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D. VANIMAN & S. F. SANGER.

DEVICE FOR PUMPING AIR AND WATER.

APPLICATION FILED SEPT. 27, 1902.

NO MODEL.

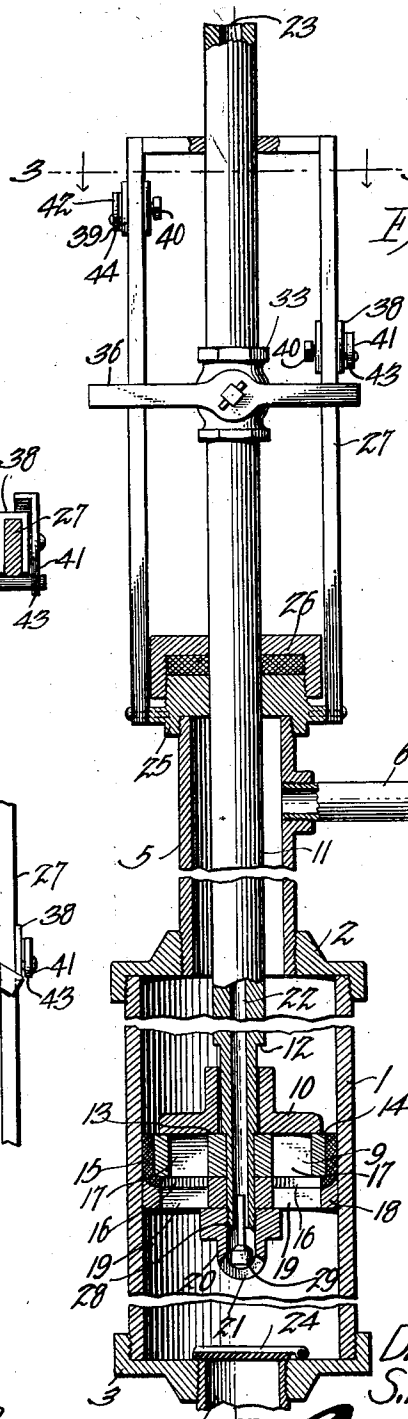


Fig. 1.

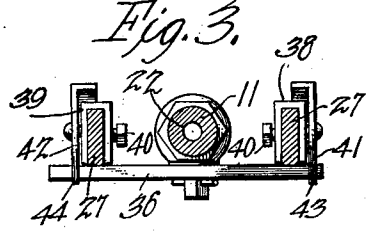


Fig. 3.

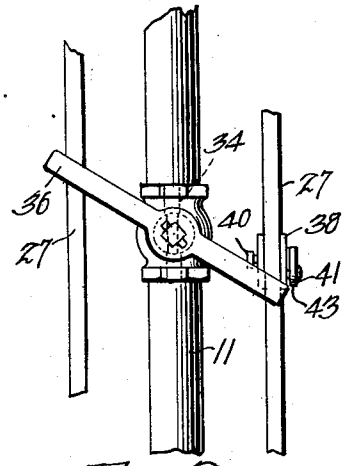


Fig. 2.

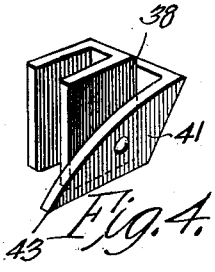


Fig. 4.

Witnesses
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No. 732,241. Patented June 30, 1903.

UNITED STATES PATENT OFFICE.

DANIEL VANIMAN, OF McPHERSON, KANSAS, AND SAMUEL F. SANGER, OF SOUTH BEND, INDIANA.

DEVICE FOR PUMPING AIR AND WATER.

SPECIFICATION forming part of Letters Patent No. 732,241, dated June 30, 1903.

Application filed September 27, 1902. Serial No. 125,094. (No model.)

To all whom it may concern:

Be it known that we, DANIEL VANIMAN, residing at McPherson, in the county of McPherson and State of Kansas, and SAMUEL F. SANGER, residing at South Bend, in the county of St. Joseph and State of Indiana, citizens of the United States, have invented a new and useful Device for Pumping Air and Water, of which the following is a specification.

This invention relates to that class of pumps which are used for pumping air and water simultaneously into a sealed tank or receptacle from which the water may be forced by the air-pressure thus created into the service-pipes.

The invention has for its object to provide a device of this class which shall possess superior advantages in point of simplicity, durability, and general efficiency and in which the general construction shall be such that the parts by means of which the air-inlet valves are opened or closed shall be readily accessible, so that they may be adjusted to control the opening and closing of the valves at certain predetermined points.

The invention consists in the improved construction, arrangement, and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical sectional elevation of a combined air and water pump constructed in accordance with the invention. Fig. 2 is a detail side view, partially in section, showing the pump-rod on its upward stroke and indicating the position assumed by the operating-lever of the upper air-cock when the latter has been thrown open by contact with one of the trips provided for the purpose of operating said valve. Fig. 3 is a sectional plan view on the line 3 3 of Fig. 1. Fig. 4 is a detail perspective view of one of the pivoted or tilting trips employed in connection with the device.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

1 designates the pump-cylinder, which is of ordinary construction, being provided with the upper and lower heads 2 and 3, from the latter of which the suction-pipe 4 extends downwardly into the well or is connected with the source of supply. The upper head 2 has the upwardly-extending discharge-pipe 5, which is connected by a branch 6 with a tank 7, which is sealed so as to be absolutely air-tight and which is connected with the service-pipes. (Not shown in the drawings.) The pipe 6 has a check-valve 8 opening toward the tank.

9 designates the plunger, which is disposed within the cylinder 1 and which embodies in its construction a valve 10, mounted slidingly upon the lower end of the piston-rod 11, which is provided with a shoulder 12 to limit the movement of said valve in an upward direction. The piston-rod 11 is provided with additional shoulders 13, engaging the upper side of the valve-seat 14, which is provided with an annular washer 15 in the form of a cup, having perforations 16 registering with the openings 17 in the seat-ring 14. The cup-leather or washer 15 is retained in position by means of a washer-plate 18 bearing against the under side thereof and having openings 19 alining with those in the cup-leather and in the valve-seat. The two latter members, as well as the washer-ring 18, are retained securely in position by means of a cap-nut 20, which engages the screw-threaded lower end of the piston-rod and serves to clamp the several members tightly together. The cap-nut 20 is provided with a slot or opening 21.

The piston-rod is tubular or provided with a passage 22, extending through the length thereof, its upper end being open, as shown at 23.

The lower end or head 3 of the pump-cylinder is equipped with an ordinary clack-valve 24 to prevent the return of water through the suction-pipe 4. The upper end of the discharge 5 of the cylinder is closed by a pump-head 25, having a packing-box 26, through which the tubular plunger-rod 11 extends, as shown, the said plunger-rod or piston-rod being further extended in an upward direction through a frame 27, which is supported upon the pump-head 25, as shown. The upper end of said piston-rod is to be con-

nected with the source of power for operating the pump by any suitable means, which have not, however, been shown in the drawings.

The lower end of the tubular piston-rod has a seat 28 for a valve 29, confined within the cap-nut 20 and closed by pressure within the pump-cylinder when the plunger is depressed and adapted to be moved to open position by atmospheric pressure during a portion of the upstroke of the plunger.

The tubular plunger-rod, which is open at its upper end, is provided with an ordinary form of stop-cock 33, having a port or passage 34 and provided with a two-armed operating-lever 36, the arms projecting laterally from the air-cock stem and being guided by contact with the side bars of the frame 27. The operating-lever is normally in an approximately horizontal position, with the port or passage of the stop-cock closed to prevent the admission of air to the lower portion of the tubular plunger-rod and pump-cylinder.

The side bars of the frame 27 are provided with vertically-adjustable clips 38 and 39, which may be locked in any position to which they may be adjusted by means of set-screws 40 or other suitable means. Pivotally connected to the clips 38 and 39 are trips 41 and 42, which may consist of approximately triangular plates having inwardly-extended corners 43 and 44, which lie in the paths of movement of the opposite ends of the valve-operating lever. The said trips have oblique outer edges which are provided with inturned flanges, (clearly shown in Fig. 4 of the drawings,) and the lower edges of which by bearing against the outer sides of the supporting-clips serve to retain the lower edges of said trips normally in an approximately horizontal position, the inner ends of the trips being overbalanced by the outer ends and the flanges also serving to prevent the trips from being overbalanced when their inner ends are tripped downwardly by the ends of the lever 36.

The operation of the mechanism will be readily understood from the foregoing description, taken in connection with the drawings hereto annexed. On the upstroke of the plunger one arm of the lever 36 will at a predetermined point engage the trip 41 and be thrown to the position shown in Fig. 2, the port or passage of the stop-cock being brought into alinement with the central passage of the tubular plunger-rod and permitting air to pass down to the lower portion of the plunger-rod and pass into the pump-cylinder, the valve 29 being opened by atmospheric pressure, while the water already contained in the lower portion of the pump-cylinder is prevented from returning to the well by the clack-valve 24 at the upper end of the suction-pipe. Air continues to pass through the plunger-rod until the upper end of the lever 36 comes into engagement with the trip 42 or a fixed stop of any character, at which time the air-cock is closed, the lever being returned to its normal approximately horizontal position. On the downstroke of the plunger the pressure within the cylinder immediately closes the valve 29, and the air and water contained in the cylinder then pass through the plunger-ports, raising the valve 10 into the upper part of the cylinder in position to be forced through the pipe 6 into the sealed tank on the next upstroke of the plunger. On the downward movement of the plunger-rod the lower pivoted trip 41 permits the passage of the lever 36 without effecting any movement thereof, the lever being maintained in horizontal position until it again comes into contact with the trip 41 on the next upstroke of the plunger. By repeating the operation there will be a continued air-pressure in the tank 7, whereby the water from said tank may be forced through the service-pipes, as will be readily understood.

The quantity of air admitted may be regulated by properly adjusting the distance between the trips, the valve being allowed to remain open during a greater or less portion of the upstroke of the plunger in accordance with the pressure desired.

Having thus described our invention, what we claim is—

1. In a device of the class described, a cylinder having a lower valved inlet for liquid and an upper outlet for fluid and liquid, a valved plunger disposed within the cylinder, a tubular plunger-rod, a pressure-operated valve at the lower end of said plunger-rod, a mechanically-operated valve disposed near the upper end of the plunger-rod and adapted to govern the flow of fluid thereinto, and means for operating said mechanically-actuated valve.

2. In a device of the class specified, the combination with a cylinder having a lower valved inlet for liquid and an upper outlet for fluid and liquid, of the valved plunger disposed within the cylinder, a tubular plunger-rod having a valve-seat at its lower end, a pressure-operated valve adapted to said valve-seat, a mechanically-operated valve carried by the hollow plunger-rod at a point outside the cylinder, and adjustable means for effecting the opening and closing of said mechanically-operated valve.

3. In a device of the class described, the combination of the cylinder, a plunger therein, a tubular plunger-rod having a pressure-operated valve at its lower end, a stop-cock disposed in the upper portion of the plunger-rod, a two-armed lever connected to the stem of the stop-cock, a frame having vertical guiding members for contact with the lever, and adjustable trips carried by said frame for contact with said lever.

4. In a device of the class described, a tubular plunger-rod having shoulders near its lower end, a vertically-slidable check-valve

below said shoulders and having its upward movement limited thereby, a plunger coacting with said check-valve, a shoulder limiting the upward movement of the members of said plunger, a recessed cap-nut at the lower end of the plunger-rod serving to compress the members of the plunger upon the latter, a valve having a seat at the lower end of the plunger-rod and confined within said cap-nut, a stop-cock near the upper end of the plunger-rod, and an adjustable operating means for opening and closing said stop-cock.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

DANIEL VANIMAN.
SAMUEL F. SANGER.

Witnesses:
NELSON H. KYSER,
WALTON F. SUCHANEP.