

(No Model.)

C. STORLA.
DEVICE FOR RAISING LIQUIDS.

No. 465,736.

Patented Dec. 22, 1891.

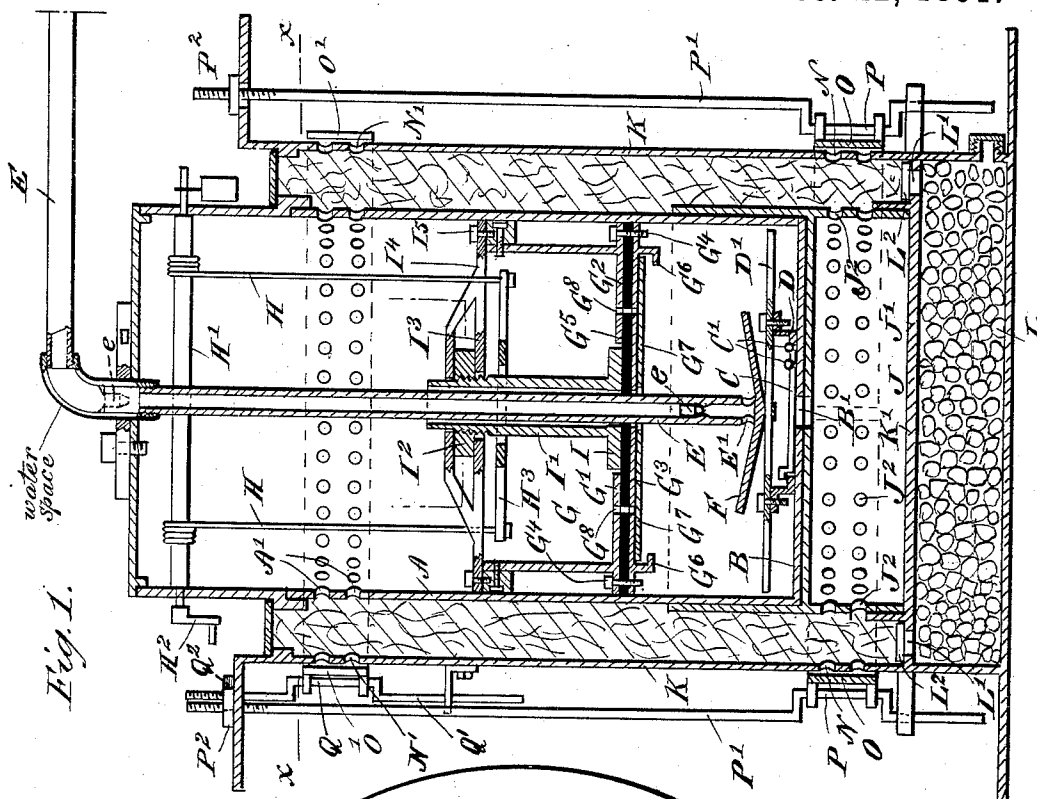


Fig. 2.

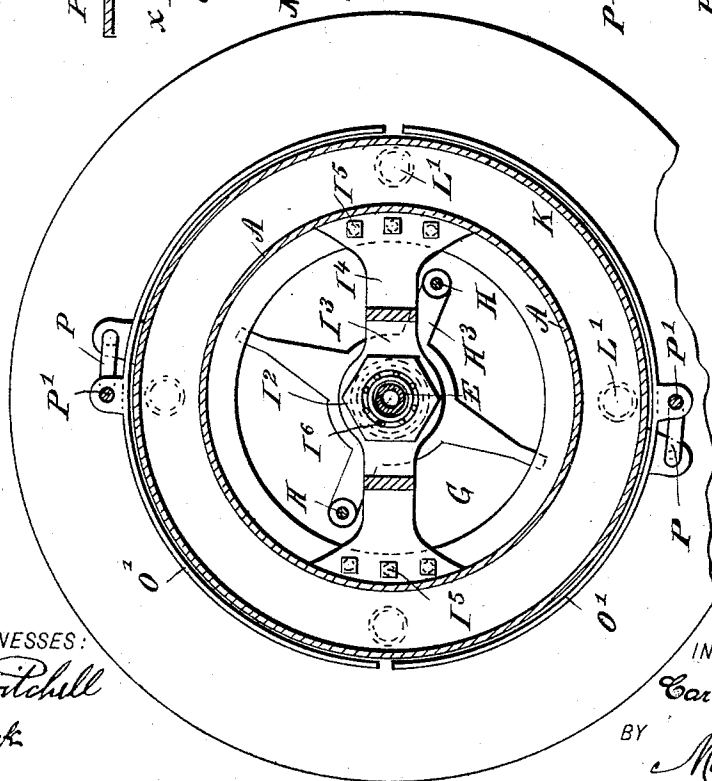
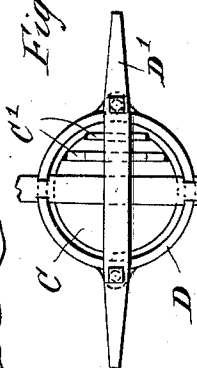


Fig. 3.



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CARL STORLA, OF BELFORD, SOUTH DAKOTA.

DEVICE FOR RAISING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 465,736, dated December 22, 1891.

Application filed January 21, 1891. Serial No. 378,504. (No model.)

To all whom it may concern:

Be it known that I, CARL STORLA, of Belford, in the county of Aurora and State of South Dakota, have invented a new and Improved Device for Raising Liquids, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved device especially designed for raising liquids, such as water from wells, lakes, rivers, &c., and which is simple and durable in construction and very effective in operation.

The invention consists in certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a sectional plan view of the same on the line *xx* of Fig. 1, and Fig. 3 is a plan view of the suction-valve.

The improved device is provided with a cylindrical casing A, having a bottom B, formed with a central aperture B', over which is arranged an upwardly-opening valve C, held in an open frame D, secured on top of the bottom B. The valve C is provided with two parallel pivots C' to insure a perfect seating of the valve over the aperture B'. The open frame D is provided on top with a horizontal bar D', which limits the upward movement of valve C. On this bar D' is secured the lower end of the discharge-pipe E, extending upwardly and passing finally to the top of the casing to any desired place to which the water is to be discharged. The pipe E is provided at its lower end with side openings E', through which the water passes from the casing A to be discharged up the pipe E. In the pipe E is arranged the valve *e* to prevent water and air from rushing down the same and out of the openings E' when the piston is raised. Over the frame D, concentric with the pipe E, is arranged a conical disk F, which serves to guide the water to the openings E'.

In the casing A, above the disk F, is fitted to slide a piston G, adapted to press on the water in the lower part of casing A, and also

adapted to be raised and lowered by ropes H, winding on a windlass H', arranged in the upper part of the casing A and provided with the usual crank-arm H² for conveniently turning the said windlass H' to raise or lower the piston G in the casing A. The piston G is provided with a bottom G', on the under side of which is arranged a packing G², held in place by false bottom G³, secured by bolts G⁴ to the bottom G'. By the tightening of the bolts G⁴ the packing is pressed into firm contact with the interior surface of casing A to prevent leakage.

In order to pack the piston on the discharge E, a second packing-ring G⁵ is placed on top of the false bottom and surrounds the pipe E. On top of this packing-ring G⁵ presses the disk I, provided with an upwardly-extending tube I', through which passes loosely the pipe E. The upper end of this tube I' is threaded and engaged by a nut I², mounted to turn between the arms I³, located one above the other and formed on a cross-piece I⁴, secured by bolts I⁵ to the upper end of the piston G, as plainly shown in Figs. 1 and 2. The under side of the cross-piece is adapted to be engaged by an arm H³, fitted loosely around tube I', and to which arm the lower ends of the ropes H are secured. In order to lock the nut I² in place on the tube I', the latter, as well as the nut, is provided with semicircular recesses, of which two registering ones are adapted to be engaged by a key I⁶ (see Fig. 2) to prevent the nut from turning. In order to firmly pack the piston on pipe E, the key I⁶ is removed and the nut I² is turned to force the tube I' and its disk I downward, so as to press the latter against the packing G⁵ to force the inner edge of the latter onto pipe E.

On the under side of the false bottom G³ are formed or secured L-shaped lugs G⁶, supporting a disk valve G⁷, adapted to close apertures G⁸, formed through the bottom G' and packing-ring G². When the piston moves downward on the water in bottom of casing A, then the disk valve G⁷ closes the apertures G⁸, and when the piston is raised by windlass above the water-level the water which may have accumulated on top of piston passes through apertures G⁸ and over the disk valve G⁷ into the lower part of casing A.

The piston G is adapted to be weighted by suitable material, such as stones, or with water entering the casing through openings A', arranged a suitable distance above the bottom B.

The lower part of the casing A fits into and is supported in a second casing J, provided with a chamber J', in communication with the opening B', formed in the bottom B of the casing, as previously described.

In case the pump is used in lakes, rivers, and similar bodies of water, except regular wells, then a filter is employed, presently to be described. The extreme lower end of the casing J rests on a plate K', formed within an outer shell K, arranged concentrically to the casing A, so as to form a space adapted to be filled with a filtering material, such as sponge. In the outer shell K, below the plate K', is formed a base L, loaded with stone or other material, so as to hold the entire device in the bottom of lake, river, or other similar bodies of water, except wells.

In order to conveniently fill the base L, apertures L' are formed in the plate K' near the shell K and closed by covers L², so as to separate the filtering material from the loaded base. In the shell K opposite the openings J², leading into the chamber J', are arranged similar openings N, adapted to be closed on the outside by semicircular valves O, each of which is pivotally connected with a crank-arm P, formed on a shaft P', mounted to turn in suitable bearings arranged on the shell K. The shaft P' extends vertically through the top flange of shell K, and is provided at this end with a screw-thread engaged by a nut P², resting on top of flange of shell K, as shown in Fig. 1. By turning the nuts P² the shafts P' and valves O can be raised to uncover fully or only partly the openings N to admit more or less water, as desired.

When the valves are closed, as shown in Fig. 1, and the operator turns the shaft P', then the crank-arms P in swinging outward move the valve away from the openings O, so that the water can enter through the said openings from the river, &c., into the filtering material, and from the latter can pass through the openings J² into the chamber J'. Similar openings N' are arranged opposite the openings A', previously mentioned, and are also adapted to be closed by valves O', pivotally connected with crank-arms Q, formed on shafts Q', having their upper ends projecting through the top flange of the shell K and provided with nuts Q².

The operation is as follows: When the casing A, with its loaded shell K, is placed in the lake, river, or other place, then the piston G is held in an uppermost position by the ropes H being wound upon the windlass H'. Water can now pass through the openings N, the filtering material, the openings J², into the chamber J', and from the latter past the valve C into the lower part of the casing A, so that the latter finally fills to the water-level in the

lake, river, &c. If desired, water can also be admitted past the valves O', and openings N' and A' simultaneously or independently with the water entering at the openings J². If the pump is applied to a well, the shell K is not used and water enters directly through opening B'. The second casing may also be dispensed with in case the ground in bottom of well proper is in a sufficiently-hard condition to withstand back-pressure. When the operator desires to raise the water, he turns the crank-arm H² of the windlass H' so as to unwind the ropes H, whereby the piston G slides down in the casing A until it reaches the level of the water in the casing A. The operator then releases the windlass H', so that the piston G by its own weight presses on the water, thus forcing the same through the openings E' into the pipe E, in which the water rises and is finally discharged through the upper end. It is understood that as soon as the piston G commences to press on the water the valves C and G' are closed, so that the water cannot escape from the lower end of the casing, except through the pipe E. If it is desired to weight the piston G with water after the latter has been started down to the level of the water in lake, river, &c., the operator can open the valve O' to permit the water from the lake, river, or sea to flow through the openings N' and through the filtering material and the openings A' into the casing A above the piston G to press on the latter. When the piston G has reached a lowermost position, the water in the lower part of the casing A has been nearly all expelled through the pipe E. Then the piston G is again raised by winding up the ropes H on the windlass H'. The water leaks out of the piston as it is raised, thus making it easy to raise to fill again with water to serve as weight for the piston. As soon as the casing A has again filled with water, as previously described, the piston G is again lowered to the water-level in the casing A and then left to slide downward by its own weight to force the water through the pipe E.

The operation of the piston in a well is the same as in a river, lake, ocean, sea, &c.; but in a well the piston is not loaded with water, but gravel, stone, or other such heavy material. Where water is taken out of a lake, &c., the piston may be loaded with water alone, stone or gravel alone, or water and stone at the same time.

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

1. In a device for raising liquids, the combination, with a fixed casing having an apertured bottom and a series of apertures in its upper portion, of a valve arranged over the aperture in the said bottom, a pipe extending upward in the said casing above the said valve and provided with inlet-openings near its lower end, a piston fitted to slide in the said casing to force the accumulated wa-

ter in the latter through the said pipe, a second casing supporting the first-named casing and provided with a chamber having apertured sides, through which passes the water to the said valve, and a shell surrounding the said casing and forming a space with the latter to be filled with the filtering material, the said shell being provided with apertures to permit the liquid to pass to the filtering material and from the latter to the said chamber, substantially as shown and described.

2. In a device for raising liquids, the combination, with a fixed casing having an apertured bottom, of a valve arranged over the apertures in the said bottom, a pipe extending upward in the said casing above the said valves and provided with inlet-openings near its lower end, a piston fitted to slide in the said casing to force the accumulated water in the latter through the said pipe, a second casing supporting the first-named casing and provided with a chamber having apertured sides, through which passes the water to the said valve, a shell surrounding the said casing and forming a space with the latter to be filled with the filtering material, the said shell being provided with apertures to permit the liquid to pass to the filtering material and from the latter to the said chamber leading to the valve, semicircular valves adapted to

open and close the apertures in the said shell, and shafts provided with crank-arms connected with the said valves, substantially as shown and described.

3. In a device for raising liquids, the combination, with a shell having apertures in its wall, of semicircular valves adapted to fit over the said apertures, a crank-arm pivotally connected with each of the said valves, and a shaft connected with each crank-arm and mounted to turn in bearings on the said casing and extending upward to be under the control of the operator for opening and closing the said valves, substantially as shown and described.

4. In a device for raising water, the combination, with the body of a piston, of a false bottom secured to the bottom of the piston, concentric packing-rings interposed between the two bottoms, a disk resting on the inner packing-ring and provided with a tube extending upwardly through the piston and having its upper end threaded, and a nut on the upper end of the tube, substantially as herein shown and described.

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Witnesses:

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