

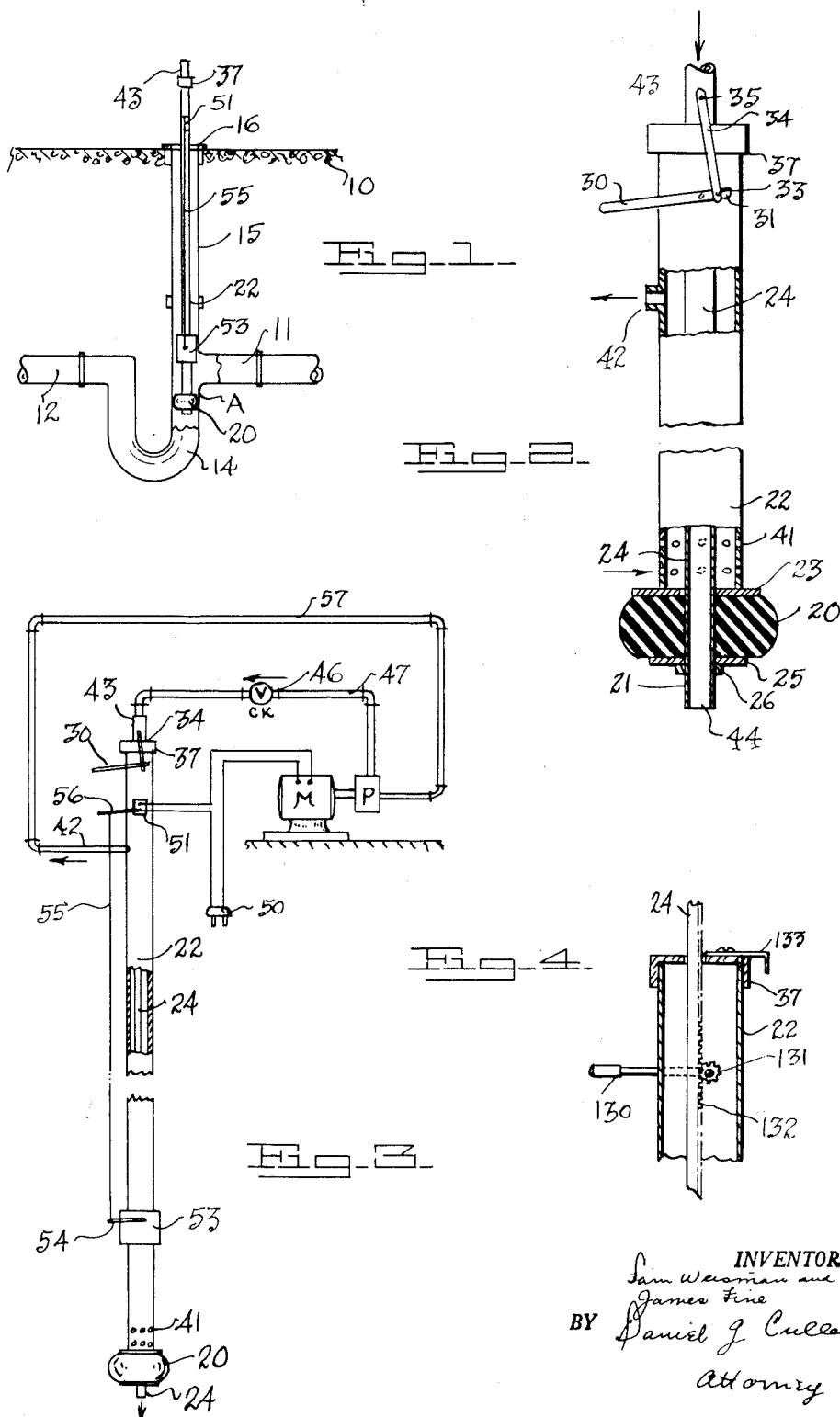
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FLOOD CONTROL MEANS

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FLOOD CONTROL MEANS

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In a prior Patent No. 2,588,188 of March 4, 1952, there is shown a flood control or back water valve having a compressible rubber ring which may be compressed for enlargement to serve as a closure in a sewer line or decompressed for reducing its diameter to open the sewer line. The means shown in that device for compressing or decompressing the rubber ring comprises an elongated tube in which is telescoped a flexible cable whose lower end projects beyond the lower end of the tube with the lower end of both tube and cable being connected to the ring at opposite surfaces so that relative longitudinal movement of the tube and cable compresses or decompresses the ring.

In that device, for providing such relative longitudinal movement of the tube and cable, there is provided a rotary handle and screw thread arrangement whereby rotation of the handle operating through the screw thread moves the cable and tube longitudinally relative to each other.

This application relates to devices of the same general character as that described in the aforesaid patent differing however in the respects indicated below.

Instead of the rotary handle and screw thread arrangement shown in that patent for sliding the tube and cable relative to each other, the device of this application includes a handle construction of the lever type freely and easily manipulable for causing such relative sliding longitudinal movement of the tube and cable, with the handle arranged so that when the lever is raised or lowered as the case may be, it serves to move the rod or cable and tube relative to each other longitudinally for compressing or decompressing the closure ring. In one form shown here, the lever handle is of toggle linkage form wherein a lever is lowered to extend the toggle and compress the ring and raised to collapse the toggle and decompress the ring. In another form the lever has a pinion gear cooperating with a rack on the cable whereby the lever may be raised to raise the cable and compress the ring or lowered to lower the cable and decompress the ring.

In addition, the tube and cable hereof are formed to enable the device to be used as a by pass means for emptying the sewer line in the event it is flooded due to seepage, while the closure ring remains enlarged for closing the sewer line, with the device being connectable to a pump whereby seepage in the sewer line above the closure ring may be pumped out of the sewer line and through the closure device down through the cable which is made hollow for this purpose and thus to empty back into the sewer line at a point below the closure, thus bypassing it. Thus the device may serve to empty the sewer line of water above the closure ring through the device and back into the device at a point below the closure ring. For this purpose the cable is made hollow, the lower end of the outer tube in which the cable is telescopically disposed is provided with perforations enabling seepage water above the closure ring to enter the outer tube, the latter having a side outlet connected

to a pump with the pump outlet in turn being connected to the upper end of the hollow cable, with the lower end of the latter extending through the center hole of the ring so as to empty seepage water pumped through the closure means back into the sewer line but at a point below the closure means.

Therefore, it is an aim and object of the present invention to provide a closure means of the general class described formed with a lever type handle for moving the inner cable and outer tube relatively longitudinally for closure purposes.

A still further object of the present invention is to form a closure means in such a way that it may be used with a pump for emptying a sewer line above the closure means back into the sewer line at a point below the closure means.

A still further object of the present invention is to provide in combination with a closure means as above described a pump and pump float control which will insure automatic operation of the pump in response to flood conditions within the sewer line above the closure.

Still further objects of the present invention will be understood upon reference to the appended drawings in which an embodiment of the invention described above has been disclosed.

In these drawings:

Fig. 1 is a diagrammatic view to small scale of a sewer and seepage line provided with a closure means of the present invention.

Fig. 2 is an enlarged side elevation view with parts cut away, showing the closure means hereof per se, and showing one form of lever type handle arrangement.

Fig. 3 is a schematic view showing a system for automatically emptying a flooded sewer line from a point above the closure means hereof back into the line at a point below the closure means hereof, with suitable controls and operating means being shown.

Fig. 4 shows a second form of lever type handle arrangement.

Referring now to the drawings it will be observed that Fig. 1 shows a plumbing system disposed below a basement floor 10, the system including a seepage sewer line 11—12 having a trap 14 and a riser 15 opening at its upper end to the drain opening 16 of the floor 10.

For closing the line 11—12—14—15 at point A to prevent flooding of the basement floor 10 there may be provided the closure means of the present invention. This closure means as will later be described more in detail is so constructed that it will not only serve to close the line at point A but likewise it may be operated to empty the sewer line into the sewer, bypassing the closure, in the event the sewer line has become filled or partially filled with seepage from line 11 which normally would flow out through the sewer line but which is blocked at point A. The closure means hereof is formed to enable the line to be emptied of seepage water, the latter being pumped out through the closure means hereof from the sewer line at a point above the closure point A and back into the sewer line through the closure means at a point below the closure point A. In this may the device hereof may be permanently mounted in a seepage and sewer line and will operate not only to prevent a flooded sewer from backing up in the sewer line but also will enable a pump to operate to empty the sewer line of seepage, emptying such seepage back into the sewer at a point below the closure.

The closure means hereof, shown in detail in Fig. 2, includes a large diameter compressible rubber ball or ring 20 having a central vertical hole 21. Above ring 20 is a small diameter vertical elongated outer tube 22 at whose lower end is a perforated washer 23 which abuts the upper surface of the ring 20. Within the tube 22

is a still smaller diameter vertical elongated rod or cable 24 arranged with its lower and upper ends projecting beyond the lower and upper ends of the tube 22. The lower end of the rod or cable 24 passes through the central hole 21 of the ring 20 and is provided with a perforated washer 25 abutting the lower surface of the ring 20, with all of the parts being clamped relatively by means of a nut 26 threaded on the lower end of the rod or cable 24.

For moving the rod or cable 24 and the outer tube 22 relatively longitudinally in a sliding movement for the purposes of compressing or decompressing the ring 20 and enlarging or reducing the diameter there is provided a lever type handle operated toggle linkage means comprising a handle link 30 pivoted at 31 on the upper end of the tube 22 and connected at 33 to a second link 34 pivoted at its opposite end 35 to a pivot point on the upper end of the rod or cable 24. Obviously, manipulation of the handle 30 and the links 30-34 will move the rod or cable 24 and the tube 22 relatively longitudinally with sliding motion for compressing or decompressing the ring 20.

Fig. 2 shows the handle means as a lever type toggle linkage handle, but Fig. 4 shows the handle means as a pinion and rack type handle, having handle 130 formed with pinion 131 meshing with rack 132 on cable 24, with a releasable catch 133 provided for retaining the rack 132 in any adjusted position.

The upper end of the rod or cable 24 is guided in its motion relative to the tube 22 by means of a guide bearing nut 37 threaded on the upper end of the tube 22 and surrounding the upper end of the inner rod or cable 24.

The parts just described may be operated as a closure means or back water valve in a manner that will be obvious and for the purposes described herein and similar to the purposes for which the back water valve of Patent 2,588,188 may be used, the difference between the two constructions being that the present construction employs a lever type handle as a means for moving the inner and outer rods or tubes of the closure means whereas the patented construction employs a rotary handle and screw thread arrangement for the same general purpose.

As will now be described, the closure means hereof is formed to enable it to be used in connection with a pump for pumping seepage water collected in the sewer line when the closure means is installed in such line and manipulated for compressing and enlarging the ring 20 for closure purposes.

For these reasons the closure means is formed as follows:

The lower end of the outer tube 22 is provided with a large number of perforations 41 which enable seepage water in the sewer line to enter the tube 22 from where it may be outletted by a side outlet 42 which may be connected to a pump P.

The rod or cable 24 is formed hollow, as a tube, and its upper end 43 may be connected to the outlet of the pump P. The lower end 44 of the hollow rod or cable or tube 24 will form the outlet of the pumping system whose operation will now be described.

With the closure means installed in the sewer line as shown in Fig. 1, and with the ring 20 expanded for closing it at point A, seepage water collected in the sewer line above the closure point A may be pumped out of the line through openings 41 into the tube 22, through outlet 42, through the pump P, back into the upper end 43 of the central tube 24 and out of the lower end 44 of the tube 24 back into the sewer line at a point below the closure point A closed by ring 20.

The pumping system, and particularly the pump P, is provided with a check valve or check arrangement. This may be in the form of a check valve 46 in line 47 connecting the pump outlet to the upper end 43 of tube 24, constructed to prevent flow in the reverse direction in line 47 that connects tube 24 to its end 43 and the pump

P. If the pump, however, happens to be of a type that may itself serve as a check means, the separate check valve 46 may be omitted.

Automatic Control

For automatically controlling the operation of the pump P, the pump motor M, connected in an electrical circuit through a conventional cord cap 50 and a switch 51, may be equipped with a float control now described.

Telescoped around the outer tube 22 of the device is a float 53 of sufficiently small diameter to be received within the riser 15 with the closure means hereof, and formed with a rigid bracket 54 connected through a link 55 to a switch operating arm 56. As seepage water rises in the riser 15 it will move float 53 upwardly and through link 55 and arm 56 will close the switch 51 to start the motor M and the pump P for the purposes described, the pump emptying the riser above point A through the tube 22 and line 42-57 and the pump 44 below closure point A.

An alternative control means for switch 51, replacing float 53, is that known as the Penn double weight pump switch control, utilizing two weights, and made by the Penn Electric Switch Co. of Goshen, Indiana. Such means, though not shown, is well known and may be used here, if desired.

If desired, the tube 22 may be made unitary with a cleanout plug like that shown at 20 in Patent No. 2,588,188 to enable the device as a whole to be permanently installed in the cleanout opening of a riser of a sewer line to become an integral permanent part of the system.

If desired tube 22 and cable 24 may be made of flexible material to enable the device to be inserted in or around a bend or curve.

It will be observed that the construction herein shown is not only useful as a closure or backwater valve even if not equipped with the pump system, but in addition when so equipped and particularly when equipped with the automatic float control means, the system hereof may be operated in the same way and serve the same purpose as the conventional sump pump arrangement that is in common use, for emptying collected seepage into a sewer line.

The device hereof may also be utilized wherever it is desired to close a line and in this way can serve in the same capacity as the conventional plumbers test plug or closure.

The device may also be used to close off a sewer line and thus enable the pump pressure to unplug a plugged line.

While lever type handles are here shown as preferred, it will be observed that a suitable, though less preferred handle of the jack screw or worm and wheel type may also be employed.

The device may also be used in a Y-type branch joint, without pump or float, as shown at Fig. 1-D of Patent No. 2,588,188, instead of in a vertical trap as shown herein.

When cable 24 is used with a pump, as shown, it will be hollow, but when used without a pump, it may be solid.

Now having described the construction and systems disclosed in these drawings, reference should be had to the claims which follow.

I claim:

1. For use with a sewer system having a seepage sewer line and a riser provided with a floor opening, a device adapted to be inserted into the riser of said system through said opening and manipulable from above and outside said riser for blocking said line at a point below and remote from said opening, said device comprising a large diameter compressible ring having a central vertical hole, a small diameter vertical elongated outer tube abutting the upper surface of the ring, a still smaller diameter vertical elongated inner tube within the outer tube and

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arranged with its lower and upper ends projecting beyond the lower and upper ends of the outer tube, with the lower end of the inner tube passing through the hole of the ring, and a washer on the lower end of the inner tube abutting the lower surface of such ring, a guide bearing and packing or sealing nut at the upper end of the outer tube closing it and forming a sealed bearing for the inner tube, and a means outside the outer tube and connecting the tubes at their upper ends and arranged to be moved manually for moving the tubes in opposite directions longitudinally for compressing and decompressing the ring longitudinally for enlarging or reducing its diameter, the ring when enlarged serving as a means for closing the line by manipulation of the handle, with the device disposed in the riser with its upper end and handle above the floor opening and the handle exposed above the floor for manipulation of the device, the lower end of the outer tube above the ring and the upper end of the inner tube having seepage water inlet openings, the upper end of the outer tube and the lower end of the inner tube below the ring having seepage water outlet openings, and a pipe line and pump connecting the outlet opening of the outer tube and the inlet opening of the inner tube through said pump.

2. A manually operated closure means for a large diameter pipe line comprising a large diameter compressible ring having a central vertical hole, a small diameter vertical elongated tube abutting the upper surface of the ring, a still smaller diameter vertical elongated rod within the tube and arranged with its lower and upper ends projecting beyond the lower and upper ends of the tube, the lower end of the rod passing through the hole of the ring and fixed to such ring, a guide bearing at the upper end of the tube closing it and forming a bearing for the rod and means outside the tube and connecting the tube and rod at their upper ends and arranged to move the rod and tube in opposite directions longitudinally for compressing and decompressing the ring longitudinally for enlarging or reducing its diameter, the tube having a side opening at its lower end, and a side outlet at its upper end, the rod being hollow and open at both ends, whereby when the closure means is disposed within a pipe line with the ring enlarged for closing it, water in the pipe line above the ring may enter the tube to be outletted through its side outlet by a pump to empty into the upper end of the hollow rod, and to empty out of the lower end of the hollow rod, and into the pipe line below the ring.

3. A manually operated closure means for a large diameter pipe line comprising a large diameter compressible ring having a central vertical hole, a small diameter vertical elongated tube abutting the upper surface of the ring, a still smaller diameter vertical elongated rod within the tube and arranged with its lower and upper ends projecting beyond the lower and upper ends of the tube, the lower end of the rod passing through the hole of the ring and fixed to such ring, a

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guide bearing at the upper end of the tube closing it and forming a bearing for the rod and means outside the tube and connecting the tube and rod at their upper ends and arranged to move the rod and tube in opposite directions longitudinally for compressing and decompressing the ring longitudinally for enlarging or reducing its diameter, the tube having a side opening at its lower end, and a side outlet at its upper end, the rod being hollow and open at both ends, whereby when the closure means is disposed within a pipe line with the ring enlarged for closing it, water in the pipe line above the ring may enter the tube to be outletted through its side outlet by a pump to empty into the upper end of the hollow rod, and to empty out of the lower end of the hollow rod, and into the pipe line below the ring, in combination with a float telescoped around the tube and slidable thereon vertically, and a pump switch connected to said float.

4. A manually operated closure means for a large diameter pipe line comprising a large diameter compressible ring having a central vertical hole, a small diameter vertical elongated tube abutting the upper surface of the ring, a still smaller diameter vertical elongated rod within the tube and arranged with its lower and upper ends projecting beyond the lower and upper ends of the tube, the lower end of the rod passing through the hole of the ring and fixed to such ring, a guide bearing at the upper end of the tube closing it and forming a bearing for the rod and means outside the tube and connecting the tube and rod at their upper ends and arranged to move the rod and tube in opposite directions longitudinally for compressing and decompressing the ring longitudinally for enlarging or reducing its diameter, the tube having a side opening at its lower end, and a side outlet at its upper end, the rod being hollow and open at both ends, whereby when the closure means is disposed within a pipe line with the ring enlarged for closing it, water in the pipe line above the ring may enter the tube to be outletted through its side outlet by a pump to empty into the upper end of the hollow rod, and to empty out of the lower end of the hollow rod, and into the pipe line below the ring, in combination with a float telescoped around the tube and slidable thereon vertically, and a pump switch connected to said float, and a pump, and motor therefor, with pipe lines connecting the pump inlet to the tube outlet, and the pump outlet to the upper end of the hollow rod, to form a float controlled pump for emptying water in the large pipe line above the ball back into the large pipe line below the ball through the closure means.

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