Dec. 13, 1949 J. W. GARRISON 2,491,104

VALVE

Filed Jan. 17, 1946

Fig. 1

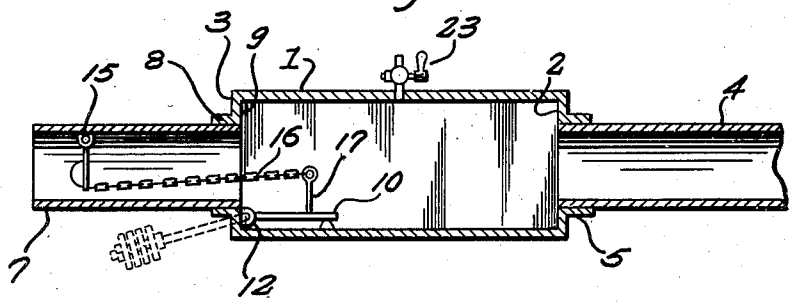


Fig. 2

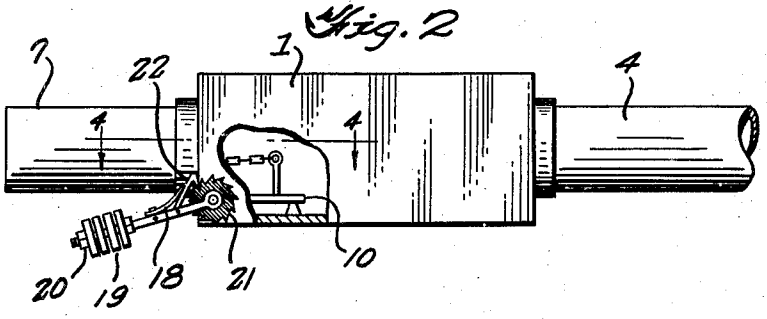


Fig. 3

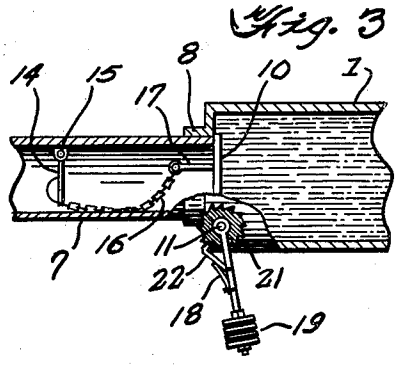
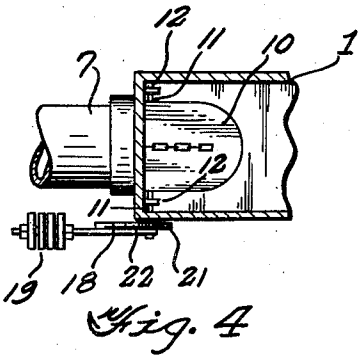


Fig. 4



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VALVE

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1 Claim. (Cl. 137—153)

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My invention relates to improvements in valves, of the gate type, for use in water, gas, or oil mains, and the like.

The primary object of my invention is to provide an efficient, simply constructed valve for installation in such mains and operation to close the line by increased, or accelerated, flow of fluid in the line resulting from a break in the line, and whereby service may be maintained between the valve and the source of supply while the break is being repaired.

Other and subordinate objects, also comprehended by my invention, together with the precise nature of my improvements, and the manifold advantages thereof will be readily understood when the succeeding description and claims are read with reference to the drawing accompanying and forming part of this specification.

In the drawing:

Figure 1 is a view in longitudinal section of my improved valve, in a preferred embodiment thereof and with the parts shown in the position which they assume when the valve is open.

Figure 2 is a view in side elevation partly broken away and shown in section,

Figure 3 is a view similar to Figure 1 but showing the parts in the position assumed by the same when the valve is closed, and

Figure 4 is a detail view in horizontal section taken on the line 4—4 of Figure 2.

Referring to the drawing by numerals, according to my invention, in the illustrated, preferred, embodiment thereof, an elongated rectangular valve casing 1 having an inlet end 2 and a discharge end 3 is interposed in a main, or trunk, pipe line 4 with its inlet end 2 coupled in said line, as at 5. A short pipe section 7 is coupled to the discharge end 3 of said casing 1, as at 8, for coupling, in turn, into the line 2 at said discharge end 3. The valve casing 1 forms a valve seat 9 therein at the discharge end 3 for a gate valve member 10 swingable into engagement with said seat and pivotally mounted in the bottom of the casing 1 as by means of side studs 11 on the member journaled in lugs 12 on the casing 1. The described pivotal mounting is below the pipe section 7 so that the valve member 8 may open downwardly and away from said seat into a horizontal position below the section 7. As will be understood, the valve member 10 opens in a direction opposite to the direction of flow through the main line 4 and indicated by the arrow in Figure 1. A stop lug 13 on the bottom of the casing 1 spaces the valve member 10, when open, from said bottom and maintains the same in horizontal position.

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A cupped valve operating member 14 is pivoted at its upper edge, as at 15, to the top of the pipe section 7 to hang pendent from its pivot for a suitable distance and be swung in the direction of the flow through the main pipe line 4.

A chain 16 is suitably connected at one end to the bottom edge of said member 14 and at its opposite end to an eye bolt, or stud, 17 suitably fixed to the valve member 10 and extending laterally from the working face of said member. As will be seen, the chain 16 is arranged so that, when the valve operating member 14 hangs vertical, and said valve member 10 is open, said chain will exert a pull on the valve member 10 well above the pivot 12. The valve operating member 14, as will be manifest, is arranged to be swung forwardly sufficiently to close the valve member 10 on the valve seat 9 by pull on the chain 16.

Counterbalance means are provided for the valve member 10 as follows. One stud 11 is extended out of one side of the valve casing 1 and has swingably mounted thereon a weight carrying arm 18 extending forwardly of the valve member 10 when said member is open. Counterweights 19 are removably mounted on said arm 18 between the nuts 20.

To prevent the weight carrying arm 18 from being bent, or broken, when the valve member 10 is suddenly closed, a ratchet wheel 21 is fixed on the extending stud 11, and a spring pressed pawl 22 is provided on said arm and adapted to engage the ratchet wheel 21 when said arm 18 is swung as the result of closing of the valve member.

A pressure vent cock 23 is provided on top of the valve casing 1 for a purpose presently explained.

Describing now, the operation and use of my invention. For reasons well understood in the art, when a break occurs in a water main line, or the like, the rate of flow through said line increases, or is accelerated. With my described valve installed in such a line, the valve member is counterbalanced by means of the counterweights 19 so that said valve member overbalances the weight carrying arm 18, the counterweights 19, and the drag of the chain 16, and will remain open under a given rate of flow through the main pipe line 4 and valve casing 1. Should a break occur in said line, in advance of the valve, the consequently accelerated flow of fluid through the casing 1 acting against the valve operating mem-

ber 14 will cause said member to swing forwardly and thereby close the valve member 10 through pull on the chain 16. In this connection, it is to be noted that the space beneath the valve member 10 when said member is open, as shown in Figures 1 and 2, provides for the fluid in the valve casing 1 flowing beneath the valve member 10 and lifting the same into its closed position, as shown in Figure 3. When the valve member 10 is closed, the main pipe line 4 will be closed between the valve and the source of supply, or in other words behind the break in the line, so that service between the valve and the source of supply may be maintained while the break in the line is being repaired. Obviously, when the valve member 10 is closed, pressure will be built up in the valve casing 1 which must be relieved before the valve member 10 may open. By opening the vent cock 23, the built up pressure in said casing 1 may be relieved so that said valve member 10 may reopen, or be reopened, when the given pressure in the main line 4 is reestablished. When the valve member 10 is open, the weight carrying arm 18 may be swung on the extended stud 11 into the proper position for counterbalancing of said valve member.

The foregoing will, it is believed, suffice to impart a clear understanding of my invention without further explanation.

Manifestly, the invention, as described, is susceptible of modification without departing from the inventive concept and right is herein reserved to such modifications as fall within the scope of the appended claim.

What I claim is:

A valve device for use in a fluid conveying pipe line comprising a casing having an inlet end and a discharge end, a pipe section extending from the discharge end, a gate valve member in said casing pivotally mounted therein for upward swinging movement to close the outlet end of said section, a valve operating member pivotally mounted in said section to hang pendent therein and be swung by fluid flowing through the section, a flexible connection between said operating and valve members, and means to counterbalance said valve member when open comprising a settable weight carrying arm on the pivot of said valve member, and ratchet and pawl devices for holding said arm in set position.

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