A. C. WELLS.

WATER AND SEWAGE EJECTOR.

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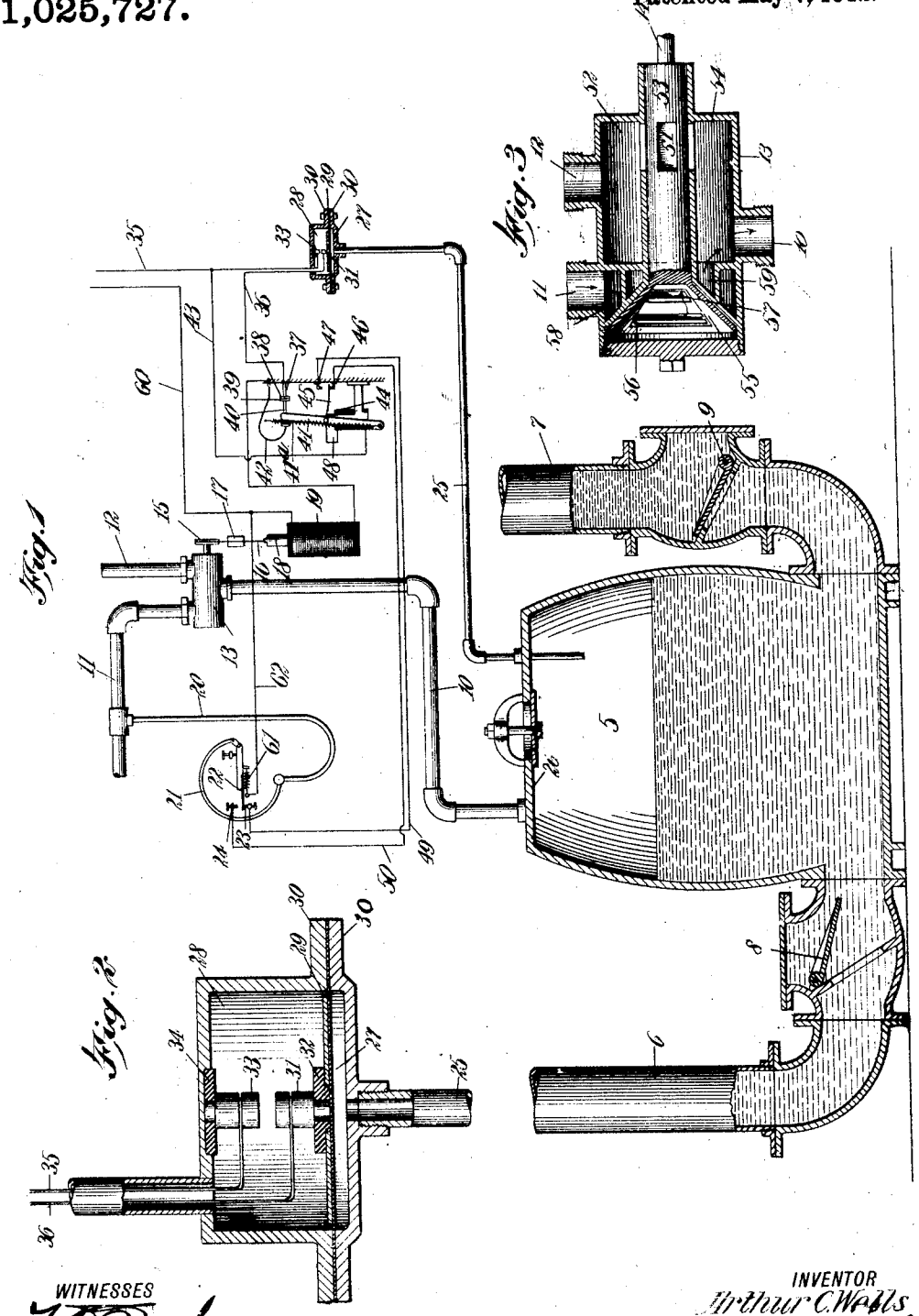

Fig. 1.

Fig. 2.

Fig. 3.

WITNESSES

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WATER AND SEWAGE EJECTOR.

1,025,727 Specification of Letters Patent. Patented May 7, 1912.

Application filed January 25, 1911. Serial No. 604,524.

To all whom it may concern:

Be it known that I, ARTHUR C. WELLS, a citizen of the United States, and a resident of Amityville, in the county of Suffolk and State of New York, have invented a new and Improved Water and Sewage Ejector, of which the following is a full, clear, and exact description.

My invention relates to water and sewage ejectors, and it has for its object to provide a tank with a conduit having two branches leading thereto, electrical means being provided for operating a switch commanding the branches, the switch being controlled by the pressure in a pipe extending through the tank, and by the pressure in one of the branches.

Additional objects of the invention will appear in the following complete specification, in which the preferred form of my invention is disclosed.

In the drawings similar characters of reference indicate corresponding parts in all the views, in which—

Figure 1 is a diagrammatic view of the invention, the tank and one of the switch members being shown in section; Fig. 2 is an enlarged sectional view of one of the switch members, and Fig. 3 is an enlarged sectional view of the valve commanding the branches.

By referring to the drawings it will be seen that a tank 5 is provided having an inlet 6 and an outlet 7, there being a check valve 8 in the inlet and a check valve 9 in the outlet, a conduit 10 being connected with the tank 5, the said conduit having two branches 11 and 12, which are commanded by the rotary valve 13. The branch 12 is open to the atmosphere. The stem 14 of the valve 13 has secured to it a pulley 15, around which is disposed a cord 16, one end of which has secured to it a weight 17, the other end being secured to the armature 18, commanded by the solenoid 19. Connected with the branch 11 of the conduit 10, there is a pipe 20, which leads to a Bourdon tube 21, a switch arm 22 being carried by this Bourdon tube, and being adapted to contact with the contact points 23 and 24. A pipe 25 is provided, one terminal of this pipe extending downwardly through the top 26 of the tank 5, the other terminal of the pipe 25 communicating with a chamber 27 in a switch member 28. One side of the chamber 27 is formed by a diaphragm 29, the periphery of which is secured between flanges 30 of the switch member 28. A contact point 31 is carried by the diaphragm 29, and is insulated therefrom by the insulating material 32. A similar contact point 33 is secured to the valve member 28, and is insulated therefrom by the insulating material 34. As will be understood, the contact member 31 is adapted to contact with the contact member 33, when the pressure in the pipe 25 is sufficient to move the diaphragm 29 the required distance. An electrical conductor 35 is connected with the contact member 33, and an electrical conductor 36 is connected with the contact member 31. The electrical conductor 36 is in electrical communication with the contact member 37, having a contact point 38, the said contact point 38 being adapted to be engaged by a contact point 39, on a contact member 40 carried by one arm of the lever 41. The contact member 40 is in electrical communication with the electrical conduit 42, which leads to the solenoid 19. The electrical conduit 43 connects the electrical conductor 35 with the solenoid 44. A switch arm 45 is carried by the lever 41, and is adapted to contact with the contact points 46 and 47. The solenoid 44 is connected with the switch arm 45 by the electrical conduit 48. The contact point 47 is connected with the contact point 23, by the electrical conduit 49, and the contact point 46 is connected with the contact point 24 by an electrical conduit 50.

As shown in Fig. 3 of the drawings, a cylindrical member 53 is secured to the valve stem 14, there being an opening 51 in this cylindrical member, adapted to afford communication between the compartment 52 in the valve leading to the branch 12, and the compartment 54 in the valve leading to the conduit 10. The cylindrical member 53 also has a cone-shaped portion forming a compartment 55, having openings or ports 56, and 57, which communicate with the compartments 58 and 59 in the valve 13, the compartment 58 communicating with the branch 11 and the compartment 59 communicating with the compartment 54, and with the conduit 10. The electric conductors 35 and 60 are connected with a battery.

The tank 5 being empty, and there being no pressure in the pipe 25, the contact member 31 is spaced from the contact member 33. The solenoid 19 is therefore not energized, and the weight 17 will therefore raise

the armature 18 from the solenoid, and rotate the pulley 15, and the valve stem 14. This will open communication between the compartments 52 and 54 in the valve, through the opening 51 and the conduit 10 will communicate with the atmosphere through the branch 12. The tank 5 may then be filled by gravity, through the inlet 6. When the level of the water in the tank 5 reaches a point above the terminal of the pipe 25, disposed in the tank 5, the air in the said pipe 25 will be compressed, which will force the diaphragm 29 upwardly, so that the contact point 31 will contact with the contact member 33. This will close the circuit formed by the electrical conductor 35, the contact members 33 and 31, the electrical conductor 36, the contact members 37 and 40, with their points 38 and 39, the electrical conductor 42 and the electrical conductor 60, which will energize the solenoid 19 which commands the armature 18. The armature will be drawn downwardly by the solenoid, which will rotate the valve stem 14, and the cylindrical valve member 53, so that communication between the compartments 52 and 54 will be cut off, and communication will be permitted between the compartments 58 and 59. When this takes place, communication between the conduit 10 and the atmosphere through the branch 12, will be cut off, and communication will take place between the branch 11, and the conduit 10. This branch 11 is in communication with a supply of air under pressure, and this compressed air will flow into the tank 5 and force the sewage and water therein out through the outlet 7. During the period when the tank 5 was filling with water and sewage, the switch arm 22 was held in engagement with the contact point 23, by the compressed air in the Bourdon tube, supplied by the branch 11. When the tank has been sufficiently emptied to permit the compressed air to escape quickly through the outlet 7, the pressure in the branch 11 is reduced, and the Bourdon tube 21 is actuated, which draws the switch arm 22 away from the contact point 23, and into engagement with the contact point 24. When this takes place, the circuit will be closed from the electrical conductor 35, through the solenoid 44, the electrical conduit 48, the switch arm 45, the contact point 46, the electrical conduit 50, the contact point 24, the switch arm 22, the spring 61, and the electrical conductor 62. This will energize the solenoid 44, which will move the lever 41 and will draw the switch arm 45 away from the contact point 46, and it also moves the contact 40 away from the contact member 37. This will break the circuit which has energized the solenoid 19, and as the armature 18 becomes free from the influence of the solenoid, the weight 17 and the cord 16 will draw the armature 18 upwardly, thereby operating the pulley 15, which is secured to the valve stem 14. This movement of the valve will close communication between the branch 11 and the conduit 10, and will open communication between the conduit 10 and the branch 12. As the pressure in the branch 11 increases, it will operate the Bourdon tube, causing the switch arm 22 to move down and against the contact point 23, closing the circuit formed by the electrical conductor 35, the electrical conduit 43, the solenoid 44, the electrical conduit 48, the switch arm 45, the contact point 47, the electrical conduit 49, the contact point 23, the switch arm 22, the electrical conductor 62, and the electrical conductor 60. This will cause the lever 41 to move so that the contact point 39 and the contact member 40 will engage the contact point 38, so that the solenoid 19 will again be energized when the water reaches a sufficient height to again compress the air in the pipe 25, and it will move the switch arm 45 out of engagement with contact point 47 and into engagement with contact point 46.

There is an armature on the lever 41 which is commanded by the solenoid 44, the solenoid when energized serving to draw the armature on the lever 41 to a center inertia, and the spring 41ª serving to move the lever past the center and into its opposite position.

The broad combination of elements herein including a solenoid, an armature commanded by the solenoid, valve mechanism commanding the conduit branches and means connecting the solenoid with the valve mechanism forms a part of the subject-matter of a separate application for patent renewed by me March 14, 1912, No. 683,703.

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

1. In a water and sewage ejector a tank having an inlet and an outlet, a conduit connected therewith having two branches, a valve commanding the branches, a solenoid, an armature commanded thereby having means for operating the valve, a circuit for energizing the solenoid, a pipe communicating with the tank, and switch means in the circuit controlled by the pressure in the pipe.

2. In a water and sewage ejector a tank having an inlet and an outlet, each commanded by a check valve, a conduit connected with the tank and having two branches, a valve commanding the branches, electrical means for operating the last-mentioned valve, a circuit connected with the electrical means, a pipe communicating with the tank, and switch means in the electrical circuit controlled by the pressure in the pipe.

3. In a water and sewage ejector a tank

having an inlet and an outlet each commanded by a check valve, a conduit having two branches, connected with the tank, a valve commanding the branches, a solenoid, an armature commanded by the solenoid having means for operating the valve, a circuit for energizing the solenoid, a switch in the circuit, electrical means for throwing the switch, a Bourdon tube connected with one of the branches, and a switch commanded by the said Bourdon tube for controlling the electrical means.

4. In a water and sewage ejector a tank having an inlet and an outlet each commanded by a check valve, a conduit having two branches connected with the tank, a valve commanding the branches, a solenoid, an armature commanded by the solenoid, and having means for controlling the valve, an electrical circuit for energizing the solenoid, a pipe communicating with the tank, switch means in the circuit controlled by the pressure in the pipe, an additional switch in the circuit, a second circuit, electrical means in the second circuit for operating the said additional switch, a Bourdon tube connected with one of the branches, a third switch in the second circuit, and means by which the Bourdon tube is adapted for operating the last-mentioned switch.

5. In a water and sewage ejector a tank having an inlet and an outlet, each commanded by a check valve, a conduit having two branches, connected with the tank, a valve commanding the branches, a solenoid, an armature commanded by the solenoid, having means for controlling the valve, an electrical circuit for energizing the solenoid, a pipe for communicating with the tank, switch means in the circuit, controlled by the pressure in the pipe, an additional switch in the circuit, electrical means for commanding the said additional switch, two contact points, an electrical conductor connected with the said electrical means, a switch arm connected with the electrical conductor carried by the said additional switch for connecting the electrical conductor with the contact points, one at a time, two additional contact points, two electrical conductors, each connecting one of the first-mentioned contact points with one of the second-mentioned contact points, a Bourdon tube connected with one of the branches, a switch arm carried by the Bourdon tube adapted to communicate with the second-mentioned contact points, and an electrical conductor connected with the switch arm carried by the Bourdon tube.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR CORNWALL WELLS.

Witnesses:

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