No. 880,463. PATENTED FEB. 25, 1908.

A. G. PAUL.

GATE VALVE.

APPLICATION FILED MAY 19, 1898.

2 SHEETS—SHEET 1.

Fig. 1,

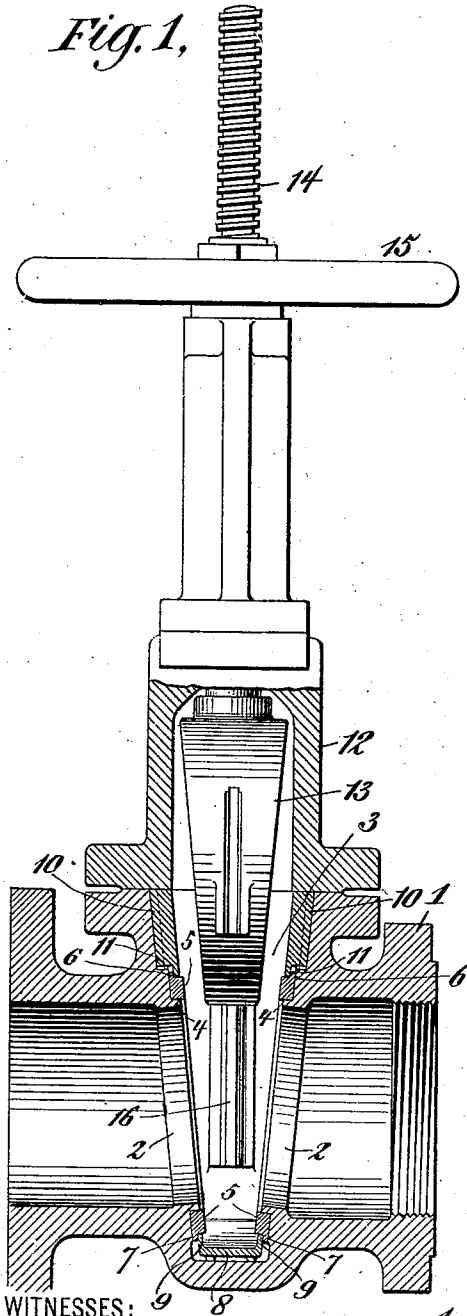
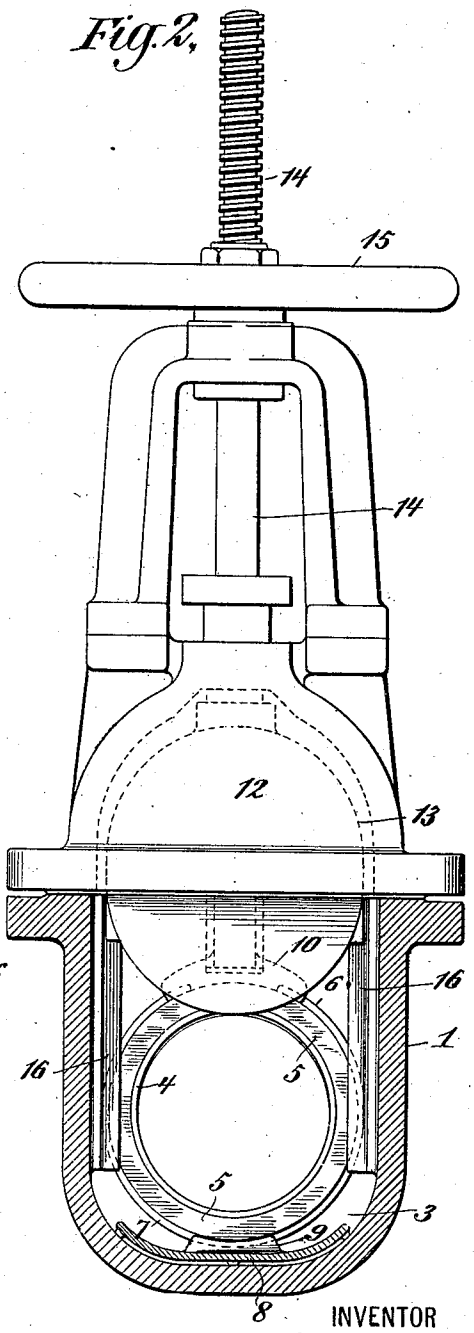


Fig. 2,

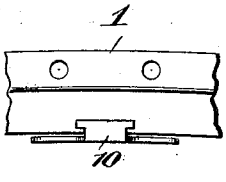


WITNESSES:

Edwin Seger.

Jas. C. Howell.

Fig. 3,



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2 SHEETS—SHEET 2.

Fig. 4,

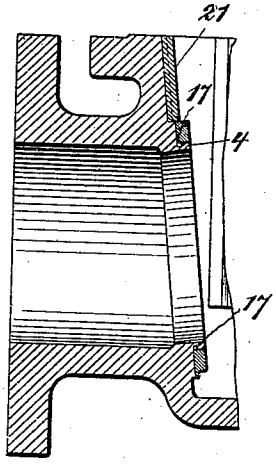


Fig. 5,

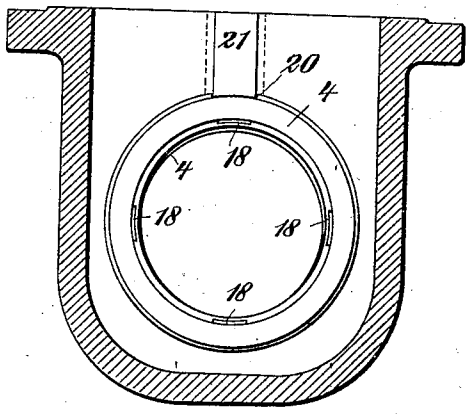
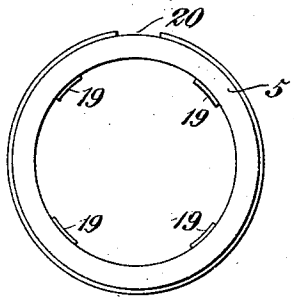


Fig. 6,



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UNITED STATES PATENT OFFICE.

ANDREW G. PAUL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO PAKIN COMPANY, A CORPORATION OF NEW YORK.

GATE-VALVE.

No. 880,463. Specification of Letters Patent. Patented Feb. 25, 1908.

Application filed May 19, 1898. Serial No. 681,128.

To all whom it may concern:

Be it known that I, ANDREW G. PAUL, a citizen of the United States, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Gate-Valves, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings, which form a part hereof.

The invention relates to gate valves in which a renewable seat is employed so that when the seat becomes worn a new one can be substituted in its place.

The object of the invention is to provide a simple and effective means of holding the seat in place which will at the same time protect the seat to a great extent from the cutting action of the material passing through the valve, and which will hold the seat firmly against radial or sidewise displacement, and thereby preserve the form of the seat and increase its durability and effectiveness; it is also the object of the invention to so construct and arrange the seat that it can be easily removed and replaced without requiring the services of a skilled workman.

The invention consists in a gate valve having a suitable valve casing provided with a port adapted to be closed by the gate, and having a lip or projection around the inner edge of the wall of the port extending toward the gate chamber for a distance not greater than the thickness of the renewable seat and affording an inside bearing or support for the renewable seat, and having a renewable seat adapted to be slipped over the lip and to surround and bear against the outside surface of the same and to fit it nicely, the casing being provided with a part adapted to lap over a part of the face or front of the seat so as to prevent the lengthwise motion of the seat one of said parts being movable with reference to the other, whereby the seat can be easily inserted in the valve and fastened in place therein, either by moving some part of the casing or connected with the casing so as to lap over the seat, or by moving some part of the seat under a projecting part of the casing, and whereby the seat can be easily removed from the valve when desired.

My invention also consists in other features of construction and combinations of parts hereinafter described and claimed.

The invention is fully shown in the accompanying drawings, in which

Figure 1 is a side view of the valve, the lower part being shown in section; Fig. 2 is an end view of the valve, the lower part being also shown in section; Fig. 3 is a detail showing the construction of the sliding clamp; Fig. 4 is a sectional view of another form of my invention, this being my preferred form; Fig. 5 is a cross section of Fig. 4 taken just in front of the renewable seat; Fig. 6 shows the renewable seat.

Similar numbers represent similar parts in the different figures.

Referring to Figs. 1, 2 and 3, 1 is the valve casing, which is made in the usual manner, and is provided with two ports 2, 2, and the gate chamber 3.

4, 4 are annular lips or rings formed around the inner edges of the walls of the ports and extending in towards the gate chamber 3. These annular lips are preferably made to extend in towards the gate chamber for a distance less than the thickness of the renewable seat, as illustrated in Fig. 1; but they may be made to project inwardly for a distance substantially equal to the thickness of the renewable seat as illustrated in Fig. 4. They must not however be made to project inwardly for a distance greater than the thickness of the renewable seat inasmuch as the gate is moved crosswise of the renewable seat, and when the valve is closed must bear against the inner face of the renewable seat. These lips are formed as an integral part of the casing or are securely fastened to the casing so as to be permanently attached thereto during the use of the valve.

5, 5 are annular renewable seats. They are made to nicely fit the lips 4 so that they can be slipped upon the lips as shown in the drawings, and will bear against the same and be held in position thereby and prevented from radial displacement and distortion. These seats may be made of any suitable material such as bronze or vulcabeston or any other material adapted for this purpose. The seats are provided with shoulders 6 and 7 at the top and bottom projecting from the outside surface or periphery of the seat as shown. In practice I form an annular shoulder entirely around the seat, cutting it away for a sufficient length to permit the seat to be withdrawn from the cage at the

bottom when turned to the proper position. These shoulders can, however, be made in any other suitable way.

8 is a cage or chair adapted to be placed in the bottom of the gate chamber and provided with the lugs or projections 9 adapted to catch and bear against the shoulders at the bottoms of the seats and thereby to hold the seats in place against pressure in the direction of the flow of the material passing through the valve. 10, 10 are clamping pieces adapted to slide in grooves or ways in the casing as clearly shown in Fig. 3. These clamps are provided at their lower ends with projecting lugs or shoulders 11, which are adapted to bear against the shoulders at the upper ends of the seats. After the renewable seats have been slipped into place over the lips 4, the clamps 10 are inserted in their grooves in the casing so that the lugs 11 bear against the shoulders 6 so as to hold the seats in place against any pressure exerted in the direction of the flow.

12 is the bonnet, which is made in the usual manner.

13 is the gate which is constructed and arranged so that it can be lowered into place and made to bear against the renewable seats and thereby to close the ports. The gate can be operated in any suitable manner, as, for example, by the screw spindle 14 and the hand wheel 15. The gate is guided in its up and down movement by the guides 16, the gate being provided with grooves in its sides to receive the guides.

In assembling the parts, the cage or chair 8 is first placed in position at the bottom of the gate chamber. The renewable seat is then slipped over the lips 4, the seat being turned for this purpose until the opening in the annular shoulder around the seat is directly opposite the lug 9 of the cage 8, in which position the seat can be easily put in place. The seat is then turned on the lip 4, so that the shoulder 7 will engage with the lug 9 of the cage. Clamps 10 are then slipped into place, after which the bonnet 12 is put on, the bonnet pressing against the upper ends of the clamps and holding them down in operative position.

A second form, and the best form, of my invention is shown in Figs. 4, 5 and 6. The parts are constructed as already described except that the lip 4 is provided with an undercut groove 17, and with one or more openings 18 into said groove, and the renewable seat is provided with one or more projecting parts 19 adapted to pass through the openings 18 and to slide in the groove, 17. The seat is also provided with the recess 20. 21 is a clamping or locking plate adapted to slide in ways in the casing and to enter the recess 20. In this form of my invention the cage at the bottom of the valve is dispensed with.

The renewable seat is slipped into place over the lip by passing the projecting parts 19 through the openings 18, and then turning the seat so that the parts 19 slide in the groove 17 and move under the overhanging part of the lip. When the recess 20 comes in line with the plate 21, that plate is forced into the recess so as to lock the seat in place.

One advantage of my improved valve is that the valve seat is protected from the cutting action of the material passing through the valve. Most of the wear produced in this way is borne by the surface of the lips 4. In the operation of a valve of this kind, when the gate is raised and drawn away from contact with the valve seat in the opening of the valve, the gate tends to draw with it the seat and thus to displace the seat in a radial or a sidewise direction. In most of the valves in general use this is a cause of frequent and serious trouble. In the present invention the lip prevents any such sidewise displacement of the seat and causes the seat to retain its original form, as a result of which the seat is always in position to make a tight joint with the gate, and is subjected to much less strain and wear.

The device is simple in construction and economical in manufacture and is made of but few parts. As a result of its simplicity the seats can be removed and replaced by the user without the assistance of a skilled workman or mechanic. The seat can be easily and accurately handled and adjusted.

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

1. In a gate valve, comprising a valve casing having a port, a movable gate, a lip integral with the casing around the inner wall of the port and projecting toward the gate chamber, a removable seat constructed so that it may be slipped over said projection and fit around the same, said seat provided with a shoulder extending partly around its outer periphery, and means for holding said seat locked to said casing, comprising parts for engaging the said shoulder, the movement of one of said parts serving to unlock the seat and permit its removal.

2. In a gate valve, comprising a valve casing having a port, a movable gate, a lip in the casing around the inner wall of the port, and projecting toward the gate chamber, a removable seat constructed so that it may be slipped over said projection and fit around the same, said seat provided with a shoulder, and means for holding said seat locked to the said casing, comprising movable parts engaging the seat, the movement of one of said parts serving to unlock the seat and readily permit its rotation and subsequent removal from the casing.

3. A gate valve comprising a suitable valve casing, a port in the casing adapted to be closed by the gate, a lip around the inner

edge of the wall of the port projecting in towards the gate chamber provided with an undercut groove, and one or more openings into said groove, a renewable seat adapted to be slipped over the lip and to surround and fit the same and provided with one or more projecting parts adapted to pass through the openings in the lip and to slide in the groove in the lip, and a gate and means for operating the gate, substantially as set forth.

4. A gate valve comprising a suitable valve casing, a port in the casing adapted to be closed by the gate, a lip around the inner edge of the wall of the port projecting in towards the gate chamber provided with an undercut groove, and one or more openings into said groove, a renewable seat adapted to be slipped over the lip and to surround and fit the same and provided with one or more projecting parts adapted to pass through the openings in the lip and to slide in the groove in the lip, means for locking the seat in place, and a gate and means for operating the gate, substantially as set forth.

5. A gate valve comprising a suitable valve casing, a port in the casing adapted to be closed by the gate, the lip 4 provided with the groove 17 and the openings 18, the renewable seat provided with the projecting parts 19, and the recess 20, the locking plate 21, and a gate and means for operating the gate, substantially as set forth.

6. A gate valve comprising a valve casing having a port, a movable gate, a lip in the casing around the inner wall of the port and projecting toward the gate chamber, a renewable seat constructed so that it may be slipped over said projection and fit around the same, and means for holding said seat locked in said casing, comprising relatively movable parts engaging the seat, one of said parts being a locking member having a radial movement to lock or unlock the said seat.

7. A gate valve comprising a valve casing having a port, a movable gate, a lip in the casing around the inner wall of the port and projecting toward the gate chamber, a renewable seat constructed so that it may be slipped over said projection and fit around the same, and means for holding said seat locked to said casing, comprising discontinuous engaging portions carried by the seat and by the casing and a locking member carried by the casing and movable to engage said seat.

8. A gate valve comprising a valve casing having a port, a movable gate, a lip in the casing around the inner wall of the port and projecting toward the gate chamber, a renewable seat constructed so that it may be slipped over said projection and fit around the same, and means for holding said seat locked to said casing, comprising discontinuous engaging portions carried by the seat and by the casing and a locking member carried by the casing and radially movable to lock said seat, or to unlock it and permit its being rotated and then removed from the casing.

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

ANDREW G. PAUL.

Witnesses:

JAMES J. IRWIN,

DUNCAN ROBINSON.