(No Model.)

J. T. CHRISTIE.

SLIDE GATE VALVE.

No. 559,677. Patented May 5, 1896.

Fig. 1.

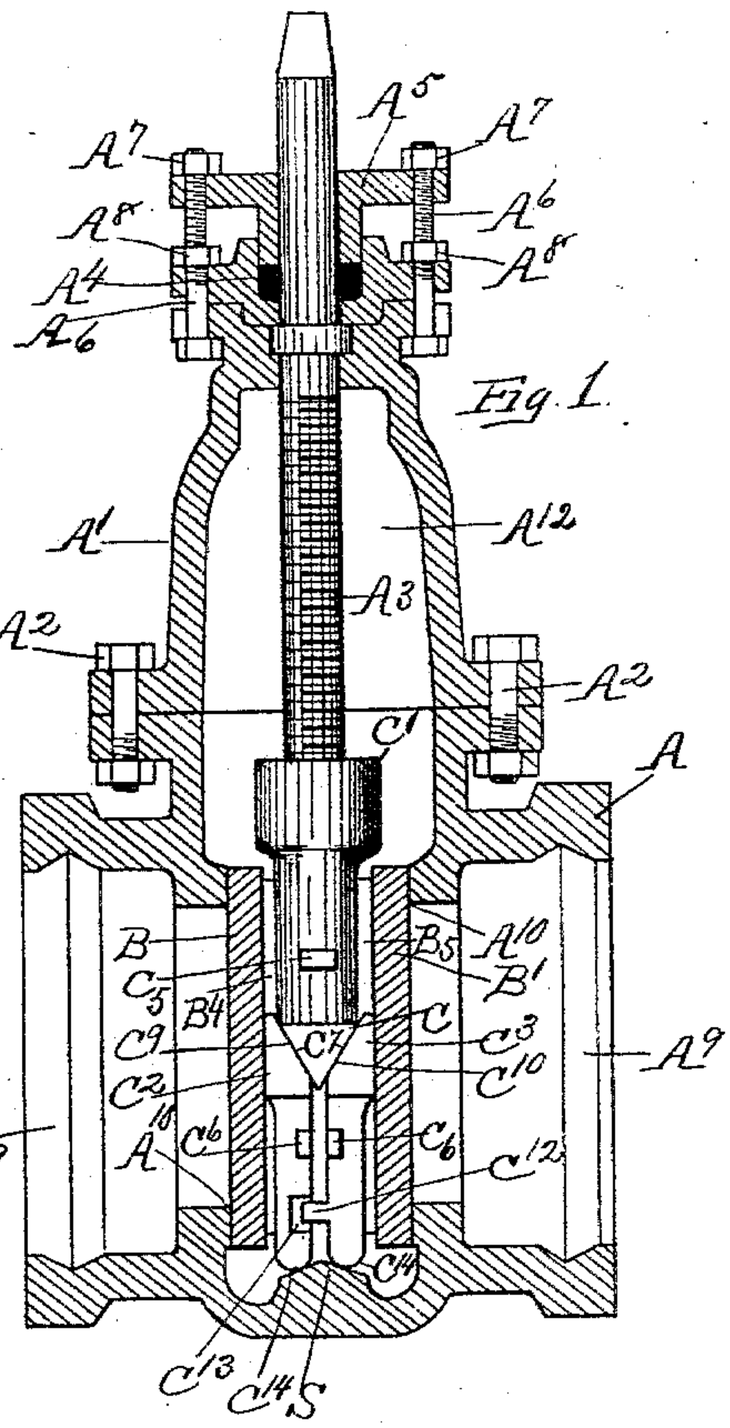


Fig. 2.

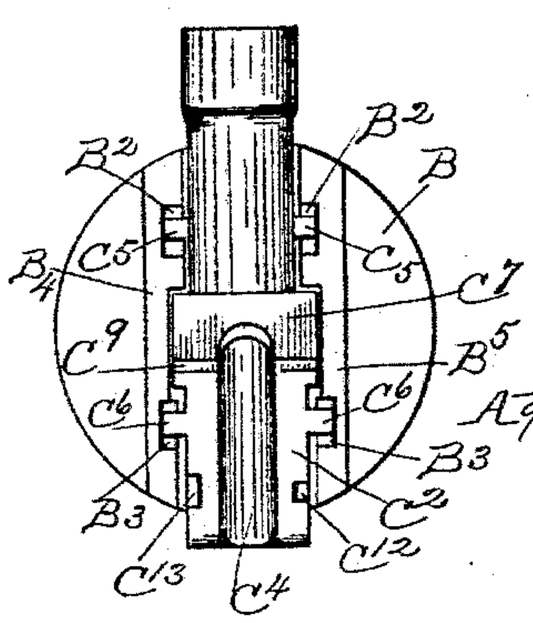


Fig. 3.

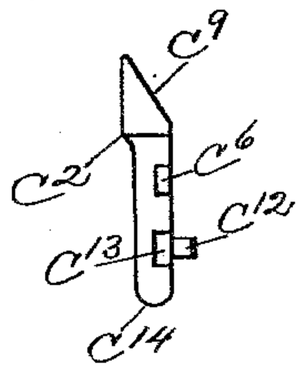
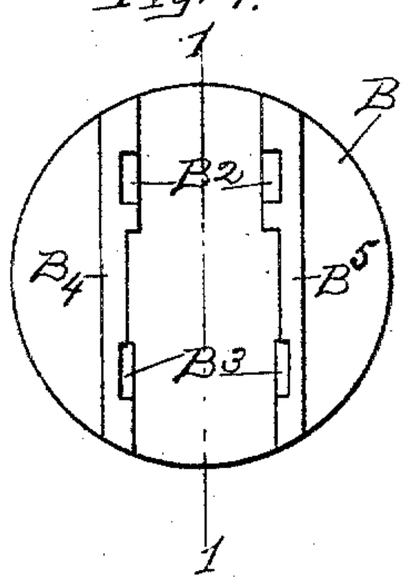


Fig. 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN T. CHRISTIE, OF TROY, NEW YORK.

SLIDE-GATE VALVE.

SPECIFICATION forming part of Letters Patent No. 559,677, dated May 5, 1896.

Application filed January 19, 1895. Serial No. 535,427. (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 Slide-Gate Valves, of which the following is a specification.

The invention relates to such improvements; and it 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. 4, and edge views of the top and bottom wedges in elevation. Fig. 2 is a side view of the wedges and back view of one of the gates in elevation. Fig. 3 is an edge view of one of the bottom wedges in elevation and detached. Fig. 4 is an elevation of the back of one of the gates detached.

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 wedges C^2 and C^3. The shanks of the bottom wedges have each a groove C^4 on the inner side to permit of the free passage of the lower end of the stem down between them. The wedge-pieces are each provided with laterally-projecting lugs C^5 and C^6, adapted to enter the vertically-elongated recesses B^2 and B^3 in the guide-flanges B^4 and B^5, fixed to or forming part of the backs of the gates. 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^5. Each of the bottom wedges is carried by that gate which is engaged by its supporting-lugs C^6. The back of each gate is provided with projections or flanges B^5 and B^4, which form a guideway for the wedges and contain the recesses which receive the lugs C^5 and C^6. The top wedge has equally-inclined working faces C^7, which respectively engage the inclines C^9 and C^{10} on the bottom wedges. The edges of the wedges are all approximately parallel with the planes of the gates, and the edge of the top wedge is normally equidistant from both gates.

When the gates are in position to engage their seats, the lower ends of the shanks of the bottom wedges engage 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-pieces engage the stop S and remain stationary. A continued movement of the stem and top wedge causes the inclines of the top wedge to engage the inclines of the respective bottom wedges, which forces the bottom wedges apart, causing them to engage and seat the gates. By employing two separate and independently-movable bottom wedges, instead of a single bottom wedge-piece, as heretofore practiced, I am able to employ symmetrically-formed wedges, which balance each other and tend to keep the top wedge in the same vertical plane, thereby relieving the screw-threaded stem from lateral strains in seating the gates. The double incline on the top wedge and the two inclines on the bottom wedges provide for a comparatively large horizontal movement of the gates toward their seats relatively to their downward movement under the influence of the downwardly-moving top wedge, which forces the gates firmly to their seats with a very slight and almost imperceptible downward movement, thereby preventing

wear upon the gate-seats. I am also able to avoid inclines on the backs of the gates and locate all the inclined working faces, which have a slide movement upon each other, upon the comparatively small and detachable pieces, which can be easily and cheaply replaced when worn by use.

By employing two bottom wedge-pieces, instead of one, as heretofore practiced, the action of one wedge is in a measure independent of the other. For example, should the accumulation of sand or other obstruction in the bottom of the valve-case partially cover the stop S a single bottom wedge-piece would be prematurely stopped and force the gates against their seats before they had descended to their proper positions, which might prevent them from operating to make a tight joint, while the two bottom wedges having an independent movement would permit the gates to descend nearer their true seating position if only one of the wedge-pieces encountered the obstruction, because the wedge on the unobstructed side would descend to or nearer to its normal stopping-point.

The recesses B^2 and B^3 in the backs of the gates, which receive the gate-supporting lugs on the top wedge-piece and the lugs C^6 on the bottom wedge-pieces, are elongated vertically to permit of a relative vertical movement of the top and bottom wedges in seating and unseating the gates, and when the bottom wedge is composed of a single piece and supported on its sides by both gates, as heretofore practiced, great care was required to secure the proper adjustment of the parts. By having the bottom wedges in two separate pieces, each supported independently of the other, a vertical position is insured to each wedge-piece and the inclines maintained in position for a proper and effective engagement with the top wedge. With such a form of construction comparatively little skill or labor is required to adjust the parts or secure the proper form and location of the recesses to give the best results.

The supporting-lugs can safely be given ample movement in their recesses to force the wedges into and out of effective engagement with each other. I also provide the bottom wedge-pieces with the interlocking lugs C^{12} and elongated recesses C^{13}.

By varying the elongation of the recesses the limit of independent movement of the pieces can be varied as desired. A limit to such independent movement is essential, because if the obstruction was so disposed as to force one of the bottom wedge-pieces to do all the work or nearly all of the work of seating the valves, to the exclusion of the other piece, the working faces would be forced out of alinement and the main stem subjected to injurious lateral strain, which might so bend it as to render it inoperative.

By making the top of the stop S slightly wedge-shaped and the bottoms of the stop-engaging wedge-pieces convexed, as shown at C^{14}, I provide for a slight lateral movement of the wedge-pieces on the stop to correspond with the lateral movements of their upper inclined ends in seating the gates, thereby maintaining the wedge-pieces in vertical positions.

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

In a slide-gate valve, the combination with the case and slide-gates, of a vertically-movable top wedge with opposite inclines; a pair of bottom wedge-pieces engageable both with the top wedge and severally with their respective gates and loosely connected with the respective gates, and interlocking lug connections between the wedge-pieces movable in slightly-elongated recesses, whereby the wedge-pieces are made capable of a limited vertical movement independently of each other and of the gates, substantially as described.

In testimony whereof I have hereunto set my hand this 11th day of January, 1895.

JOHN T. CHRISTIE.

Witnesses:
GEO. A. MOSHER,
FRANK C. CURTIS.