

Feb. 12, 1935.

W. CHARPIER

1,991,081

AUTOMATIC BACK WATER VALVE

Filed Oct. 21, 1932

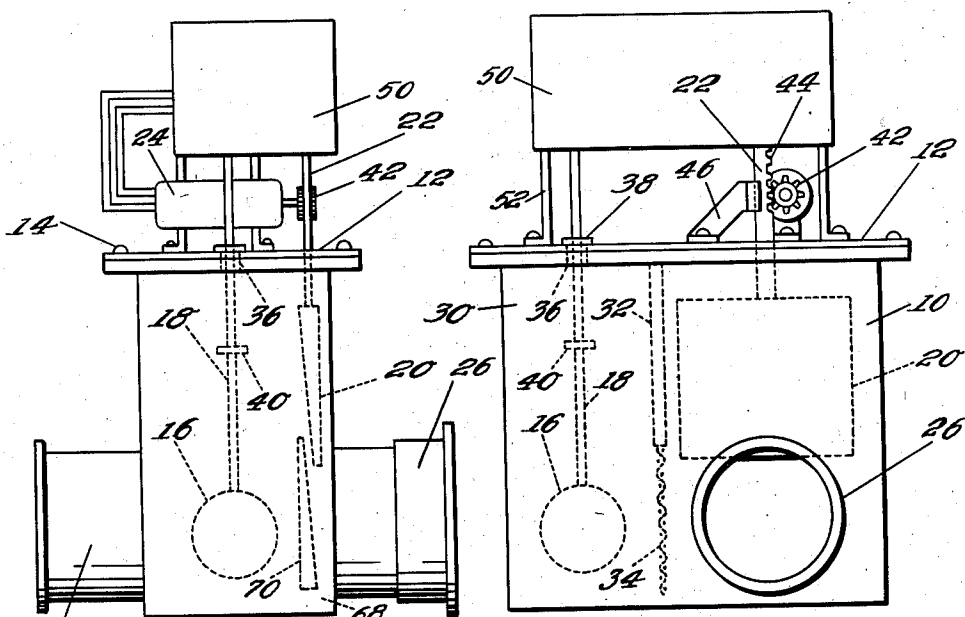


FIG. 1

FIG. 2

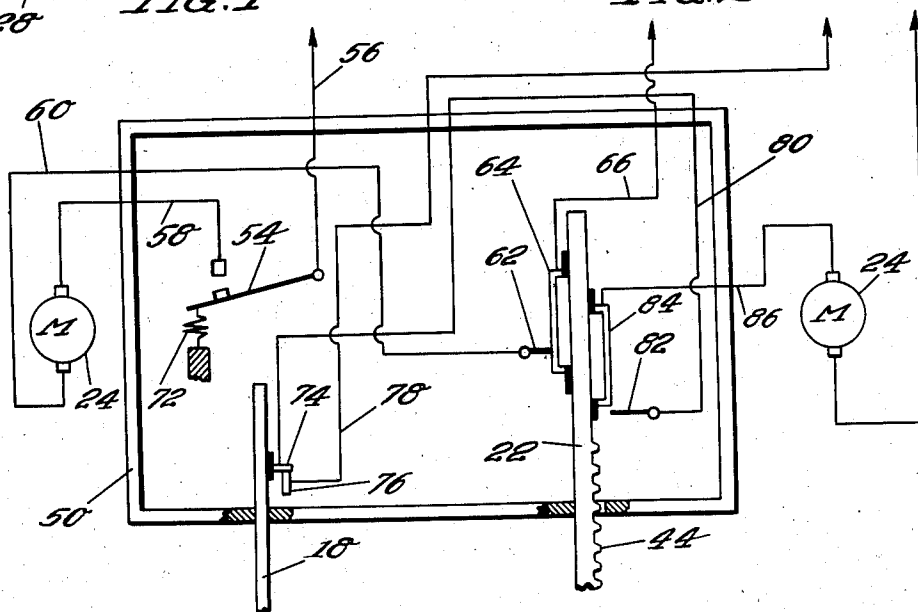


FIG. 3

WALTER CHARPIER
INVENTOR

PER

Albert J. Fisher
ATTORNEY

UNITED STATES PATENT OFFICE

1,991,081

AUTOMATIC BACK WATER VALVE

Walter Charpier, Chicago, Ill.

Application October 21, 1932, Serial No. 638,942

2 Claims. (Cl. 182—26)

This invention relates to an improved automatic back water valve, and has for one of its principal objects the provision of an automatically operating valve which will positively prevent undesirable backing up of sewer water into basements or other portions of residences or the like in times of heavy rains, floods, and similar emergencies.

One of the important objects of this invention is to provide a safety valve for preventing undesirable backing up of sewage water which shall be at all times in condition for immediate and successful operation and which shall be free from inherent defects which might retard or prevent the automatic features.

Another object of the invention is to provide a positively operating means such as a motor in conjunction with a float and a gate valve whereby when the float is raised above a certain level by the backing up of sewer water or the like, the motor will be immediately operated to positively close the gate valve and keep it closed until the flood has subsided when the motor will again be actuated to open the valve, thereby again providing free drainage from the building.

Another and still further important object of the invention resides in the provision of an automatic back water prevention valve of this type which shall be composed of a minimum of parts simple in operation and not likely to get out of order, and wherein the moving parts are few and free from expensive and cumbersome accessories, and wherein the device is further so constructed as to positively avoid corrosion and subsequent sticking, or the undesirable accumulation of sediment with corresponding leakage.

A still further and additional object of the invention is the provision in an automatic back water prevention valve of this type of an unitary assemblage of operating elements which is readily accessible at all times for purposes of inspection, maintenance, and repairs, and the further provision of a structure which is so designed as to be out of the way and not subject to harm from extraneous causes.

Other and further important objects of the invention will be apparent from the disclosures in the accompanying drawing and following specification.

The invention, in a preferred form, is shown in the drawing and hereinafter more fully described.

In the drawing:

Figure 1 is a side elevation of the improved automatic back water valve of this invention,

illustrating particularly the float, gate valve and controlling motor.

Figure 2 is another view of the device taken at right angles to the showing of Figure 1, and illustrating the relationship of the float to the gate valve and the construction of safety means whereby the float is secured against undesirable interference from sediment or other foreign objects in the water.

Figure 3 is a diagrammatic view illustrating a preferred embodiment of the motor operating and control means, and showing particularly the relation of parts whereby the gate is automatically closed when flood water backs up into the drain and again is automatically opened when the water subsides.

As shown in the drawing:

The reference numeral 10 indicates generally the casing of the improved automatic back water valve of this invention, the same being provided with a lid or cap 12 which is secured in position on the casing by means of bolts or the like 14. In and upon this cover 12 is mounted a control float 16 and its operating stem 18, the gate valve 20 and its operating rack 22, and the motive power 24 together with all connections and operating switches, the same being assembled in such a manner that the entire device as a unit may be removed from the casing and again as readily applied.

The casing is provided with the usual intake pipe or fitting 26 and an outlet pipe 28 which are preferably in alignment with each other, the chamber for the float 16 being at one side of the casing 10 as best illustrated at 30 in Figure 2, but all being closed by the common top or cover 12.

Adjacent the juncture of the inlet pipe 26 to the casing 10 is provided a gate valve 20 which is normally in raised or open position as indicated in Figures 1 and 2, so as to allow free flow of sewage water and the like from the inlet pipe 26 through the casing 10 and thence through the outlet pipe 28, and to the main sewer.

The float chamber 30 is separated from the main casing 10 by means of an interior partition or the like 32, a portion of which comprises a screening or the like 34, which is preferably of perforated brass or other non-corrodible metal so that the same will always function properly, and which, while allowing free access of water to the float, will prevent the entry into the float chamber of sticks, leaves and other coarse for-

eign matter and sediment which would interfere with the proper operation of the float 16.

The stem 18 of the float 16 passes through a suitable over-sized opening 36 in the cover 12 so that its free movement is always assured, and when the float is in lowermost position, escape of sewer gas or the like through this opening 36 is prevented by means of a suitable washer or the like 38 fixed to the float stem 18. Another washer 40 is mounted on the float stem in the casing 30, and when the float is raised by the backing up of flood water or the like, this is moved up against the opening 36, thereby preventing leakage of back water therethrough. In this manner, a positively free operation of the float is assured at all times and undesirable sticking is absolutely prevented.

A gear wheel 42 is mounted on the shaft of the motor 24, and this gear is in continuous engagement with a rack 44 forming part of the operating stem 22 of the gate valve 20, the operating stem 22 and its associated rack being maintained in mesh with the gear at all times by means of a suitable bracket or the like 46 mounted on the cover 12.

So long as there is no undesirable height of water in the casing or pipes, the float remains in its lowermost position, and the mechanism is not operative, the gate remaining open. However, should the water in the casing rise to an undesirable height due to the backing up of flood water in the pipes or to some other cause, the float 16 and its associated stem are raised, and it will be noted that the upper end of the stem 18 projects into the casing 50 which is also mounted on the cover plate 12 in conjunction with the motor and other elements, and which casing contains the necessary switches and controls for the entire device.

The casing 50 is mounted on supporting brackets or the like 52, and it will be obvious that the length of these brackets may be varied as desired to meet different conditions met with in the application and installation of devices of this sort, and the motor supports, length of float stems, gate valve rods, etc. may also be varied so as to allow the entire mechanism to be positioned at different heights above the valve, thus permitting of ease of installation, maintenance, and also providing against undesirable contact with and consequent damage to the mechanism by foreign objects which may be accidentally moved there-against or from any other cause. In fact, the entire mechanism may be positioned at a considerable distance from the valve itself, if such a remote control is desired or necessary.

Upon the raising of the float 16 to a predetermined height which occurs upon the backing up of flood water into the system, the upper end of the stem contacts an electric switch or the like 54 which closes a circuit in a current-carrying wire 56 to an adjacent wire 58 leading to the motor 24, and from where a further wire 60 leads to a brush 62 mounted against a contact plate or commutator element 64 affixed to the upper end of the stem 22 of the gate valve 20. This contact plate is insulated from the stem 22 and has a suitable current-carrying wire 66 leading therefrom to the main power line or the like. Accordingly, when the switch 54 is closed, the motor 24 is operated in a desired direction to force the gate valve 20 through the gear 42 and rack 44 downwardly into position to close the entrance to the inlet pipe 26.

It will be noted that the gate valve 20 is wedge-

shaped so as to afford a sliding closing fit which positively eliminates leakage and which also operates in such a manner as to automatically eliminate any accumulated sediment or the like which may have been deposited on the valve seat during periods of non-use. A space 68 is provided at the lower end of the valve seat wherein such accumulated sediment may be forced by the valve and subsequently washed away while at the same time allowing of a positive closing of the entrance to the pipe 26. In this manner, undesirable sticking and leakage of the valve is positively prevented.

The length of the contact plate 64 is such that when the valve reaches the bottom of its travel and is firmly positioned in its seat 70, the upper end of the contact plate 64 will ride out from beneath the brush 62, thereby breaking the source of current supply to the motor 24 and stopping any further downward movement of the valve. This condition remains as long as the float is in position to keep the switch 54 closed, but when the float drops slightly owing to a receding of the flood waters, the switch 54 is again opened by means of a spring or the like 72 as shown in Figure 3.

When the float has again reached its normal level, a switch element 74 positioned adjacent its upper end contacts with a corresponding switch element 76 allowing current from an intake line 78 to pass through this connection into a current carrying wire 80 which leads to a brush or the like 82 which in the lowermost position of the gate and associated stem 22 is in current-carrying association with a contact plate 84 mounted on and insulated from the stem 22.

A wire 86 leads from this contact plate to the motor 24 which is preferably of the reversible type so that current flowing through the switch connections 74-76 and 82-84 will act to raise the gate valve 20 again, opening the entrance of the intake pipe 26 for normal operation. The length of the contact plate 84 is such that when the gate has again assumed its uppermost normal position, the lower end of this contact plate rides out from under the brush 82, thereby shutting off the current supply to the motor 24 and allowing the mechanism to resume its normal quiescent state. Obviously, other means of controlling the operating distance of the gate valve may be employed such as automatic shut-off means for the motor when the same has turned through a required or predetermined number of revolutions, and if a reversible motor is not desired or is found impractical owing to operating conditions, a pair of motors may be employed.

It will be evident that herein is provided an automatically operating back water prevention valve which requires absolutely no attention and which will positively operate whenever necessary, and which, furthermore, is relatively inexpensive and can be easily installed, and when installed, will soon return the initial investment in the saving effected by the prevention of untold damage which continually results from flooded basements and the like. The ordinary check valves will not answer this purpose, and the reputed automatically operating valves now on the market are subject to undesirable sticking, particularly after periods of non-use, and when the emergency arises, will be found to have become corroded or otherwise unfit for the necessary operation.

Additionally, no manual control of the valve of the present invention is necessary or required, and after it is initially installed, there need be

no attention paid to it save an occasional oiling or cursory inspection.

I am aware that many changes may be made and numerous details of construction varied throughout a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than as necessitated by the prior art.

I claim as my invention:

- 10 1. An automatic back water valve, including a float, a gate and means operated by the rising of the float to close the gate, and operated by the falling of the float to open the gate, said means comprising a reversible motor, and switch means operated by the float and valve stems for initiating and stopping the motor operation, said switch means including a contact for the upper end of the float stem for initiating the motor operation to close the valve, and a further contact on the float stem for opening the valve when the float is in lowermost position, together with contact plates of predetermined length on the

gate valve supporting stem for halting the operation of the motor after a movement of the gate valve through a predetermined distance.

2. An automatic back water valve, including a float, a gate and means operated by the rising of the float to close the gate, and operated by the falling of the float to open the gate, said means comprising a reversible motor, and switch means operated by the float and valve stems for initiating and stopping the motor operation, said switch means including a contact for the upper end of the float stem for initiating the motor operation to close the valve, and a further contact on the float stem for opening the valve when the float is in lowermost position, together with contact plates of predetermined length on the gate valve supporting stem for halting the operation of the motor after a movement of the gate valve through a predetermined distance in either direction.

WALTER CHARPIER.