(No Model.)

W. M. STEVENSON.

2 Sheets—Sheet 1.

NON FREEZING FORCE PUMP.

No. 329,233. Patented Oct. 27, 1885.

Fig. 1.

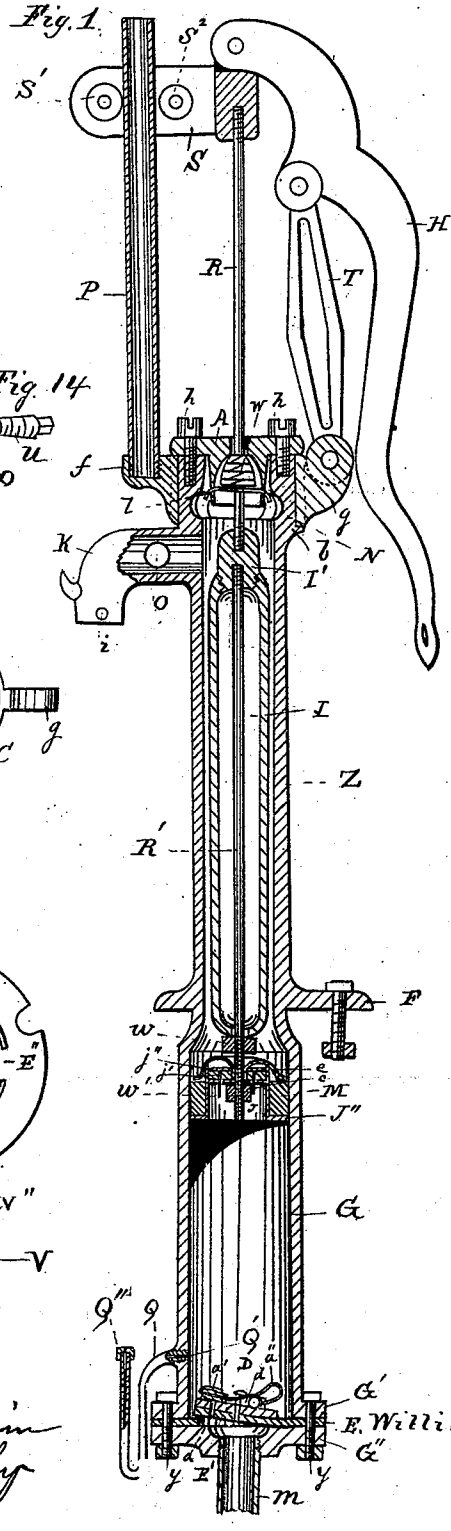


Fig. 2.

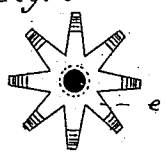
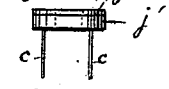


Fig. 3.

Fig. 4.



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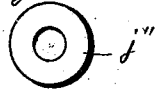


Fig. 6.

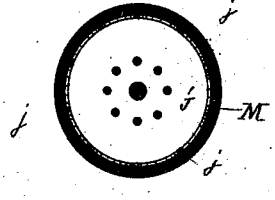


Fig. 7.

Fig. 8.

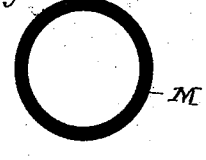


Fig. 9.

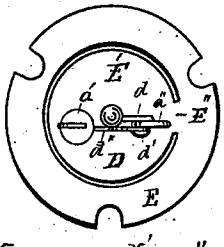


Fig. 10.

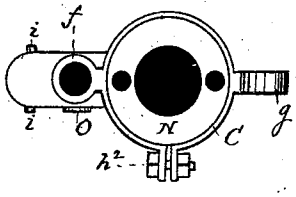


Fig. 11.

Fig. 12.

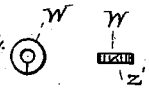


Fig. 13.

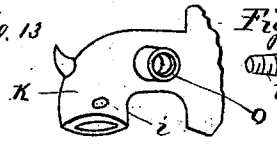
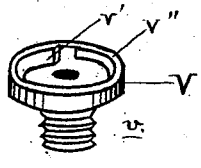


Fig. 14.

Fig. 15.



WITNESSES.

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(No Model.) 2 Sheets—Sheet 2.

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NON FREEZING FORCE PUMP.

No. 329,233. Patented Oct. 27, 1885.

Fig. 16

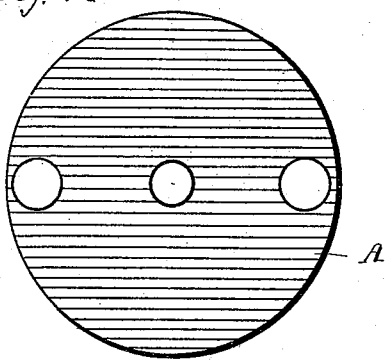


Fig. 17

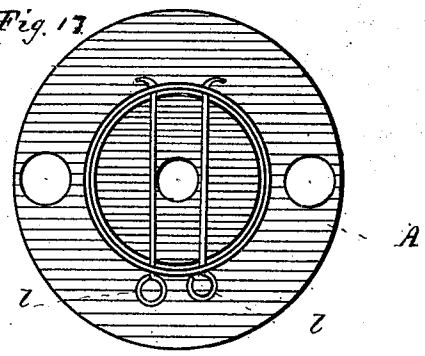


Fig 18.

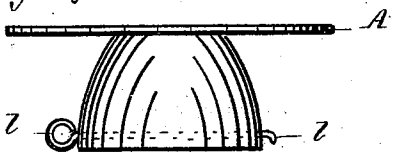


Fig. 19

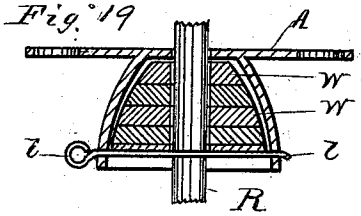
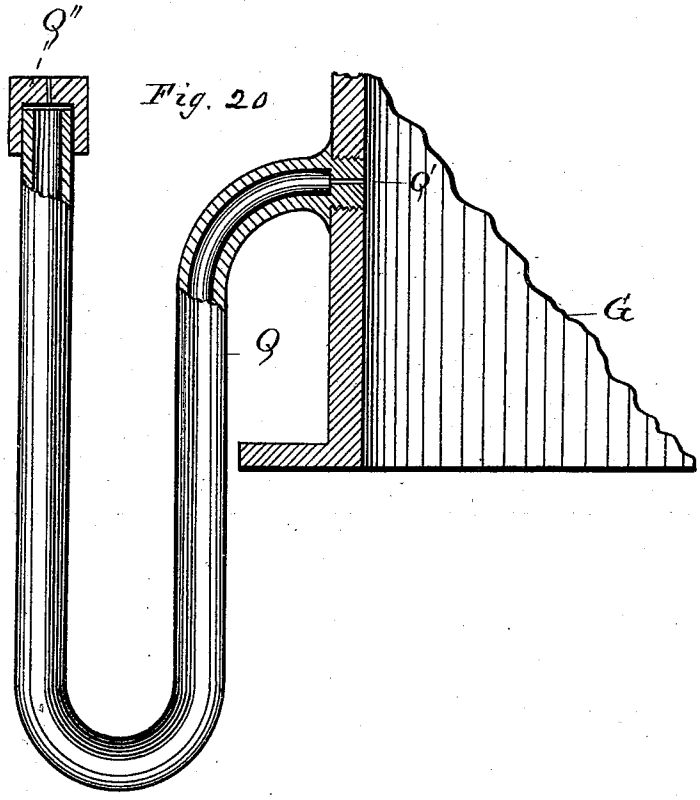


Fig. 20



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UNITED STATES PATENT OFFICE.

WILLIAM M. STEVENSON, OF CLEVELAND, OHIO.

NON-FREEZING FORCE-PUMP.

SPECIFICATION forming part of Letters Patent No. 329,233, dated October 27, 1885.

Application filed August 13, 1884. Serial No. 140,414. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. STEVENSON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Non-Freezing Force-Pumps, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in non-freezing force-pumps for wells, cisterns, sinks, or for any purpose where a pump may be used, and has for its objects to produce a pump which cannot be frozen up in winter, and in which the friction of the several parts is reduced to a minimum. These objects are attained by the mechanism illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a sectional view. Figs. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 are detailed views showing the construction of the different parts. Fig. 13 is a detached view of the spout K, partly broken away, and shows the threaded opening O, also projecting lug *i*. Fig. 14 is a detached view of a plug, *u*, having a thread on one end adapted to fit the opening O. Fig. 15 is a detached view of the coupling V, which is adapted to fit over the mouth of the spout K and be retained thereon by the lugs *i*. Fig. 16 is a detached plan view of the cap A, and shows the central opening for the passage of the piston-rod A and side openings for the bolts *h*. Fig. 17 is a view of the under side of the cap A, and shows the cup-shape cavity, and a circular metal plate therein supported by two bolts or pins, *l*. Fig. 18 is a side elevation of the cap A, the lower cup-shaped portion thereof, and one of the supporting bolts or pins *l*. Fig. 19 is a vertical section of the cap A, the cup-shaped portion thereof, the packing-rings W, lower plate, one of the supporting-pins *l*, and a part of the piston-rod R. Fig. 20 is an enlarged view of the pipe Q and part of the cylinder G broken away, a portion of the pipe in section, and also the cap Q″, and of the opening Q′ into the interior of the cylinder G.

The letters Z G indicate the cylinders, the inner peripheries of which are true circles, but of different diameters. The upper cylinder, Z, has an enlarged rim, N, which supports the clamp C, and is tapped to receive the bolts *h*, whereby the packing-cap A is secured to the rim N.

Surrounding the rim N is the clamp C, secured by one or more clamping-bolts, h^2, and is provided with projecting arms *f g*. The arm *f* supports a vertical guide-bar, P, which may be attached thereto in any convenient manner, and may be made of any suitable form for the purpose, either solid or hollow.

On the arm *g* is pivoted a toggle, T, which may be made of one or more pieces, and to the top of which is pivoted the handle H.

To the upper end of the handle H there is pivoted a guide-arm, S, made of one or more pieces, and provided with friction-rollers $s' s^2$. When the guide-arm S is made of two pieces, the guide-rod P passes between the two, and also between the friction-rollers $s' s^2$.

Attached to the guide-arm S is the piston-rod R, which passes through a central opening in the cap A, and through leather packing-rings W, which are supported in a suitable cavity in the cap A by bolts or pins *l*. These packing-rings W have a bevel-joint, as shown at *z*′. The upper cylinder, Z, has a projecting shoulder, *b*, and a spout, K, upon which the clamp C rests.

The spout K has an opening, O, threaded to receive a hose-coupling having a thread on the outside, or a plug, U, which is intended to remain at all times in the opening O when a hose is not to be used, also slightly-projecting points *i*, by means of which another coupling, V, of different form, (illustrated in Fig. 15,) may be secured to the mouth of the spout. The coupling V has inclines V′ V″, which are intended to engage with the lugs *i*, and a leather ring or gasket is intended to be placed between the coupling V and the spout K, and thus make a water-tight joint. The lower end of the coupling V has a neck, *v*, threaded to receive a hose, which may be secured thereto in any convenient manner.

The lower end of the piston-rod R is screwed or otherwise attached to the top of a hollow plunger, I, which is preferably provided with a plug, I′, at the top for that purpose. A second rod, R′, extends from the bottom of the plug I′, to which it is attached in any convenient

manner downwardly through an opening considerably larger than the rod R′ in the bottom of the hollow plunger I, and thereby permit water, when pumping, to enter the lower part of the plunger I, the upper portion of which is filled with air, which is compressed by the water that enters the bottom of the plunger I, and thereby causes a uniform flow of water (when pumping) through the cylinders Z and out of the spout K, or the hose attached thereto.

A flange, F, surrounds the cylinder Z on the outside, and is provided with suitable bolts to fasten the pump to a platform or covering of the cistern or well, whereby it may be held in proper position. The lower end of the piston-rod R′ should be made long enough to extend entirely through the cylinder Z down into the cylinder G far enough to be securely fastened to a piston, J, therein, suitably packed to form a water-tight joint, and which may be given a reciprocating motion by means of the handle H and rods R R′.

At the bottom of the cylinder G is a flange, G′, perforated with suitable openings to receive bolts *y*, which penetrate a leather washer, E, cut into the shape shown in Fig. 9, which forms a part of a check-valve. The washer E is placed between the flange G′ and the flange G″, into the latter of which is screwed the pipe *m*, which extends downwardly to the water in the well or cistern. The central portion of the washer E is cut into the shape E′, (of Fig. 9,) the portion E″ being left to form a hinge.

On top of the valve E′ is secured a metal plate, D, provided with a lug, *d*, on one side of which is secured a projecting pin, *d′*, forming a bearing upon which a wire, *d″*, having one end provided with a valve, *a′*, and the other with a spring, *a″*, may oscillate. A suitable opening, *a*, penetrates the leather E′ and the metal plate D for the passage of water when the valve *a′* is open. This valve *a′* is intended as a drain-valve to drain the water from the interior of the cylinders Z and G when the pump is not in use, and is opened by the descent of the piston J upon the spring *a″*, which, upon being pressed down, raises the valve *a′*.

Q is a bent tube screwed into the cylinder G at or near the bottom, having an opening at the end Q′ about one-sixteenth of an inch in diameter. This tube should be of much greater internal diameter than the opening at the end Q′ and of the outlet Q″, and in order to hold a considerable quantity of water the bent portion should be longer than shown in the drawings. This water is caused to flow in a small jet through the small hole Q′ by the vacuum produced below the piston J. The water so entering moistens the foot-valve E′ and piston, producing at once a strong vacuum in the cylinder G, and thereby raising water from the well. The water so obtained in the cylinder G at once begins replenishing the tube Q, instead of exhausting it. In starting the pump the first time the tube Q is first filled with water, then screwed into its place in the cylinder G. After this first filling it is always filled from G through the opening at Q′. The pumps as manufactured by me are in daily use, and are working satisfactorily and in accordance with this explanation. The tube is intended to drain the cylinders of water when the pump is not in action, and thereby prevent freezing in the winter-time. This tube is bent into the form shown in order to retain at all times a body of water, and thereby prevent air from entering the cylinder G, which would destroy a vacuum.

The operation of my invention is as follows: To start the pump when first set in a well or cistern, a small vessel of water is held at the end of the spout K. The handle H is then moved up and down, moving the piston-rods R R′, the hollow (air) plunger I, and the piston J in the same manner. The cylinders Z and G being of different diameters, and the hollow plunger I and piston J also being of different diameters, a vacuum is formed in the cylinders on the downstroke of the piston-rods R and R′ and their connections. The water in the small vessel is caused to flow into the cylinders Z and G, and, coming in contact with the valves therein, a vacuum is formed and the pump starts to work, filling the cylinder G on the upstroke of the valve or piston J, and discharging the water above J past the hollow air-plunger I and through the spout K. The air in the hollow plunger I is compressed, and this causes a steady flow of water from the cylinder Z through the spout K to the point where it is desired to deliver the water. On using a hose and nozzle on spout K a heavy pressure is made, which immediately acts on the self-adjusting packing-rings W, causing them to raise up and bear against the sides of the cavity in the cap A and close around the piston-rod R, and thereby make a water-tight joint around said rod and the cap A. When the hose is removed, the packing-rings W drop and rest upon the pins or bolts *l*. The rollers *s′ s²* in the arm S cause a great reduction in the friction upon the guide-bar P. The continuous leather packing M of the valve or piston J also tends to reduce the friction. On stopping the motion of the handle H for two minutes, or by tripping the auxiliary drain-valve *a′*, the water is drained from the pump and cannot freeze.

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

1. The cylinder G and the piston J, in combination with the check-valve E′, consisting of the leather E, hinge E″, and flap E′, provided with metal plate D, having a lug, *d*, and projecting pin *d′*, the opening *a*, and auxiliary drain-valve *a′*, having wire *d″* and spring *a″*, as described, and for the purposes set forth.

2. In combination with handle H, secured to the top of a pump-cylinder, the piston-rod R, the guide-arm S, having friction-rollers *s′ s²*,

and guide bar P, secured to the opposite side of said pump-cylinder, as described, and for the purposes set forth.

3. In combination with the lower cylinder of a pump, G, the bent tube Q, screwed into one side thereof above the bottom valve of said cylinder, and provided with reduced aperture Q′, opening into said cylinder, the bent portion of the tube extending below the bottom of said bottom valve, then upwardly to a level with said aperture Q′, the outer end of said tube being provided with a perforated cap, Q″, the perforation therein being of less internal diameter than the internal diameter of the tube, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM M. STEVENSON.

Witnesses:
EDMUND JAMES,
GEO. W. DAY.