E. C. SMITH & W. A. CRUMPACKER.

COMPRESSED AIR WATER ELEVATOR.

APPLICATION FILED MAR. 26, 1910.

976,004.

Patented Nov. 15, 1910.

2 SHEETS—SHEET 1.

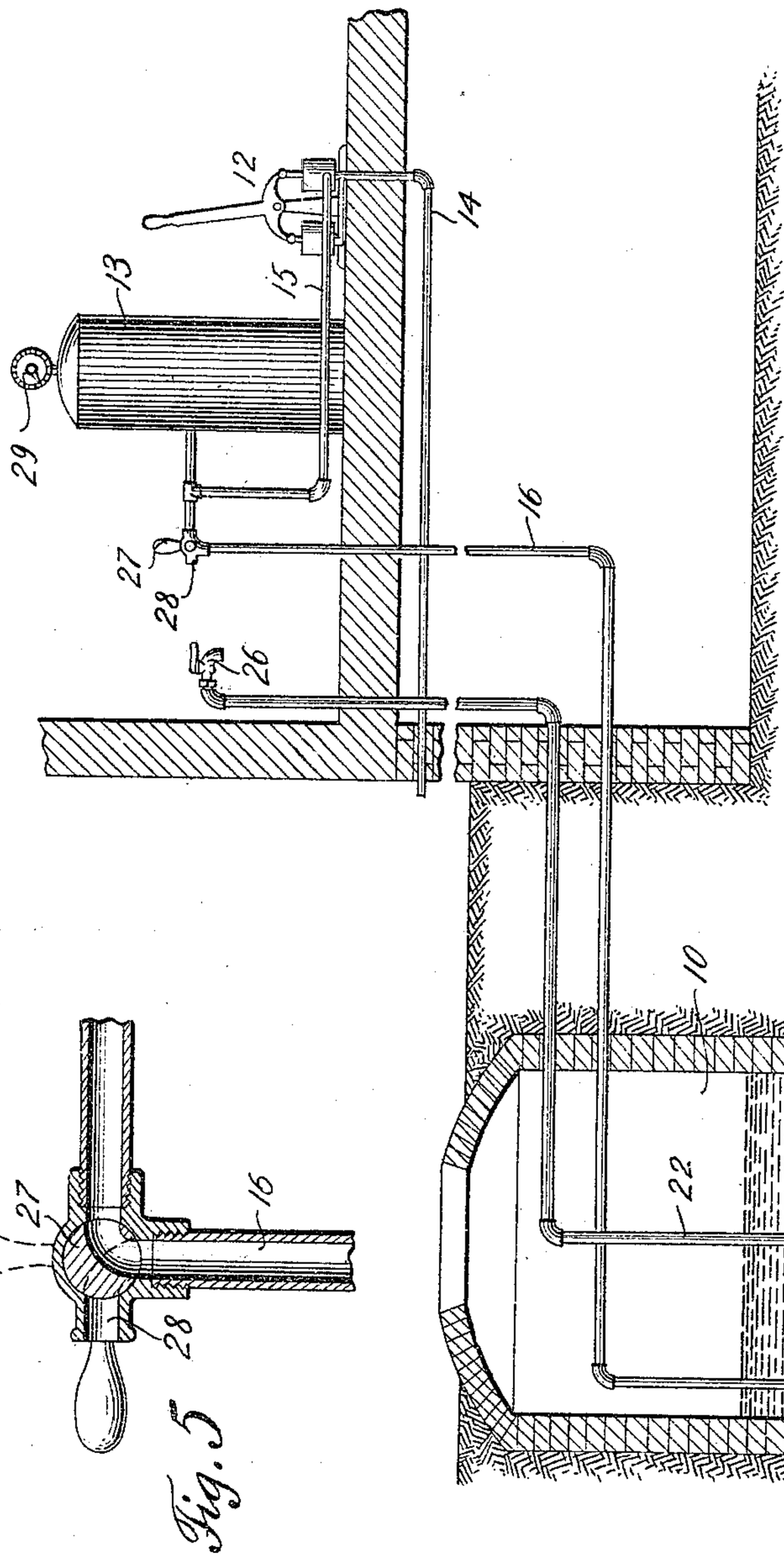

Fig. 1

Fig. 5

Witnesses
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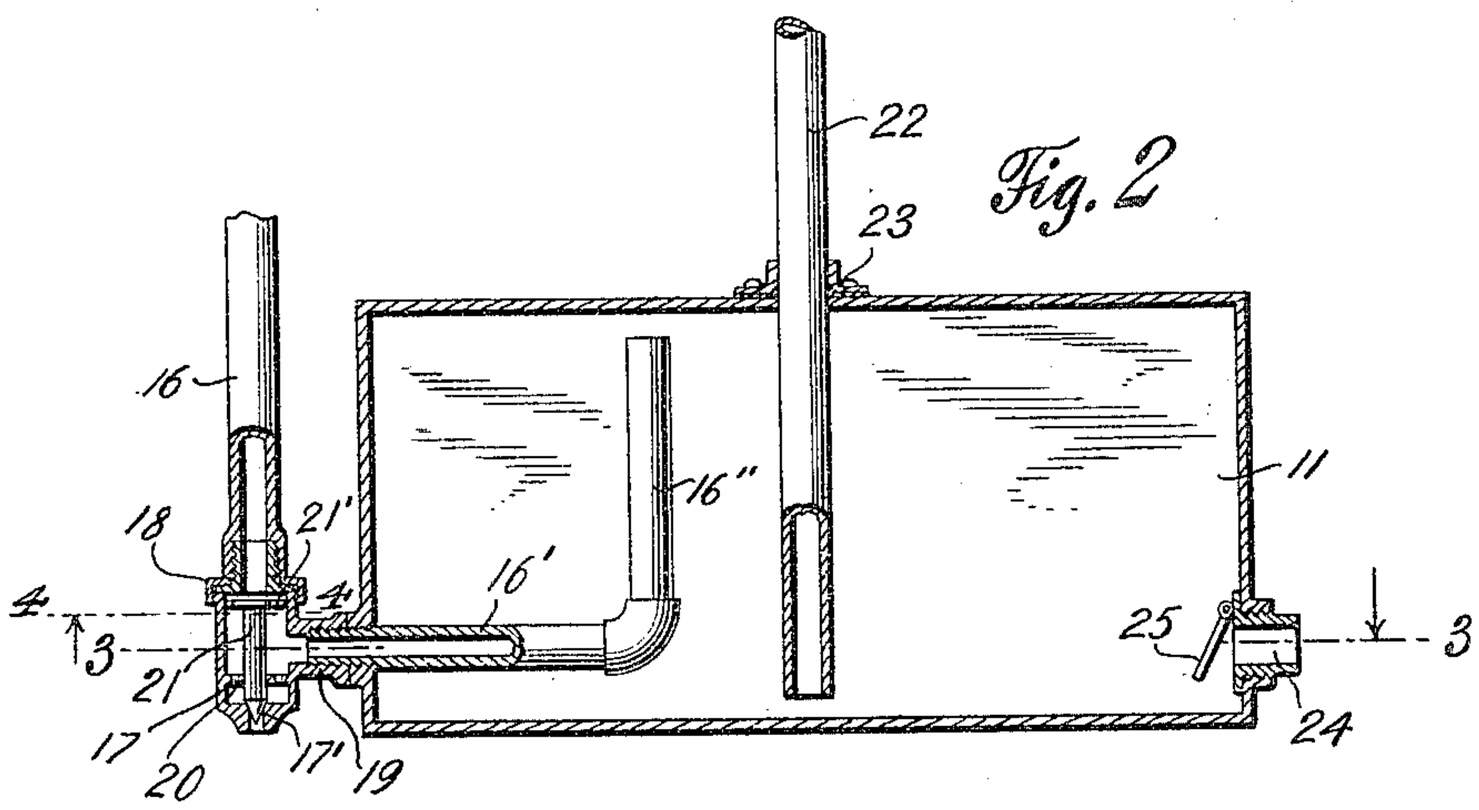

Fig. 2

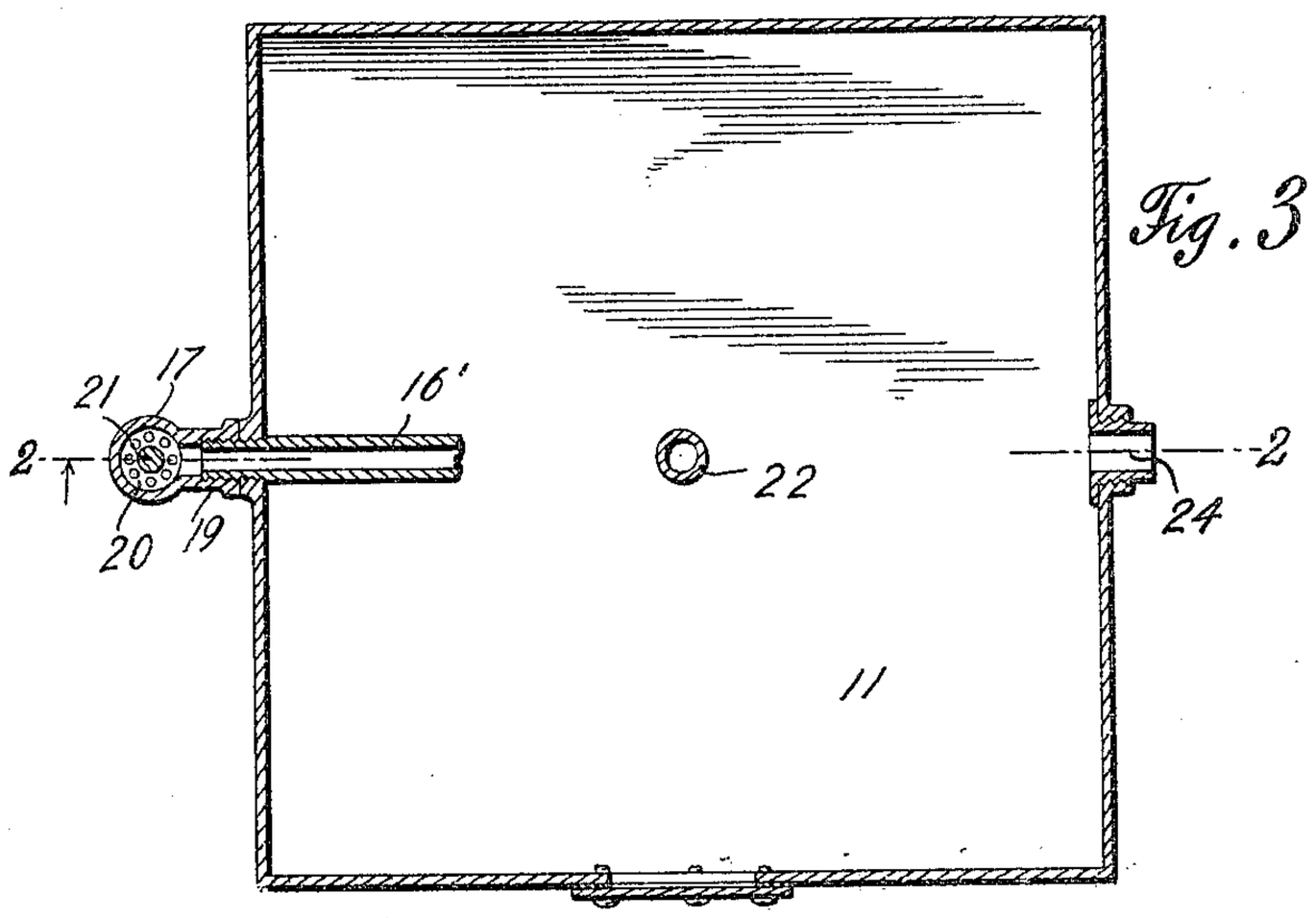

Fig. 3

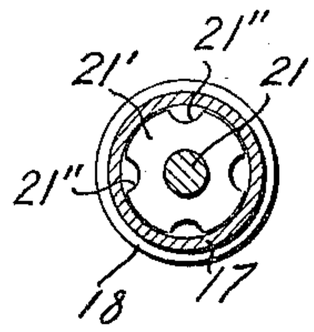

Fig. 4

Witnesses

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UNITED STATES PATENT OFFICE.

ERNEST C. SMITH AND WILLIAM A. CRUMPACKER, OF CENTERVIEW, MISSOURI.

COMPRESSED-AIR WATER-ELEVATOR.

976,004. Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed March 26, 1910. Serial No. 551,794.

To all whom it may concern:

Be it known that we, ERNEST C. SMITH and WILLIAM A. CRUMPACKER, citizens of the United States, residing at Centerview, in the county of Johnson and State of Missouri, have invented certain new and useful Improvements in Compressed-Air Water-Elevators, of which the following is a specification.

This invention relates to compressed air water elevators, and the invention consists in certain specific novel features of construction and principles of operation hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a somewhat diagrammatic representation of the invention, parts broken away; Fig. 2 is a vertical section substantially on the line 2—2 of Fig. 3; Fig. 3 is a transverse section on the line 3—3 of Fig. 2; Fig. 4 is a transverse detail on the line 4—4 of Fig. 2, and Fig. 5 is a detail view of a valve described below.

Throughout the following description and on the several figures of the drawings similar parts are referred to by like reference characters.

At 10 is indicated any suitable form of well or cistern from which water is to be elevated.

11 indicates a pressure tank within the well preferably near its bottom.

An air pump 12 and a compressed air reservoir 13 are located at any desired point or points irrespective of the place of delivery for the water to be elevated. As indicated the air is led to the pump by means of a pipe 14 having its outer end on the outside of the building in which the devices are located, thus insuring pure fresh air to be supplied to the pump and thence to the reservoir and well, the air being conveyed from the pump to the reservoir by means of a pipe 15. A pipe 16 leads from the reservoir, preferably being connected at its upper end to the reservoir through a portion of the pipe 15. The lower end of the pipe 16 extends into the water in the well and into the pressure chamber 11.

Located near the lower end of the pipe 16 is a peculiar type of what may be regarded as a relief and aerating valve 17. This valve includes a barrel conected by a coupling 18 to the portion of the pipe 16 which leads down into the water and the horizontal portion 16′ of the pipe is connected to one side of the barrel at 19. Another portion of the pipe 16″ leads from the horizontal portion up near the top of the pressure tank.

At 20 is indicated a perforated diaphragm through which a valve 21 operates, the lower end of which is adapted under certain conditions to close a port 17′ leading through the bottom of the barrel 17. The upper end 21′ of the valve is broader than the stem and is adapted to close the pipe 16 which extends above it when the valve is lifted. Said upper end or head of the valve is also provided with a series of notches 21″ of sufficient capacity to permit the air to pass down between the walls of the barrel and the valve.

A water pipe 22 extends from the interior of the pressure tank at a point near its bottom up out of the well to any point to which the water is to be delivered. The pipe 22 is shown as being passed through the top of the tank, the point being sealed by any suitable form of gland 23 so as to make the upper portion of the pressure tank air tight.

At 24 is indicated an inlet through which water passes from the well into the interior of the pressure tank and this port is adapted to be closed upon the inside by a check valve 25.

The discharge end of the pipe 22 may be provided with a spigot 26 if desired, especially if there are to be provided a plurality of such pipes 22 leading from the same pressure tank.

A three-way cock 27 is located at any suitable point in the pipe 16 whereby air may pass from the air reservoir 13 down through the pipe 16 into the pressure tank when the valve is in one position. The arrangement is such however that when the valve is moved from the position shown in full lines to that shown in dotted lines in Fig. 5 communication from the tank 13 will be cut off and the communication will be from the remaining portion of the pipe 16 to the atmosphere through the port 28.

When the valve 27 is in the position indicated in Fig. 1 the air pump 12 may be operated to charge the compressed air reservoir with the charge of air under such pressure as may be desired within the capacity of the pump, the pressure being indicated by any suitable form of indicator 29. If it is desired to obtain water from the well the valve 27 will be turned to the position shown in full lines in Fig. 5, whereupon air under pressure will pass through

the pipe 16 past the valve 21 into the upper portion of the tank 11. The water in the tank 11 will then be forced upwardly through the pipe 22 and discharged from its upper end, the spigot 26 of course being open. When sufficient water has been received the valve 27 will be turned to stop the flow of air from the tank 13. At this time the pocket of compressed air which will be at the top of the tank 11 will pass in a reverse direction through the pipe sections 16″ and 16′ out through the ports of the diaphragm 20 and the port 17′ where it will agitate and aerate practically all of the water in the well. This action of the air in the reverse direction will continue until equilibrium is restored between the inside and the outside of the tank 11 and during such outflow of air from the tank 11 a fresh supply of water will enter the tank through the port 24 ready for a succeeding discharge of water through the pipe 22. When the valve 27 is turned to stop the flow of air from the tank 13 and to make communication between the pipe 16 and the atmosphere through the port 28 the pressure within the tank 11 will immediately seat the valve 21 upwardly with the head 21′ against or closing the port of the pipe 16. This insures that the back pressure from the tank 11 will cause the air to flow through the bottom of the valve 17 as above described.

The device may be made of any suitable dimensions or proportions and the details of construction may be varied without departing from the spirit thereof.

The principle of operation of the device is comparatively simple and the mechanism is not likely to become disarranged or out of order. The arrangement furthermore is such that the tank of compressed air may be availed of to force water from the well for various purposes, such as for the extinguishing of fires by the mere application of a hose to the pipe 22. Another advantage of this type of elevator is that there are no exposed parts containing water which might become frozen during cold weather.

We claim:—

In a compressed air elevator, the combination with an air reservoir, of an air pressure tank in the bottom of the well, a supply pipe extending from said air reservoir and terminating near the top of said tank, a barrel located in said pipe adjacent to the exterior of said tank, having perforated diaphragm adjacent to the lower terminal thereof, and a port at the lower terminal thereof, a valve stem operating through said diaphragm carrying a transverse head at the upper extremity thereof, said head having a series of recesses formed about the edge thereof, the lower terminal of said valve stem adapted to coöperate with and close said port at predetermined intervals, means whereby the water supply may enter said tank, and a distributing pipe extending from the bottom of said tank to the top thereof.

In testimony whereof we affix our signatures in presence of two witnesses.

ERNEST C. SMITH.
WILLIAM A. CRUMPACKER.

Witnesses:
E. P. Hering,
A. D. Latine.