No. 724,887. PATENTED APR. 7, 1903.

T. A. KNICKERBACKER.

VALVE.

APPLICATION FILED SEPT. 3, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

FIG 1

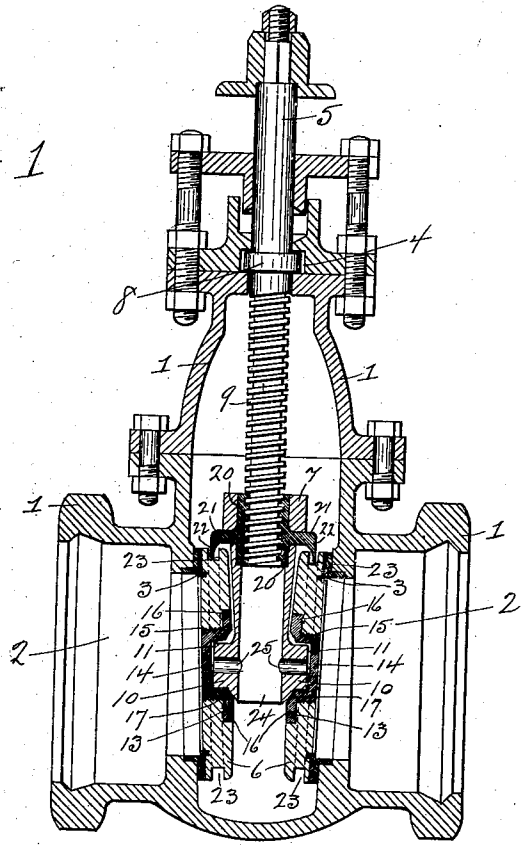


FIG 2

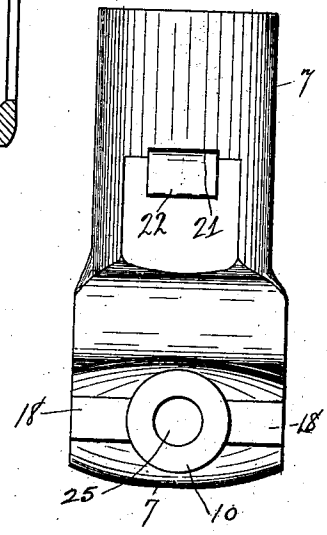
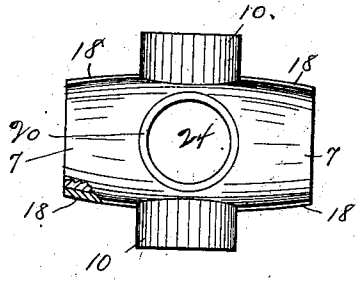


FIG 3



WITNESSES

Wm. J. Greer

H. E. Curtis.

INVENTOR

Thomas A. Knickerbacker

By Mosher & Curtis

attys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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FIG 5

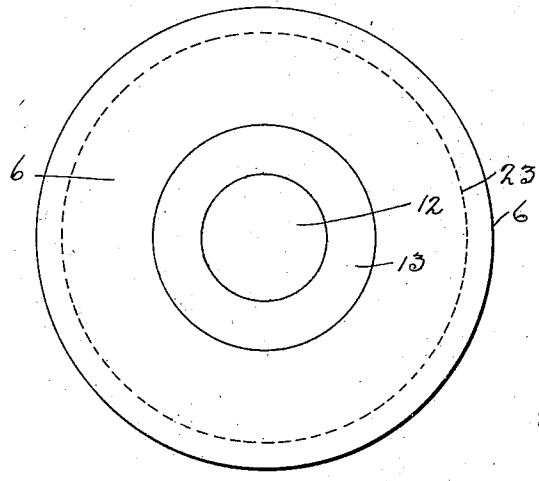


FIG 4

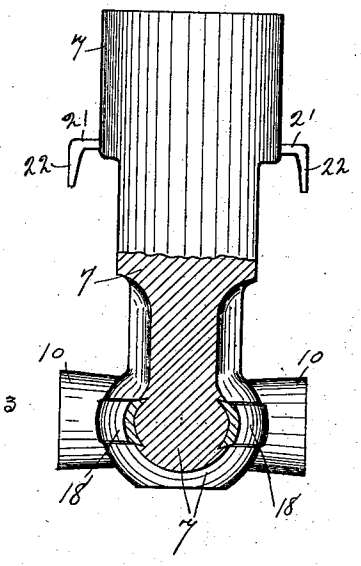


FIG 6

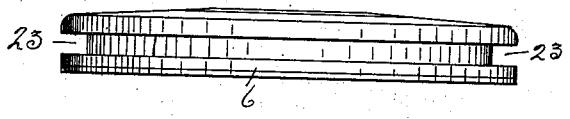
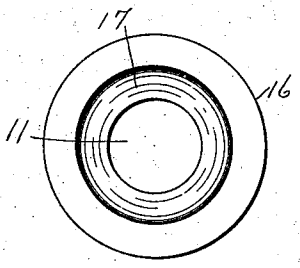


FIG 7



WITNESSES

Wm. J. Greer

H. E. Curtis.

INVENTOR

Thomas A. Knickerbacker,

By Mosher & Curtis

Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

THOMAS A. KNICKERBACKER, OF TROY, NEW YORK, ASSIGNOR TO EDDY VALVE COMPANY, OF WATERFORD, NEW YORK, A CORPORATION OF NEW YORK.

VALVE.

SPECIFICATION forming part of Letters Patent No. 724,887, dated April 7, 1903.

Application filed September 3, 1902. Serial No. 121,947. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. KNICKERBACKER, 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 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 reference characters marked thereon, which form a part of this specification.

Similar characters refer to similar parts in the several figures.

Figure 1 of the drawings is a central vertical longitudinal section of my improved valve. Fig. 2 is a view in elevation of the gate-carrier, showing an end elevation of one of the gate-supporting bosses. Fig. 3 is a bottom plan view of the same. Fig. 4 is a view in side elevation of the gate-carrier, partly broken away. Fig. 5 is a plan view of the back of the gate. Fig. 6 is an edge view of the same. Fig. 7 is a plan view of the open end of a cup-shaped flanged bushing.

My invention relates to improvements in gate-valves, and more particularly to the style of valve shown and described in United States Letters Patent No. 140,407, issued to George W. Eddy, July 1, 1873, to which patent reference may be had for a more complete understanding of the present invention.

Referring to the drawings, 1 is the valve-case having the fluid passage-way 2 surrounded by valve-seats 3, inclined toward each other and provided in its upper end with a bearing 4 for the valve-stem 5. The stem and bearing may be of any known construction. A pair of gates 6 are supported and moved toward and from the seats 3 by means of a gate-carrier 7, operated by the valve-stem 5. The gate-carrier may be operated by the stem in substantially the manner shown and described in said prior patent. I prefer to provide the stem 5 with a flange 8, whereby the stem is held against endwise movement by the bearing 4, and provide the inner end of the stem with screw-threads 9, adapted to fit a similarly-screw-threaded portion of the interior of the gate-carrier, whereby when the stem is rotated in the usual manner the carrier will be caused to travel longitudinally of the stem to carry the gates toward and from their seats. The gate-carrier is provided with a pair of oppositely-projecting bosses 10, whereupon the gates are respectively supported, and is also provided adjacent to the respective bosses with convexed surfaces adapted to engage correspondingly-concaved surfaces on the backs of the respective gates.

The construction and operation of the parts above referred to are substantially the same as shown and described in said prior patent.

In the operation of hydraulic machinery it is desirable to prevent contact between relatively movable parts composed of cast-iron, for the reason that said parts are caused to adhere tightly together by the formation of rust therebetween and also for the reason that excessive wear occurs from the movement of one of such parts upon another. For these reasons, among others, it is desirable to use bronze for the various bearing parts where practicable. In my improved valve the gates 6 are composed of cast-iron, each being provided with a central aperture 12, extending entirely through the gate and surrounded by a countersink 13, formed in the back of the gate. Located within each of said gate-apertures 12 is a cup-shaped bushing 14, secured therein, as by a screw-threaded connection 15, and provided on its inner end with an exterior flange 16, adapted to be seated in and fit the countersink 13 in the back of the gate, and adapted to form a tight joint therewith and an extended bearing engagement with the gate. The central portion of the cup-shaped bushing forms a recess 11, adapted to receive a boss 10 on the gate-carrier, and surrounding the central recess in said bushing, the latter is provided with a concaved surface 17, adapted to be engaged by the convexed

surface on the carrier adjacent to said boss. The bushing 14 is made of bronze and receives and transmits the full force of the gate-carrier in moving the gates toward and from their seats. The gate-carrier is provided on its lower end with a plurality of bronze bearing-plates 18, anchored in the main body of the carrier, which is of cast-iron, the same being cast upon and around the inner portions of said plates. These bronze plates are located adjacent to the respective bosses 10, extending laterally on opposite sides thereof, and project outwardly beyond the neighboring portions of the carrier-casting, being formed to present an exterior convexed surface corresponding with the concaved surface 17 on the several gate-bushings. The gate-carrier is provided at its upper end with a bronze stem-nut 20, incorporated into the carrier by casting the body of the carrier upon said nut. This nut is adapted to fit the screw-threaded portion 9 of the valve-stem. I have shown the stem-nut provided with oppositely-projecting arms 21, formed integral therewith and each provided with an offset finger 22, adapted to rest loosely in a peripheral groove 23, formed in a gate 6, whereby a rotative movement of the gate upon the boss 10 of the gate-carrier is permitted, while an excessive rocking movement of the gates toward and from the carrier is prevented. The arms 21 project outwardly through the body of the carrier, which is cast thereupon. The lower portion of the carrier is provided with a chamber 24, somewhat larger in diameter than the screw-threaded aperture in the stem-nut 20 and extending from the lower open end of the carrier to a point above the center of the bosses 10, each of which is provided with a central aperture 25, communicating at the inner end with said chamber and at the outer end with the central recess in the cup-shaped bushing 14. The chamber 24 is thus adapted to loosely receive the screw-threaded portion 9 of the valve-stem, permitting the water or other fluid to pass freely around said stem within said chamber 24 and to enter the apertures 25 in the respective bosses and facilitate the escape therethrough of accumulations of sand, dirt, &c., which tend to gather in the central recess in the cup-shaped bushing, which accumulation if permitted to remain would cause the thrust of the carrier to be transmitted directly to the closed outer end of said bushing instead of to the concaved surface 17 thereon.

In my improved construction it is impossible for water to accumulate around the bearing-surface of the carriers, which are kept dry and free from rust when the valve is closed. The thrust upon the gate is taken up by the bronze bushing and distributed through the flange thereof over a comparatively large area of the gate-body, the construction shown being proportionally materially stronger than a gate of solid cast-iron. The recess 11 in the bushing is preferably made somewhat larger in diameter than the boss which it receives, permitting a slight upward movement of the carrier in advance of the gate, which movement serves to relieve the wedging pressure upon the gate and permit the same to move without binding upon its seat.

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

1. In a slide-gate valve, the combination with a hollow cast-iron gate-carrier having a gate-supporting boss; and a gate mounted upon said boss and provided with an edge groove; of a bronze bushing anchored within the hollow gate-carrier and provided with interior screw-threads adapted to fit the screw-threaded stem; and an integral arm projecting from said bushing exteriorly through the carrier-casting and having exteriorly thereof a guide-finger adapted to enter the edge groove in the gate, substantially as described.

2. In a slide-gate valve, the combination with a stem-nut having an apertured gate-supporting boss, and provided near its upper end with an interiorly-screw-threaded portion adapted to fit the stem, and below said threaded portion with an enlarged axial chamber extending to its lower end and connecting with the boss-aperture; of a gate mounted upon said apertured boss, substantially as described.

3. In a slide-gate valve, the combination with a gate-carrier having a boss; of a gate provided with a central aperture therethrough; and a cup-shaped bushing secured within and closing said aperture and adapted to receive the boss on the gate-carrier, substantially as described.

4. In a slide-gate valve, the combination with a gate-carrier having a boss; and a gate provided with a screw-threaded central aperture and a countersink in the back of the gate around said aperture; of a cup-shaped screw-bushing secured in said gate-aperture and having an exterior flange seated in said countersink, said bushing being adapted to receive the boss on the gate-carrier, substantially as described.

5. In a slide-gate valve, the combination with a gate-carrier having a gate-supporting boss, and adjacent thereto a convexed bearing-surface; of a gate provided with a central aperture therethrough; and a bushing secured in and closing said gate-aperture and having on its inner end an exterior flange adapted to bear upon the back of the gate, said bushing being provided with a central recess adapted to receive the boss on the gate-carrier, and adjacent thereto with a concaved surface adapted to engage said convexed surface on the carrier, substantially as described.

6. In a slide-gate valve, the combination

with a cast-iron gate-carrier having a gate-supporting boss; of a bronze block anchored in the carrier-casting and provided with an exterior convexed bearing-surface adjacent to said boss; and a gate provided with a recess to receive said boss and adjacent thereto with a concaved surface adapted to conform to the convexed surface on the carrier-supported bronze plate, substantially as described.

In testimony whereof I have hereunto set my hand this 27th day of August, 1902.

THOMAS A. KNICKERBACKER.

Witnesses:

EDWIN H. WHITNEY,

HOWARD C. ROGERS.