(No Model.) 2 Sheets—Sheet 1.

M. D. TEMPLE.

PUMP.

No. 597,155. Patented Jan. 11, 1898.

Fig. 1.

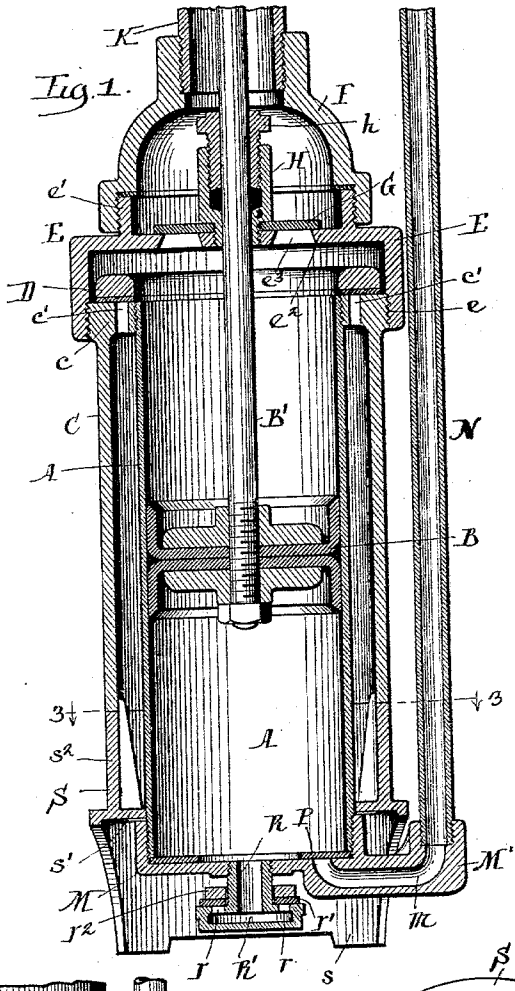


Fig. 2.

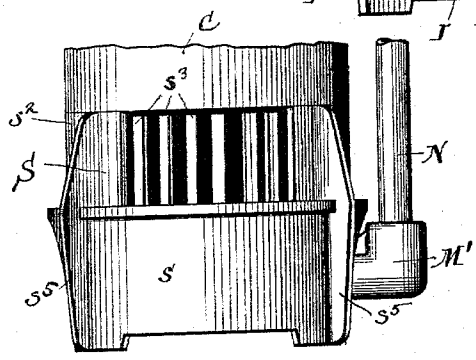
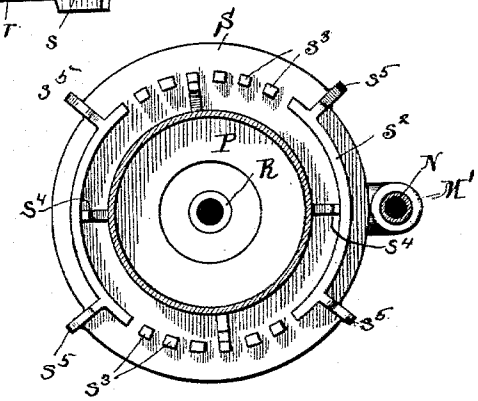


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

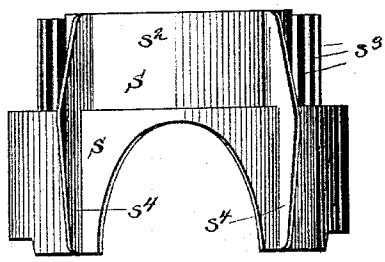
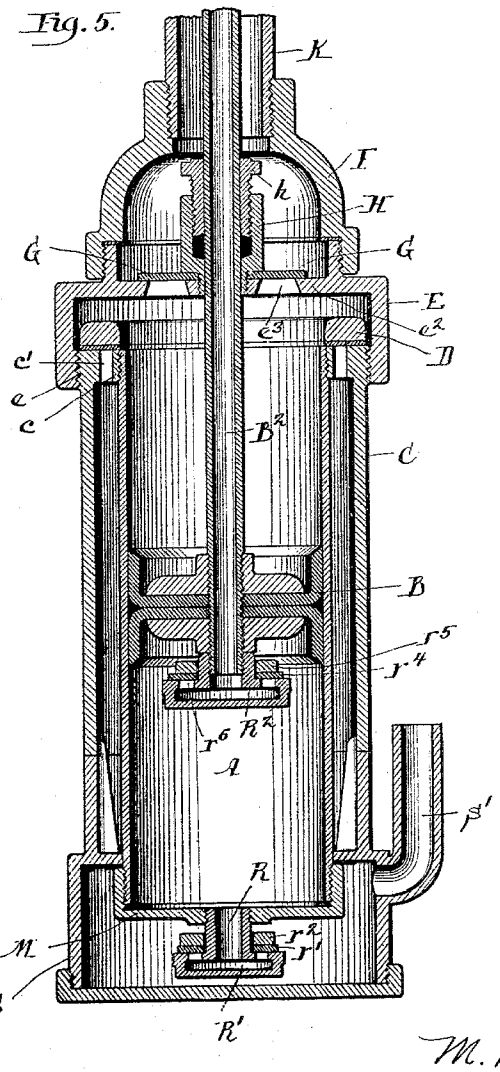


Fig. 5.



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UNITED STATES PATENT OFFICE.

MORRIS D. TEMPLE, OF CHICAGO, ILLINOIS.

PUMP.

SPECIFICATION forming part of Letters Patent No. 597,155, dated January 11, 1898.

Application filed December 17, 1896. Serial No. 616,033. (No model.)

To all whom it may concern:

Be it known that I, MORRIS D. TEMPLE, a citizen of the United States, and a resident of the city of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Pumps, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

The present invention has relation more particularly to that class of pumps designed not only to raise water from the well or cistern, but also to force air beneath the surface of the water in order to destroy the animalculæ, organic matter, or like disease-germs contained therein. An example of this type of pump is illustrated in Letters Patent No. 490,776, granted to me January 31, 1893.

The invention has for its object, primarily, to provide for a more effective delivery of the air into the well or cistern, so that the air thus delivered from the pump shall pass upward to the surface of the well or cistern and shall not be returned directly into the pump.

The invention has also for its object to improve the pump in various particulars, all of which will be hereinafter described, and set forth in the claims at the end of this specification.

Figure 1 is a view in central vertical section through a pump embodying my invention. Fig. 2 is a view in side elevation through the lower portion of the pump. Fig. 3 is a view in horizontal section on line 3 3 of Fig. 1. Fig. 4 is a detail view, in side elevation, of the guide or deflector. Fig. 5 is a view in central vertical section through a modified form of the invention.

A designates the cylinder of the pump, within which cylinder is the piston B, that is carried by the piston-rod B'. The piston B is shown as consisting of reversely-arranged cup-leathers held between screw-threaded clamping-plates, but this particular construction of piston is not essential. The upper part of the cylinder A forms what may be termed the "water-cylinder," while the lower part of the cylinder A forms an air-cylinder. The upper end of the cylinder A is screw-threaded and engages an interiorly-extending screw-threaded flange at the top of an outer casing C, that encircles the cylinder A throughout more or less of its length. The space between the cylinder A and casing C serves for the passage of water from the well, and the flange c at the top of the casing C is provided with perforations or slots c', through which the water will pass upwardly from the well or cistern, the slots or perforations c' being closed against the backflow of water by means of an annular valve D, that rests upon the top of the flange c. The upper end of the casing C is also screw-threaded exteriorly to engage with an interior thread e, formed at the base of the cap E, and the top of this cap E is provided with a screw-threaded annular flange e', with which engages the correspondingly-threaded lower end of the supplemental cap F. The exterior of the cap E and the exterior of the upper or lower part of the supplemental cap F may be of polygonal shape to permit these parts to be more readily connected together by means of a suitable wrench, although I do not regard this feature as in any respect essential and have not therefore deemed it necessary to illustrate the same in the drawings.

The cap E is formed with the transverse diaphragm e^2, having ports e^3 therethrough, above which rests the valve-leather G, by which the ports e^3 will be closed against backflow of water from the tube K. Preferably the valve G, which may be of leather, rubber, or like flexible material, is held in place by a bushing H, the reduced threaded lower end of which engages with a correspondingly-threaded hole formed in the center of the diaphragm e^2, and by preference the upper part of the bushing H is chambered to form a stuffing-box and to receive the threaded cap h, through which bushing and cap the piston-rod B passes. The upper end of the supplemental cap F will be threaded in usual manner to receive the lower end of the pump-tube K.

From the construction of parts as thus far defined it will be seen that as the pump-piston B descends water will be drawn up through the annular space between the cylinder A and the casing C and, lifting the valve D, will pass upward through the ports c' and into the cylinder A. When the stroke of the piston B is reversed, the valve D will close and thus prevent the backflow of the water from

the cylinder, while the valve G will open to allow the water to pass into the pump-tube.

The lower end of the cylinder A is exteriorly threaded to engage a correspondingly-threaded upright annular flange formed on the base M, that closes the lower end of the cylinder A. The base M in the embodiment of my invention shown in Fig. 1 is provided with a lateral extension M′, through which leads a port *m*, that connects the interior of the cylinder A with an air-supply pipe N, that leads from above the well and is attached to the arm or extension M′. Above the port *m* and resting upon the bottom of the casing M is an annular valve P, preferably of leather, rubber, or the like, the edge of this valve being clamped between the lower end of the cylinder A and the base M. The valve P will raise and uncover port *m* on the upstroke of the piston B, but will descend and close the port *m* on the downward stroke of the piston. Into the bottom of the base A is tapped a short pipe R, the lower end of which is formed with a chambered head R′, from the upper face of which extends the port *r*. Upon the head R′ and over the port *r* rests an annular valve *r*′, that is held normally against its seat by a weighted ring r^2, that loosely encircles the pipe R. From the foregoing description it will be seen that at each upstroke of the piston B air will be drawn from above the surface of the well down through the pipe N and into the lower portion of the cylinder A, and as the air is thus drawn into the cylinder A the valve P will be lifted to admit the air to the interior of the cylinder, while the valve *r*′ will close against the port *r* and thus guard against the entrance of water through the pipe R. On the downstroke of the piston B the valve P will close the port *m*, while the pressure of air passing through the pipe R will lift the valve *r*′ from its seat, thereby permitting the air to pass freely into the body of water within which the pump is submerged. Hence it will be seen that at each up-and-down movement of the piston water will be lifted from the well and air will be forced thereinto.

In order to insure that the air passing from the lower end of the cylinder A shall be delivered into the water in such manner that it will rise to the surface of the well and will not pass immediately with the water entering the pump through the annular space between the cylinder A and casing C, I provide a guide or deflector that will guard against the direct passage of the air into that part of the body of water that is being drawn up into the pump. The guide or deflector which I prefer to use is that to be hereinafter described, although I wish it distinctly understood that my invention (except where so specifically stated in the claims) is not restricted to the particular construction of deflector or guide. Between the base M and the lower end of the casing C is interposed the deflector S. Preferably, although not essentially, this deflector is formed as a single casting having the depending wall *s* and having an inwardly-extending flange *s*′ that rests upon the upper end of the base M. The upper part of the deflector is provided with raised plates s^2 and preferably also with raised bars or fingers s^3. At opposite points in the depending wall *s* are formed openings, (see Figs. 1 and 4,) through one of which openings extends the lateral arm M′, and both of which openings serve as passage-ways for air as it is forced from the bottom of the cylinder A. By reference to Figs. 1 and 3 of the drawings it will be seen that the openings through the walls *s* of the deflector are located immediately beneath the raised plates or walls s^2 at the upper part of the deflector. Consequently as the air discharging from the bottom of the cylinder A passes through the openings formed in the wall *s* and in upward direction the raised plates or walls s^2 will prevent the air being drawn into the casing C, thus enabling it to rise directly upward into the body of water above the pump. The vertical bars or fingers s^3 serve as a screen to prevent the access of chips, leaves, or the like into the body of the casing C. Preferably the guide or deflector S is strengthened by internal and external ribs s^4 and s^5, respectively, although these are not essential.

In the modification of the invention illustrated in Fig. 5 of the drawings the cylinder A, the piston B, the casing C, and the cap and supplemental cap and valves therein contained are the same in construction as hereinbefore described. In this form of the invention, however, the supply of air to the lower part of the cylinder A is admitted through a hollow piston-rod B^2, and to the lower end of this piston-rod is connected a valve-chamber R^2, similar to the pipe and chamber R and R′ shown in Fig. 1 of the drawings, and upon the upper face of the valve-chamber R^2 is mounted an annular valve r^4 and weight r^5, the valve r^4 serving to control the ports r^6, as in the construction hereinbefore described. The base M of the pump is provided with an air-discharge pipe and chamber R and R′, furnished with valves *r*′ and weights r^2, as hereinbefore described. In this form of my invention the guide or deflector S is shown closed at its bottom and provided at the side with a short guide-pipe S′, leading, preferably, to a point above the lower end of the casing C.

From the foregoing description it will be seen that on the downstroke of the piston B water will be drawn into the pump, as hereinbefore described, and the air within the lower part of the cylinder A will be forced out through the pipe R into the closed deflector S and will be delivered thence by the pipe S′ into the body of water at a point above the induction end of the casing C. On the upstroke of the piston B the valve *r*′ will close and the valve r^4 will open, thereby admitting air into the lower part of the cylinder A through the hollow piston-rod B^2.

It is manifest that the details of construction above set out may be varied within wide limits without departing from the spirit of my invention. So far as I am aware my invention presents the first instance of a submerged pump in which provision is made for guiding the air-supply to be delivered into the water in such manner that this air-supply will not be immediately drawn back into the pump, but will be allowed to rise through the body of water within the well or cistern.

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

1. A pump comprising the combination with a cylinder and with means whereby air is admitted to and discharged from the lower end of said cylinder and with channels for admitting water to and discharging it from the upper end of said cylinder and with a piston and rod, of a suitable guide or deflector for preventing the passage of air into said water-admission channel, substantially as described.

2. A pump comprising the combination with a cylinder and with means whereby air is admitted to and discharged from the lower end of said cylinder and with channels for admitting water to and discharging it from the upper end of said cylinder and with a piston and rod, of a suitable guide or deflector for preventing the passage of air into said admission-channel, said guide or deflector comprising a wall interposed between the air-outlet at the lower end of the cylinder and the channel whereby water is admitted to the top of the cylinder, substantially as described.

3. A pump comprising the combination with a cylinder and with means whereby air is admitted to and discharged from the lower end of said cylinder and with channels for admitting water to and discharging it from the upper end of said cylinder and with a piston and rod, of a casing surrounding said cylinder and open at its bottom and a guide or deflector for preventing the admission of air into said casing having a flange abutting against the cylinder and having a depending wall below said cylinder and one or more vertical plates or walls located above the passage-way for air through said depending plate or wall, substantially as described.

4. A pump comprising the combination with a cylinder and with means whereby air is admitted to and discharged from the lower end of said cylinder and with channels for admitting water to and discharging it from the upper end of said cylinder and with a piston and rod, of a casing surrounding said cylinder and open at its bottom for admission of water to its lower portion, and a guide or deflector whereby the passage of air into said water-admission channel is prevented, said guide or deflector being formed with vertical bars or fingers located opposite the admission end of said casing, substantially as described.

5. A pump comprising the combination of a cylinder and with suitable means whereby air is admitted to and discharged from the lower portion thereof, of a casing surrounding said cylinder and connected to the upper end of said cylinder and terminating above the bottom thereof and open for the admission of water to its lower portion, a spacing-ring interposed between the upper end of the casing and the upper end of the cylinder and having passages therethrough for the admission of water, a check-valve above said spacing-ring, a suitable cover for said casing and cylinder connected to the upper end of said casing, a piston within said cylinder and a rod for operating said piston, substantially as described.

6. A pump comprising the combination with a cylinder and with suitable means whereby air is admitted to and discharged from the lower portion thereof, of a casing surrounding said cylinder and provided at its upper end with an inwardly-extending perforated flange threaded to engage an exterior thread upon the upper end of said cylinder, a cover comprising a cap having an interiorly-threaded surface engaging the exteriorly-threaded upper end of the cylinder and having in one piece therewith a perforated plate and above said plate a screw-threaded annular flange, a supplemental cap threaded to said annular flange, a check-valve above the perforated flange at the top of the casing, a check-valve above said perforated plate, a piston within said cylinder and a rod for operating said piston, substantially as described.

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