March 27, 1956 A. SOFIA 2,739,662

BACKWATER SEWER TRAP

Filed March 23, 1953

FIG. 1

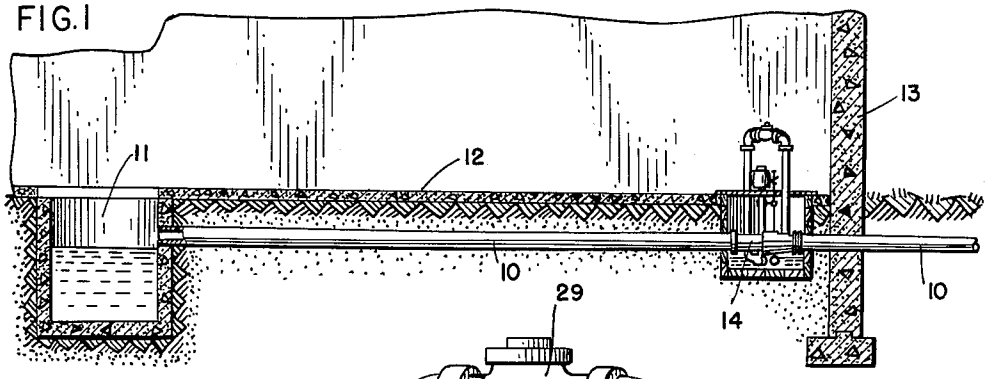

FIG. 2

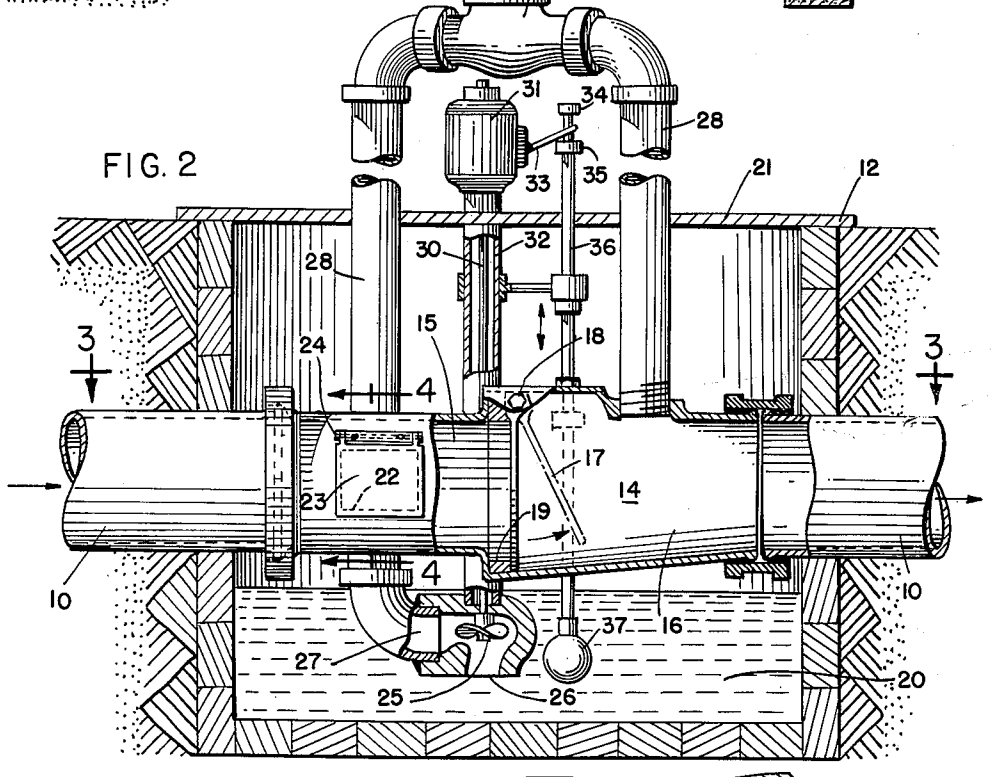

FIG. 3

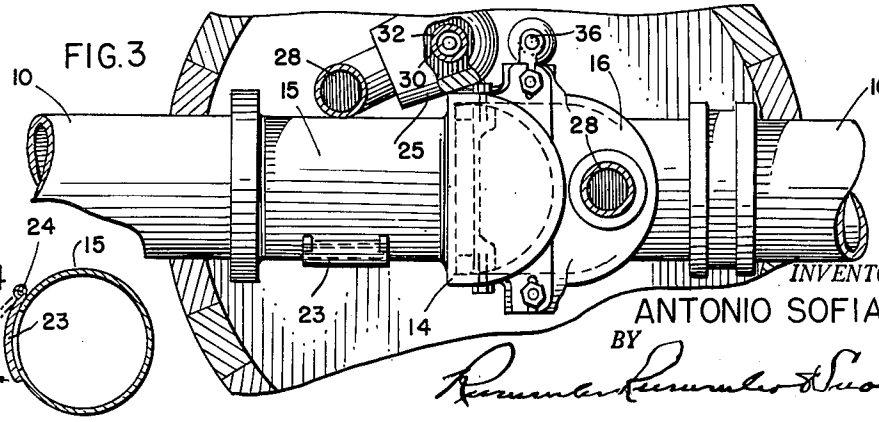

FIG. 4

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BACKWATER SEWER TRAP

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1 Claim. (Cl. 182—1)

This invention relates to drainage systems for buildings and particularly to apparatus for preventing the flow of backwater from a sewer into the building.

The main objects of this invention are to provide improved means for maintaining uninterrupted transmission of waste waters from a building to the street sewer and preventing a return flow of water from the sewer to the building; and to provide an improved structure for apparatus of this kind which is compact in its arrangement of parts, capable of prefabricated assemblage as a unitary structure for shipment and in condition for installation into the sewer pipe system of a building without requiring special skills on the part of the workman making the installation.

A specific embodiment of this invention is shown in the accompanying drawings, in which:

Figure 1 is a fragmentary vertical section showing a suitable relation of the improved trap to the sewer pipe leading from the usual catch basin of a building to a sewer.

Fig. 2 is a side elevation partly in section of a backwater trap constructed according to this invention with the enclosing sump structure shown in section.

Fig. 3 is a horizontal section of the same taken on the line 3—3 of Fig. 2.

Fig. 4 is a vertical sectional detail taken on the line 4—4 of Fig. 2.

In the drawings, the sewage disposal pipe 10 which leads from the usual catch basin 11 of the building to the sewer is shown below the building which is represented by the floor structure 12 and the wall structure 13.

According to the present invention, a conduit member 14, which constitutes the base frame for the trap assemblage, is connected as a segment of the sewer pipe 10 and comprises an inlet portion 15 connected to the building side of the pipe 10 and an outlet portion 16 connected to the outlet side of the sewer pipe 10. A free swinging check valve 17 is hung on a pivot 18 at its upper edge and normally urged by gravity into a closed position against the seat 19 so as to prevent flood water in the outlet portion 16 from flowing back to the inlet portion 15 and entering the building by overloading the catch basin 11.

The conduit member 14 may, of course, be installed initially at the time of the installation of the sewer pipe 10; or may be readily inserted as a part of an existing sewer pipe, as will be understood.

The backwater trap is surrounded by a pit structure or sump 20 below the floor 12 and having a suitable closure 21 at the top. According to the present invention, the sump 20 serves as a catch basin for sewage from the building during flood conditions.

The inlet portion 15 of the conduit member has a spillway aperture 22 in one side above the bottom thereof which serves as a passage leading to the sump and which is provided with a gate 23 hinged at 24 at its upper edge and weighted so as to normally close

the passage 22, except at times when a return flow pressure against the check valve 17 prevents the free flow of liquid from the inlet portion 15 to the outlet portion 16 of the conduit. At such times the gate 23 will open under a predetermined rise of hydraulic pressure in the inlet portion 15 and allow the sewage to escape into the sump 20.

In order to dispose of sewage that enters the sump when the check valve 17 is closed by back pressure, the device is provided with a sump pump 25 having a screened inlet 26 below the conduit 14. The discharge outlet 27 of the pump 25 is connected by a pipe 28 that is looped upwardly and then downwardly to complete a by-pass passage around the check valve 17 from the inlet portion 15 to the upper part of the outlet portion 16 of the conduit member 14. A check valve 29 in the pipe 28 permits a free flow of fluid from the pump 25 to the conduit portion 16 but prevents any back flow from the conduit portion 16 to the pump.

In the form shown, the pump 25 has a rotary impeller driven by a vertical shaft 30 and motor 31 carried by a tubular frame element 32 that is suitably attached to the conduit member 14.

The motor 31 is controlled by a switch arm 33 actuated by spaced shoulders 34 and 35 on a rod 36 which is shifted by a float 37 so as to start the motor 31 when the float 37 is lifted by the fluid in the sump 20 and to shut off the motor when the float falls, due to the disposal of the contents of the sump.

The operation of the device shown is as follows:—

Normally the catch basin 11 functions as usual in preventing the entrance into the sewer pipe 10 of a solid material sufficiently dense to clog the pipe. The valve 23 is normally closed by gravity and the contents of the pipe 10 are free to flow toward the sewer without material resistance by the check valve 17. If, however, flood conditions outside the building cause the water to back up from the sewer into the building, then the check valve 17 closes and prevents a return flow of liquid into the sewerage system of the building and the check valve 29 prevents any such return flow from reaching the pump or the sump. The check valve 17 is mounted to swing freely and practically offers no resistance to the flow of sewage away from the building. The gate 22 is spaced above the bottom of the conduit 15 and is weighted so that it normally remains closed at times of normal flow of sewage through the valve 17 but opens under a predetermined rise of hydraulic pressure in the inlet portion 15 due to the accumulation of sewage after the check valve 17 has been closed by back pressure, due to flood conditions in the outlet portion 16.

The waste water and sewage from the building at such times escapes from the pipe 10 on the inlet side of the check valve 17 into the sump 20, causing the float 37 to rise, lifting the switch arm 33 to start the motor 31, whereupon the pump 25 operates to dispose of the contents of the sump 20 through the pipe 28 against whatever pressure may exist in the outlet portion 16 of the conduit member 14, until such time as the descent of the float 37 shuts off the motor 31. Thus the motor operates only at times when the accumulation in the sump 20 is sufficient to lift the float 37 and maintain the motor in operation. This condition will arise only when back pressure closes the check valve 17 and only during the period of the flood condition that has caused such back pressure and only to the extent required to dispose of sewage originating on the premises.

Although but one specific embodiment of this invention is herein shown and described, it is understood that numerous details of the structure shown may be

altered or omitted without departing from the spirit of the invention as defined by the following claim:

I claim:

A backwater trap comprising, a sump, a conduit member having inlet and outlet portions and extending across the sump above the bottom thereof, a check valve between said portions adapted to be closed by back pressure in the outlet portion, a by-pass pipe leading from said sump to the outlet side of said conduit member, a sump pump positioned in the sump below the conduit member and adapted to discharge the contents of said sump through said by-pass pipe into the outlet side of said conduit member, a motor drivingly connected to said pump, a control switch for said motor, a float in said sump below the conduit member connected to said switch to control said motor through changes in the water level in said sump, the inlet portion of said conduit member having an aperture in the side thereof intermediate the top and bottom faces of the member, and a gate hinged to the conduit member and normally urged by gravity to close the conduit aperture and adapted to be opened by fluid pressure in the inlet portion of said conduit member.

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