

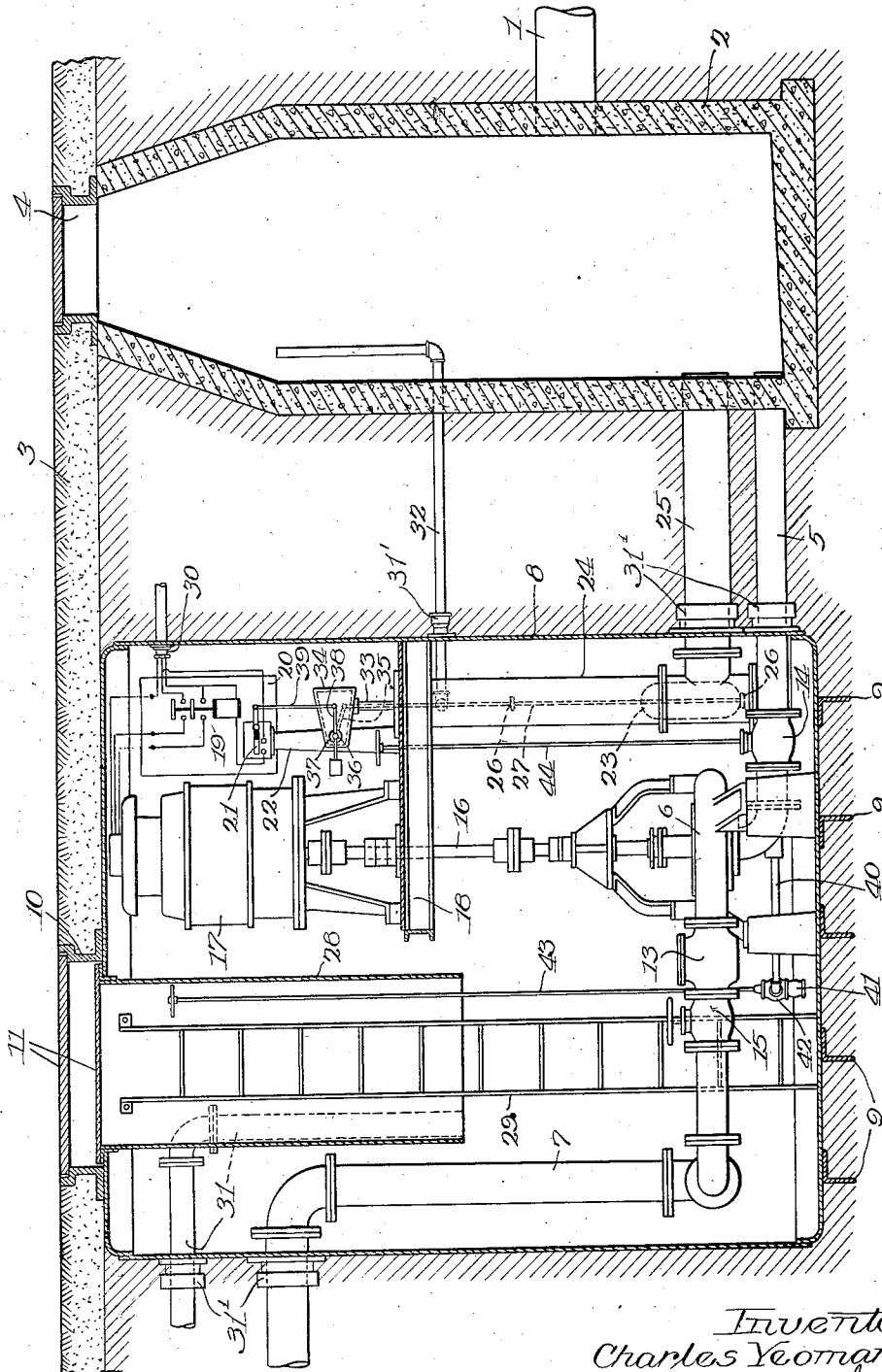
Jan. 4, 1927.

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1,613,007

SEWAGE PUMPING STATION

Filed June 12, 1926



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Patented Jan. 4, 1927.

1,613,007

# UNITED STATES PATENT OFFICE.

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## SEWAGE-PUMPING STATION.

Application filed June 12, 1926. Serial No. 115,508.

The invention relates to sewage pumping systems in which a suitable pump or ejector withdraws sewage from a cistern or the like, in which it collects and forces it to a higher level, means being provided to automatically start and stop the pump or control the operation of the ejector in accordance with the level of the sewage in the cistern. In such systems it is generally necessary to locate the pumping or ejecting apparatus in a pit and on a level with the lower end of the cistern or the like in which the sewage collects. But to avoid the possibility of damage by flooding, the operating motor and the automatic starting and stopping devices are arranged in a suitable building above the street level and particularly where, as is usual, an electric motor and automatic controlling switch mechanism is employed.

The present invention seeks to avoid the necessity of arranging the motor and automatic controlling devices above the street level, and to provide an improved pumping station in which they are located in the upper portion of the pit casing, which is provided with means for preventing the flooding of the motor and its controlling devices. The invention consists in the features hereinafter set forth, illustrated in the preferred form in the accompanying drawing and more particularly pointed out in the appended claims.

The drawing shows the preferred arrangements of the improved sewage pumping station in vertical section.

The sewage is delivered through one or more pipes 1 into a suitable well or cistern 2 arranged below the street pavement 3, and access to which is afforded through a manhole 4. Sewage passes from the lower end of the well 2 through a pipe 5 to the inlet of a pump 6 which forces it out through a discharge pipe 7.

The pumping apparatus is disposed in the lower portion of a steel pit casing 8 which, as shown, is arranged below the pavement. This casing preferably comprises a vertically disposed cylindrical shell and upper and lower circular ends connected to the shell by water and air-tight joints. In the form shown the bottom of the casing is stiffened by angle bars 9. A manhole 10 extending through the pavement 3 and is provided with

one or more covers affords access to the casing.

The pump 6 is preferably of the centrifugal type and it is mounted, as shown, in the lower portion of the casing with its axis vertical. The discharge pipe is provided with a check valve 13, and preferably both the inlet and discharge pipes have gate valves 14 and 15. The vertical pump shaft 16 is connected at its upper end to the rotor of an electric motor 17. This motor is mounted in the upper portion of the pit casing on a suitable platform 18. The motor circuit is controlled by an electromagnetic starting and stopping switch 19 arranged in the upper portion of the casing adjacent the motor on a panel 20, and this switch in turn is controlled by a pilot switch 21 mounted on a standard 22 that extends upwardly from the platform 18. The pilot switch is operated to start and stop the motor at the high and lower levels of the sewage in the pit or cistern 2 by means of a float 23 arranged within a vertical pipe 24 that is disposed within the casing and is connected at its lower end to the well 2 by a pipe 25. The float, in the form shown, is arranged to engage lugs 26 on a float rod 27, the upper end of which is connected to the pilot switch 21.

To prevent damage to the motor and its controlling switches in case the pit is flooded, the pit casing is provided with a space or chamber in which these parts are located, and in which air is entrapped when the lower portion of the casing is flooded. For this purpose, in the form shown, a partition extends downwardly from the top of the pit casing to a point below the platform 18 on which the motor is mounted. Preferably, as shown, this partition is in the form of a cylindrical open-ended drum 28 arranged in line with the manhole and connected to the top of the pit casing by an air-tight joint. If the casing is flooded, air will be entrapped in its upper portion when the level therein rises above the lower end of the drum 28, and the entrapped air will of course prevent the water from rising high enough in the casing to damage the motor and its controlling switches. The drum not only forms an air chamber for protecting the motor and the switches, but also forms an entrance shaft for the casing, a ladder

29 being arranged therein in the form shown.

To prevent leaking and particularly to prevent leaking of air from the air chamber in the upper portion of the casing, the casing joints and the joints between it and the pipes extending therethrough, are made air-tight. For this reason, the motor leads extend into the casing through an air-tight stuffing box 30 and a ventilating pipe 31 for the pit chamber extends into the upper portion of the casing through a stuffing box or collar 31' and thence downwardly to the level of the lower end of the drum 28, and preferably similar stuffing boxes are provided for all of the pipes. Also, for this reason, the float pipe 24 is sealed at its upper as well as its lower end, and to avoid the trapping of air in it, it is connected at its upper end to a vent pipe 32 which opens into the upper end of the cistern or well 2. The upper end of the float rod extends through a small pipe 33 into an air tight casing 34, and is connected by an arm 35 to a shaft 36 which extends into the casing 34 through a suitable stuffing box 37. The outer end of this shaft is connected by an arm 38 and a link 39 to the pilot switch 21.

To pump liquid from the pit itself, a small pipe 40 is connected to the pump inlet and is provided with check and cut-off valves 41 and 42. Normally the cut-off valve 42 is closed, but its stem 43 extends upwardly into the upper portion of the drum 28, so that it can be opened even if the pit should be flooded. Preferably, to permit convenient operation of the valve 14 in the main inlet pipe 5, when the lower portion of the pit casing is flooded, the stem 44 of this valve extends upwardly through the platform 18.

It is obvious that changes may be made in the details set forth without departure from the scope of the appended claims.

I claim as my invention:

1. A sewage pumping station comprising

a pit casing having an entrance shaft and an air chamber above the lower end of the entrance shaft, a sewage ejecting apparatus in the lower portion of said casing and automatic operating means therefor arranged in said air chamber.

2. A sewage pumping station comprising a pit casing, a sewage ejecting apparatus and float-controlled operating means therefor arranged in the lower and upper portions respectively of the casing, the latter having a partition in the upper portion forming an air chamber in which said operating means is located.

3. A sewage pumping station comprising a pit casing having an entrance shaft and an air chamber above the lower end of the entrance shaft, a sewage pump in the lower portion of said casing, an operating motor for the pump, and float-actuated switch mechanism for controlling the motor, the latter and the switch mechanism being arranged in said air chamber.

4. In combination in a sewage pumping station, a pit casing, a sewage pump and a float-controlled electric motor for operating the pump arranged respectively in the lower and upper portions of said casing, the latter having a manhole at the upper end and a partition between the manhole and the motor forming an air chamber for protecting the motor against flooding.

5. In combination in a sewage pumping station, a pit casing having a manhole in the upper end and an open-ended drum depending from the top of the casing in line with the manhole and forming an entrance shaft, a sewage pump in the lower portion of the casing, an electric motor for operating the pump, and float-controlled, start and stop, switch mechanism for the motor, the latter as its controlling switch mechanism being arranged in the upper portion of the casing above the lower end of said drum.

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