(No Model.)

J. T. CHRISTIE.

VALVE.

No. 539,167. Patented May 14, 1895.

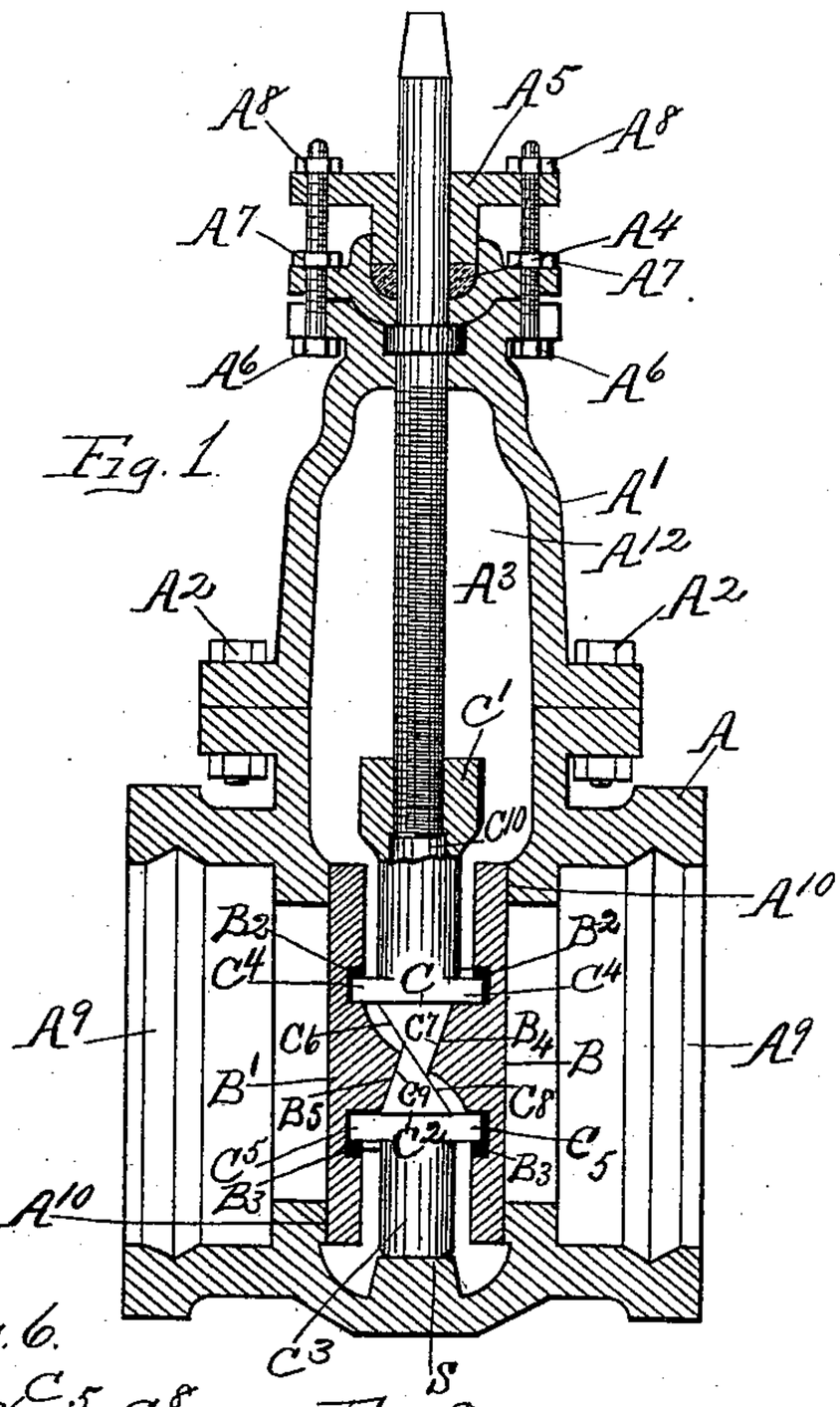

Fig. 1.

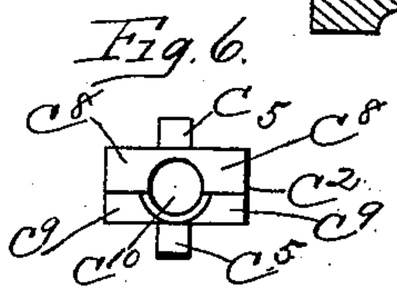

Fig. 6.

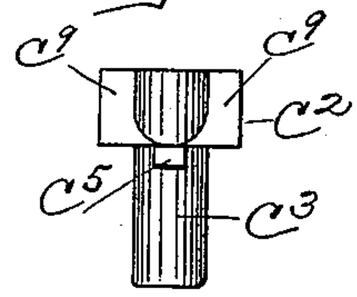

Fig. 5.

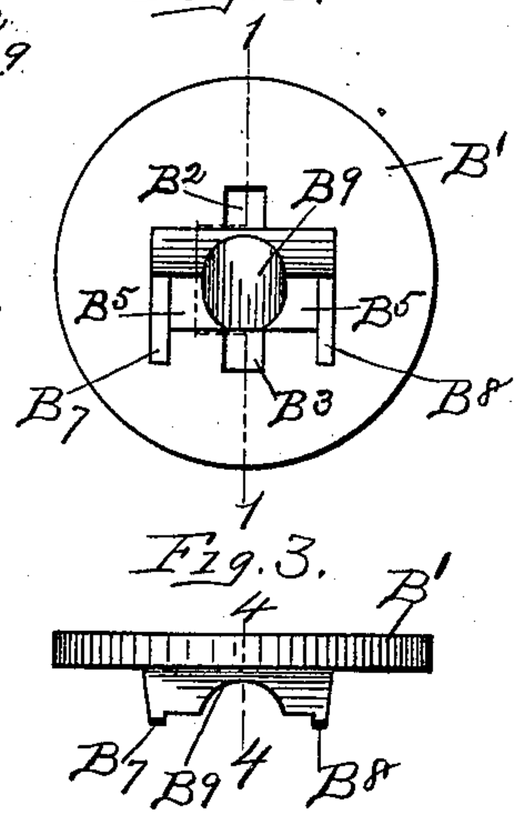

Fig. 2.

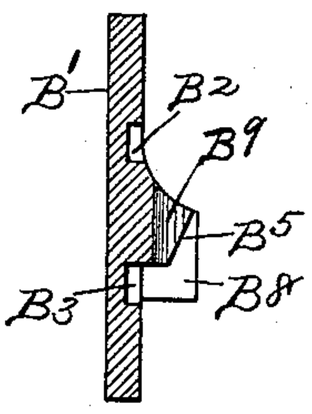

Fig. 4.

Fig. 3.

Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN T. CHRISTIE, OF TROY, NEW YORK.

VALVE.

SPECIFICATION forming part of Letters Patent No. 539,167, dated May 14, 1895.

Application filed January 10, 1895. Serial No. 534,412. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. CHRISTIE, a citizen of the United States, residing at Troy, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Valves, of which the following is a specification.

The invention relates to such improvements and consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in the several figures therein.

Figure 1 of the drawings is a central vertical section of the valve-case, showing a section of the gates, taken on the broken line 1 1 in Fig. 2, and the top and bottom wedges in elevation. Fig. 2 is a view in elevation of the inner side or back of one of the gates detached. Fig. 3 is a top plan view or edge view of the same. Fig. 4 is a central vertical cross-section of same, taken on the broken line 4 4 in Fig. 3. Fig. 5 is a view in front elevation of the bottom wedge detached. Fig. 6 represents an end view of one of the wedge-pieces, showing the unequal inclines.

A is the valve-case, and A′ the cover which is secured to the case by bolts A^2, as shown.

The cover is apertured to receive the screw-threaded valve-stem A^3 and provided with a stuffing-box A^4 and gland A^5 operated in the usual manner, as by bolts A^6 and nuts A^7, and A^8.

The case is provided with a straight-way passage A^9 surrounded by the annular gate-seats A^{10}.

B, and B′ are two slide-gates shown seated in Fig. 1.

The gates are operated through the top wedge C having a hollow supporting shank C′ screw-threaded interiorly to fit the screw-threaded portion of the stem, and the bottom wedge C^2 having a hollow shank C^3 adapted to permit of the free passage of the lower end of the stem therethrough. Both of the wedge pieces are provided with laterally projecting lugs C^4 and C^5 adapted to enter the vertically-elongated recesses B^2 and B^3 in the gate-backs. The recesses are elongated to permit a slight vertical movement of the gates and wedges relatively to each other. As the screw-threaded stem is rotated to the right or left, the upper wedge piece travels up or down on the stem and carries with it the gates which are supported by the lugs C^4. The bottom wedge-piece is carried by the gates which support it through the lugs C^5.

The back of the gate B is provided with the inclined faces B^4 which incline inwardly and downwardly. The back of gate B′ is provided with similar faces B^5 which incline inwardly and upwardly. The wedges are each provided with oppositely and unequally inclined working faces.

The working faces C^6 on the top wedge have a greater or easier incline than the oppositely inclined faces C^7 on the same wedge, and engage working faces C^8 on the bottom wedge which are more inclined than the oppositely inclined faces C^9 on the same wedge. The faces C^7 on the top wedge engage the gate-surfaces B^4, and the faces C^9 on the bottom wedge engage the gate-surfaces B^5.

When the gates are in position to engage their seats, the lower end of the shank of the bottom wedge piece engages the stop S in the bottom of the case, as shown in Fig. 1.

The operation of seating the gates is as follows: The screw-threaded stem is turned in a direction to force the top wedge piece downward until the gates are carried down from the gate-chamber A^{12} in the cover to a position approximately opposite their seats, whereupon the bottom wedge piece engages the stop S and remains stationary. A continued movement of the stem and top wedge causes the easier inclines on the two wedges to engage each other, and the steeper inclines on the wedges to engage the similar inclines on the gates, as seen in Fig. 1, whereby the gates are quickly forced to their seats by a slight downward movement. So long as the gates continue to move after the engagement of the inclined surfaces, they will have a resultant movement which may be resolved into a vertical movement equal to the vertical movement of the top wedge piece on the stem, and a total horizontal movement equal to the distance the gates are forced apart. In valves operated by slide-gates, it is desirable to se-

cure a relatively large horizontal movement for the reason that any considerable vertical movement of the gates upon their seats after the greater part of the seating pressure has been applied to seat the gates, would be likely to scratch and materially injure the seats; and if frequently repeated to destroy the usefulness of the valve. By my improved construction, I get a large horizontal movement with relatively steep inclines, and firmly seat both gates without the necessity of sufficient vertical movement to materially injure the seats. To open the valve, the gates are lifted from their seats into the gate chamber by a rotary movement of the screw-threaded stem in a direction to cause the top-wedge to travel upward. As soon as the top-wedge piece commences its upward movement, the gates are relieved from the pressure induced by the inclines, and are easily lifted from their seats. By having the engaging surfaces between the top-wedge piece and one gate inclined, and the engaging surfaces between the bottom-wedge piece and the other gate also inclined, the back pressure of the gates upon the wedges tends to give the gates and wedges which are in engagement with each other, a movement relative to each other, when the screw-threaded stem is turned backward to allow the top-wedge to rise, thereby separating the several engaging surfaces of the gates and wedges, whereas in the usual constructions, in which the engaging surfaces between the gate-backs and movable seating blocks occupy vertical planes, the engaging surfaces, after a long period of engagement, adhere so firmly as not to be disengaged by the back pressure, and impair the usefulness of the apparatus.

As seen in Figs. 2, 3 and 4, the gate-backs are provided with a pair of guide-flanges B^7 and B^8 on opposite sides of the inclines, adapted to include and guide one of the wedge-pieces.

The back is cut away at B^9 to afford a free path for the screw-threaded stem, and the inclines located on opposite sides of the groove B^9.

The wedge-pieces being provided with a longitudinal aperture C^{10} to permit of the free passage for the stem therethrough, it is essential that the apertures in the two pieces should be maintained in alignment, or in such position that the stem will enter the bottom wedge-piece when the gates are drawn up into the upper chamber.

It is desirable to have the gates as near to each other as possible to economize in space and material necessary to inclose them, and by making one incline steeper than the other on each of the wedge-pieces, I am able to provide for lapping the wedges upon each other, as seen in Fig. 1, without laterally offsetting the bases of the inclines relatively to their supporting shanks, thereby preventing the base of each incline from projecting beyond the periphery of the hollow shank. The distance between the gates will, therefore, need to be no greater than that required for the admission of the hollow wedge-shanks.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a slide-gate valve, the combination with the case, and screw-threaded stem, of a hollow interiorly-threaded top-wedge rotarily mounted on the stem and provided with oppositely inclined working faces, a subjacent bottom-wedge provided with oppositely inclined working faces, and a pair of gates, one gate having on its back an inclined surface engageable with one of the inclines of the top wedge and the other gate having an inclined back-surface engageable with one of the inclines on the bottom wedge, the contiguous inclines of the wedges being engageable with each other, substantially as described.

2. In a slide-gate valve, the combination with the case, and a pair of slide-gates, of a pair of gate-seating wedges, each wedge having two oppositely and unequally inclined faces, two of the faces, one on each wedge, being engageable respectively with the gates, and the other two faces with each other, and means for operating the wedges, substantially as described.

3. In a slide-gate valve, the combination with the case, and screw-threaded stem, of a hollow interiorly threaded top-wedge rotarily mounted on the stem and provided with oppositely and unequally inclined working faces, a gate having on its back an inclined surface engageable with the steeper incline on the top wedge, a bottom wedge provided with oppositely and unequally inclined working faces, and having its easier incline engageable with the easier incline of the top-wedge, and a gate having on its back an inclined surface engageable with the steeper incline on the bottom wedge, substantially as described.

In testimony whereof I have hereunto set my hand this 31st day of December, 1894.

JOHN T. CHRISTIE.

Witnesses:
FRANK C. CURTIS,
THOMAS H. GUY.