May 20, 1924. 1,494,875

E. YEOMANS

AUTOMATIC PUMP

Filed Sept. 10, 1923

Fig. 2

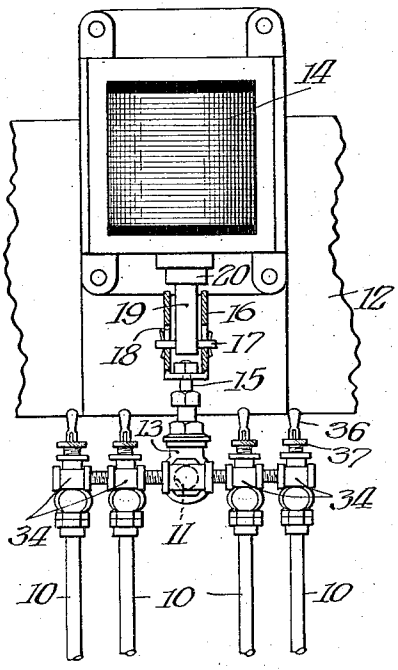


Fig. 1

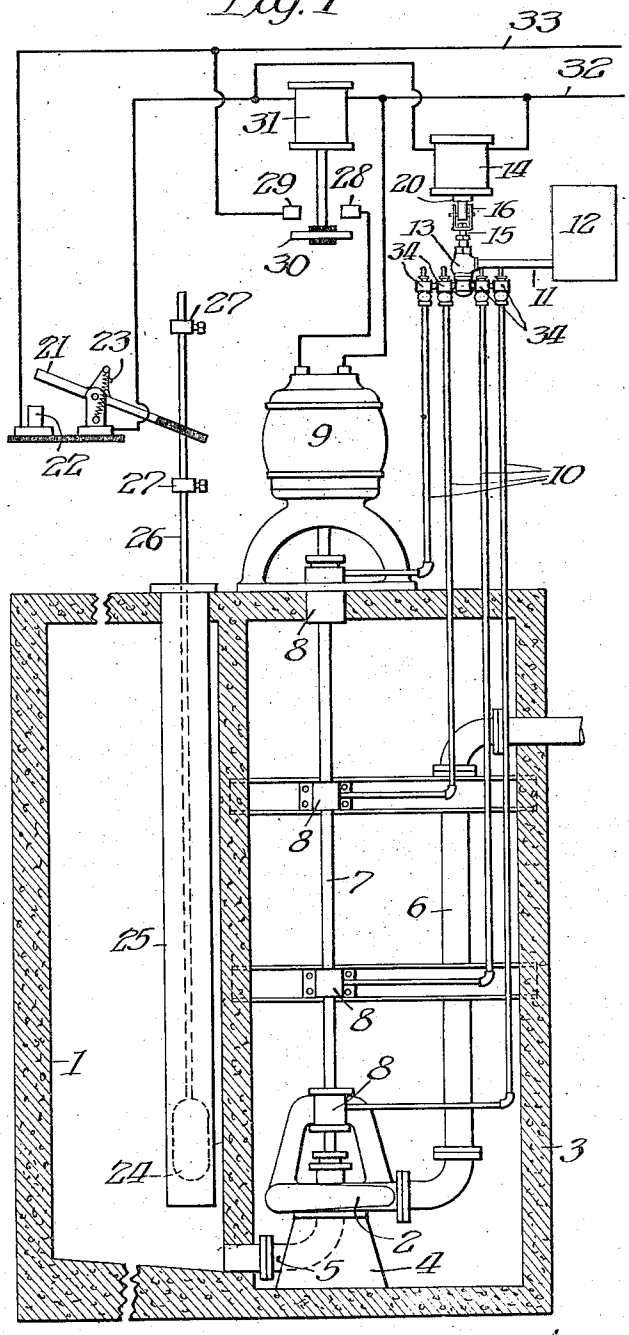
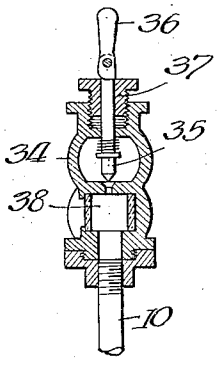


Fig. 3



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UNITED STATES PATENT OFFICE.

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AUTOMATIC PUMP.

Application filed September 10, 1923. Serial No. 661,730.

To all whom it may concern:

Be it known that I, EDWARD YEOMANS, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Automatic Pumps, of which the following is a specification.

The invention relates to pumps and more particularly to sewage pumps which are automatically thrown into and out of operation, and seeks to provide improved means which are automatically thrown into and out of operation with the pump for supplying lubricant when the pump is actuated. The invention consists in features of improvement hereinafter set forth, illustrated in a preferred form in the accompanying drawing, and more particularly pointed out in the appended claims.

Figure 1 is an elevation of a system embodying the present invention. Figs. 2 and 3 are detail views of parts of the apparatus.

The particular system illustrated is adapted for ejecting liquid sewage from a receptacle or well 1 in which it collects. A centrifugal pump 2 having a vertical axis is arranged adjacent the lower end of the receptacle or well 1 and preferably in the pit 3. The pump is shown mounted upon a suitable base 4 and its suction or intake pipe 5 communicates with the bottom of the receptacle or well 1. When the pump is in operation liquid is drawn from the receptacle 1 and is forced through an upleading discharge pipe 6. A vertical pump shaft 7 is mounted in suitable bearings 8 and its upper end is connected to the rotor of an electric motor 9 mounted at the upper end of the pit.

A series of pipes 10 extending downwardly into the pit supply oil to the shaft bearings and also, if desired, to the bearings of the centrifugal pump. These pipes are connected at their upper ends to a common supply pipe 11 which leads from a tank or oil reservoir 12, a valve 13 being provided the pipe 11 for establishing or cutting off communication between the tank 12 and the individual supply pipes 10.

The valve 13 is operated by an electromagnet or, preferably, by a solenoid 14 arranged immediately above the valve. Preferably, as shown, the stem 15 of the valve is connected at its upper end to the lower end of a U-shaped member or yoke 16, and a pin 17 extends through vertical slots 18 in the sides of the yoke and through the lower end of an extension 19 on the solenoid core 20. When the solenoid is deenergized, the weight of its core is sufficient to close the valve 13. When the magnet is energized, it opens the valve. The lost-motion connection between the valve stem and solenoid core permits the initial movement of the latter in opening and closing the valve before the valve itself is shifted.

The circuits of the electric motor 9 and the electro-magnet or solenoid 14 are automatically and simultaneously opened and closed by means of a float switch 21. In the form shown, this switch is pivoted and co-operates with a fixed contact 22, the switch being held in either open or closed position by an over-the-center spring 23. A float 24 within the receptacle or well 1 is preferably arranged within a pipe 25 and has an upwardly extending rod 26. The latter at its upper end is provided with adjustable buttons 27 which, at the upper and lower limits of the level of the liquid in the well, are arranged to engage and close and open the switch 21.

In addition to closing and opening the circuits of the electro-magnet 14, the switch 21 may also directly open and close the circuit of the motor 9. Preferably, however, the switch controls the motor circuit through the medium of an electro-magnet switch comprising stationary contacts 28 and 29 and a movable contact 30 operated by a solenoid magnet 31. One of the supply conductors 32 is connected parallel to the solenoid magnets 14 and 31 and to one of the terminals of the motor. The other terminals of the magnets are connected to the movable switch member 21 and the other terminal of the motor to the stationary contact 28. The other supply conductor 33 is connected to the switch contacts 22 and 29.

When liquid in the receptacle 1 reaches the high level, the float switch 21 is closed, thereby starting the motor 9 and pump 2 to discharge liquid through the pipe 6, and also opening the valve 13 to supply lubricant to the pump shaft bearings. At the low level the switch is opened, stopping the motor and closing the valve. In addition to the common supply pipe 11, the oil supply pipes 10 are preferably provided with individual valves 34. Each valve casing, as

shown in Fig. 3, has a needle valve 35 which is spring-pressed towards its seat but is normally held open by means of a cam lever 36 which co-operates with a collar 37 adjustably threaded to the upper portion of the valve casing. By adjusting the collar 37 the extent of the opening of the needle valve can be regulated to deliver the desired amount of oil and by means of the cam lever the valve can be opened and closed. Preferably, as shown, these valves are provided with sight openings 38.

Obviously, changes may be made in the details set forth without departure from the essentials of the invention as defined in the claims.

I claim as my invention:

1. The combination of a pump, an electric motor connected to the pump shaft, an electrically operated valve controlling the flow of lubricant to the pump shaft bearings, a float-actuated switch and means controlled thereby for automatically starting and stopping the motor and opening and closing said valve, substantially as described.

2. The combination with an electric motor, of a pump operated thereby, a valve controlling the flow of lubricant to the pump shaft bearings, an electro-magnet for opening and closing said valve, and a float-actuated switch for automatically closing and opening the circuits of said motor and said magnet, substantially as described.

3. The combination with a receptacle, of a pump for withdrawing liquid from said receptacle, an electric motor connected to the pump shaft, a valve controlling the flow of lubricant to the pump shaft bearings, a solenoid for opening and closing said valve, a float in said receptacle and means controlled by said float for automatically closing and opening the circuits of said motor and said solenoid, substantially as described.

4. The combination with a receptacle, of a centrifugal pump located adjacent the bottom of the receptacle for withdrawing liquid therefrom and having a vertical shaft, an electric motor connected to the upper end of said shaft, a series of pipes for supplying lubricant to the pump shaft bearings, a valve controlling the supply of lubricant to said pipes, an electro-magnet for opening and closing said valves and a float-actuated switch controlled by the liquid in said receptacle for automatically closing and opening the circuits of said motor and said magnet, substantially as described.

5. The combination of a centrifugal pump having a vertical shaft, an electric motor connected to the upper end of said shaft, a series of pipes having individual controlling valves for supplying lubricant to the pump shaft bearings, a common valve controlling the supply of lubricant to said individual valves, a solenoid for opening and closing said common valve, and means for automatically opening and closing the circuits of said motor and said solenoid, substantially as described.

6. The combination with an electric motor, of a pump operated thereby, a valve for supplying lubricant to the pump, a solenoid provided with a core having a lost-motion connection with said valve for opening and closing the same, and means for automatically opening and closing the circuits of said motor and said magnet, substantially as described.

EDWARD YEOMANS.