(No Model.)

W. M. PRATHER.

SUBMARINE SOUNDING APPARATUS.

No. 525,362. Patented Sept. 4, 1894.

Fig. 1.

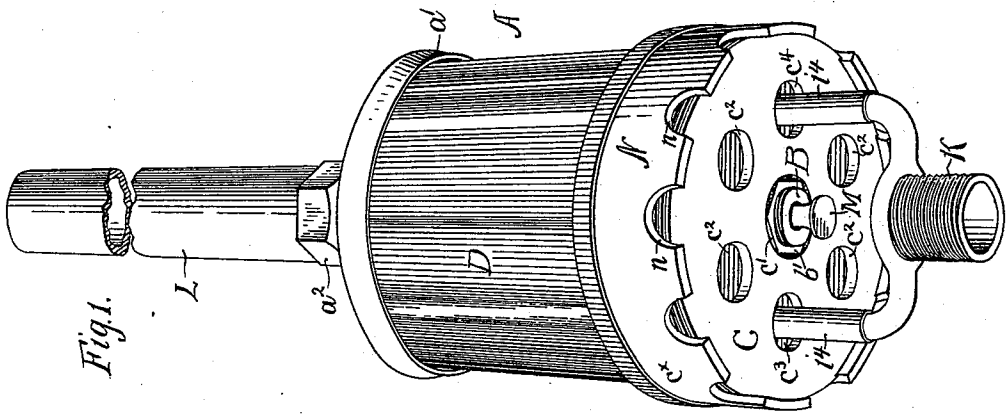


Fig. 3.

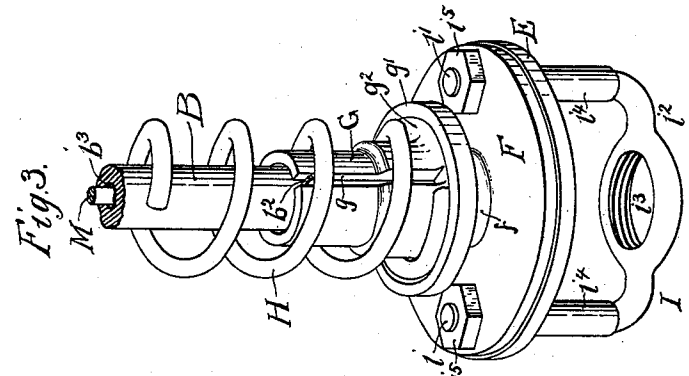
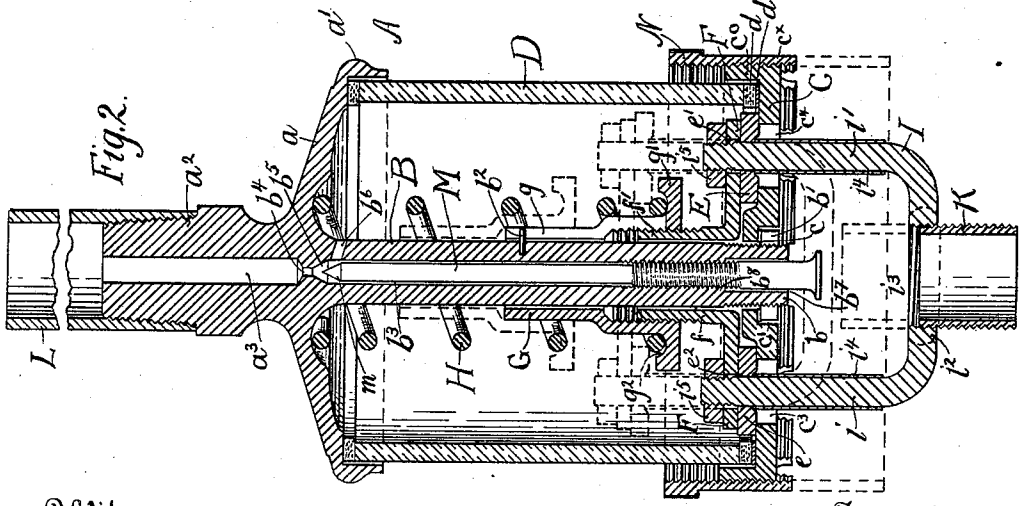


Fig. 2.



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SUBMARINE SOUNDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 525,362, dated September 4, 1894.

Application filed October 27, 1893. Serial No. 489,253. (No model.)

To all whom it may concern:

Be it known that I, WILLIS M. PRATHER, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Submarine Sounding Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of my invention is,—first, a liquid receiver for sounding and wherein to obtain for analysis a quantity of the liquid upon the bottom of a water course, well, cistern or other reservoir in which the sedimentary deposit is largely in excess, and enable the condition of the liquid to be inspected; second, to determine the depth of the sedimentary deposit beneath the liquid; third, to regulate the force of the displacement of air by the liquid, when the valves are opened.

My invention further consists in the novel construction and combination of parts such as will be first fully described and specifically pointed out in the claims.

In the drawings: Figure 1, is a view in perspective of the sounding apparatus. Fig. 2, is a vertical sectional view of the apparatus as seen in Fig. 1. Fig. 3, is a detail view in perspective of the bottom of the receiver, the spindle, the yielding valve, and spring and valve lifting extensible stems.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to the drawings, A represents a closed liquid receiver or vessel of the proper size to be submerged in the water, and meet with the least resistance before the air is expelled.

In the construction of the receiver *a* represents the top, which consists of a circular plate or disk a short portion of the outer edges of which is bent in a downward direction to form the flange *a'*. To the under side of the disk *a*, and at a central point to its circular outer edge is rigidly attached one end of the spindle B, the other end of which spindle extends the described length of the receiver, and a short portion of said end is screw threaded at *b*, upon which end is fitted a nut *b'*.

The bottom C of the receiver consists of a disk C, which is of the same dimensions as the top *a*. At the center of the disk is a circular opening *c*, of the proper size to admit the passage of the lower screw threaded end *b*, of the spindle B, a portion of which disk around said opening is counter sunk at *c'*, so as to admit the nut *b'* which nut holds the bottom C, upon the spindle B. A portion of the circular outer edge of the bottom C is bent at an angle in an upward direction so as to form the flange c^0. The said outer edge of the bottom C, and also the outer portion of c^0 is screw threaded. In the bottom C of the receiver A are valve openings c^2 c^2 for the purpose hereinafter described.

The sides of the receiver consist of a hollow cylinder D, which is preferably made of glass. The cylinder D is extended around the spindle B, one end of which cylinder is made to fit against the under side of the disk *a*, and within the inner side of the flange *a'*. The other end of the cylinder extends to and within the inner side of the flange c^0, and nearly to the inner side of the disk C.

Between the lower circular edge of the cylinder D and the inner side of the disk C, is fitted a rubber gasket *d*, and between the gasket and the inner side of disk C is a washer *d'*. Upon the upper side of the disk C, and extending around the spindle B, is a self closing circular valve plate E, in which is a circular opening *e*, slightly larger than the counter sunk depression *c'* on the disk C, and which plate covers each one of the valve openings c^2 c^2 in the bottom C of the receiver A.

Upon the upper side of the valve plate E, and nearly of the same diameter as the disk E, is a circular plate F, which is provided with a central opening f^0, which is slightly larger than the spindle B, which passes through it. To the upper side of the disk F, and fitting loosely around the spindle B, is rigidly attached a sleeve or collar *f'*, which is externally screw threaded at its upper end.

Upon the spindle B, above the disk F is fitted loosely a sleeve G, which is slotted upon

one side at g, in the line of direction of the spindle B. In the side of spindle B, at an intermediate point from the top and bottom of the receiver is a guide pin b^2, which extends outwardly through the slot g, in the sleeve G. The lower end of the sleeve G, is enlarged in circumference and its inner side also extended outwardly from the spindle B, which inner side of sleeve G is screw threaded, and fitted to the externally screw threaded collar f' on the disk F. Upon the lower end of the sleeve G, and extending around the outer side portion is a horizontally extended flange g' in the upper side of which is a recess or seat g^2.

Around the spindle B is a coiled spring H, one end portion of the spring H rests on the seat g^2 of the flange g' of sleeve G, and the other end against the under side of the top plate a at the upper end of the receiver; the tension of which spring is increased or diminished as hereinafter described.

Through the bottom or plate C of the receiver, equi-distant from the spindle B, and the outer side of the cylinder D, extends an opening c^3, which is of the same size as the valve opening c^2, and arranged between adjacent valve openings. Upon the other side of the spindle B, and in line diametrically with said spindle, extended across the opening c^3 in plate C is a similar opening c^4. In the valve plate E, and disk F in a vertical line with the openings c^3 c^4 in the plate C, are openings e' e^2, which are smaller in diameter than the openings c^3 c^4.

The valve lifting device I, consists of two upwardly extended valve stems or rods, i, i' which are connected at their lower ends by the transverse bar i^2, which bar is extended in width at a point equi-distant from the stems i i', and a circular screw threaded opening i^3 formed in said bar. Over each stem i i' is fitted a sleeve i^4, each one of which sleeves extends from the bar i^2 upwardly to within a short distance of the upper end of each respective stem. The upper ends of both stems i i' are screw threaded, and one of said stems i is inserted in the opening c^3 of the plate C, and also in the opening e^2 in the respective plates E. F; the upper end of the sleeve i^4 abutting the under side of the valve plate E, and the screw threaded end of the stem i extending a short distance above the line of the upper surface of the disk F, and the other stem i extending through the opening c^4 in the plate C is also extended through the opening e' in the valve plate E, and disk G, and a short distance above the upper surface of said disk, the upper end of the sleeve i^4 abutting the under side of the valve plate E. Upon the upper end of each one of the stems i, i' is fitted a nut i^5. In the screw threaded opening i^3 of the bar i^2 is inserted the screw threaded upper end of an extension rod K.

From the outer side of the top plate a, and centrally in position to the outer edge of said plate is extended a circular screw threaded neck a^2 to which is fitted the lower end of an internally screw threaded tubular handle L of any desired length.

In the spindle B is a longitudinal central opening b^3, which communicates with a similar opening a^3 in the neck a^2. In line with the plate a, the openings a^3 b^3 are contracted, so as to form a small air passage b^4, and a conical valve seat b^5, at the terminal of the opening b^3.

In the spindle B, near the under side of the plate a, and communicating with the opening b^3, near the valve seat b^5 is an opening or vent b^6. A portion of the inner side of the opening b^3 from the lower end of the spindle, a short distance in the direction of the valve seat b^5 is enlarged in diameter, as at b^7 and from said enlarged opening a short portion of the sides of the opening b^3 beyond the enlarged opening is screw threaded as at b^8. In the opening b^3 is fitted a needle valve M, which extends the entire length of the opening b^3; the inner end m of which needle valve is gradually diminished to a single point and fit the valve seat b^5. The other or outer end of the valve extends a short distance beyond the lower end of the spindle B. A short portion of the needle valve M, which is opposite the screw threaded portion b^8 of the side of the opening b^3 is also screw threaded and fitted so as to enable the adjustment of the valve in the proper degree.

Extending around the flanged plate C, which forms the lower end or bottom of the receiver A is an internally screw threaded circular plate or ring N, which is fitted to the screw threads c^0 on the said flange, so as to be adjusted the proper degree in an upward or downward direction, and extends in width a short distance below the line of the lower end of the spindle B. In the lower edge of the plate N, are transverse openings, n, n.

In the operation of the improved sounding apparatus the depth at which the receiver is to be operated is first ascertained, and the needle valve M, so adjusted as to permit the air within the receiver to escape through the opening b^6 freely or retard its escape in proportion to the resistance to the receiver, when submerged in the liquid, which varies with its depth. For the purpose of obtaining the desired measure of liquid, in shallow reservoirs or cisterns to which the invention is particularly applicable the rigid handle L is employed with the hands to force the receiver A beneath the water and to the bottom of the reservoir. The deposit of sedimentary matter in reservoirs which varies in depth is first tested as to its depth by the sinking of the bar i^2, without the rod k in the sediment, until the bottom of the reservoir is reached, and then pressing upon the handle L with sufficient force to lift the valve plate E, and the needle valve M, being opened its full extent permits the liquid to enter the receiver through the valve openings c^2 c^2, and fill the receiver at the same time expelling the air. Upon the

release of the pressure on handle L the valve closes automatically. When the sediment is found of such a depth that the resistance of the bottom of the reservoir is not obtained to open the valve, the extension rod K is employed which is made of any desired length, and will penetrate the full depth of the sediment. The liquid which enters the receiver can thus be obtained at any depth below the surface. In the removal of sedimentary deposits from reservoirs and when it becomes necessary to test the proportinate amount of sediment remaining as the cleansing process progresses the circular plate N, is turned or adjusted in position, so as to extend its lower edge beneath the line of the under surface of the plate C, so as to rest upon the bottom of the reservoir, and at the same time permit the valve E to be opened its full extent, the water in its purified state entering through the passages *n* in the lower edge of plate N.

For the purpose of increasing or diminishing the tension of the spring H, the receiver is held firmly, one hand grasping the top *a* and the other hand the valve lifting bar i^2, which latter is turned in one direction or toward the operator and the tension of the spring is diminished according to the threads the thread collar *f* on the disk F drawing the flanged sleeve G, which is prevented from turning on spindle B in a downward direction. In a reverse movement of the bar i^2 the sleeve G is moved in an upward direction and the tension of the spring correspondingly increased. In the movement of the bar i^2, the rotation in a partial degree of the disk F and plate E and bottom C is effected and without moving the cylinder D the washer *d'* permitting the free movement of the bottom C, upon the lower edge of the cylinder D.

In deep water sounding, when a line is used to lower the receiver A the tubular handle L is removed and the tension of the spring H is decreased so as to permit of the ready action of the valve. In such position the needle valve M is adjusted so that the air will escape slowly and as a consequence admit the water in a like degree, which compresses the air within the receiver.

To the receiver may be attached any weight requisite to carry the receiver to the depth, at which the soundings are to be obtained.

In water courses, of shallow depth the tubular handle L, permits the air escaping from the receiver to pass through the tube. In deep water sounding the tubular handle is removed and the air permitted to escape and the water enter in proportion to the depth of the water and the resistance in descent. In the latter use the sides of the receiver are made of metal and of sufficient strength to withstand the outward pressure of the water and the extra weight applied to cause the receiver to descend in the well known manner. When the sample of the water is obtained, the valve stems may be forced in an upward direction which will open the valves and the water will flow through the valve openings and may be preserved for analysis as described.

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

1. A sounding apparatus consisting of a liquid receiver, having valvular openings and valve opening stems extending outwardly from said receiver for opening said valves to said openings, and admitting the liquid, and an air vent in said receiver having a needle valve seat and a needle valve in said seat extending outwardly from the receiver regulating the escape of the air from the receiver in degrees as described.

2. A sounding apparatus consisting of a liquid receiver, having valvular openings and valve opening stems extending outwardly from the receiver, an air vent and means for regulating the escape of the air from the receiver, and extension devices for said valve opening stems substantially as described.

3. A sounding apparatus consisting of a liquid inclosing receiver having an outwardly discharging air vent valvular openings, and valve opening stems extending outwardly from said receiver a stationary spindle within said receiver, having a longitudinal opening in communication with said air vent, and a needle valve seat and a needle valve within the opening in said spindle for the purpose described.

4. In an apparatus for sounding, &c., consisting of a liquid inclosing receiver, having valvular openings and a stationary spindle within said receiver, of a valve closing said valvular openings a vertically adjustable sliding collar, keyed on said spindle a spring upon said spindle bearing upon said collar and means for opening the valves in said valvular openings, and a collar upon said valve adjustably connected with the sliding collar upon said spindle as and for the purpose described.

5. In an apparatus for sounding, &c., consisting of a liquid receiver, and a spindle within and connected with the top of said receiver, and a removable bottom to said receiver, having valvular openings, and a valve to said openings, having an externally threaded collar, and a sliding collar keyed on said spindle having an internally threaded flanged collar, adapted to fit over the collar on said valve, and a spring on said collar bearing upon the flanged collar at one end, and the inner side of the top of said receiver at the other, and means for communicating a partial rotation to said bottom of the receiver, as and for the purpose described.

6. In an apparatus for sounding, &c., consisting of a liquid inclosing receiver, having its sides and ends detachable, and an interior spindle connected with each end, and one of said ends revoluble on said spindle, and

provided with valvular openings of a revoluble spring actuated valve closing said valvular openings as described.

7. In an apparatus for sounding, &c., consisting of a receiver having valvular openings and means for operating said valves externally of an extension plate, extending around said receiver, and adjustable in position upon said receiver, substantially as and for the purpose described.

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