

(No Model.)

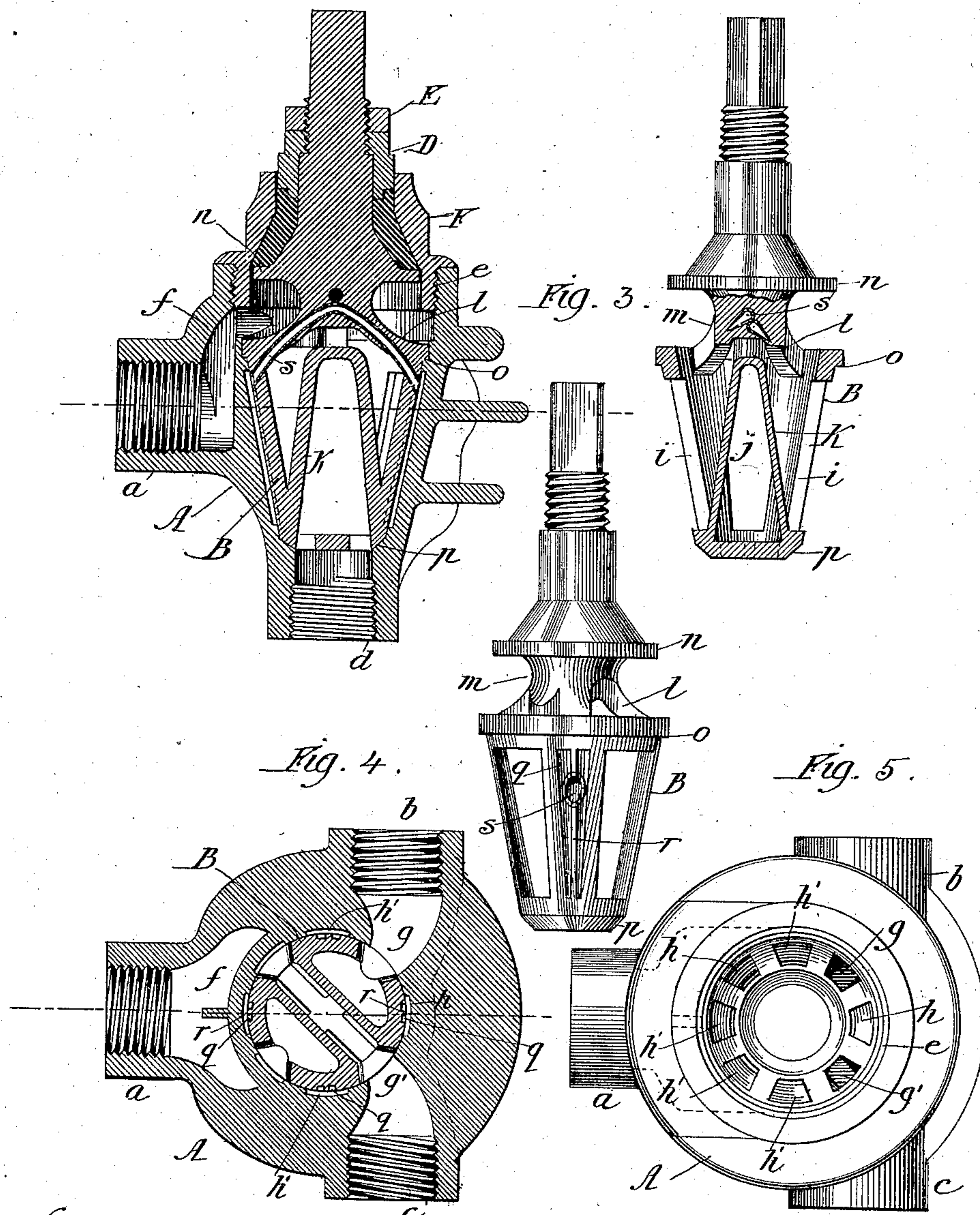
J. S. GLENN.
BALANCED ROTARY VALVE.

No. 335,188.

Patented Feb. 2, 1886.

Fig. 1.

Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN S. GLENN, OF CHICAGO, ILLINOIS.

BALANCED ROTARY VALVE.

SPECIFICATION forming part of Letters Patent No. 335,188, dated February 2, 1886.

Application filed November 6, 1885. Serial No. 181,978. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. GLENN, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Balanced Rotary Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

The nature of my invention relates to valves for steam or hydraulic engines, and it is of the kind described in Letters Patent Nos. 200,388 and 264,525, granted to me on February 19, 1878, and on September 19, 1882, respectively.

My invention consists of minor improvements in the construction of such valves, which, as I have found by experience, make these valves more practicable for the purpose designed by reducing their friction, insuring a more even wearing of the bearing-surfaces, and thereby increasing the durability of the same, all as hereinafter will be fully described and specifically claimed.

In the accompanying drawings, Figure 1 represents a longitudinal vertical section of the valve and casing complete; Fig. 2, a sectional view of the valve detached; Fig. 3, an elevation of the same; Fig. 4, a sectional plan of the valve and casing; and Fig. 5 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, which is bored out conical, and is provided with four screw-necks, *a*, *b*, *c*, and *d*, screw-neck *a* being intended for the steam or water inlet, screw-necks *b* and *c* to connect with the two opposite cylinder-ports of an engine, and screw-neck *d*, forming the continuation of the small end of the bore of the casing, to be the exhaust. The casing is also provided with a screw-threaded opening, *e*, for connecting the stuffing-box. The screw-neck *a*, by a port, *f*, communicates with the space above the valve-seat, while the screw-necks *b* and *c* communicate with the two ports *g* *g'*, that are cut through the bore of the casing, the relative position of these two ports to each other being on an angle of ninety degrees. Intermediate of these ports *g* and *g'*, and of equal area therewith, is formed a cavity,

h, and five more such cavities, *h'*, of same dimensions, are equally divided within the remaining circumferential surface of the bore of such casing, thus leaving an upper and a lower marginal annular surface connected by narrow strips, to be the bearing-surface for the valve. Two of the cavities *h'* being diametrically opposite to ports *g* and *g'*, each of the remaining cavities is diametrically opposite another cavity.

B is the valve, being turned conically to form 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 port *f* and screw-neck *a* of the casing, and that the ports *j* communicate with the screw-neck *d*, while the screw-necks *b* and *c* will communicate with either one of the screw-necks *a* or *d* through either ports *i* or *j*, as the valve may be set. Four curved arms, *l*, form the connection between the upper rim of valve B with stem *m*. This stem *m* 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 squared for attaching a hand-wheel, crank, or operating-lever.

F is the stuffing-box secured into the opening *e* of casing A. This stuffing-box is bored cylindrical in its bottom for admitting the collar *n*, and is bored out in its top end for admitting the packing-sleeve D, and its intermediate portion is bored out conical to correspond with the conical portion of the valve-stem. The conical chamber between collar *n* and sleeve E is filled with packing, that is tightened by screwing down the sleeve D, and holds the valve B to its seat.

So far described the valve is about the same as specified in my former Letters Patent, and I will now set forth the improvements I have added since. First. The annular conical bearing-surface to the upper edge of valve B proved to be inefficient, inasmuch as the steam or water cut it away, and thus soon allowed leakage, which to obviate I provide valve B with a shoulder or offset, *o*, that is fitted upon

a corresponding shoulder in the bore of casing A. Second. Before I turned the valve B square on its lower or small end and seated it upon a square shoulder in the casing, which
 5 did not prevent, however, the valve to wear sideward, therefore, for the purpose of better holding the valve in its concentric position with the bore of the casing, and for increasing its bearing-surface at this point, I turn a cham-
 10 fer, *p*, to the end of the valve, which enters a corresponding socket formed in the casing. Third. When the valve was constantly oscillated to open its ports only half, or less, such portions only of the bearing-surfaces of the
 15 casing or valve were apt to wear away which did overlap each other, whereby the edge of each port of the valve produced a shoulder in the bore of the casing, and, vice versa, did the edge of each port or cavity of the casing pro-
 20 duce a shoulder on the bearing-surface of the valve, which to prevent I now form or cut a recess or cavity, *q*, in the valve between each two ports, only leaving a marginal bearing-
 25 strip to each side of a port circumferentially, of sufficient width that, even with a partial opening of the ports, will fully overlap the bearing-strips between ports *g* and cavities *h*
 30 *h'* in the casing, which are arranged and proportioned in conformity with such valve, and for the joint purpose. Fourth. Such bearing-
 strips between a port and a cavity, formed in the valve as well as in the casing, being narrow, the wide opening of the valve would be apt to al-
 35 low steam or water to find its way from a cavity in the valve to a cavity in the casing, and thus allow leakage, which to prevent I provide each
 cavity *q* of valve B, or each cavity *h h'* of casing A, with one or more intermediate narrow bear-
 40 ing-strips, *r*, that will cut off such leaks. Fifth. For insuring a perfect balance of the valve

from all sides I form channels *s* in such valve for connecting each two diametrically-opposite cavities *q* in a manner that the pressure of the fluid or liquid in each two opposite
 45 cavities is counterbalanced or equalized, and for this purpose I cast into the valve B small tubes that in crossing pass each other.

The operation of the valve otherwise is the same as described in my former patents.

What I claim is—

1. The combination, with casing A, having ports *g g'* and cavities *h h'*, of valve B, having ports *i i* and *j j* and cavities *q*, substantially as described, for the purpose specified. 50
2. The combination, with conically-bored casing A, having ports *g g'* and cavities *h h'*, of valve B, having shoulder *o*, ports *i i* and *j j*, and cavities *q*, as described. 55
3. The combination, with casing A, having ports *g g'* and cavities *h h'*, and with valve B, having ports *i i j j* and cavities *q*, of intermediate bearing-strips, *r*, in either casing A or valve B, all substantially as and for the purpose described. 60
4. The combination, with conically-bored casing A, having ports *g g'* and cavities *h h'*, of valve B, having chamfered end *p*, ports *i i* and *j j*, and cavities *q*, as described. 65
5. The combination, with casing A, of valve B, having ports *i* and *j* and cavities *q*, each pair of diametrically-opposite cavities communicating through channels *s*, all substantially as and for the purpose set forth. 70

In testimony whereof I affix my signature in presence of two witnesses.

JOHN S. GLENN.

Witnesses:

RICHARD REINBOLD,
 HOWARD HALLOCK.