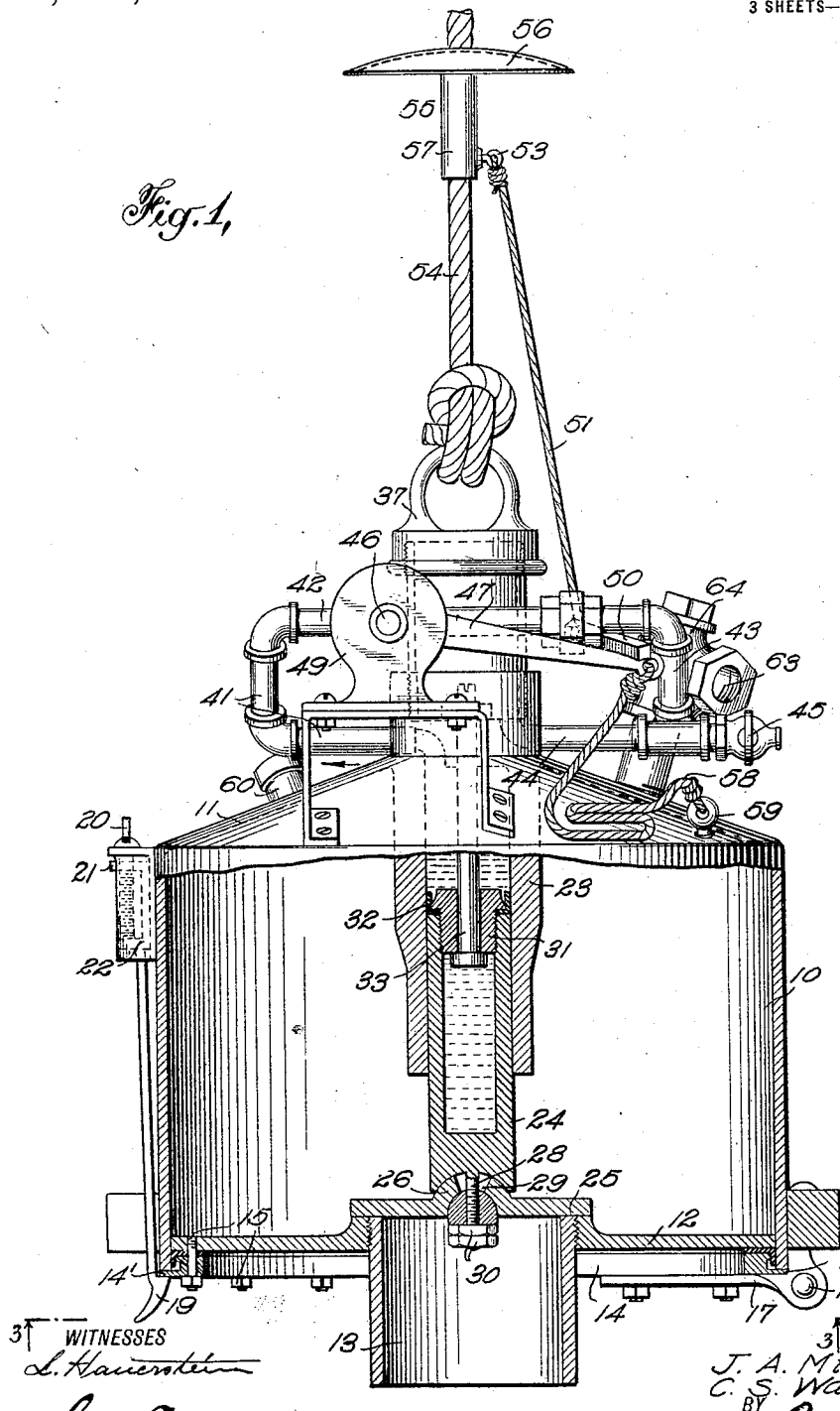
APPLICATION FILED SEPT. 16, 1915.

1,198,255.

Patented Sept. 12, 1916.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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3 SHEETS—SHEET 2.

Fig. 2,

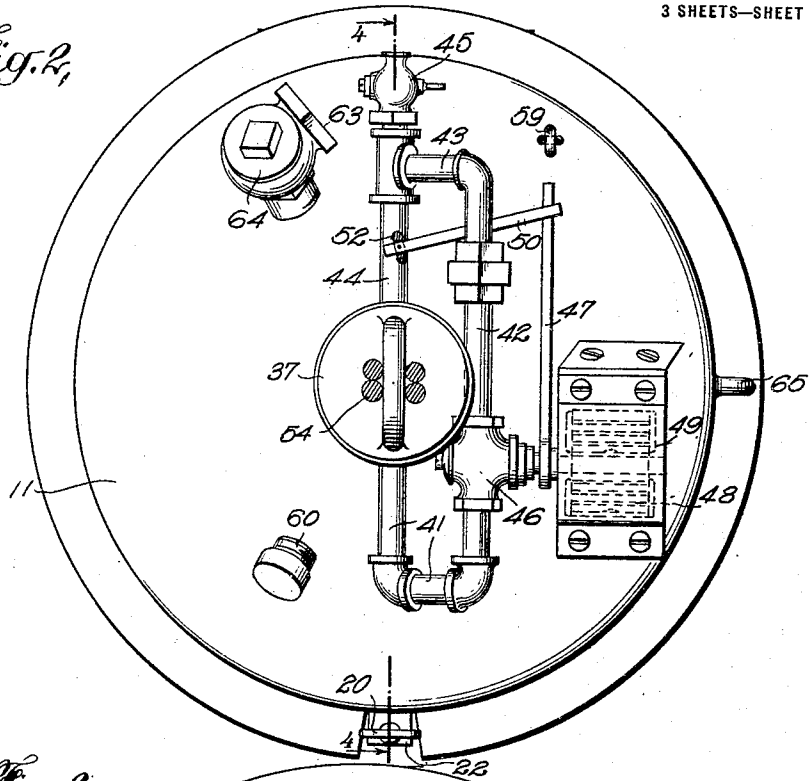
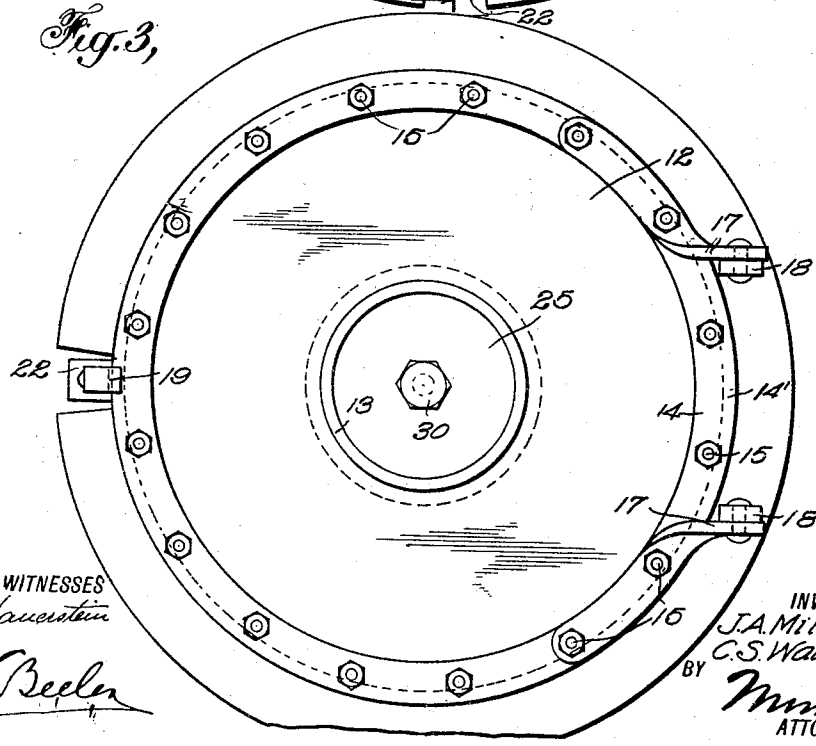


Fig. 3,



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3 SHEETS—SHEET 3.

Fig. 5.

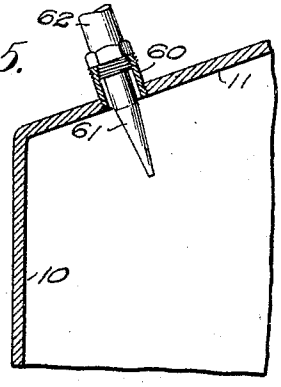
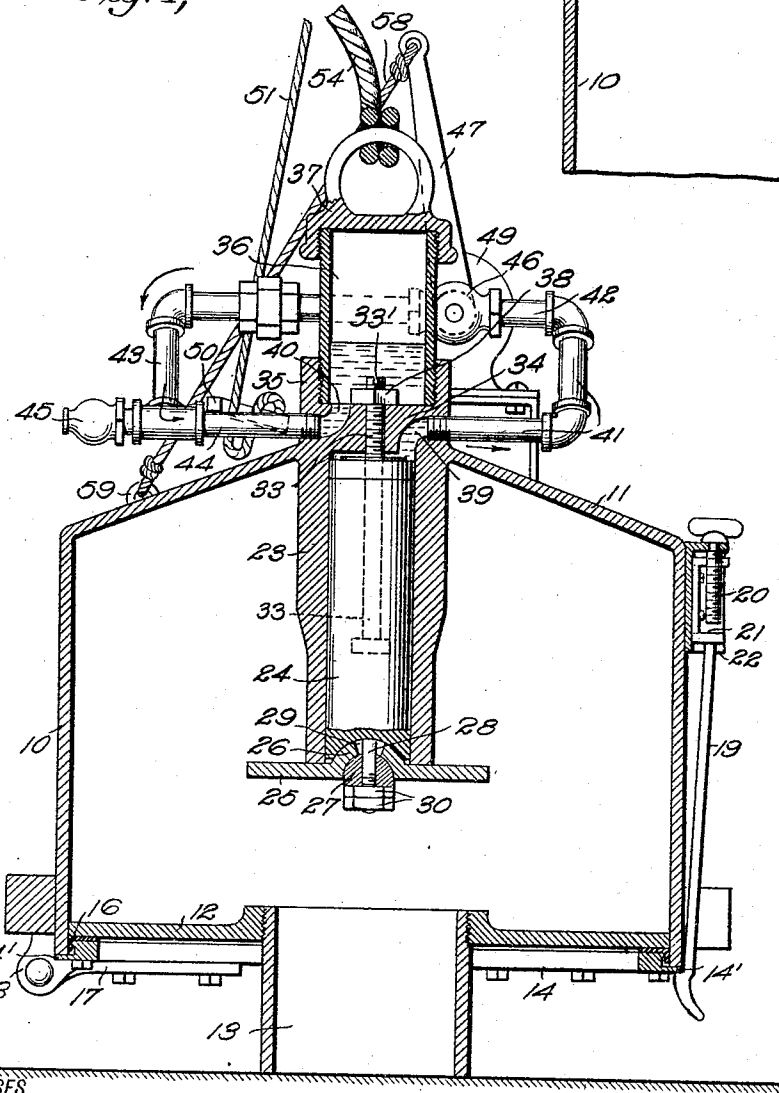


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN ALEXANDER MILLER AND CHARLES STERLING WALLACE, OF BELLINGHAM, WASHINGTON; SAID MILLER ASSIGNOR TO SAID WALLACE.

DREDGE.

1,198,255. Specification of Letters Patent. Patented Sept. 12, 1916.

Application filed September 16, 1915. Serial No. 50,980.

To all whom it may concern:

Be it known that we, JOHN A. MILLER and CHARLES S. WALLACE, citizens of the United States, and residents of the city of Bellingham, in the county of Whatcom and State of Washington, have invented a new and Improved Dredge, of which the following is a full, clear, and exact description.

This invention relates to dredges and has particular reference to a self-filling dredge receptacle adapted to be operated at the bottom of a body of water at any desired depth.

More definitely stated, among the objects of our invention is to provide a device adapted to be lowered from a barge or the like, above the surface of the water, the device sinking automatically to the bottom of the body of water and when the bottom is reached, the material at the bottom on which the device comes to rest will be automatically drawn into the receptacle, means furthermore being provided to prevent the escape of such dredged material from the receptacle.

A further object of the invention is to provide an automatic controlling means for the inlet of the receptacle, such controlling means including a connection with the main hoisting cable and being provided with a retarding device to prevent the opening of the valve prior to contact with the bottom of the body of water even though the hoisting cable is slack.

With the foregoing and other objects in view the invention consists in the arrangement and combination of parts hereinafter described and claimed, and while the invention is not restricted to the exact details of construction disclosed herein, still for the purpose of illustrating a practical embodiment thereof reference is had to the accompanying drawings, in which like reference characters designate the same parts in the several views, and in which—

Figure 1 is a side elevation partly in vertical central section showing our improvement with the parts in position as when being lowered; Fig. 2 is a top plan view; Fig. 3 is a bottom plan view; Fig. 4 is a vertical central section on the line 4—4 of Fig. 2; and Fig. 5 is a detail view of the steam jet device.

Referring more particularly to the drawings we show a device or apparatus comprising a receptacle 10 indicated as of cylindrical form and having a closed convex or upwardly projecting conical top 11. The bottom of the receptacle is open and provided with a closure plate or its equivalent 12 having a central opening into which may be fitted a nozzle 13 of any suitable length or character through which the material to be dredged may be sucked into the interior of the receptacle. The bottom 12 is reinforced by a strong heavy ring 14 connected by bolts 15 to the periphery of the bottom disk and carrying a strip of packing 16 to make the bottom closure air and water tight. The ring 14 has a peripheral flange 14′ adapted to seat against the lower end of the receptacle to prevent the bottom closure from being forced too far inwardly. The bottom is connected by strap hinges 17 to lugs or ears 18, whereby the bottom is permitted to swing downwardly for dumping the material from the receptacle. The bottom is held closed by a spring catch 19 whose adjustment may be effected by means of a screw 20 acting upon a head 21, carried by the upper portion of the catch and movable along a keeper 22, adjacent the top of the receptacle.

Within the receptacle and carried by the top 11 is a cylinder 23 fitted with a piston 24 to the lower end of which is secured a valve 25. The valve is provided with a hemispherical projection 26 coöperating with a similar concavity in the lower end of the piston 24 and provides for a certain amount of vibration of the valve while carried by the piston. The connection between the valve and the piston is completed by a ball 27 surrounding a screw end 28 projecting through a loose fitting hole 29 in the valve extension and secured by lock nuts 30. The valve 25 is adapted to seat snugly and tightly upon the upper end of the nozzle 13 or rim surrounding the opening in the closure 12. The cylinder 23 above the piston is filled with water or other fluid which serves to hold the valve 25 tightly seated as above described. The piston 24 is hollow and has fitted to its upper end a head 31 serving to hold a packing strip 32 in position and also constituting a means for connecting a stationary bolt 33 to the piston, preventing the piston and valve from dropping downwardly when the

bottom of the receptacle is open. The hollow of the piston is also filled with a fluid and the head 31 has a comparatively loose sliding fit over said bolt 33.

The upper threaded end of the bolt is fitted adjustably in the partition 34 across the top of the cylinder 23 but just below a socket 35 formed at the upper end of the cylinder to receive a tubular member 36 constituting an air chamber when closed by the hoisting cap 37 shown as threaded thereon. The bolt is provided with a slot 33′ or its equivalent at its upper end, accessible through the air chamber when the cap 37 is removed whereby the effective length of the bolt may be determined, and such length may be made permanent by lock nut 38.

The upper end of the cylinder structure 23 is provided with by-passes 39 and 40 communicating respectively with the main body of fluid within the cylinder and the air chamber. A series of pipes extend from one by-pass to the other on the outside of the receptacle, such pipes being indicated at 41, 42, 43 and 44. These several pipes are suitably connected by unions and thereby provide a circuit for the passage of fluid from the cylinder 23 to the air chamber and return upon the reversal of direction of flow through the pipes. A pet cock 45 is connected to the pipe 44 and serves as a means to charge the cylinder 23 and series of pipes with fluid under pressure, thereby causing a body of air under pressure to be collected in the upper portion of the air chamber. The circulation of fluid through the series of pipes is controlled by a valve 46 located in a pipe 42. A lever 47 is connected to the valve 46 and controls the position of the valve. When the lever is down or extending in a horizontal direction as shown in Fig. 1 the valve is closed, but such position is maintained against the force of the spring 48 in a barrel 49, by means of a bar 50 extending beneath the pipe 42 and over lever 47 as shown in Figs. 1 and 2. This position of the bar 50 is maintained by a line 51, extending from a ring 52 at the other end of the bar up to a screw eye 53. The position or movement of the receptacle as a whole is controlled by a main hoisting cable 54 attached to the cap 37 and adapted to be manipulated either by hand or by suitable power devices as shown.

55 indicates a strong retarding device comprising a disk-like cap or dome 56 and a sleeve 57 extending downwardly from the center of the dome around the cable 54. The screw 53 above mentioned constitutes a set screw acting through the sleeve serving to fix it in position upon the cable and thereby determine the effective length of the line 51. With the parts in the relative positions shown in Fig. 1 if the device be lowered in the body of water the bar 50 will remain functional holding the valve 46 closed until the line 51 becomes slack. At such time the spring 48 will swing the lever 47 upwardly opening the valve 46. The retarding device 55 acts upon the lower portion of the cable 54 in the nature of a parachute serving to keep the line 51 under sufficient tension for its purpose, even though the main portion of the cable 54 may be paid out and slackened in excess of the sinking movement of the device through the water. A line 58 connected at one end to the lever 27 and to a fixed eye 59 at the top of the receptacle 10 serves to limit the upward swinging movement of the lever when the valve 46 is open.

At 60 we provide a nipple for the attachment of the steam nozzle 61 whereby steam or its equivalent may be forced through a pipe 62 into the interior of the receptacle 10. With the bottom closed and the parts in position shown in Fig. 1 when the steam is forced into the receptacle any air contained therein will be discharged through the air outlet 63 past a check valve 64. Upon shutting off the steam and after condensation thereof within the receptacle a substantially complete vacuum is left therein. It follows, therefore, that when the device is lowered upon the material to be dredged and the valve 46 is opened by the means above described the hydrostatic pressure on the outside of the receptacle and acting around the material to be dredged in connection with a vacuum which may be formed within the receptacle, will cause the valve 25 to be lifted as shown in Fig. 4 and permit the receptacle to be filled with the desired material. The upward movement of the valve 25 elevates the piston 24 causing the fluid in the cylinder 23 to flow through the series of pipes into the air chamber 36 partially filling the same and compressing the air therein. When the receptacle is filled as described and the equilibrium of pressures is established between the inside and the outside thereof the valve 25 will automatically close under the force of the compressed air in the chamber 36 acting to drive the fluid in a reverse direction into or toward the cylinder 23.

When dredging at great depths, say at one hundred feet or deeper, it is not necessary to charge the receptacle with steam preliminary to sinking it. The air contained within the receptacle at such depths will be driven out through the air outlet by the hydrostatic pressure.

The apparatus is especially adapted for prospecting and dredging in the rough, uneven, rocky bottoms of rivers, lakes, or the like, for the recovery of gold or other purposes ordinarily inaccessible in such places by dredging apparatus heretofore known.

At 65 is provided an eyelet adjacent the

bottom of the receptacle to which an anchoring line may be attached when operating in swift currents.

We claim:—

1. In a dredge, the combination of a receptacle having a closed top and an open bottom, a movable closure for the bottom, having a central opening, means to hold the closure in closing position, a movable valve within the receptacle adapted to close said central opening and an automatically operated device for controlling the position of the valve, substantially as set forth.

2. In a dredge, the combination of a receptacle having a rigid closed top and a bottom having an opening, a valve within the receptacle adapted to close said opening, a hydraulic jack comprising a rigid cylinder carried by the receptacle top and projecting into the receptacle above the bottom opening, said jack also including a piston slidable in the cylinder, ball and socket joint connections between the valve and the piston and means on the outside of the receptacle to control the operation of motive fluid into or out of the cylinder to control the position of the valve.

3. In a dredge, the combination of a receptacle adapted to receive a load of material and having an opening through which the material enters, a valve adapted to close said opening, a main hoisting cable connected to the receptacle to control its movements, means connected to the valve to control its position holding it normally closed while the receptacle is being lowered for filling and means including a line attached to the main cable serving to cause the valve to open automatically when the receptacle reaches the bottom to be dredged.

4. In a dredge, the combination of a receptacle adapted to be filled with material and having an opening to admit such material, a valve adapted to close said opening, a hydraulic jack carried by the receptacle and serving to hold the valve closed while the receptacle is descending, a main hoisting cable connected to the receptacle and devices between the cable and the jack to cause the jack to release the valve automatically when the receptacle reaches the bottom.

5. In a dredge, the combination of a receptacle having an opening to admit the material to be dredged, a valve adapted to close said opening, a hydraulic jack serving to hold the valve closed while the dredge is descending, a flexible connection to control the movements of the receptacle, a retarding device carried by said connection and devices between the retarding device and the jack serving to maintain the jack in position to hold the valve closed under the influence of the retarding device but releasing the jack automatically when the receptacle reaches the bottom to be dredged.

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CHARLES STERLING WALLACE.

Witnesses:
W. B. WALLACE,
J. W. SELLS.

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