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FLOOD CONTROL MEANS

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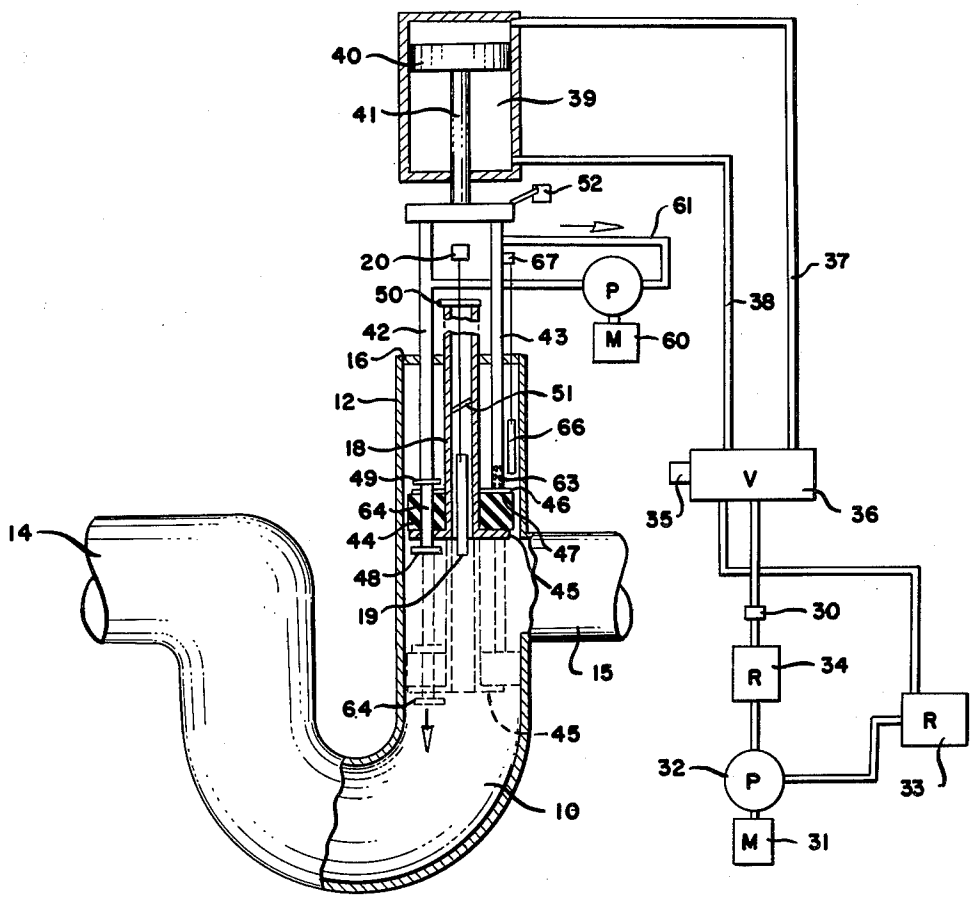


Fig. 1

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FLOOD CONTROL MEANS

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2 Claims. (Cl. 137—110)

Be it known that certain new and useful improvements in flood control means have been invented by the undersigned of which the following is a specification.

A prior Patent No. 2,588,188 of March 4, 1952, discloses a flood control means having a compressible rubber ring which may be moved into position for blocking off a sewer line and which may be compressed for enlargement when in such position to serve as a closure in such sewer line or may be decompressed for reducing its diameter to open that line.

The present application shows a system employing a device generally of the character described in such patent for blocking off a sewer line in response to a rise of water level in riser thereof.

More especially, the present application discloses means operating automatically in response to a rise of water level in the riser for moving a rubber ring into sewer line closing position from a normal inoperative position and for enlarging the ring in the sewer line blocking position for the purposes of automatically closing off the sewer line without manual attention.

Generally speaking, the system or systems hereof include a pressure responsive cylinder and piston means for moving the closure ring into closure position and for enlarging it, with the pressure responsive means energized in some suitable manner and controlled by a float control means in the riser whereby rise of water level in such riser operating through the float control means energizes the pressure means and the cylinder piston arrangement to advance the closure ring to sewer line blocking position.

An embodiment of the invention is disclosed in the appended drawing.

In the drawing:

Fig. 1 is a diagrammatic view showing a closure for a line with the closure shown in solid lines in the open or normally inoperative position.

The drawing shows at 10 a sewer line portion having a riser 12 with a sewer outlet at 14 and connected to the house plumbing drain line at inlet 15. The riser 12 has a cleanout cap 16 in which is slidably mounted a central tube 18 in which is a control float 19 connected to a switch 20 whereby water rising in the riser 12 lifts the float 19 to close the switch circuit at 20.

Switch 20, by means of a circuit connected to it, controls a valve 30 in the outlet side of a pressure means which comprises a motor 31, a pump 32, a pressure fluid supply tank 33, and a pressure cylinder 34. A pressure fluid is circulated within this system and this fluid may be of some suitable oil or gas or the like.

When the switch 20 is closed by the rising of float 19, pressure is built up in cylinder 34, or if this pressure is already provided in cylinder 34, such pressure becomes available to through open valve 30 in response to the rising of the float 19 and the closing of switch 20. When valve 30 opens to permit the flow of fluid under pressure into the multiple position valve 36, the system is operated as will be described hereinafter.

The pressure fluid in valve 36 will be transmitted through line 37 to cylinder 39 to thereby cause the piston 40 to move downwardly. This downward movement of the piston 40 will likewise cause the two tubes 42 and 43, which are connected to the end of the piston rod 41, to move downwardly in the riser 12.

At the lower end of these tubes, and permanently affixed to the lower end of tube 18 is an expansible rubber ring 4. This ring rests upon the enlarged lower end 45 of tube 18. On top of the rubber ring 44 a washer 46 loosely slidable upon the tube 18 is placed. The lower end 47 of tube 43 is permanently secured to the washer 46 by means of welding or the like.

The lower end of tube 42 passes through an opening in the washer 46, an opening in the rubber ring 44 and an opening in the enlarged end 45 and extends a short distance below said enlarged end 45. The lower extending end of tube 42 is formed into an enlargement 48. In addition, a stop collar 49 is permanently fastened to the tube 42 directly above the washer 46.

Thus, the downward movement of tubes 42 and 43 in response to piston movement causes the tube 18 which is freely slidable within cap 16, and the rubber ring 44 to move downwardly into the dotted position shown in Fig. 1 until a stop collar 50 formed on the upper end of tube 18 comes into contact with the closure 16 of riser 12. At this point, the downward movement of the tube 18 and the washer ceases and further downward movement of tubes 42 and 43 causes the rubber ring to become compressed and thereby expand to close off the sewer line 10 just beneath the inlet 15.

The ring 44 when expanded, prevents water from backing up from the outlet 14 to the inlet 15. To prevent water from rising in the tube 18, a check valve 51 is located within the tube 18 thereby stopping the rise of water into the upper end of the riser 12.

When the water level in the riser 12 lowers, the float 19 will lower to re-actuate switch 20. Switch 20 thereupon actuates a solenoid switch 35 attached to valve 36 to shut off line 37, and instead open line 38 into pressure valve 30. Thus, fluid under pressure will enter the lower portion of cylinder 39 and cause the piston 40 to rise. This rising of piston 40 will cause the tubes 42 and 43 to likewise rise and thereupon relieve the pressure upon washer 46 and permit the ring 44 to contract. Further upward movement of these tubes will cause the enlarged end of tube 42 to bear against the enlargement 45 and lift both the ring 44 and the tube 18 up into their normal inoperative position.

The upward motion of the tubes 42 and 43 will continue until a limit switch 52 is reached and this limit switch will both shut off valve 30 and shut off line 38 to permit line 37 to again receive pressure fluid when desired.

Seepage control

As a part of the system there is shown a seepage pumping arrangement comprising a suitably supported motor driven pump 60 connected through conventional flexible hose lines 61 to the two small tubes 42 and 43 whereby seepage above the ring 44 will be pumped upwardly in tube 43 and then through the pump 60 and then downwardly in tube 42 which empties below the ring 44. The lower end of the tube 42 is perforated at 63 to form an inlet for this seepage pumping operation whereas the lower end 64 of tube 42 is open.

For automatic operation of pump 60 there is provided in riser 12 a float 66 connected to a switch 67 controlling a circuit for pump 60 whereby the rising of seepage in the drain riser 12 will raise float 66 to close switch 67 to operate pump 60 and pump the seepage from drain line 15 upwardly in tube 43 and downwardly in tube 42 to empty at 64 into the sewer line 10 below the closure 44.

Operation

The operation is as follows: ring **44** is above the line **15** in a normal inoperative position as shown. Pressure exists or is available at pressure cylinder **34**.

When the water level backs up in riser **12**, float **19** rises to energize the circuit controlled by switch **20** and thus to make pressure available at line **37** to move down the piston **40** and the unit comprising the two tubes **42** and **43**, ring **44**, and tube **18** until the ring is in a position below the line **15**. When the tube **18** and ring **44** stop moving downward due to stop collar **50**, the ring **44** is expanded to close off the line **15** from the line **10** and thus to prevent water from backing up from line **14** through line **10** into line **15**.

Subsequently, in the event seepage builds up in line **15**, by means of the float **66** and the switch **67** connected to the pump **60**, seepage is pumped out of line **15** through tubes **43** and **42**, outletting at **64** below the closure ring **44** and thus pumping the seepage out of the system and particularly out of the house sewage line **15** and into the sewage outlet line **14**.

Return of ring **44** to normal inoperative position is effected by release of pressure at line **37** and by the establishing of pressure at line **38**, to return the piston **40**, all in response to the lowering of a float **19** in drain riser **12**, as the water level therein drops.

Now having described the system herein disclosed for flood control, reference should be had to the claims which follow.

We claim:

1. A flood control system comprising a sewer line portion whose inlet is connected to a house plumbing line and whose outlet is connected to a sewer line and which has a riser between the inlet and outlet, an expansible closure ring normally contracted and normally positioned in inoperative position in said riser, means connected to said ring for automatically moving it down in said riser into positon between the inlet and outlet and for expanding it to shut off the inlet from the outlet, said means comprising a pressure cylinder, a piston within it connected to said ring, pressure means connected to said cylinder for moving said piston and thus said ring, a float control in said riser for said pressure means and responsive to a rise of water level in said riser to energize said pressure means and thus move said piston to lower said ring and expand it to shut off the outlet from the inlet, the connection between said ring and said piston comprising a closure cap for the upper end of the riser, a tube in said riser having its upper end slidable through said cap and its lower end passing through said ring and enlarged below the ring, a push-pull means passing through said cap and connecting the piston and the ring whereby advance of the piston pushes down the tube and ring until, the tube is stopped by means of stop means engaging the cap whereupon the ring is stopped and expanded, and whereby retracting of the piston pulls up the ring and tube to contract the ring and to slide the ring to its normal contracted inoperative position, the float control being within the said tube.

2. A flood control system comprising a sewer line portion whose inlet is connected to a house plumbing line and whose outlet is connected to a sewer line and which has a riser between the inlet and outlet, an expansible closure ring normally contracted and normally positioned in inoperative position in said riser, means connected to said ring for automatically moving it down in said riser into position between the inlet and outlet and for expanding it to shut off the inlet from the outlet, said means comprising a pressure cylinder, a piston within it connected to said ring, pressure means connected to said cylinder for moving said piston and thus said ring, a float control in said riser for said pressure means and responsive to a rise of water level in said riser to energize said pressure means and thus move said piston to lower said ring and expand it to shut off the outlet from the inlet, the connection between said ring and said piston comprising a closure cap for the upper end of the riser, a tube in said riser having its upper end slidable through said cap and its lower end passing through said ring and enlarged below the ring, and a push-pull means passing through said cap and connecting the piston and the ring whereby advance of the piston pushes down the ring and tube until the tube is stopped by a stop means engaging the cap whereupon the ring is stopped and expanded, and whereby retracting of the piston pulls up the ring and tube and contracts the ring to return the ring to its normal contracted inoperative position, the float control being within said tube, the push-pull means further being formed as two tubes, whose upper ends above the cap are connected to each other through a pump, with the lower end of one of these two tubes engaging the upper surface of the ring and having an opening communicating its interior with the riser above the ring, and with the lower end of the other of these two tubes passing through the ring and enlarged beneath the lower surface of the ring and opening into the riser below the ring, said pump having its inlet connected to the first of these tubes and its outlet connected to the second of these tubes, and a float control in said riser for said pump to energize said pump to pump seepage in said riser above the ring through these two tubes into said riser below the ring.

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