No. 876,625. PATENTED JAN. 14, 1908.

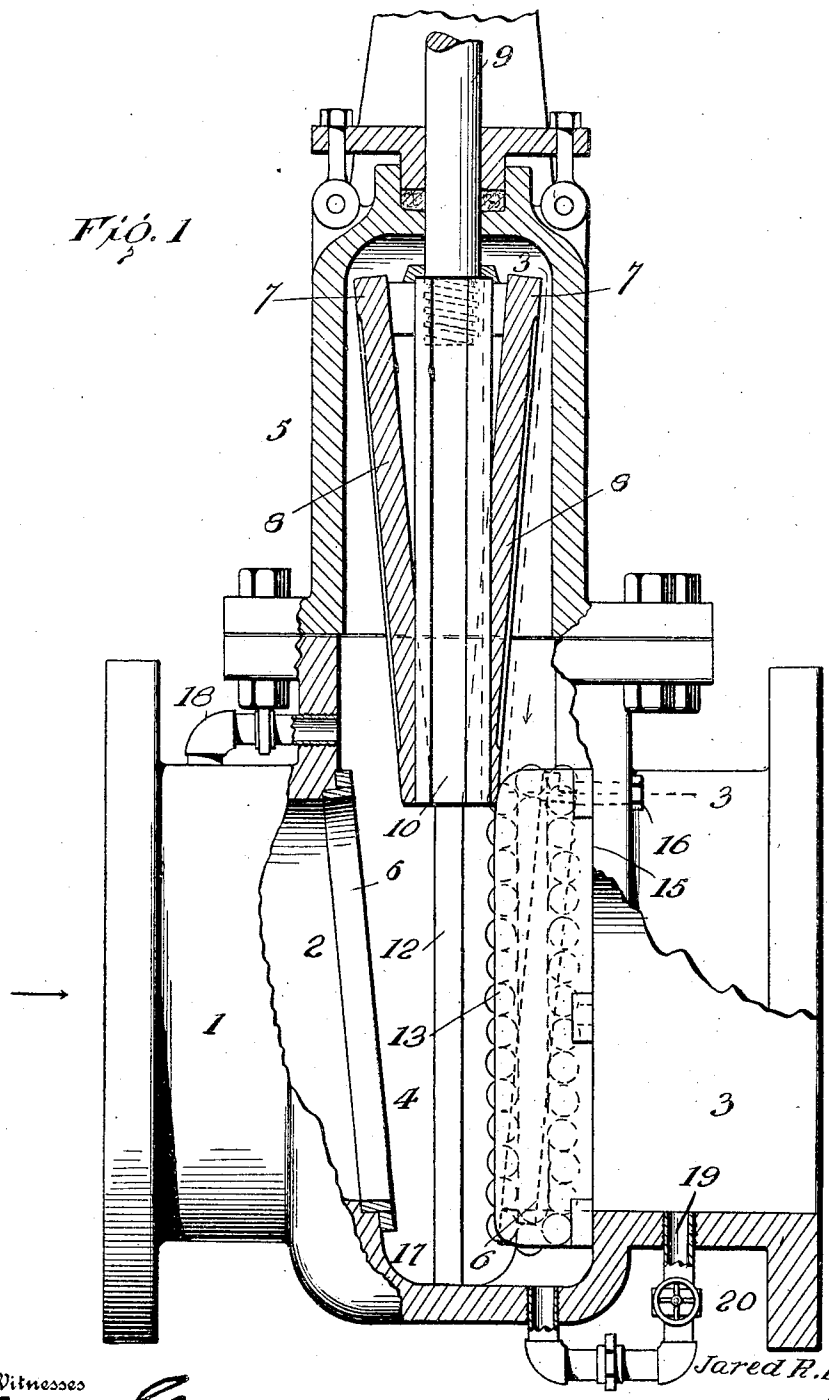
J. R. DE REMER.

GATE VALVE.

APPLICATION FILED JAN. 24, 1906.

2 SHEETS—SHEET 1.

FIG. 1



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

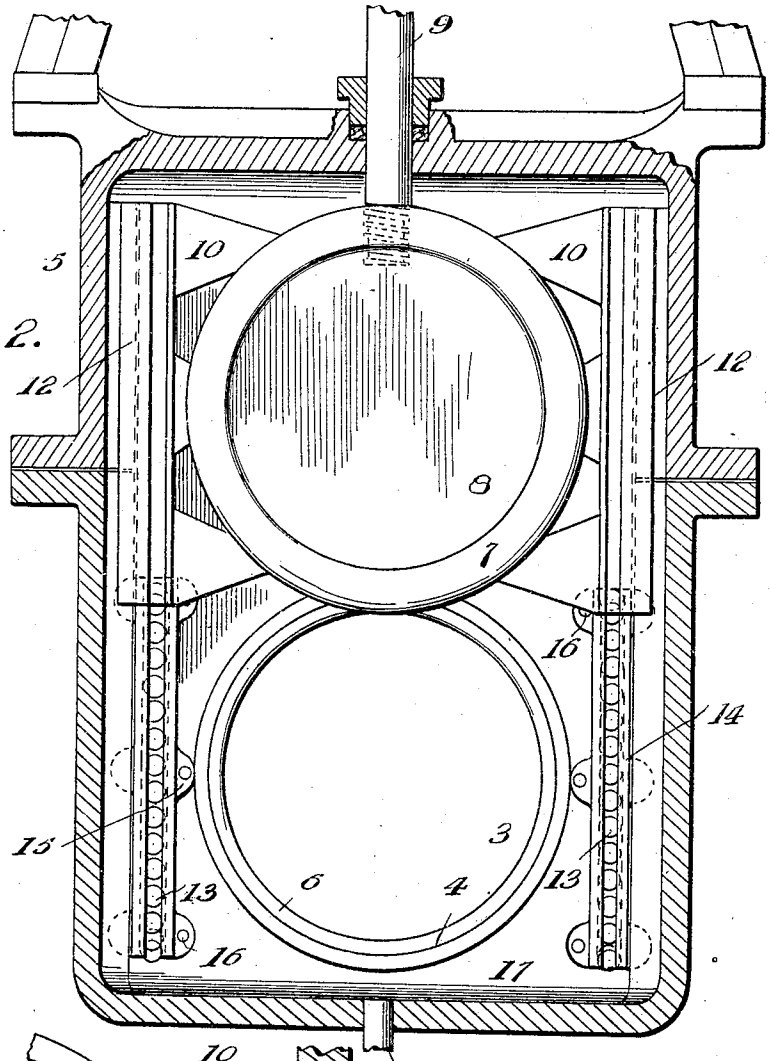


Fig. 3.

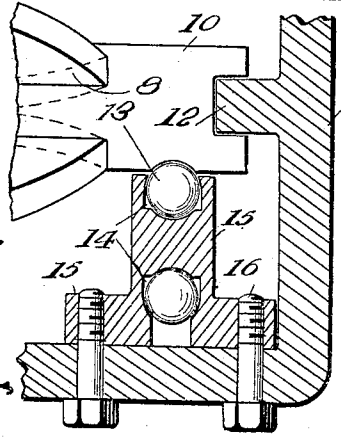
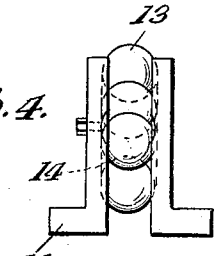


Fig. 4.



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JARED R. DE REMER, OF GLENWOOD SPRINGS, COLORADO.

GATE-VALVE.

No. 876,625. Specification of Letters Patent. Patented Jan. 14, 1908.

Application filed January 24, 1906. Serial No. 297,714.

To all whom it may concern:

Be it known that I, JARED R. DE REMER, of Glenwood Springs, in the county of Garfield and State of Colorado, have invented certain new and useful Improvements in Gate-Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The primary object of this invention is to provide an improved gate valve for either steam or water, and which may be operated with the exercise of but little power, and accurately guided to avoid canting and which will not be liable to be dished by the high pressure to which such valves are ordinarily subjected, as when used in water mains.

A further object is to enable the sand settling chamber to be readily cleansed, and the guides for the valve freed of all sand or other gritty substances.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a view partly in section, with parts broken away, the valve being shown open. Fig. 2 is a transverse sectional view. Fig. 3 is a section on line 3—3, Fig. 1, including a portion of the valve disks. Fig. 4 is a face view of a portion of one of the valve guides or bearings.

Referring to the drawings, 1 designates the casing having the inlet chamber 2, the outlet chamber 3, and the intermediate valve chamber 4, above and in line with which is the valve housing 5. Over the inner ends of the chambers 2, 3, are seat rings 6, set on an incline, as customary in valves of this type, so as to allow the rings 7 of the valve disks 8 to readily conform thereto when the valve is closed. These valve disks are mounted on the lower end of a vertically movable rod 9 which extends through the top of the housing, the same being equipped with suitable actuating mechanism, not shown. The two disks are inclined, that is, they are closer together at the bottom than at the top. Extending from between these disks, at the sides, are webs 10 having grooves in their outer edges to accommodate vertical guide ribs 12 extending inwardly from the valve casing and housing.

In practice, especially in hydraulic works, valves of this type are made very large in diameter, and have to withstand very high pressures. This not only calls for a great deal of labor in opening and closing the valves, but the pressure tends to cant the valves or dish the valve seats, since the disks have a tendency to move horizontally at the bottom a greater distance than at the top. This results in leakage. The entire energy against the disks is sustained by the valve rings and seats. Now, in order to protect these parts from undue wear, and enable the valve to be easily manipulated, and avoid the necessity of employing a by-pass or an auxiliary valve in order to relieve the pressure on the valve disks, I provide an improved arrangement of ball or cylinder bearings interposed between the valve and the outlet chamber, so that the pressure will be relieved from the rings and seats, and the valves will be braced or supported in line with the pressure thereon. These bearings are shown as consisting of a series of balls 13 mounted in continuous raceways 14 in boxings 15 secured by bolts 16 to the vertical wall of the housing between the valve chamber and the outlet chamber. The webs 10 constantly bear against the inner flight of balls, and are guided by ribs, and in consequence there is less friction of the disk rings against the valve seats and the tendency of the valve to cant is obviated. But what is of equal importance is the fact that the valve may be more readily operated, since the balls while confined upon the casing, not only revolve, but are free to travel bodily both upwardly and downwardly with the valve, both flights of each raceway being connected at the top and bottom. Although I prefer to use balls as the roller bearing medium it is manifest that cylinders may be substituted.

It is customary in valves of this type to provide a sand settling chamber 17 beneath the valve disks. In order to enable sand to be readily washed out from this chamber, and to remove all gritty substances from the ball bearings, I connect the receiving chamber 2 with the upper portion of the valve chamber by a by-pipe 18 which opens into the latter above the valve seat. The bottom of the sand chamber is connected by a second by-pipe 19 with the outlet chamber 3. By opening valve 20 of this pipe, the water will wash all sand or other foreign substances from the valve chamber and the ball bearings and race-ways. When this has been accomplished the valve 20 is closed.

I am aware that gate valves have been provided with antifriction media such as ball or cylinder bearings, but so far as these constructions have come to my knowledge the roller bearings have been mounted in frames carried by the vertically movable valve, the frames moving through guides in the casing. The operation of a valve of this construction is attended by difficulty in clearing the bearings when they have become clogged by sand and other gritty matter, since if the mode of freeing these particles should be washing them with water introduced into the casing from the receiving chamber, the extent to which the bearings are always housed by their frames and the guides would prevent the water from getting to and cleaning them. By my invention the roller bearings are arranged on the outlet side of the casing instead of being carried by the valve and consequently they are not covered when the valve is opened, so that when in this position or even when the valve is closed, the water entering the valve chamber above the seats, from pipe 18, and passing down into and through pipe 19 and valve 20, will thoroughly cleanse the guides and the bearings and insure their effective operation. It will also be noted that in addition to the contact of the webs 10 with the bearings, the valve is constantly guided by the ribs 12, thus insuring its even seating and avoiding canting.

From what has been stated the advantages of my invention will be apparent to those skilled in the art.

I claim as my invention:

1. In a gate valve, the combination with the casing having inlet and outlet sides, of roller bearings on said outlet side between the latter and the adjacent valve disk, said bearings being confined upon the casing but rotatable and bodily movable in contact with the valve as the latter is actuated in either direction.

2. In a gate valve, a casing having inlet and outlet chambers and an intermediate valve chamber, a valve movable vertically in said valve chamber, guides for said valve, ball bearings interposed between said valve and said outlet chamber, and raceways for said ball bearings secured to the wall between said outlet and valve chambers.

3. In a gate valve, a valve casing having vertically disposed ribs, the valve, grooved webs extending therefrom and engaging said ribs, two series of ball bearings with which said webs engage, and a continuous raceway for each series of bearings located between said webs and the outlet of the casing and mounted in said casing.

4. The combination with the casing having a central valve chamber and inlet and outlet chambers, of the vertically movable valve having grooved webs extending therefrom, guides in said valve chamber with which said webs engage, two series of ball bearings mounted in the walls of said outlet chamber and with which said webs engage, and boxings having continuous raceways for said bearings.

5. In a gate valve having inlet and outlet chambers and an intermediate valve chamber, a by-pipe leading from said inlet chamber into said valve chamber above the valve seat, and an outlet by-pipe leading from a lower portion of said valve chamber into said outlet chamber.

6. In a gate valve having inlet and outlet chambers, an intermediate valve chamber, and a sand settling chamber, a by-pipe leading from said inlet chamber into the upper portion of said valve chamber above the valve seat, and a second by-pipe leading from said sand chamber into said outlet chamber.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

JARED R. DE REMER.

Witnesses:
E. E. Lucas,
C. W. Darrow.