No. 780,099. PATENTED JAN. 17, 1905.

J. A. GOODNER.

WATER ELEVATOR.

APPLICATION FILED APR. 4, 1904.

Fig. 1

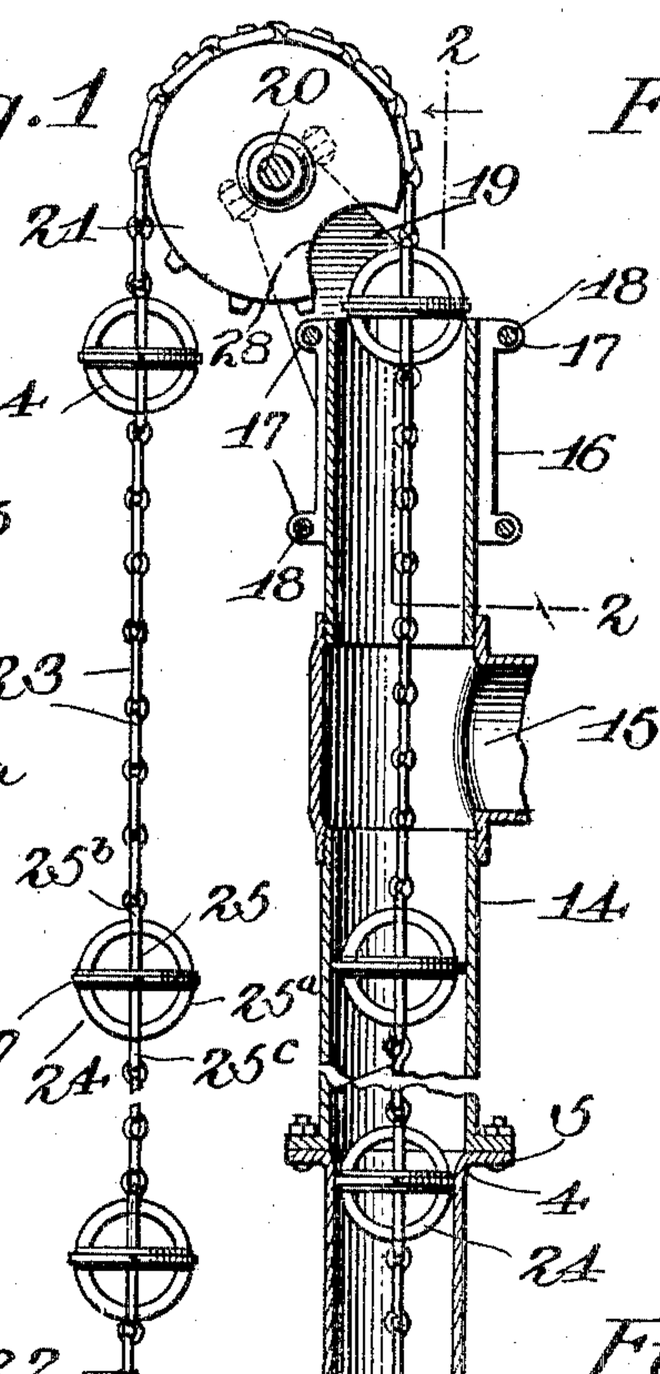
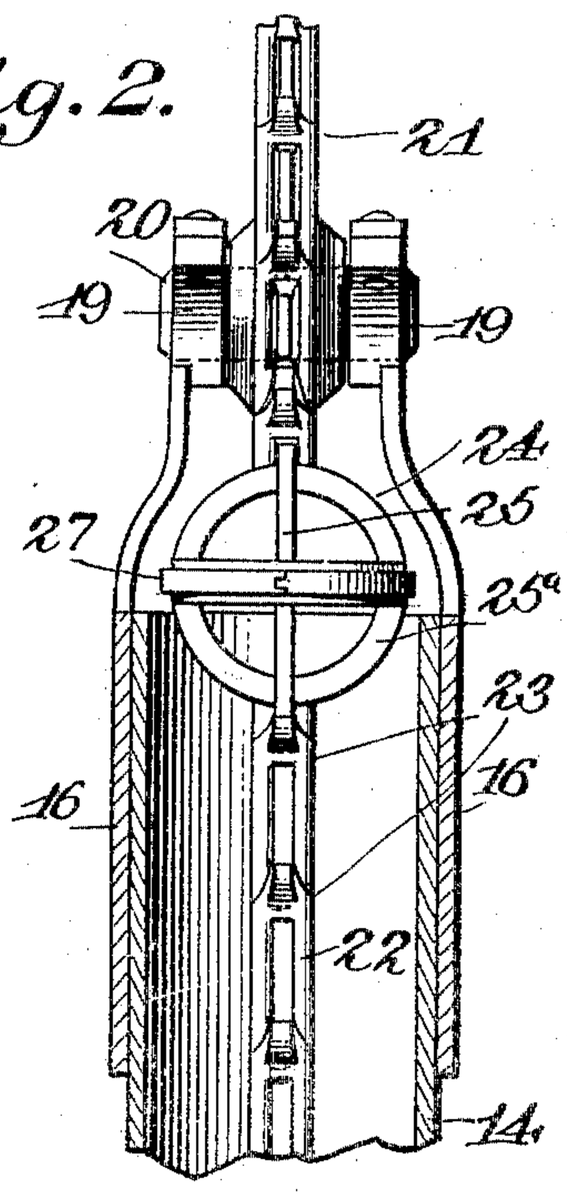


Fig. 2.



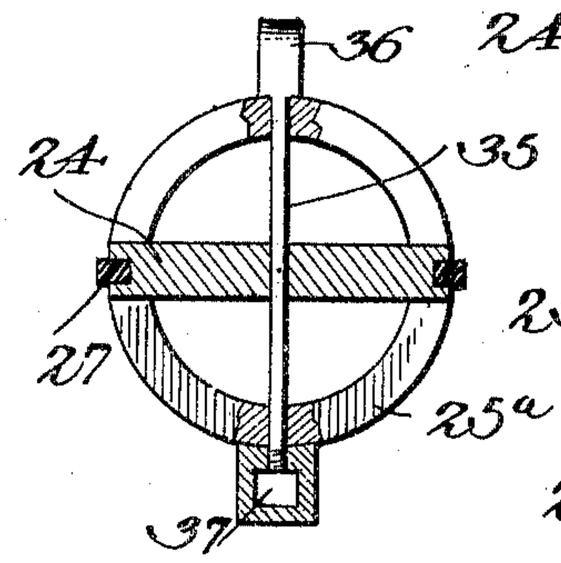


Fig. 6.

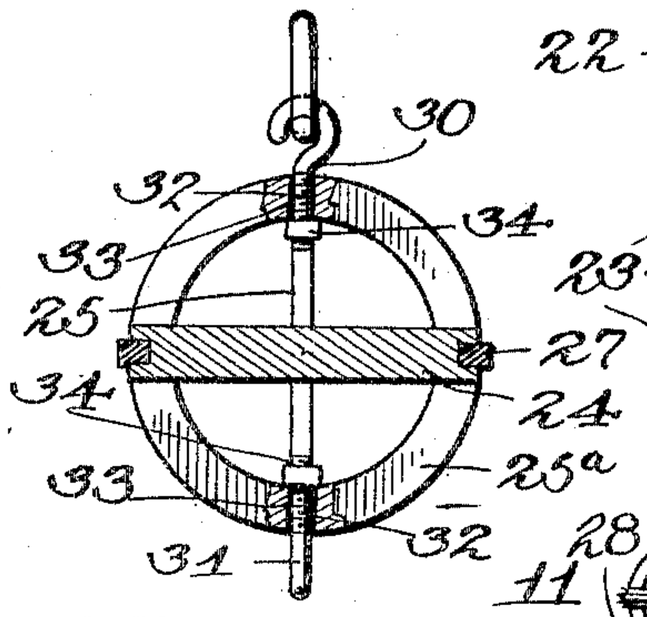


Fig. 5.

Fig. 3.

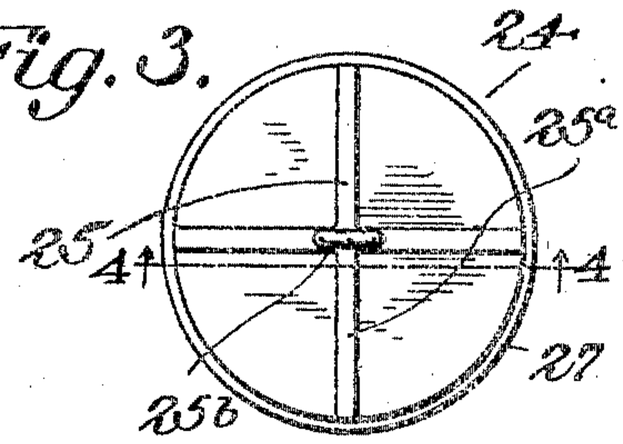
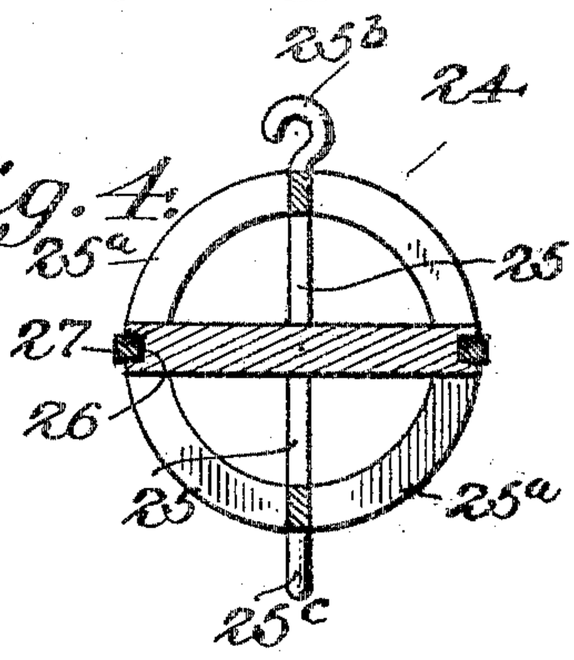


Fig. 4.



Witnesses

E. J. Stewart

Wm. Bagger

James A. Goodner, Inventor.

by Church & Co

Attorneys

No. 780,099. Patented January 17, 1905.

UNITED STATES PATENT OFFICE.

JAMES ANDREW GOODNER, OF ROCKYFORD, COLORADO.

WATER-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 780,099, dated January 17, 1905.

Application filed April 4, 1904. Serial No. 201,545.

To all whom it may concern:

Be it known that I, JAMES ANDREW GOODNER, a citizen of the United States, residing at Rockyford, in the county of Otero and State of Colorado, have invented a new and useful Water-Elevator, of which the following is a specification.

This invention relates to that class of water-elevators which are also known as "chain-pumps," and it has among its objects to provide a pump-cylinder adapted to coöperate with peculiarly-constructed buckets mounted upon an endless chain, so that water elevated through the cylinder by the action of the pump buckets or pistons may be raised to any desired height through an ordinary conducting-pipe of larger diameter than the pistons, thereby saving wear upon the latter and insuring a perfectly steady action of the device.

Further objects of the invention are to provide a device of the class referred to which shall possess superior advantages in point of simplicity, durability, and general efficiency; and with these and other ends in view, which will readily appear as the nature of the invention becomes better understood, the same 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 view of my improved water-elevator, showing the same applied in operative position. Fig. 2 is a vertical transverse sectional view taken on the line 2 2 in Fig. 1. Fig. 3 is a top plan view, enlarged, of one of the pistons or pump-buckets. Fig. 4 is a sectional view of the same, taken on the line 4 4 in Fig. 3. Fig. 5 is a vertical sectional view illustrating a modified construction of the piston or pump-bucket. Fig. 6 is a vertical sectional view illustrating another modification.

Corresponding parts in the several figures are indicated by similar numerals of reference.

The member 1, which I designate the "cylinder" of my improved pump, is cylindrical throughout the greater part of its length and is provided with a smoothly-finished bore. The lower end of the cylinder has a funnel-shaped enlargement 2, terminating in an annular flange 3, and the upper end of the cylinder has a flaring portion 4, terminating in an annular flange 5.

6 designates a casing which is suspended or supported in the bottom of the well, said casing being provided in one side thereof with an opening 7, covered by a screen 8, for the admission of water. The casing 6 is provided with slots 6^a, forming bearings for a transverse shaft 9, carrying a sprocket-wheel 10, the upper side of the casing being slotted for the accommodation of the sprocket-wheel as well as for the down and up going pistons, the opening for the down-going piston being indicated at 11 and that for the up-going piston at 12. The latter opening is of a diameter equal to the expanded lower end of the pump-cylinder, which is secured in alinement with said openings by means of bolts or fastening members 13.

Suitably connected with the flange at the upper end of the pump-cylinder is a conducting-pipe 14, which is of an interior diameter slightly exceeding that of the pump-cylinder, so that the pump-pistons may travel upwardly through said conducting-pipe without frictional contact with the walls thereof. Said conducting-pipe may be composed of any desired number of lengths or sections suitably connected with each other and it may be constructed of any suitable material. Above the ground the conducting-pipe 14 is provided with a laterally-extending outlet 15, and the top section of the pipe, above the outlet 15, is composed of two vertically-divided members 16, having lugs 17 for the reception of connecting bolts or members 18, and provided with brackets 19, affording bearings for a driven shaft 20, carrying a sprocket-wheel 21.

22 designates the pump-chain, which is supported upon the sprocket-wheels 21 and 10, said chain being made up of flat links 23, engaging the sprocket-wheels and provided at intervals with buckets or pistons 24. The latter are preferably cast of iron, although within the limits of my invention any suitable material may be employed, and said pistons consist each of a circular disk of suitable dimensions provided on its upper and under sides

with approximately semicircular bails 25 and 25[a], crossing each other at right angles and provided at their points of intersection with means, such as a hook 25[b] and a link 25[c], for connection with the chain-links. Each of these pistons is provided with a circumferential groove 26, in which is placed a packing-ring 27 of resilient metal and having overlapping ends, said packing-ring being in the main of the character ordinarily employed in piston construction to provide a leak-proof joint between the piston and the cylinder in which it works. The pistons 24 are spaced apart upon the chain 22 a distance equal to the periphery of the sprocket-wheels, each one of which is provided with a peripheral recess 28 to accommodate said pistons during the operation of the device, as will be readily understood. The cylindrical bore of the cylinder is also to be of a length at least equal to the distance from center to center of proximate buckets upon the endless chain in order that when one piston passes over the upper end of the cylinder another piston shall simultaneously be entering the lower end of the cylinder, thereby preventing water from backing into the well.

The operation and advantages of this invention will be readily understood from the foregoing description, taken in connection with the drawings hereto annexed.

It will be observed that by this invention water will be positively forced in an upward direction through the cylinder 1 by the action of the successive pistons and also that the said pistons have no frictional contact with the conducting-pipe, thereby effecting a great saving in power, while the effectiveness of the operation is not lessened. The general construction of the pump is of such a nature as to insure permanency and long life to the parts, and there is no danger of the pump getting out of working order. Under ordinary circumstances a column of water will always fill the conducting-tube, thus causing the water to flow as soon as the operation of the pump is begun. When in cold weather it shall be desired to return the column of water to the well in order to avoid freezing, this may be easily effected by operating the pump reversely, as will be readily understood, the upper end of the cylinder being purposely expanded in order to permit such operation to take place.

Under the preferred construction of the pump-piston (illustrated in Figs. 1, 2, 3, and 4) each piston-plate, with its yokes or bails 25 and 25[a] and the connecting means 25[b] and 25[c], has been shown as cast or formed in a single piece. In Fig. 5 has been illustrated a modified construction, whereby the connecting means, shown as consisting of a hook 30 and a ring or link 31, have been provided with screw-threaded shanks 32, extending through the bails of the piston at their points of intersection, where perforations 33 are provided for the passage of said shanks, said connecting members being secured in position by means of nuts 34 upon their threaded shanks. Still another modification (illustrated in Fig. 6) shows the crossed yokes or bails 25 25[a] as being formed separate from the piston-plate 24, upon the upper and lower sides of which the crossed bails are caused to abut, said bails being connected and tightened upon the piston-plate by means of a bolt 35, having at one end a hook member 36 and at its other end a link 37, which latter also serves as a tightening-nut. When this bolt is used, it is obviously necessary to perforate the piston-disk for the passage thereof. I do not deem it necessary, however, to pack this perforation, inasmuch as the bolt may be made to fit quite snugly therein, and it may even be found desirable to leave a slight opening or vent through which water may leak back into the well instead of being left standing in the well-tube. The yokes or bails, which form part of the piston, serve to guide the piston-plate and to steady the movement thereof, thus promoting the efficiency of the pump. These simple modifications will suggest many others which may be resorted to within the scope of the invention, and I desire it to be understood that I reserve to myself the right to such changes and modifications as may be used without departing from the spirit of the invention or sacrificing any of the advantages of the same.

Having thus described my invention, I claim—

1. In a water-elevator, a casing, a sprocket-wheel supported in said casing, the latter being provided with openings for the accommodation of said sprocket-wheel and for down-going and up-going pistons, a cylinder having flaring flanged ends, said cylinder being supported upon the casing in alinement with the opening for the up-going piston members, a conducting-pipe connected with the upper end of the cylinder, said conducting-pipe being of an interior diameter greater than that of the bore of the cylinder, a lateral exit upon said conducting-pipe, separable top members for the latter, having supporting-brackets, a shaft journaled in said brackets, a sprocket-wheel upon said shaft, an endless chain supported upon the upper and lower sprocket-wheels, piston members carried by said chain, and packing-rings upon said piston members, the sprocket-wheels being provided with recesses for the accommodation of said piston members.

2. A piston for water-elevators consisting of a disk provided on its upper and under sides with approximately semicircular yokes crossing each other at right angles.

3. A piston for water-elevators consisting of a disk provided on its upper and under sides with approximately semicircular bails

crossing each other at right angles, and means for connecting said bails with adjacent chain-links.

4. A piston for water-elevators consisting of a disk provided on its upper and under sides with semicircular yokes or bails crossing each other at right angles, said disk having an annular groove, and a packing-ring seated in said groove.

5. A piston for water-elevators consisting of a disk provided on its upper and under sides with semicircular yokes crossing each other at right angles, a hook member, and a link member connected with said yokes at their points of intersection at opposite sides of the disk, and a packing-ring seated in a groove in the latter.

6. A piston for water-elevators consisting of a disk, two bail members, each comprising two semicircular yokes crossing each other at right angles, and means for connecting said bail members with each other and with the disk.

7. A piston for water-elevators consisting of a disk having an annular groove and a packing-ring seated in said groove, two bail members, each comprising a pair of yokes crossing each other at right angles, said bail members abutting upon opposite sides of the disk, and a connecting-bolt extending through said bail members at the points of intersection of the yokes composing the same.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JAMES ANDREW GOODNER.

Witnesses:
JAMES M. CHRITTON,
A. H. GRISWOLD.