(No Model.)

J. GILES.

VALVE.

No. 373,522. Patented Nov. 22, 1887.

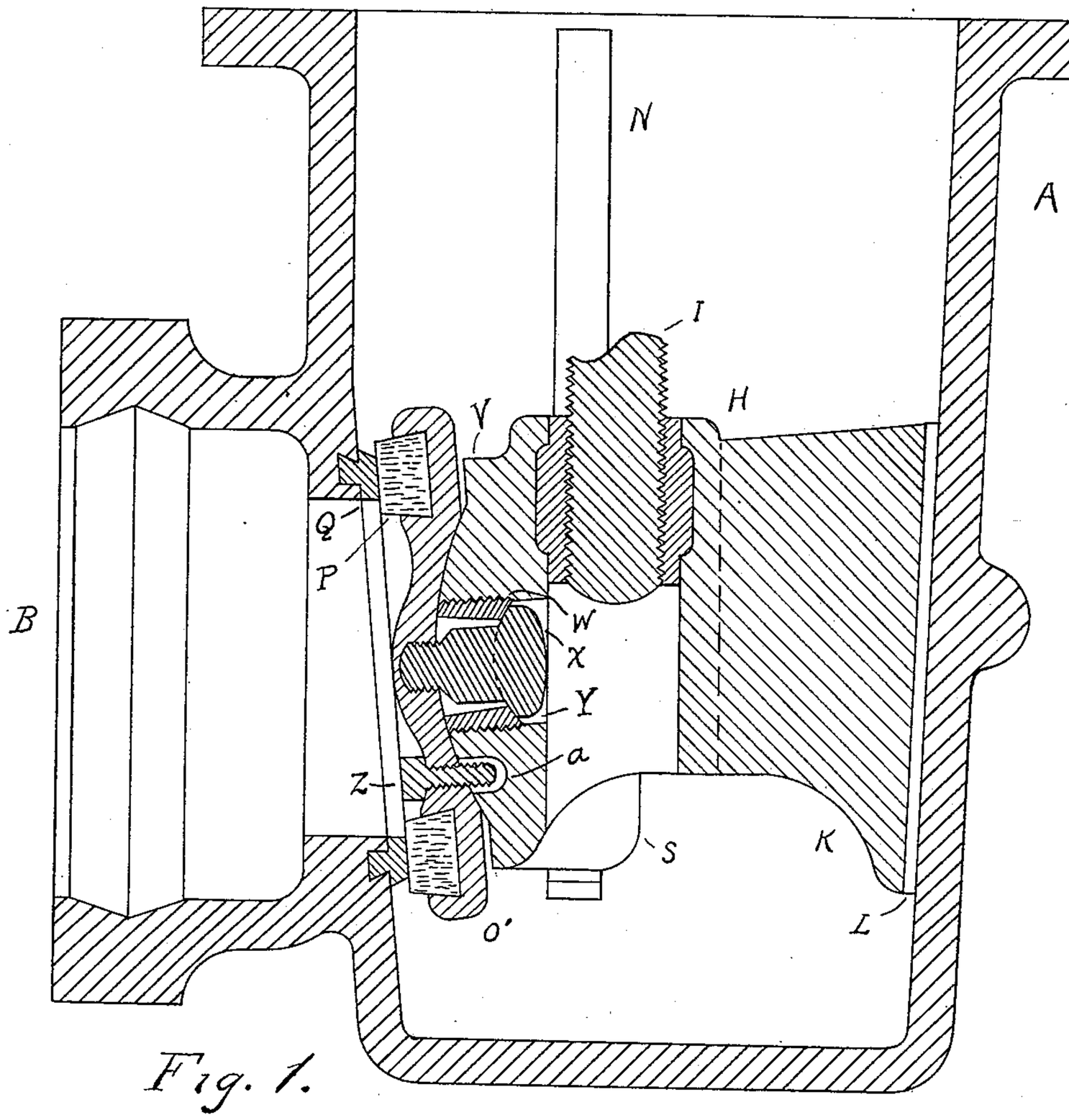

Fig. 1.

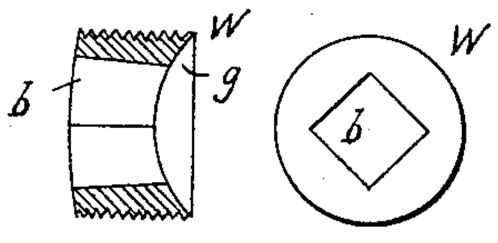

Fig. 2.

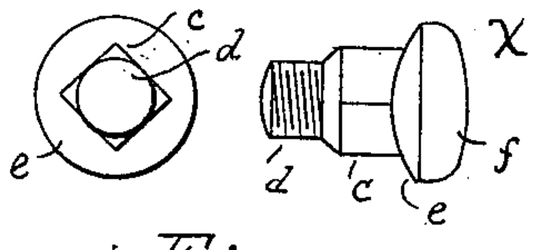

Fig. 3.

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JASON GILES, OF INDIAN ORCHARD, MASSACHUSETTS.

VALVE.

SPECIFICATION forming part of Letters Patent No. 373,522, dated November 22, 1887.

Application filed November 18, 1886. Serial No. 219,328. (No model.)

To all whom it may concern:

Be it known that I, JASON GILES, of Indian Orchard, in the county of Hampden and Commonwealth of Massachusetts, have invented a new and useful Improvement in Gate-Valves, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof.

My invention relates to that class of valves in which a valve-disk is mounted so as to have a slight universal movement upon a gate or carriage, said gate being moved in a direction transverse to the "water-way" or passage through the shell to open and close said passage.

The object of my invention is to provide means for mounting the disk upon the gate in such manner as to secure a free universal movement to the former over an extended bearing-surface, whereby resistance to a pressure exerted against its face will be distributed over substantially the whole of the rear surface of the disk, and also to prevent bodily movement of the disk away from the gate.

To this end my invention consists in the construction and combination of parts, hereinafter fully described, and particularly pointed out in the claims.

Referring to the drawings, in which like letters designate like parts in the several figures, Figure 1 is a central vertical section of a gate-valve constructed according to my invention. Figs. 2 and 3 are detail views of parts, hereinafter described.

The letter A designates the shelf, B the water-way or inlet-passage thereto, H the gate, and I the spindle, of a valve well known as the "Chapman Valve," which I have shown for the purpose of illustrating the application of my invention to gate-valves generally. In these valves the gate has a tapering face and a tapering wing, K, at the rear, which act as a wedge in connection with the tapering seat Q and way L to force the gate to its seat in closing.

The gate is also provided with vertical guides at the sides, consisting of the splines N on the shell, which project into suitable grooves in the gate. The spindle I, which is shown broken off in Fig. 1, is screw-threaded at its lower end, where it enters a screw-threaded socket in the gate, and at its upper end is provided with suitable means for imparting axial rotation thereto, whereby the gate is raised and lowered to open and close the passage B in a manner well known to those skilled in the art. Upon the face V of this gate is mounted the disk O', having seated within an undercut groove in its face a wooden ring, P, which ring contacts with the annular seat Q of the shell, when the gate is lowered, and insures a perfectly-tight joint between the valve and its seat.

In order to enable the disk to adjust itself truly to the seat Q it is mounted upon the gate by a universal joint, and to facilitate this freedom of movement, as well as to afford an extended bearing-surface at the rear of the disk, the face of the gate is provided with a convex bearing-surface extending from the center of the face to or nearly to each of its edges, and the disk has in its rear side a concave depression corresponding in contour and area therewith, so that while the disk is thereby permitted to move freely upon the gate its resistance to the pressure exerted against its face is equally distributed over its rear side, instead of being confined to its center, as would be the case with a less extended bearing-surface.

The universal joint is constructed as follows: A circular opening, Y, is made in the center of the face V of the gate, preferably extending into the spindle-bore, as shown. The wall of this opening is screw-threaded for a greater part of its length to receive a gland, W, having a screw-threaded periphery. This gland (shown in detail in Fig. 2) is formed with a concave depression, *g*, at its inner end, and is slightly convex at its outer end, to correspond with the convex face of the gate, and has a rectangular bore tapering with a decreasing diameter from its convex to its concave end. A bolt, X, (shown detached in Fig. 3,) is formed with a head, *f*, convex upon its under side to correspond with the concavity of the inner end of the gland, and a stem, rectangular for a portion of its length, as at *c*, terminating in a screw-threaded end, *d*. The "ball-and-socket" conformation of the head of the bolt and the inner end of the gland permits the former to have a free universal movement within the latter; but the rectangular portion of the stem coacting with the rect-

angular bore of the gland prevents any considerable axial movement of the bolt, as will be presently described.

At the center of its rear side, which is also the center of the concave depression therein, the disk O′ is provided with a screw-threaded orifice to receive the end of bolt X.

In assembling the parts just described the bolt is inserted head foremost in the opening Y in the gate, after which gland W is screwed into said opening until its convex end is flush with and forms a continuation of the convex bearing-surface on the face of the gate, as shown in Fig. 1. The disk O′ is then screwed upon the protruding end *d* of the bolt, the latter being prevented from sufficient axial movement to interfere with such operation by the rectangular conformation of the bolt and gland, previously described. It will be observed that when thus assembled the disk will have a universal movement upon the convex bearing-surface of the gate. As the desired amount of such movement is very slight, I prefer to form annular plane surfaces upon the face of the gate and rear side of the disk, surrounding the convex and concave portions thereof, as shown in Fig. 1, to limit the rocking movement of the disk.

To prevent accidental rotation of the disk upon the bolt after being placed thereon I insert a check-screw, Z, through the body of the disk, its inner end projecting within a recess, *a*, in the convex portion of the face of the gate, said recess being sufficiently large to permit the necessary universal movement of the disk, while at the same time preventing further axial movement thereof.

It will be understood that while I have shown and described my invention as applied to a valve with a single water-way and but one disk, it is equally applicable two two-way valves, in which the parts above described would be duplicated upon the opposite side of the gate.

I desire to call particular attention to two features of the construction above described—first, that by seating the bolt X within the lateral opening of the gate and retaining it in such position by means of the gland the spindle-bore of the gate is left unobstructed, so that in what are known as "stationary" spindle-valves, like the one shown, the gate is free to rise upon the spindle by means of the screw-threads thereon, the spindle, of course, projecting farther and farther within said bore as the gate rises thereon; and, second, that the head of bolt X, while permitting a free universal movement of the disk, effectually prevents any bodily movement of the disk away from the gate, which last-mentioned feature is of especial importance in two-way valves, for the reason that if the disks were free to move bodily away from the gate the streams of water rushing into the shell when the valve is opened would float the opposite disks from their bearings and render them liable to wedge in between the gate and valve seat when the gate is shut down.

Another important feature of the construction shown, as hereinbefore intimated, is the extended bearing-surface afforded by the convex face V of the gate, for the pressure exerted by the water, particularly in hydrant-valves, is so great that if the bearing-surface at the rear of the disk were confined to the vicinity of the center thereof the universal joint would soon be rendered inoperative, as the parts thereof would soon be worn out of their original conformation. By extending the bearing-surface, on the contrary, as shown in the drawings, the resisting strain is evenly distributed over the disk in such manner that no degree of pressure exerted against its face by the water can wear the contacting surfaces of the gate and disk sufficiently to impair the universal movement.

While I have shown and described the disk as having the wooden bearing-surface P seated within its face, it will be understood that, so far as the construction herein claimed is concerned, this feature may be omitted, and the disk may have its face formed to a plane bearing-surface, as is customary in such valves.

The use of wood as a bearing-surface in connection with gate-valves such as that above described is made the subject of a separate application filed by me on the 28th day of February, A. D. 1887, Serial No. 229,090.

Having thus described my invention, what I claim is—

1. In a gate-valve, a shell having an annular valve-seat, a gate having a vertical spindle-bore extending centrally through it, and a lateral opening leading from the center of the face of said gate adjacent to the valve-seat at substantially a right angle to said bore, the said face having a convex bearing-surface extending from said central opening to or nearly to each of its edges, in combination with a stationary spindle, a disk having within its rear side a concave depression corresponding in area and contour with the convex surface of the gate, and a universal joint securing said disk to the gate, said joint being located wholly within the lateral opening in the latter, whereby the spindle-bore is left unobstructed to permit the gate to rise upon the spindle, arranged and operating substantially in the manner and for the purpose set forth.

2. In a gate-valve, the combination, with the gate H, having the lateral opening Y and a convex bearing-surface surrounding said opening, the area of which is but slightly less than that of the face of the gate, of bolt X, having a ball-shaped head inserted within the opening Y, gland W, having a tapering bore and a cup-shaped inner end to receive the head of said bolt, and a disk, O′, secured to the outer end of said bolt, said disk being provided upon its rear side with a concave depression corresponding in area and contour with the bearing-surface of the gate, substantially as described.

3. In a gate-valve, the combination, with the gate H, having the lateral opening Y, of the bolt X, having the globular-shaped head, rectangular stem, and screw-threaded end, as shown, the gland W, filling the mouth of the opening in the gate, and having a cup-shaped inner end and a rectangular bore tapering toward said inner end, and a disk, O′, having a central screw-threaded orifice adapted to receive the end of said bolt, arranged and operating substantially as set forth.

4. In a gate-valve, the gate having the extended convex bearing-surface, as shown, and having the recess *a* within said bearing surface, the disk having the extended concave bearing-surface, the bolt and gland connecting said gate and disk, as shown, and the check-screw Z, passing through the disk and entering the recess *a*, combined and operating substantially as and for the purpose set forth.

5. In a gate-valve in which the gate and a valve-disk are provided with corresponding concavo-convex bearing-surfaces, as a means for securing the disk to the gate, a bolt secured at its outer end to said disk, and having a ball-shaped head inserted within a lateral opening in the gate, and a gland confining the head of the bolt within the opening, said gland having a cup-shaped inner end, and having its outer end shaped to conform to the curvature of the face of the gate, combined and operating substantially as shown and described.

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