(No Model.)

J. S. GLENN.

BALANCED ROTARY VALVE.

No. 264,525. Patented Sept. 19, 1882.

Fig 1

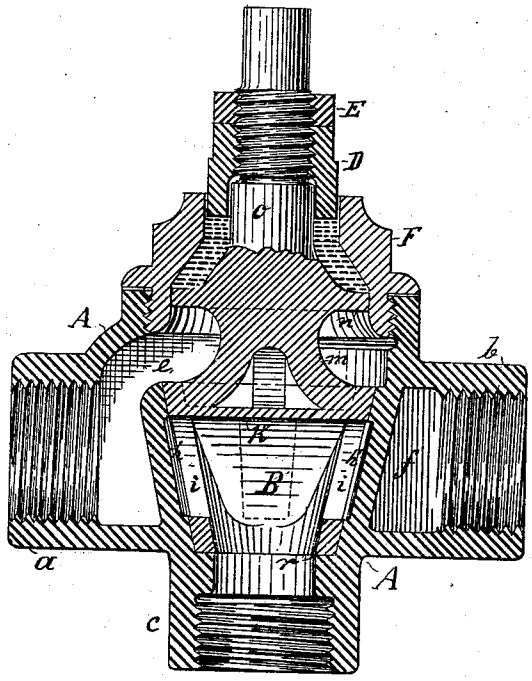
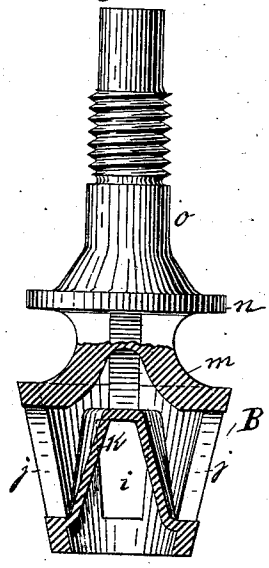


Fig 3



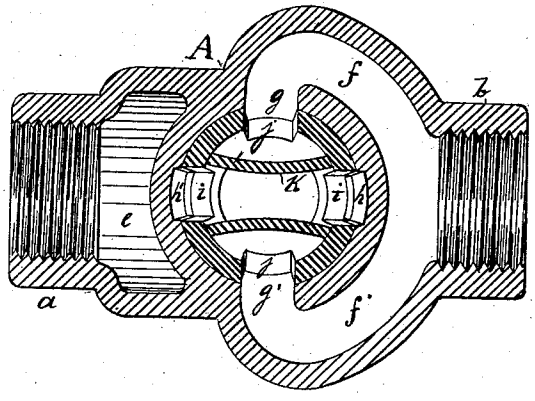


Fig. 2

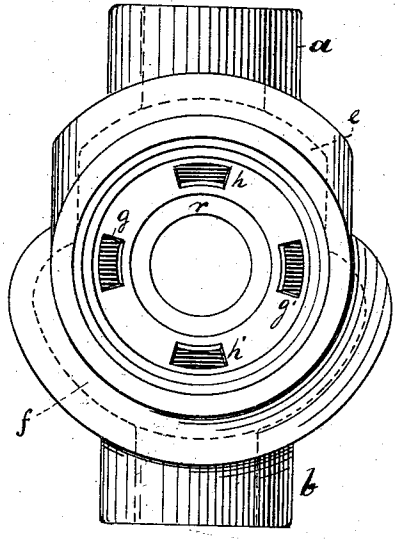


Fig. 4

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UNITED STATES PATENT OFFICE.

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BALANCED ROTARY VALVE.

SPECIFICATION forming part of Letters Patent No. 264,525, dated September 19, 1882.

Application filed July 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. GLENN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Balanced Rotary Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The nature of my invention relates to valves for steam or hydraulic engines of the kind described in Letters Patent No. 200,388, which were granted to me on February 19, 1878; and it is my object to construct such a valve that is more readily adapted for a three-way cock, or for steam-engines having a separate valve for each port, and in which the pressure and wearing surface is counterbalanced from opposite sides, so as to be moved with very little friction, and that its surface will wear even.

Therefore my invention consists in the peculiar construction and arrangement of the valve and casing, and in the construction of the stuffing-box, all as more fully will be hereinafter described and specifically claimed.

In the accompanying drawings, Figure 1 represents a longitudinal vertical section of the valve and casing complete, and Fig. 2 a sectional plan of the same. Fig. 3 is a cross-section of the valve detached; and Fig. 4, a plan view of the casing, the valve and stuffing-box being removed.

Corresponding letters in the several figures of the drawings designate like parts.

A denotes the valve-casing, that is bored out conically, and is provided with two diametrically-opposite screw-necks, *a* and *b*, a screw-neck, *c*, that forms a continuation of the small end of the bore for the valve, and with a screw-threaded opening, *d*, for connecting the stuffing-box. The screw-neck *a*, by a port, *e*, communicates with the space above the valve-seat, and the screw-neck *b* communicates through two quarter-circular channels, *f* and *f'*, with the two ports *g* and *g'*, that are cut through the valve-seat shell at its diametrically-opposite sides. Intermediate of and rectangular with these ports *g* and *g'*, and of equal size therewith, are formed two cavities, *h* and *h'*, which are also diametrically opposite.

B is the valve, which is turned conically to make a tight fit with the conical bore of the casing. This valve has four ports, *i i* and *j j*, each pair being diametrically opposite and rectangular to the other pair, and a U-shaped partition, K, separates the ports *i* from the ports *j* in a manner that the ports *i* communicate through the upper end of valve B with the port *e* and screw-neck *a*, and the ports *j* communicate with the screw-neck *c*, while the screw-neck B will communicate with either one of the screw-necks *a* or *c* through either the ports *i* or *j*, as the valve may be set. Four curved arms, *m*, form the connection between the upper rim of valve B with stem *o*. This stem *o* has a collar, *n*, and above such collar the stem is conical. The cylindrical portion of the stem is screw-threaded for securing the packing-sleeve D by a jam-nut, E, and the extremity of such stem is reduced in diameter for attaching a hand-wheel or operating-lever.

F is the stuffing-box, which is screwed into the opening *d* of casing A. This stuffing-box is bored cylindrical in the bottom for admitting the collar *n*, and is bored out in its top end for admitting the packing-sleeve E, and the intermediate portion is bored out conical to correspond with the conical portion *p* of the valve-stem. The conical chamber between collar *n* and sleeve E is filled with packing, that is tightened therein by screwing down the sleeve E, which packing, in pressing against the conical surfaces of the stuffing-box and valve-stem, will push the valve down and hold it in its seat, and will thus provide an elastic shoulder for such valve upwardly, while its lower edge is brought to bear against a shoulder, *r*, above screw-neck *c*, that will prevent such valve from being forced too tight in its seat. The collar *n* of valve-stem *o* is to be of a diameter to provide sufficient area for counteracting the downward pressure upon the valve B, which pressure should be just enough and not more than to hold such valve to its seat.

When applying the valve as a three-way cock the screw-neck *b* of the casing is to connect with the supply-pipe, while the screw-necks *a* and *c* are to be connected with the two branch pipes, either one of which can be made to communicate with neck *b* by turning the valve B so as to bring either its ports *i* or *j* in

line with ports *g* and *g'* of the casing; or the supply may be shut off entirely by turning the valve half-way, whereby all the ports are being closed.

For steam-engines the neck *a* of casing A is to form part of the steam-cylinder port. Neck *b* is to communicate with the steam-chest or steam-supply pipe and neck *c* with the exhaust-pipe; and when thus applied the valve-casings may be cast solid with the steam-cylinder, one to each end.

As will be seen from the above description, this valve is perfectly balanced around its circumferential face, while its end pressure can be regulated by the size of collar *n*. The circumferential wearing-surfaces are equalized by the cavities *h* and *h'*, which will also assist in lubricating such surfaces uniformly. The stuffing-box, by its peculiar construction, will hold the valve to its seat by the interposed elastic packing, thus assisting an easy movement of such valve; and the entire arrangement of the valve is such that it will answer equally well for steam, air, or water, and offers equal advantages as a rotary or oscillating valve.

What I claim is—

1. The conical valve B, having ports *i i* and *j j* and U-shaped partition K, in combination with the casing A, having screw-neck *a*, that communicates through channel *e* with ports *j j* of the valve, having screw-neck *b*, that is connected with the diametrically-opposite ports *g g'* by channels *f f'*, and screw-neck *c*, that communicates with the ports *i i* of the valve, all substantially as and for the purpose set forth.

2. The conical valve B, having ports *i i* and *j j* and U-shaped partition K, in combination with the casing A, having screw-neck *a*, with channel *e*, screw-neck *b*, with channels *f f'*, and diametrically-opposite ports *g g'* and intermediate cavities, *h h'*, and screw-neck *c*, all constructed and arranged to operate substantially as and for the purpose set forth.

3. The combination, with the conical valve B, having a partially-conical stem, *o*, with collar *n* and screw-sleeve D, of the casing A, having conical stuffing-box F, the whole being constructed and arranged substantially as and for the purpose described and shown.

4. The casing A, that forms the conical valve-seat and has screw-neck *a*, with channel *e*, screw-neck *b*, with channels *f f'*, and diametrically-opposite ports *g g'*, intermediate cavities, *h h'*, shoulder *r*, screw-neck *c*, and conical stuffing-box F, in combination with the conical valve B, having ports *i i* and *j j*, partition K, arms *m*, and stem *o*, with collar *n*, adjustable packing-sleeve D, and jam-nut E, the whole being constructed and arranged to operate substantially as and for the purpose shown and specified.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JOHN S. GLENN.

Witnesses:
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H. HUEHL.