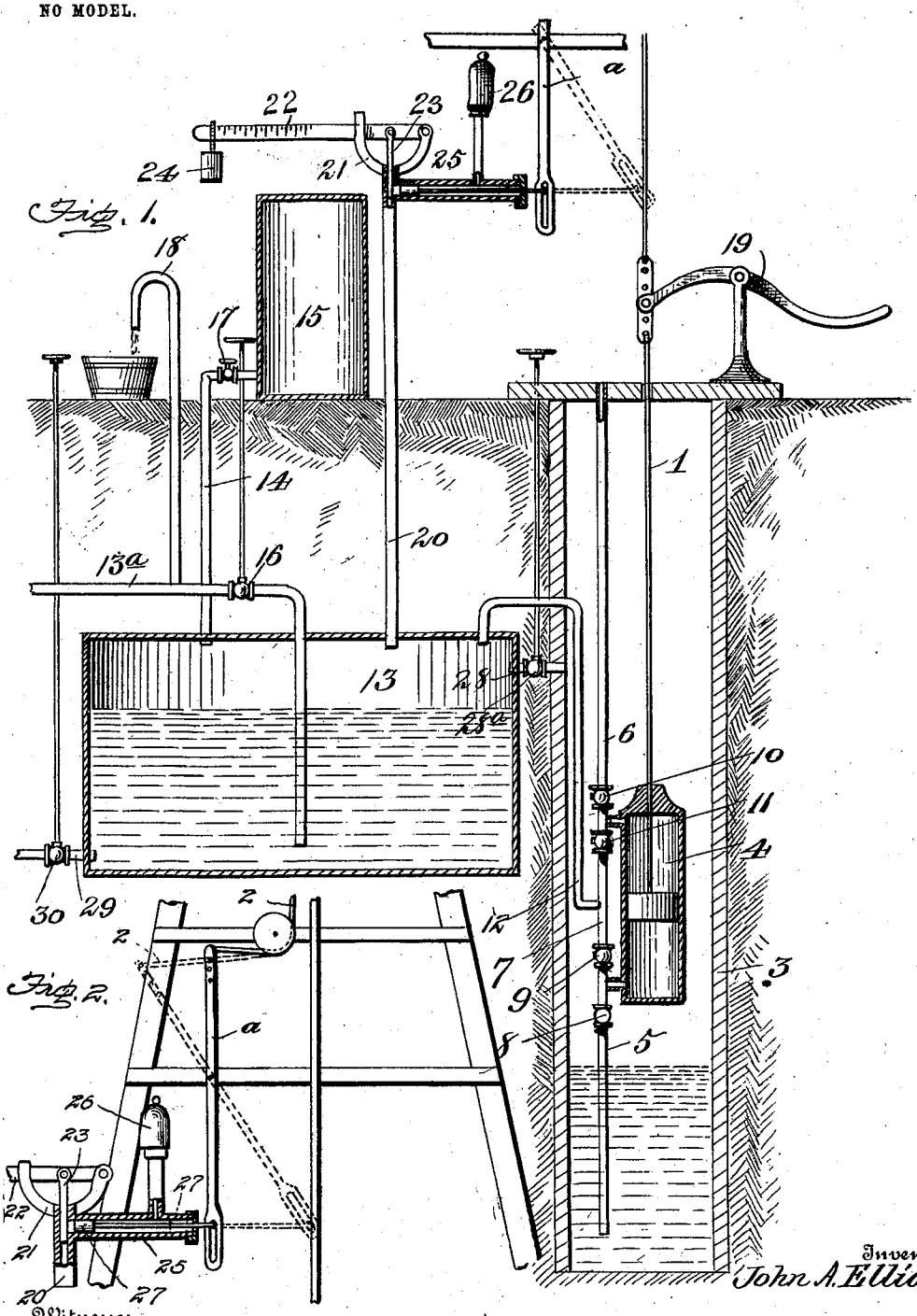
No. 763,051. PATENTED JUNE 21, 1904.

J. A. ELLIOTT.

WATER ELEVATOR.

APPLICATION FILED MAR. 6, 1902.

NO MODEL.



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No. 763,051. Patented June 21, 1904.

UNITED STATES PATENT OFFICE.

JOHN A. ELLIOTT, OF BUTTE, MONTANA, ASSIGNOR OF ONE-HALF TO GEORGE E. DE SNELL, OF BUTTE, MONTANA.

WATER-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 763,051, dated June 21, 1904.

Application filed March 6, 1902. Serial No. 96,958. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. ELLIOTT, a citizen of the United States, residing at Butte, in the county of Silverbow and State of Montana, have invented certain new and useful Improvements in Water-Elevators; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to water-elevating apparatus, and particularly to an apparatus employing a suitable motor, such as a windmill, for operating a pump which draws water from a well or cistern, which water is delivered by compressed air to the point of consumption.

The object of the invention is to provide an apparatus of this character which shall be comparatively simple and cheap in construction, efficient in operation, adapted to supply reserve power for use when the motor is not running, and provided with means for stopping the motor and sounding an alarm when the pressure in the air-reservoir rises above a predetermined point.

With this and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in certain novel features of construction and combination and arrangement of parts, as will be hereinafter fully described, defined in the appended claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical sectional view of a water-elevating apparatus embodying my invention. Fig. 2 is a detail sectional view of the whistle or alarm device, showing the same connected to the pivoted lever which operates a windmill-controlling rope.

Referring to the drawings, the numerals 1 and 2 represent, respectively, the plunger-rod and the controlling rod or rope of an ordinary windmill, which is not shown in full, as it is not necessary to a complete disclosure of the invention.

Within the well 3 is arranged a double-acting pump 4, the cylinder of which is in communication at one end with a suction-pipe 5, submerged in the water in the well, and an air-pipe 6, leading from the top of the well down to the pump. These two pipes are connected by a union-pipe 7 and are provided with valves for regulating the inlet and discharge of water and air. Upon the upward movement of the pump-piston water is drawn into the lower end of the pump-cylinder through the pipe 5, which is provided with a check-valve 8 to prevent the water from returning, and upon the downward movement of the piston the water previously drawn in is discharged into the union-pipe 7, which is provided with a check-valve 9 to prevent the water from flowing back into the cylinder. The downward movement of the piston also draws air into the upper end of the cylinder through the pipe 6, and this air is prevented from flowing back into said pipe by a check-valve 10, while upon the upward movement of the piston the air is discharged into the pipe 7 and prevented from returning to the cylinder by a check-valve 11. By constructing the parts in this manner the pipes or sections 6, 7, and 5 form a continuous pipe from the top of the well to near the bottom or below the water-line, which thus forms a support for the pump-cylinder 4 as well as conduits for air and water. The check-valves in this pipe are arranged in pairs in which the valves of one pair each open toward those in the other pair and with each end of the cylinder communicating with the pipe between a pair of valves.

The union-pipe 7 is connected with a feed-pipe 12, which conveys the air and water therefrom to a storage-tank 13, in which a supply of water is at all times maintained for use when the windmill is not running. The air drawn in by the pump and forced with the water through the feed-pipe to the tank aerates the water and is used as the medium for forcing the water through a service-pipe 13^a to a house or point where the water is to be used. The constant supply of air to the tank maintains the same under the desired pressure, and any excess pressure passes therefrom through a pipe 14, leading to an air-reservoir 15, in which a reserve supply of

air is contained for use in forcing the water to the point of consumption when the windmill is not in operation. The service-pipe 13^a is provided with a controlling-valve 16 and the air-pipe 14 with a similar valve 17 for respectively cutting off the flow of water through the service-pipe and preventing the inlet to or discharge of air from the reservoir 15. These valves are provided with suitable handles or hand-wheels attached to the stems thereof, whereby they may be conveniently manipulated. Preferably the tank 13 will be arranged at a suitable depth below the surface of the ground, and in that case the stem of the valve 16 extends upwardly to a point above the surface of the ground and in such close proximity to the handle of the valve 17 that both may be conveniently manipulated from a point adjacent to the tank 15. The service-pipe 13^a may be provided with a discharge-pipe 18 for convenience in drawing off water from the tank 13 at a point adjacent to the tank and coöperating parts. When the windmill is not in use, the pump-rod may be operated by a hand-lever 19 to supply water and air to the tank 13.

In the normal operation of the apparatus the water in the tank 13 is held under pressure by the compressed air, which forces the water through the service-pipe 13^a to the point of consumption, and a certain proportion of the air passes from the tank through the pipe 14 to the air-reservoir 15, in which it may be kept compressed to the required density for use in forcing the water through the service-pipe when through lack of wind or other causes the windmill is not in operation. Under some conditions, however, as during the constant operation of the windmill for a long period of time, the air-pressure within the tank 13 is liable to become too great, and in that case it is essential to provide some means for relieving the excess pressure and arresting the action of the windmill until the pressure of the air within the water-tank has again fallen to the normal. To this end I provide automatic means for permitting of the escape of air from the tank for sounding an alarm and for throwing the windmill out of operation when the pressure within the tank rises above a predetermined point. The automatic means for performing these several functions consists of a vent-pipe 20, extending from the tank 13 to a point above the surface of the ground and provided at its upper end with a yoke 21, to which is pivoted a graduated bar or lever 22, carrying a valve 23, which is adapted to seat within the upper end of the pipe 20. This lever carries a balancing-weight 24, which is adjustable thereon to vary the resistance of the valve to opening under the pressure of the confined air. Connected to the upper end of the pipe 20 is a pipe 25, to which the inlet of air is controlled by the valve 23 and which leads to a whistle or alarm device 26. The outer or free end of this pipe is open to receive a plug or plunger 27, which is slidably mounted therein and also slidably connected to one end of a pivoted lever *a*, which is connected at its opposite end to the controlling-cable 2 of the windmill-gearing. When the pressure in the tank passes beyond the safety-point, the pressure of the air opens the valve 23 and tilts the lever 22 upwardly, whereupon the air passes from the pipe 20 to the pipe 25 and forces the plug or stopper 27 outward to the broken-line position and moves the lever *a* from the full to the broken-line position, thereby causing said lever to pull or draw upon the cable and throw the gearing of the windmill out of action, thus stopping the operation of the pump 4. The outward movement of the plug 27 also permits air to pass to the whistle 26, which is thereby sounded. When the plug 27 is forced inwardly from the broken line to the full-line position shown in Fig. 1, which operation is manually performed, the lever *a* occupies a substantially vertical position, and the cable 2 is relaxed, allowing the parts of the gearing to be thrown into action to start the operation of the pump again.

Any excess water pumped into the tank 13 is allowed to flow back into the well through a waste-pipe 28, provided with a controlling-valve 28^a. The water and residuum may be drained off from the tank 13 through a pipe 29, having a controlling-valve 30. When this valve is open, the compressed air will force the water and impurities within the tank 13 out through the pipe 29. When the valve is closed, a fresh supply of water is pumped into the tank by the setting of the pump mechanism in action.

From the foregoing description, taken in connection with the accompanying drawings, it is thought that the construction, operation, and advantages of my improved water-elevator will be readily apparent without requiring a more extended explanation.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

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

1. In a water-elevator, a pipe extending from the top of the well to below the water-line and provided with two pairs of valves intermediate its length, the valves of each pair opening toward the valves of the other pair, a pump-cylinder supported by said pipe and provided with a solid piston, each end of the cylinder communicating with the pipe between a pair of valves, a water and compressed-air tank provided with air and water outlets, a pipe communicating with the tank and with the first-mentioned pipe between the pairs of valves and means connected with one of the

air-outlets from the tank for controlling the action of the piston.

2. In a water-elevator, a tank for containing water and compressed air, a combined air and water pump communicating therewith, water-outlets communicating with the tank near its bottom and three pipes communicating with it at the top, one of which latter pipes communicates with the well, an auxiliary air-reservoir communicating with another of said three pipes and means connected with the third pipe for controlling the action of the pump.

3. In a water-elevator, a tank for containing water and compressed air, a pump for supplying the tank, water-outlets communicating with the tank near its bottom pipes communicating with the top of the tank, one of which is provided with a yoke at its upper end, a laterally-extending pipe communicating with the first-mentioned pipe near the yoke, the intermediate portion of which is provided with a pneumatically-operated signal, a plug mounted in the second-mentioned pipe between the signal and the first-mentioned pipe and adapted to control the action of the pump, a weighted lever mounted in the yoke, and a valve in the end of the first-mentioned pipe with its outer end pivotally connected with the lever and its inner end normally below the entrance to the second-mentioned pipe.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN A. ELLIOTT.

Witnesses:
E. G. SMITH,
G. E. DE SNELL.