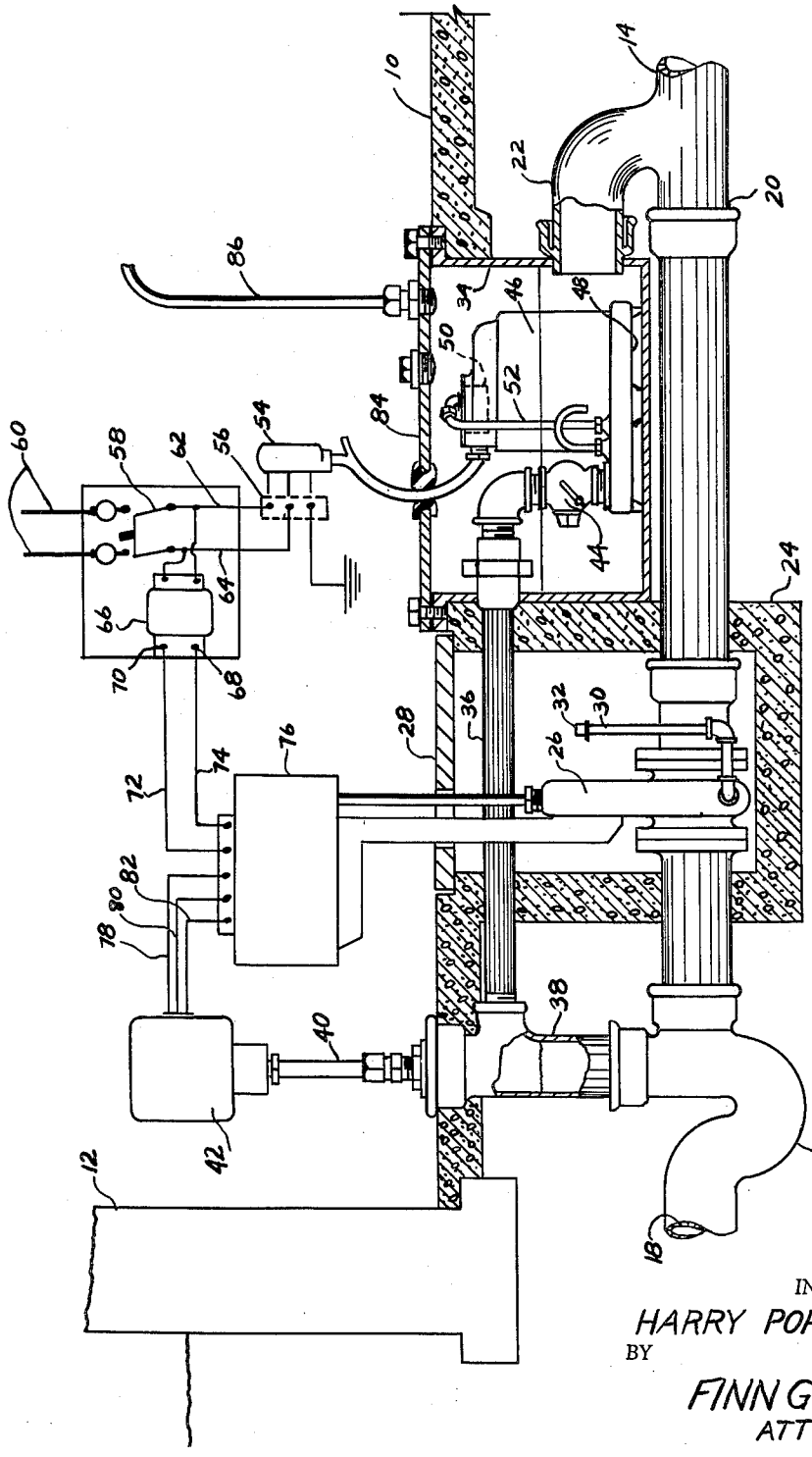
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FLOOD CONTROL SYSTEM

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FLOOD CONTROL SYSTEM

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The present invention relates to a flood control system and more particularly to an automatic device to check the back pressure in the main sewer in buildings, and to means for pumping out water, sewage or the like against the back pressure of the main sewer.

It has become increasingly evident in recent years that the sewer systems in the larger or expanding cities are inadequate to handle the water and sewage from the many homes, particularly during heavy rains or flood conditions. This has resulted in the sewers backing up into the basements of the homes causing considerable damage. It is the principal object of the present invention to provide a simple but effective flood control system to be installed in individual homes and other buildings where such damage is apt to occur, said flood control system being constructed and arranged so that it checks the back flow that may occur from the main sewer and at the same time pumps out any sewage or accumulated water that may collect in the basement or elsewhere throughout the house.

It is another object of the present invention to provide a flood control system of the foregoing character which is constructed and arranged so that it is completely automatic in operation, thereby eliminating need for manual attention during an emergency condition.

It is another object of the present invention to provide a flood control system of the foregoing character which is constructed and arranged so that it can be installed at a minimum of cost in new homes or homes previously constructed.

It is another object of the present invention to provide a flood control system of the foregoing character which is constructed and arranged to have a gate valve which will provide positive closing of the main sewer line when desired, and which has means for cleaning the valve seat of the gate valve should such valve seat become clogged.

It is another object of the present invention to provide a flood control system of the foregoing character wherein the gate valve is actuated by an electric motor, said motor being designed to operate at a relatively low voltage, thereby assuring minimum installation and operating costs.

It is still another object of the foregoing invention to provide a flood control system wherein the pump which is utilized to remove flood waters and sewage against the pressure of the sewer is positioned below the cellar floor and can be inspected readily in the event repairs are necessary.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawing:

The FIGURE of the drawing is an elevation, partly schematic and partly in section, illustrating one embodiment of the invention.

Before explaining the presentt invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawing, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology

employed herein is for the purpose of description and not of limitation.

Referring now to the drawing, a more detailed description of the invention will be given. The cellar floor line of a basement in which the present flood control system is installed is shown at 10. The outside wall of the building is shown at 12. Extending below the cellar floor line 10 is a storm and sanitary waste pipe 14 through which the storm and sanitary waste products will flow, past the trap 16 and out the end 18 to the main sewer (not shown).

The storm and sanitary waste conduit 14 has two generally vertically disposed branches 20 and 22. The lower branch 20 or main passageway extends in a generally horizontal line over to the trap 16. A small compartment 24 encloses a portion of the main passageway 20, and the main passageway 20 has a gate valve 26 therein for opening and closing such passageways. The upper part of the compartment 24 has a cover 28 which may be removed when it is desired to gain access to the gate valve 26.

Extending into the bottom of the housing for the gate valve 26 is a small conduit 30 which has a closure cap 32 which may be removed when it is desired to flush out the valve seat for the gate valve 26. It will be recognied by those skilled in the art that the cap 32 may be any suitable cap or valve which will permit liquid to be discharged through the conduit 30.

The upper branch or by-pass passageway 22 includes the chamber 34, the conduit 36, and the vertical riser 38. The riser 38 terminates at the lower end in the trap 16. At the upper end of the vertical riser 38 is a tube 40 communicating with a pressure responsive member 42 which includes electric switches (not shown) which will be actuated by predetermined pressure conditions within the riser 38, for reasons which will be more fully explained hereafter. Located at the upstream end of the conduit 36 is a check valve 44 which will allow passage of water and sewage downstream but will prevent return flow of the same. Immediately upstream of the check valve 44 is an electrically driven pump 46 which has its inlet end at the bottom 48 and is adapted to discharge directly through the check valve 44. A pressure responsive switch device 50 is mounted in the upper end of the pump 46 and is connected to the conduit 52 so that when the liquid level in the compartment 34 rises above a predetermined level the pressure responsive switch device 50 will close an electric circuit, to be described, energizing the motor of the pump 46 thereby pumping the liquid from the chamber 34 through the conduit 36 back to the main storm and sanitary waste conduit 14. The electric motor for the pump 46 is connected to an electrical contact plug 54 which may be plugged into the electrical receptacle 56. The latter is connected to the manually operable switch 58 which can be closed across the electrical source of 110 volts shown at 60. Connected across the lines 62 and 64 to the receptacle 56 is a 24 volt transformer 66. The latter has two outlet terminals 68 and 70 which can be connected by conductors 72 and 74 to the 24 volt electric motor 76. The latter is connected to the gate valve 26 so that when the motor 76 turns in one direction the valve will be raised and when the motor turns in the other direction the valve will be lowered.

Also connected to the 24 volt electrical motor 76 are the three conductors 78, 80 and 82 which are also connected to the pressure responsive member 42. The electrical connections between these parts are such that when the pressure exceeds a predetermined amount at the upper end of the riser 38, a switch (not shown) within the pressure responsive device 42 will close actuating the electric motor 76 causing it to turn in one direction thereby closing the valve 26. Likewise, when the pressure falls

below a predetermined amount a switch (not shown) will be opened and a second switch (not shown) will be closed causing the electric motor to turn in the opposite direction thereby raising the valve 26.

From the foregoing it can be understood that when the main sewer (not shown) backs up into the riser 38, pressure builds up in the tube 40 causing the pressure sensitive device 42 to close an electrical switch (not shown) energizing electric motor 76 so that it rotates in one direction thereby closing the valve 26. This has the effect of closing the main sewer (not shown) from that portion of the storm and sanitary waste conduit 14 which is upstream of the gate valve 26 and the check valve 44. Following this operation, water and sewage or the like from the interior of the home may flow into the upper branch or by-pass passageway 22 into the chamber 34 causing the pressure sensitive device 50 to close energizing pump 46 which then pumps such water and sewage through the inlet opening 48 past the check valve 44 from where it can flow through the conduit 36 and the riser 38 to the main sewer line (not shown). When the pump 46 has removed the water and sewage down to a predetermined safe level, the pressure sensitive switch device 50 will de-energize the pump 46. When the back pressure in the main sewer line (not shown) falls to a safe level, the pressure in the riser 38 and thereby in the conduit 40 will drop causing pressure responsive member 42 to reverse electric motor 76, and gate valve 26 will then open to allow the lower branch or main passageway 20 of storm and sanitary waste conduit to resume normal gravity operation.

It will be observed that the pump 46 and associated parts are housed in the chamber 34 which has a removable cover 84. A vent tube 86 allows gases to escape from the chamber 34 to the atmosphere outside the home. Thus, the pump 46 and its associated parts as well as the gate valve 26 can be inspected and serviced when necessary by removing covers 84 and 28. Also, the present invention can be readily incorporated either into a conventional sewer system of a home previously built or into a new home during its construction.

Having thus described my invention, I claim:

1. A flood control system comprising a main passageway for disposal in a normally downstream direction of water, sewage or the like, a gate valve in said main passageway for interrupting flow through said passageway, a by-pass passageway positioned completely above and communicating with said main passageway on opposite sides of said gate valve, electric motor means operatively connected to said gate valve for moving the latter to its open and closed positions, fluid pressure responsive switch means extending into said by-pass passageway and operatively connected to said electric motor means for energizing the latter in response to pressure conditions in said by-pass passageway so that the gate valve will be closed and opened respectively at predetermined maximum and minimum pressure conditions in the by-pass passageway, a check valve in said by-pass passageway in a normally upstream direction of said fluid pressure responsive switch means preventing return flow through said by-pass passageway, an electrically driven pump in said by-pass passageway in a normally upstream direction of said check valve for pumping water, sewage or the like downstream, pressure responsive switch means extending into said by-pass passageway in a normally upstream direction of said pump for energizing the latter when the last-named switch means is subjected to a predetermined fluid pressure.

2. A flood control system comprising a main passageway for disposal in a normally downstream direction of water, sewage or the like, a gate valve in said main passageway for interrupting flow through said passageway, a by-pass passageway positioned completely above and communicating with said main passageway on opposite sides of said gate valve, motor means operatively connected to said gate valve for moving the latter to its open and closed positions, fluid pressure responsive means extending into said by-pass passageway and operatively connected to said motor means for actuating the latter in response to pressure conditions in said by-pass passageway so that the gate valve will be closed and opened respectively at predetermined maximum and minimum pressure conditions in the by-pass passageway, a check valve in said by-pass passageway in a normally upstream direction of said fluid pressure responsive means preventing return flow through said by-pass passageway, a pump in said by-pass passageway in a normally upstream direction of said check valve for pumping water, sewage or the like downstream, pressure responsive means extending into said by-pass passageway in a normally upstream direction of said check valve and operatively connected to said pump for actuating the latter when the last-named pressure responsive means is subjected to a predetermined fluid pressure, and a flush-out conduit extending into said main passageway adjacent the seat for said gate valve for cleaning said valve seat.

3. A flood control system comprising a main passageway for disposal in a normally downstream direction of water, sewage or the like, a gate valve in said main passageway for interrupting flow through main passageway, a by-pass passageway positioned completely above and communicating with said main passageway on opposite sides of said gate valve and located generally vertically above said main passageway, motor means operatively connected to said gate valve for moving the latter to its open and closed positions, fluid pressure responsive switch means extending into said by-pass passageway and operatively connected to said motor means for actuating the latter in response to pressure conditions in said by-pass passageway so that the gate valve will be closed and opened respectively at predetermined maximum and minimum pressure conditions in the by-pass passageway, a check valve in said by-pass passageway located in a normally upstream direction of said fluid pressure responsive means preventing return flow through said by-pass passageway, a pump in said by-pass passageway located in a normally upstream direction of said check valve for pumping water, sewage or the like downstream, pressure responsive means extending into said by-pass passageway in a normally upstream direction of said check valve and operatively connected to said pump for actuating the latter when the last-named means is subjected to a predetermined fluid pressure, said pump and said last-named means being enclosed in a chamber forming a part of said by-pass passageway, said chamber having a removable cover permitting ready access to the enclosed parts.

4. A flood control system adapted to be installed in a conventional home having 110 volt electrical supply comprising a main passageway for disposal in a normally downstream direction of water, sewage or the like, a gate valve in said main passageway for interrupting flow through said passageway, a by-pass passageway positioned completely above and communicating with said main passageway on opposite sides of said gate valve, a 24 volt valve operating electric motor operatively connected to said gate valve for moving the latter to its open and closed positions, said electric motor being in a circuit including the 110 volt source of electric supply and a 24 volt transformer for reducing the electrical potential to said motor, a fluid pressure responsive means extending into said by-pass passageway and operatively connected in said electric circuit with said electric motor for closing the circuit in response to pressure conditions in said by-pass passageway so that the gate valve will be closed and opened respectively at predetermined maximum and mini-

mum pressure conditions in the by-pass passageway, a check valve in said by-pass passageway located in a normally upstream direction of said fluid pressure responsive switch means preventing return flow through said by-pass passageway, an electrically driven pump in said by-pass passageway in a normally upstream direction of said check valve for pumping water, sewage or the like downstream, pressure responsive switch means extending into said by-pass passageway in a normally upstream direction of said check valve and operatively connected to said pump for energizing the latter when the last-named switch means is subjected to a predetermined fluid pressure.

5. A flood control system comprising a main passageway for disposal in a normally downstream direction of water, sewage or the like, a gate valve in said main passageway for interrupting flow through said passageway, a by-pass passageway positioned completely above and communicating with said main passageway on opposite sides of said gate valve, said by-pass passageway including a vertical riser connected to the main passageway on the normally downstream side of said gate valve, electric motor means operatively connected to said gate valve for moving the latter to its open and closed positions, fluid pressure responsive switch means positioned at the upper end of said vertical riser and operatively connected to said electric motor means for energizing the latter in response to pressure conditions in said vertical riser so that the gate valve will be closed and opened respectively at predetermined maximum and minimum pressure conditions in the vertical riser, a check valve in said by-pass passageway located in a normally upstream direction of said vertical riser preventing return flow through said by-pass passageway, an electrically driven pump in said by-pass passageway in a normally upstream direction of said check valve for pumping water, sewage of the like downstream, pressure responsive switch means extending into said by-pass passageway in a normally upstream direction of said check valve and operatively connected to said pump for energizing the latter when the last-named switch means is subjected to a predetermined fluid pressure.

6. A flood control system comprising a main passageway for disposal in a normally downstream direction of water, sewage or the like, a gate valve in said main passageway for interrupting flow through said passageway, a by-pass passageway positioned completely above and communicating with said main passageway on opposite sides of said gate valve, said by-pass passageway having a vertical riser connected to the main passageway on the normally downstream side of said gate valve, electric motor means operatively connected to said gate valve for moving the latter to its open and closed positions, fluid pressure responsive switch means extending into said vertical riser and operatively connected to said motor means for energizing the latter in response to pressure conditions in said vertical riser so that the gate valve will be closed and opened respectively at predetermined maximum and minimum pressure conditions in the by-pass passageway, a check valve in said by-pass passageway in a normally upstream direction of said vertical riser preventing return flow through said by-pass passageway, an electrically driven pump in said by-pass passageway in a normally upstream direction of said check valve for pumping water, sewage or the like downstream, pressure responsive switch means extending into said by-pass passageway in a normally upstream direction of said check valve and operatively connected to said pump for energizing the latter when the last-named switch means is subjected to a predetermined fluid pressure, said pump and last-named responsive means being enclosed in a housing forming a part of said by-pass passageway, said housing having a removable cover providing access to the pump and pressure responsive means associated therewith.

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