S. B. BOWER.

NON-FREEZING ATTACHMENT FOR PUMPS.

APPLICATION FILED SEPT. 8, 1908.

916,663.

Patented Mar. 30, 1909.

2 SHEETS—SHEET 1.

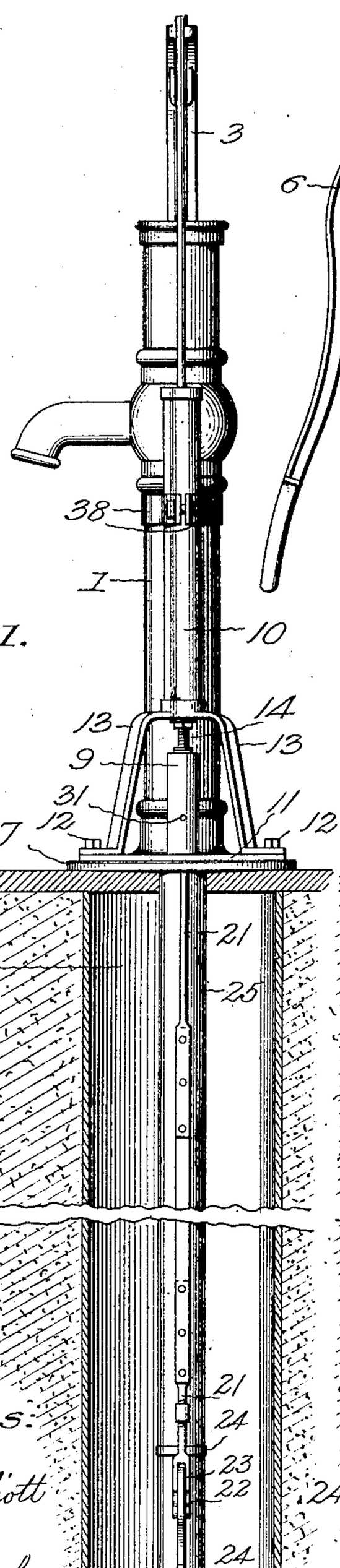

Fig. 1.

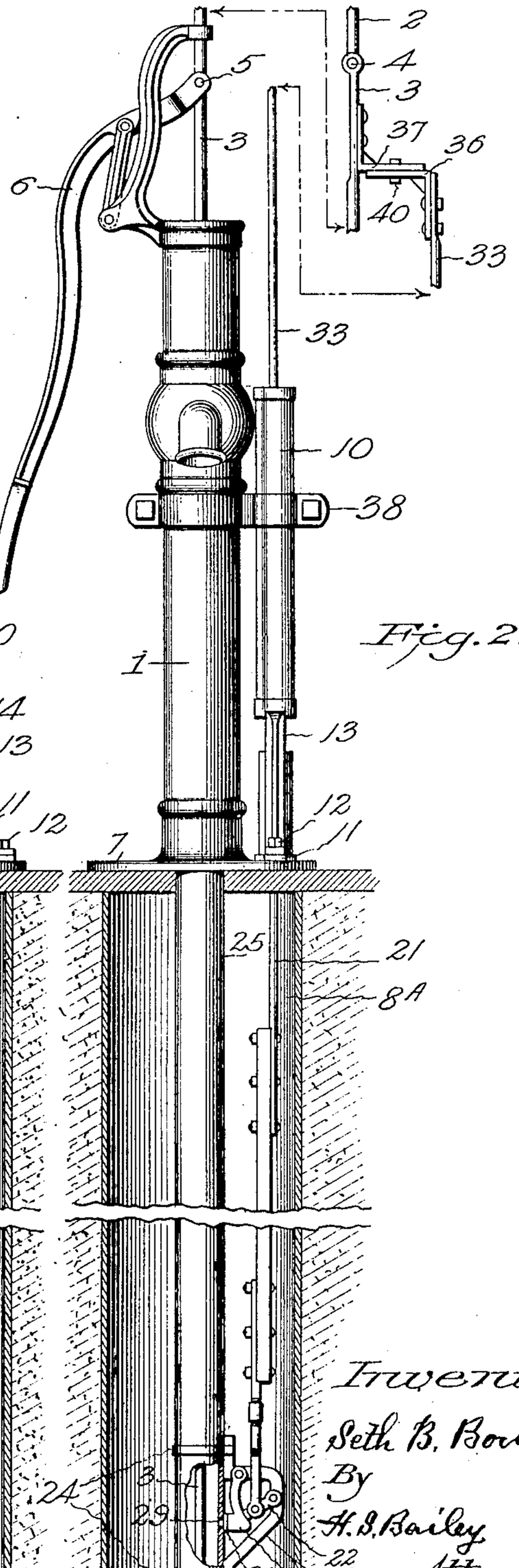

Fig. 2.

Witnesses:

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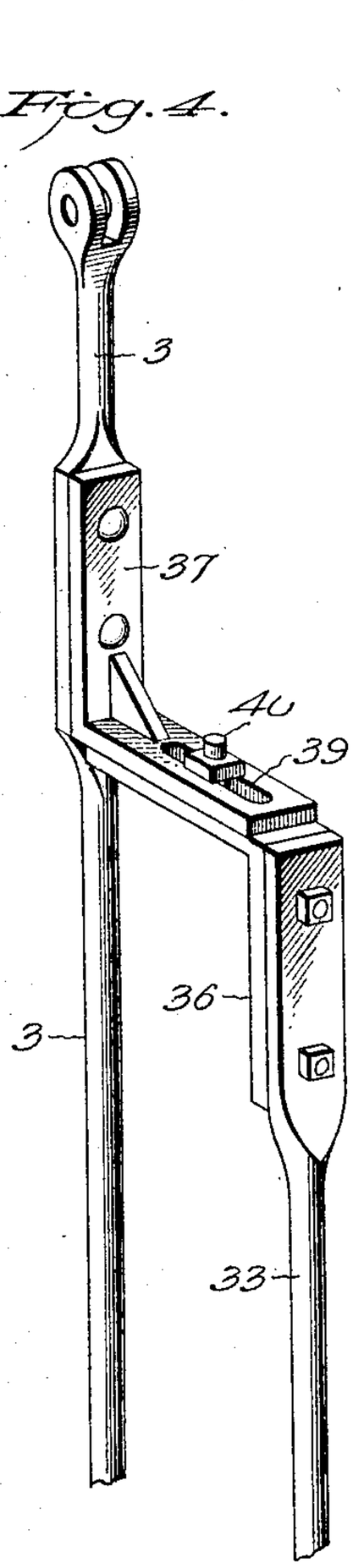
2 SHEETS—SHEET 2.

Fig. 4.



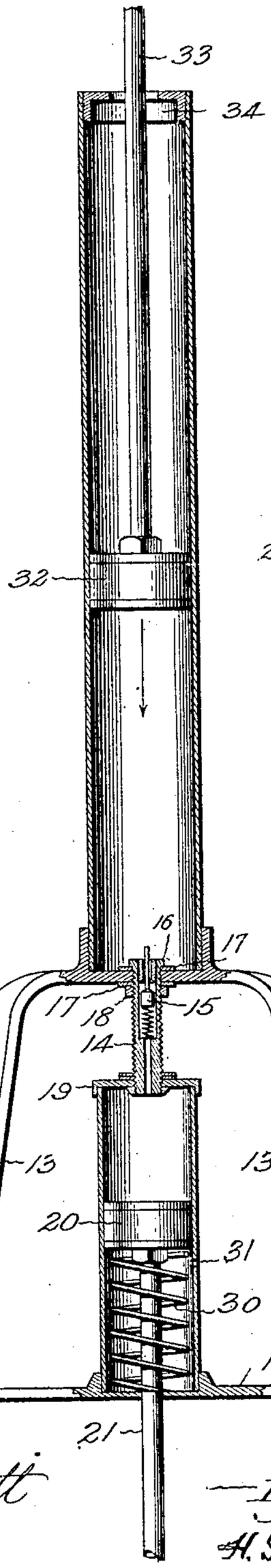


Fig. 5.

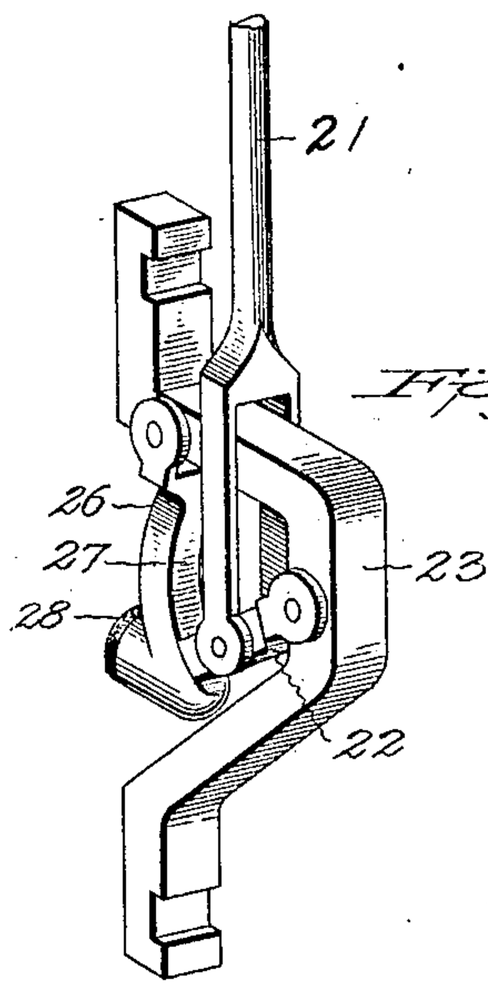


Fig. 3.

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UNITED STATES PATENT OFFICE.

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NON-FREEZING ATTACHMENT FOR PUMPS.

No. 916,663. Specification of Letters Patent. Patented March 30, 1909.

Application filed September 8, 1908. Serial No. 452,042.

To all whom it may concern:

Be it known that I, SETH B. BOWER, a citizen of the United States of America, residing in the city and county of Denver and State of Colorado, have invented a new and useful Non Freezing Attachment for Pumps, of which the following is a specification.

My invention relates to improvements in non-freezing attachments for pumps; and the objects of my invention are: first, to provide an automatically operating compressed air actuated valve for permitting the water to discharge from the freezing zone of pumps when they are not operating. And second, to provide a simple, inexpensive attachment that can be applied to all kinds of water pumps at present in use, which are exposed to freezing weather. I attain these objects by the mechanism illustrated in the accompanying drawings, in which:

Figure 1, is a front elevation of my improved device showing the same attached to a pump, the well casing being in section. Fig. 2, is a similar view of the device in side elevation, the upper ends of the air cylinder operating rod and pump rod being set to one side of the figure for purposes of convenience. Fig. 3, is an enlarged vertical sectional view through the air-compressing cylinder and the air-receiving cylinder, in which the valve operating rod is actuated. Fig. 4, is an enlarged perspective view of the upper ends of the pump rod and of the air cylinder rod, showing the manner of connecting them. And Fig. 5, is an enlarged perspective view of the valve mechanism which is connected to well casing.

Similar characters of reference refer to similar parts throughout the several views.

Referring to the drawings, the numeral 1, designates a pump of the usual type, which is adapted to be either manually operated or to be connected to the driving rod 2, of a windmill. The windmill rod is coupled to the pump rod 3, so that it may be disconnected, when desired, leaving the pump free to be operated by hand. A removable pin 4, connects the pump rod and windmill rod, and a pin 5, connects the pump handle 6, with the pump rod, and when the pump is being operated by the windmill, the pin 5, is removed, thereby permitting the handle to swing back out of operative position. The pump is provided with a base flange 7, which is bolted to a platform 8, which is placed above the well casing 8^A. I preferably place my device for preventing the pump from freezing on this flange 7, and clamp it to the cylinder of the pump. This device comprises an air receiving cylinder 9, to which is connected an air pump 10. The air receiver is provided at its lower end with a flange 11, which preferably rests on the flange 7, and is secured thereto by bolts 12. The air pump cylinder is positioned in vertical alinement above the air receiver cylinder, and at its lower end it is provided with yoke arms 13, which extend down to the flange 11, and under the bolts 12, by which they are bolted to the flange 7. The air pump is thus held rigidly over and in axial alinement with the air receiving cylinder. These two cylinders are connected by a tube 14, which is provided with an automatically operating air valve 15.

My invention contemplates the use of any suitable automatically operating air valve and air conducting tube connecting these two cylinders, but I preferably use the automatic air inlet valve that is attached to and is used to admit air to pneumatic bicycle and automobile tires; consequently this air valve and its supporting tube do not form a direct element of my invention, but form a coöperating element of it.

The air tube 14 is provided with an external thread and with a head portion 16. Two washers 17 are also mounted on the tube, and one is placed against the head on one side of the end of the cylinder, and the other is placed against the opposite side of the end of the cylinder. The tube is extended through an aperture formed in the lower end of the air pump cylinder, and one of the washers and the head rest against and are clamped to the bottom of the cylinder by a nut 18, which is threaded on the tube and is screwed against the under side of the air cylinder. The opposite end of this tube is screwed into a threaded aperture, formed in a cap portion 19, that is secured to the top of the air-receiving cylinder. The air receiver cylinder is provided with a piston head 20, from which a piston rod 21 extends through the lower end of the cylinder and through the flanges 7 and 11, and its lower end is pivotally connected to a rock arm 22, intermediate of its ends. The rock arm 22 is pivoted at one end to a bracket 23, which is secured by bands or strap irons 24 to the side of the pump cylinder 25. The opposite end of this rock arm engages a swinging valve 26, which is pivotally secured to the bracket, and de-

pends therefrom. This valve is provided at its lower end with a hammer shaped head, and one side of it is provided with an inwardly curved face 27, which is normally engaged by the free end of the arm 22, while the inner face of the hammer head portion is provided with a rubber or leather valve disk 28, that fits over a waste water escape aperture 29, formed through the side of the pump cylinder below the freezing zone portion of the pump cylinder, and controls it to open or close it automatically, as will be explained fully hereinafter. The curved face of the valve is eccentric to the arc described by the engaging end of the rock arm 22, so that when the arm is up it is out of engagement with the valve, and when it is down it presses against the valve, which thus closes the outlet aperture. A short coiled spring 30, is placed around the piston rod 21, within the air receiving cylinder, which bears at one end against the inner end of the piston head 20, and its opposite end bears upon the flange 11, which acts as an abutment for the spring. This spring 30 is arranged to lift the piston 20 and rod 21, when the pressure of the air above the piston is not sufficient to move or hold the piston down against the spring, thereby causing the valve 26 to uncover the aperture 29, and permit the water in the pump cylinder to escape until it is reduced to the level of the said aperture. An air escape aperture 31 is formed in the casing of the cylinder, at the end of the valve closing stroke of the piston head 20, as will be explained hereinafter. The air pump cylinder is also provided with a piston head 32, and a piston rod 33, which is secured to the piston head at one end and extends through a cylinder head or cap 34, that is secured to the top of the cylinder. The opposite end of the piston rod is secured by bolts to a right-angled bracket 36, which is bolted to a similar bracket 37, which is secured to the pump rod 3. In order to secure the air-pump cylinder firmly in its relative position to the pump, clamping straps 38 are employed, which surround both of the cylinders and clamp them rigidly together. The brackets 36 and 37 are provided with slots 39, through which the securing bolt 40 passes, and these slots permit the brackets to be adjusted to suit the varying distances between the rods 3 and 33.

The operation of my improved device for preventing pumps from freezing, is as follows: As the pump rod reciprocates in pumping water, the brackets 36 and 37 impart a reciprocal movement to the piston rod and piston head of the air pump cylinder, which pumps air into this cylinder and compresses and forces it through the air valve into the air receiver cylinder, where it exerts a pressure on the piston head 20 of that cylinder, which when this pressure is sufficient to compress the spring 30, causes the piston head and rod to move down, and this downward movement is continued until the spring 30 is compressed to its fullest capacity between the abutment flange 11, which rests on the bottom of the cylinder and the piston head. This downward movement of the piston rod 21 causes the rock arm 22 to slide down the beveled face of the clapper valve and force its disk against the water discharging aperture 29, in the pump cylinder of the windmill, and close it, thus preventing the escape of the water being pumped by the windmill. Should an excessive pressure of air be compressed in the air cylinder, the piston head will move more than is required to close the water escape aperture by the clapper valve, and will move just enough further to uncover the air escape aperture 31 in the air cylinder, and allow the air to escape. When, however, the windmill pump is stopped, its pump and the air cylinder's piston rod are also stopped, and the air in the air receiver escapes sufficiently past its piston head to the pressure exhaust outlet and the cylinder's lower piston rod aperture to relieve the pressure on the air receiver's piston head, when the resilient expansive tension of the spring 30 raises the piston head and piston rod, and moves the rock arm 22 up the inclined surface of the clapper valve lever and relieves the clapper valve from pressure against the water escape aperture 29, in the pump cylinder, allowing the water in the pump cylinder which is under the pressure of the amount of water in the freezing zone of the pump's cylinder, to flow out of the cylinder down as far as the water discharge aperture 33, which is placed below the freezing zone of the pump cylinder, to be out of danger of freezing. When the pump is started again, the air pump is also started, which quickly fills the air reservoir with pressure enough to move the piston rod of the air receiver to engage and move the rock arm and the clapper valve to again close the water discharge aperture 29 of the pump cylinder.

My invention is simple, thoroughly practical, and can be very quickly attached to windmills in use at very small expense, and while I have preferably illustrated it in connection with windmill pumps, I contemplate its use on all kinds of both power operating and hand operating pumps.

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

1. A non-freezing device for water pumps, comprising a pump cylinder provided with a discharge aperture, and a reciprocating piston, with an air pump provided with a piston, means for connecting said air pump's piston to said water pump's piston, an air receiver attached to said air pump arranged to receive air from said air pump and provided with a piston, and a valve connected to

said air receiver piston and arranged and adapted to control said water pump's cylinder's discharge aperture to close said aperture when said water pump and air pump are in operative pumping operation, and to open it when said water pump and air pump are not in pumping operation.

2. In a non-freezing device attachment for pumps, the combination with a pump's pumping rod and its pumping cylinder, provided with a waste water discharge aperture, of an air pumping cylinder secured to said pump's cylinder, a reciprocating piston rod and piston head in said air pump connected to said pump's pumping rod, an air receiving cylinder operatively secured to said air pump cylinder to receive and retain air, a piston rod and head reciprocally mounted in said air receiving cylinder, a spring arranged to move said piston in one direction of its reciprocal movement, a bracket secured to said pump cylinder adjacent to its waste water discharge aperture, a clapper valve supported by said bracket and arranged to control said pump cylinder's waste water discharge aperture, and a rock arm connected at one end to said bracket and pivotally connected intermediate of its ends with said piston rod, and arranged to engage and move said clapper to close or open said pump cylinder waste water escaping aperture.

3. In a non-freezing attachment for pumps, the combination with the pump cylinder, having an outlet aperture, and the pump rod, of an air pump connected with the pump rod; an air receiving cylinder connected with the air pump; a tube connecting the air pump and air receiver, having a check valve; a piston in said receiver, and a rod connected to said piston; a bracket on the pump cylinder; a valve on the bracket for controlling the outlet aperture of the cylinder; and an arm pivoted to the bracket at one end, and engaging the valve with its opposite end, said arm being connected to the lower end of the air receiver piston rod.

4. In a non-freezing attachment for pumps, the combination with the pump cylinder, having an outlet aperture, and the pump rod; of an air pump connected with the pump rod; an air receiver connected with the air pump and a valve for preventing back pressure from the receiver; a piston in the receiver, having a downwardly extending piston rod, and an expansion spring between the under side of the piston, and the bottom of the receiver; a bracket on the pump cylinder; a valve pivotally attached to the bracket at one end and adapted to cover the outlet aperture with its opposite end, said valve having curved outer face; an arm pivoted at one end to the bracket, its opposite end being in engagement with the curved face of the valve, said arm being connected with the lower end of the air receiver piston rod.

5. The combination with a pump cylinder, having an outlet aperture, and the pump rod, of a bracket attached to the cylinder; a valve pivoted at one end to the bracket, and adapted to cover the outlet aperture with its opposite end; an arm in engagement with the valve at one end and pivoted to the bracket at its other end; an air pump connected with the pump rod, an air receiver connected with the pump, a piston in the receiver, a rod connecting the piston and the arm engaging the valve, and an expansion spring beneath the piston.

6. In a device as specified, the combination with a pump cylinder having a discharge aperture below the ground level, and the pump rod, of a bracket secured to the cylinder; a valve pivoted at one end to the bracket, and adapted to close the said aperture with its opposite end; an arm pivoted at one end to the bracket and adapted to engage a cam face on the valve with its opposite end; an air pump having a piston rod connected with the pump rod; an air receiver having an escape aperture; a tube connecting the pump and receiver, having a check valve; a piston in the receiver and a piston rod connected therewith, which extends down and connects with the arm pivoted to the bracket, and an expansion spring below the piston.

7. In a device as specified, the combination with a pump standard, the cylinder connected therewith, and the operating pump rod, of an air pump connected to the pump standard, comprising a cylinder, a piston, and a piston rod connected to the piston; a bracket having an elongated slot, secured to said piston rod; a similar bracket having an elongated slot, secured to the pump rod; and a bolt passing through said slots and connecting said brackets; an air receiver; a tube connecting the air receiver and pump, having a check valve; a piston in the receiver having a downwardly extending rod; a bracket on the pump cylinder; an arm pivoted at one end to the bracket and connected with the downwardly extending rod; a valve having a cam face which is engaged by the free end of the arm, one end of said valve being pivotally secured to the bracket, while the other end is adapted to open or close the discharge aperture of the pump cylinder; and an expansion spring below the piston of the air receiver.

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

SETH B. BOWER.

Witnesses:
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ADELLA M. FOWLE.