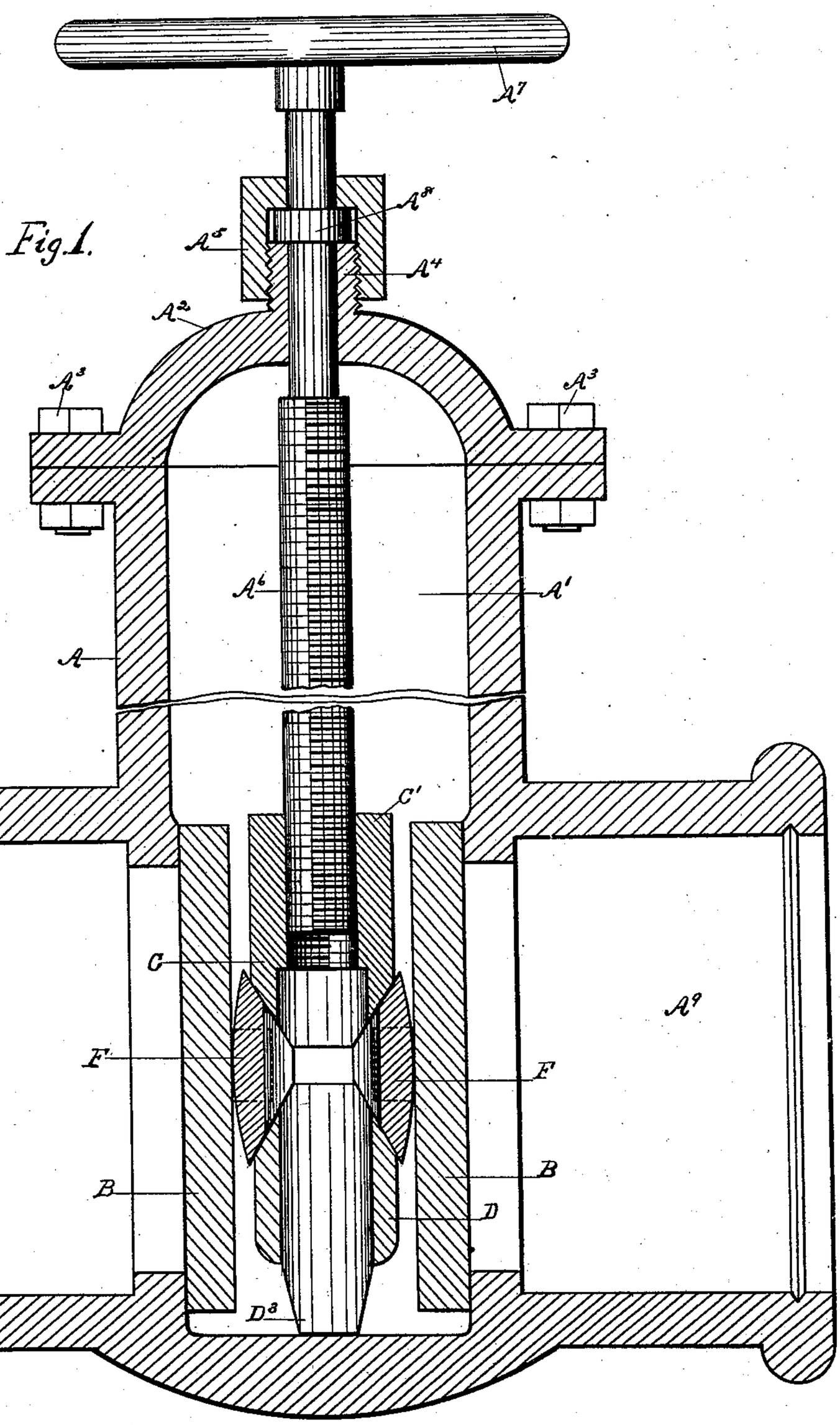
(No Model.) 2 Sheets—Sheet 1.

R. HUGHES.

SLIDE GATE VALVE.

No. 466,350. Patented Jan. 5, 1892.

Fig. 1.



WITNESSES:
Frank C. Curtis
John T. Booth.

INVENTOR:
Robert Hughes,
by Geo. Uhler
atty.

(No Model.) 2 Sheets—Sheet 2.

R. HUGHES.

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Fig. 6.

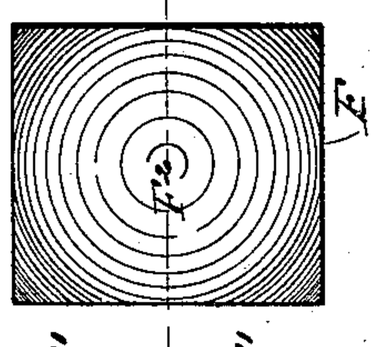


Fig. 5.

Fig. 3.

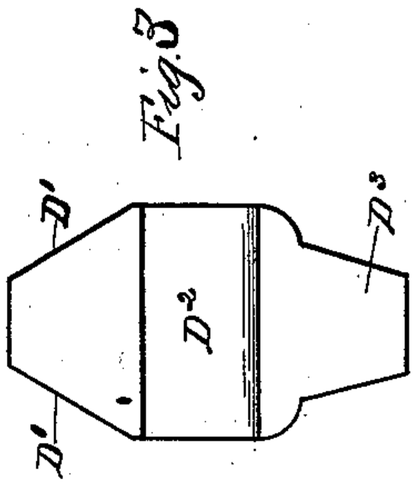


Fig. 2.

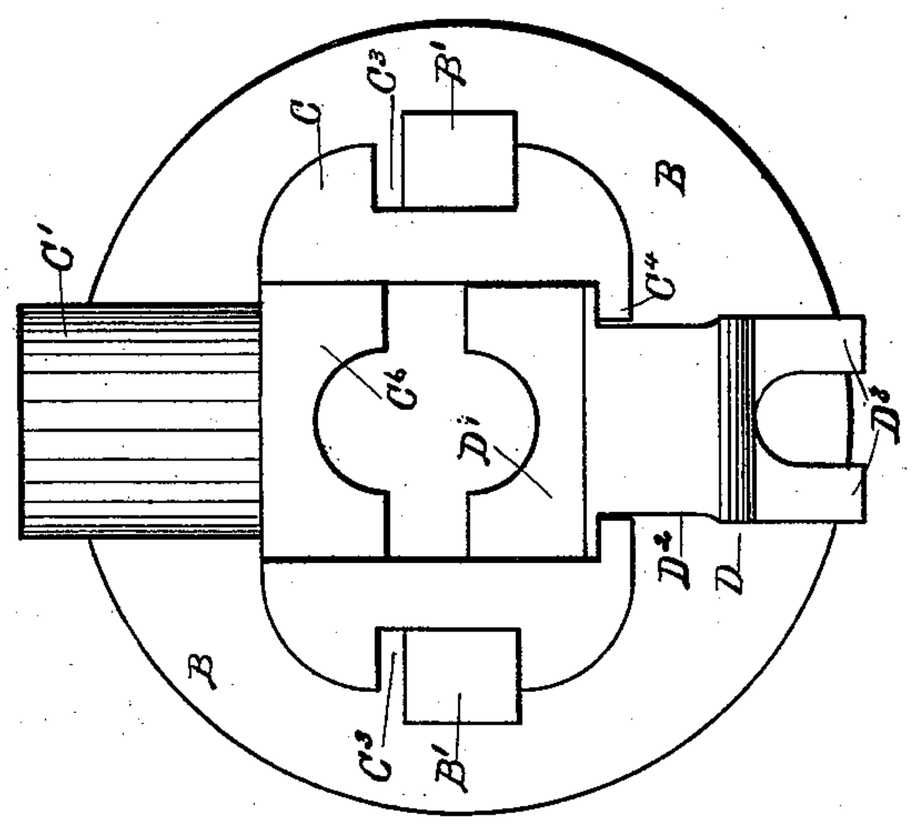


Fig. 4.

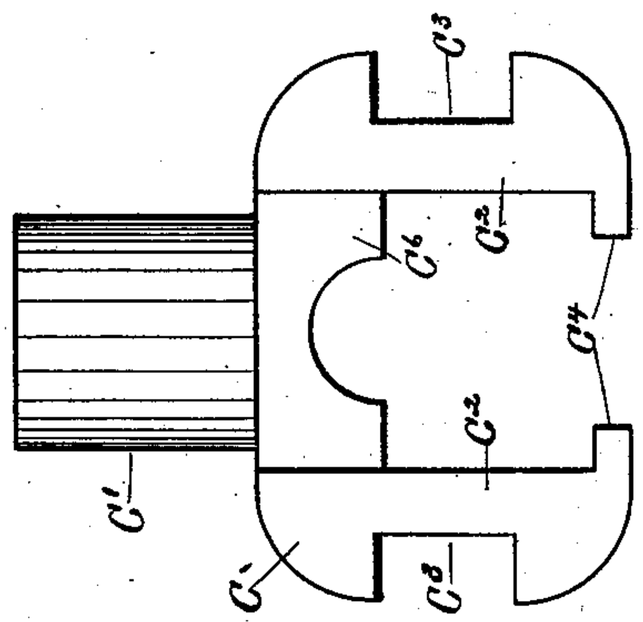
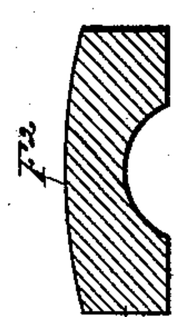


Fig. 7.



WITNESSES:
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INVENTOR:
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UNITED STATES PATENT OFFICE.

ROBERT HUGHES, OF WATERFORD, ASSIGNOR TO JOHN KNICKERBACKER, OF TROY, NEW YORK.

SLIDE-GATE VALVE.

SPECIFICATION forming part of Letters Patent No. 466,350, dated January 5, 1892.

Application filed March 24, 1890. Serial No. 345,085. (No model.)

To all whom it may concern:

Be it known that I, ROBERT HUGHES, a citizen of the United States, residing at Waterford, county of Saratoga and State of New York, have invented certain new and useful Improvements in Slide-Gate Valves, of which the following is a specification.

My 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.

My present invention embodies certain improvements upon the valve shown and described in United States Letters Patent No. 387,164, issued to me July 31, 1888, to which patent reference may be had.

Figure 1 of the drawings forming a part of the following specification is a central vertical section of the valve, showing the slide-gates in a closed position. Fig. 2 is a side elevation of the gate-carrier, one of the gates and the gate-seating plunger detached from the other parts and shown in their relative positions for use. Fig. 3 is an edge view of the plunger detached. Fig. 4 is a side elevation of the carrier detached. Figs. 5 and 6 are respectively edge and side views of one of the gate-seating blocks, convex or rounded on one side and beveled or wedge-shaped on the opposite side, detached. Fig. 7 is a central horizontal section of the block, taken on the broken line 7 7 in Figs. 5 and 6.

A is the valve-case, having the upper gate-chamber A′ and the cap A^2 detachable by removing the screw-bolts A^3. The chamber opens upwardly through sleeve A^4 on the cap. The sleeve is exteriorly threaded to receive the stuffing-nut A^5. The valve-stem A^6, screw-threaded at its lower end, as indicated, and rotary in the sleeve and nut, is provided on its exteriorly-projecting end with an operating-handle A^7. The stem is also provided with a collar A^8, fixed thereon between the cap and sleeve to prevent any longitudinal movement of the stem. The lower part of the case is provided with the oppositely-located pipe openings A^9, together forming a straightway passage transversely through the valve. The slide-gates B in the usual form of disk-valves are adapted to be forced against seats formed on the inner surface of the case-walls surrounding the passage-way. The slide-gates are moved to and from the passage-way openings by means of a stem-actuated carrier C, having a nut C′ interiorly threaded to fit the threaded portion of the stem. The carrier is provided with a pair of oppositely-located depending bifurcate arms C^2, having in their outer sides recesses C^3, adapted to receive the studs B′, projecting from the backs of the gates, the studs on the respective gates entering the recesses from opposite sides of the carrier, as indicated by the dotted lines in Fig. 1. The lower ends of the bifurcate carrier-arms are each provided with an interiorly-projecting flange C^4, adapted to engage with and carry the plunger D when idle. The plunger is provided with a central aperture, permitting the valve-stem to pass through it, a wedge-shaped head D^8, adapted to loosely fit the space between the carrier-arms, a narrower body part D^2, movable in the space between the flanges C^4, and the legs D^3, adapted to engage with the bottom of the valve-case to seat the gates by means of the seating-blocks F. The lower end C^6 of the carrier between the arms C^2 is wedge-shaped to correspond in form with the form of the plunger-head. The seating-blocks are wedge-shaped on one side F′ and convexed on the opposite side F^2. The seating-blocks are adapted each to fit the chamber formed between the carrier and plunger-head on one side and one of the gates on the other side, one of the inclined surfaces of the block resting upon the inclined surface of the carrier and the other upon the inclined surface of the plunger-head, while the convexed side is contiguous to the back of the gate and adapted to engage therewith when the plunger-head is forced into close proximity to the wedge-shaped portion of the carrier. It is obvious from an inspection of Fig. 1 that if the screw-stem is turned in the direction to force the stem-nut and carrier downward while the feet of the seating-plunger rest upon the bottom of the valve the inclines of the carrier and

plunger, sliding upon the inclines of the seating-blocks, will force the latter outward against the gates and securely seat them; also, that if the stem is turned in the opposite direction the carrier will be moved upward and its wedge-shaped portion drawn away from the bearing-blocks, thus reducing the pressure exerted through them upon the gates to seat them until the latter are released and carried up into the chamber A′, opening the passage-way. By having a single convexed seating-block for each gate the seating-pressure is always equally distributed over the whole seat, whereas in the valve described in my former patent, No. 387,164, if the blocks differed in size, the pressure was unequally distributed through the two blocks and the gate insecurely seated. The universal rocking movement is not, however, necessary, it being essential only that the blocks be so convexed or rounded as to permit a rocking movement in one plane.

By providing the carrier with the open or bifurcate flanged arms C^2, I can easily insert and remove the plunger for cleaning or repairs, and less accuracy is required in fitting the parts.

In the valve shown in my said patent, No. 387,164, the back of each gate has at its middle part a single stud or trunnion adapted to enter and fit a recess in the carrier. The studs projected from the gate-backs in a direction such that if they were produced sufficiently they would intersect the pathway of the stem within the carrier, which necessarily made the stud-supporting recess very shallow and the studs short after allowing the necessary space for the stem-pathway between them. By having two studs on the back of each gate and corresponding recesses on the outer side of the depending arms C^2 the studs in entering the recesses move in lines parallel to each other, and which, if produced, would pass along opposite sides of the stem-pathway and inclose the same, so that the studs may enter a common recess in the carrier-arms and be made long enough to meet each other without interfering with the stem-pathway. I am thus able to make the studs longer than in the older construction by one-half the diameter of the stem, thereby insuring in all cases sufficient length of the studs without a special exactness or nicety in finishing, the ordinary method of casting being found sufficiently accurate.

It will be observed in Fig. 2 that the gate-studs fit quite loosely in the recesses C^3, which construction enables me to continue the downward movement of the carrier to tightly seat the gates without forcing the gates to accompany the carrier and slide on their seats while under the seating-pressure. The same amount of independent upward movement is also permitted to reduce the seating-pressure before a sliding movement is communicated to the gates.

The pitch or degree of inclination on the different wedge-shaped parts may be varied, as desired, and the plunger or the carrier only may be wedge-shaped, the contiguous sides of the convexed seating-blocks being made to conform to the desired modifications in form of the carrier or plunger.

The gate-carrier is operated by the stem through nut and screw connections, as shown, or in any known manner.

It should be borne in mind that my present construction not only simplifies and reduces the cost of construction by reducing the number of seating-blocks and actuating stops or plungers, but greater accuracy and certainty of operation are secured. A slight variation or inaccuracy in the size of the parts and accumulated deposit in the bottom of the valve-case do not affect the seating of valves operated by one contact-block actuated by a single seating stop or plunger. The use of a single gate-seating plunger with a pair of gate-seating blocks on two opposite sides of the plunger enables me to easily and quickly insert the plunger in an accessible and detachable position between supporting-flanges upon arms depending from the carrier, thereby rendering the wearing parts easily accessible for repairs or changing.

I do not broadly claim the combination of seating-blocks and actuating-plungers, but in combination the mechanism for cheaply and conveniently supporting and operating such parts, as herein set forth.

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

1. In a slide-gate valve, the combination, with the inclosing case, of a carrier-stem projecting exteriorly of the case, slide-gates, a stem-supported gate-carrier having a pair of depending bifurcate arms, a pair of gate-supports for each gate on the depending bifurcate arms, located on opposite sides of and inclosing the stem-pathway, introverted plunger-supporting flanges on the lower ends of the arms, a gate-seating plunger adapted to be inserted laterally between the bifurcate flanged carrier-arms and be supported thereby, and a gate-seating block on each of two opposite sides of the plunger, each engageable on one side with the plunger and on the other side with the central portion of one of the gates, substantially as described.

2. In a slide gate valve, the combination, with the inclosing case, of a carrier-stem projecting exteriorly of the case, slide-gates, a stem-supported gate-carrier, a single gate-seating-plunger, and a single gate-seating block on each of two opposite sides of the plunger between the plunger and the central part of the gate, having a rounded gate-engaging surface, substantially as described.

In testimony whereof I have hereunto set my hand this 22d day of March, 1890.

ROBERT HUGHES.

Witnesses:
CHARLES H. COLE,
THOMAS MULHERN.