

(No Model.)

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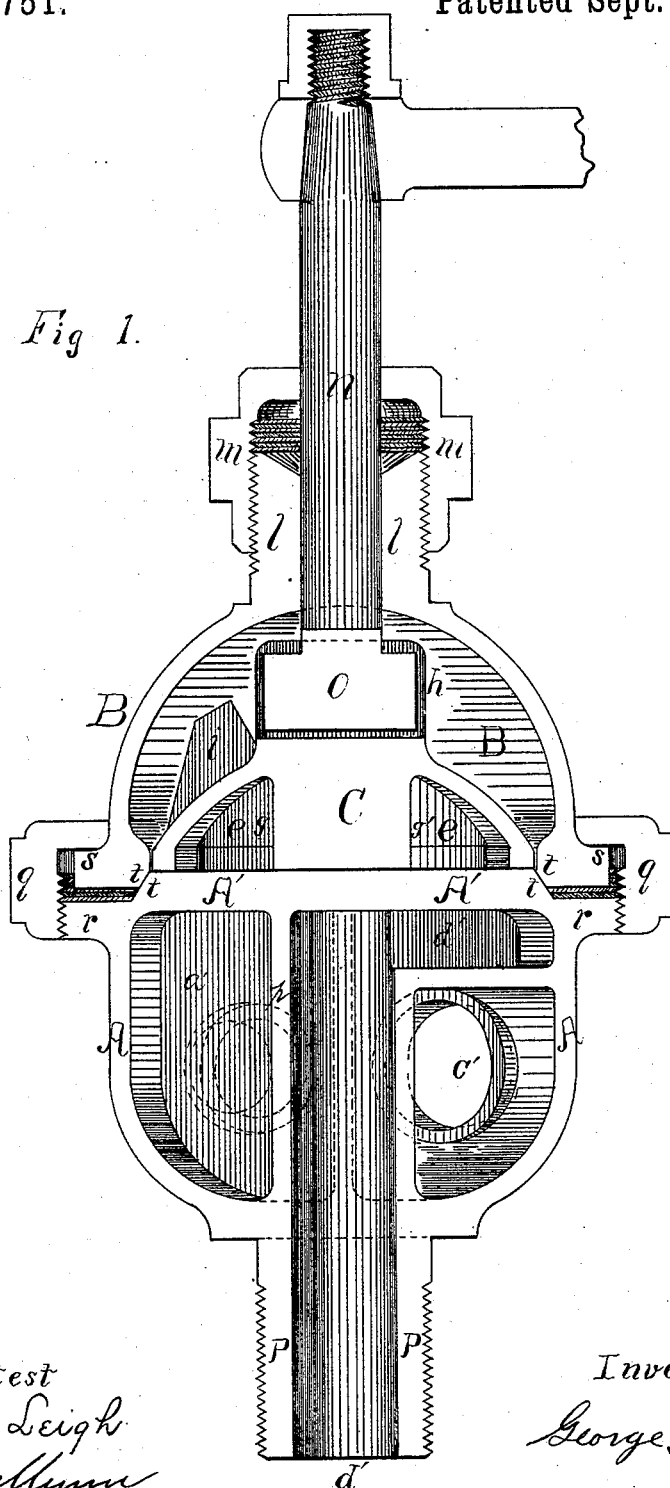
G. H. POOR.

ROTARY VALVE.

No. 304,751.

Patented Sept. 9, 1884.

Fig 1.



Attest
E. B. Leigh
J. W. McElhinn

Inventor
George H. Poor

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2 Sheets—Sheet 2.

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Fig 2

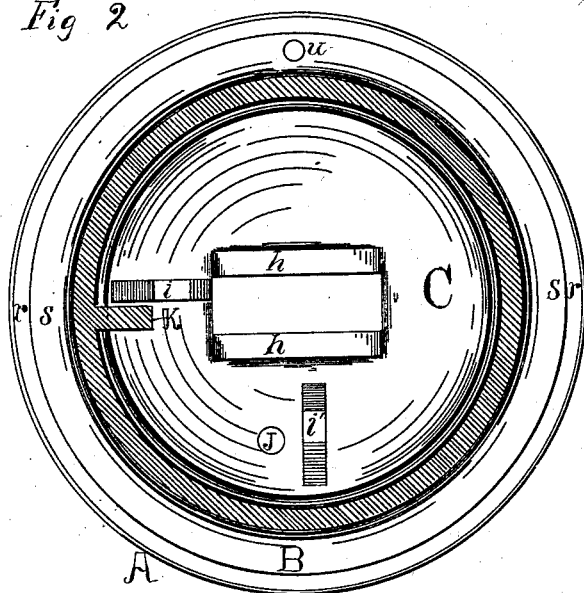


Fig 3

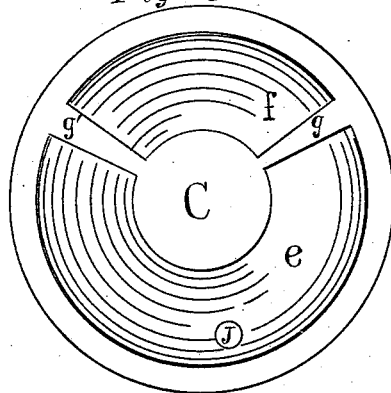


Fig 5

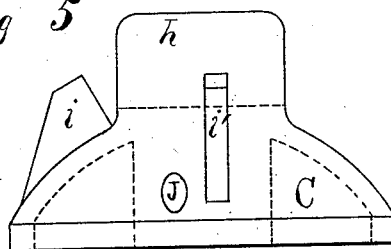


Fig 4

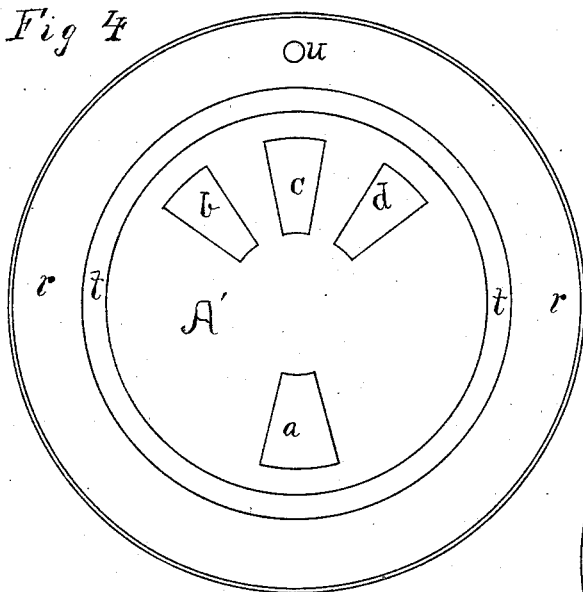
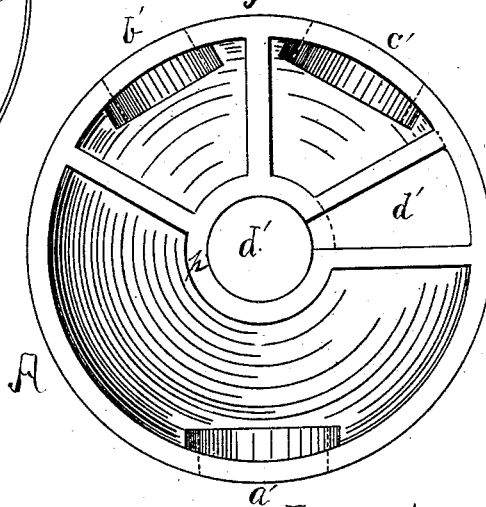


Fig 6



Attest.
E. B. Leigh
J. W. McArthur

Inventor.
George H. Poor.

UNITED STATES PATENT OFFICE.

GEORGE H. POOR, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE AMERICAN
BRAKE COMPANY, OF SAME PLACE.

ROTARY VALVE.

SPECIFICATION forming part of Letters Patent No. 304,751, dated September 9, 1884.

Application filed April 7, 1884. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. POOR, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Rotary Valves; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical central section of a valve embodying my invention. Fig. 2 is a horizontal section through the cover of the valve-chamber, showing the top of the valve. Fig. 3 is a bottom view of the valve. Fig. 4 is a top view of the lower section of the shell, showing the valve seat and ports. Fig. 5 is an elevation of the valve; and Fig. 6 is a horizontal section of the shell just below the valve-seat, showing the relation of the induction and eduction (or exhaust) ways.

Like letters refer to like parts wherever they occur.

My invention relates to the construction of rotary valves for controlling the flow of gases, vapors, or fluids, and while I shall hereinafter, for purposes of convenience, refer to it as a steam-valve, I do not propose or intend to be limited to such an application of the invention.

The main points of novelty which characterize this invention are as follows: First, the ingress and egress ports are all located under and open inside the valve proper, which facilitates the balancing of the valve, said valve being concave or of cup form; secondly, the stem or support of the valve-chamber is utilized as an exhaust-port, which reduces the number of openings necessary in the side of the shell; and, thirdly, the stops or lugs which limit the movement of the valve are placed within the shell, where they are positive in their operation, and cannot be tampered with.

There are minor points of novelty, which will hereinafter more fully appear.

I will now proceed to describe my invention, so that others skilled in the art to which it appertains may apply the same.

The valve chosen to illustrate my invention is a three-way valve which I have devised for use with locomotive and tender brakes.

The valve shell or casing may consist of two

sections, the lower section, A, containing the ingress and egress ports and the valve-seat, while the upper section or cover, B, forms a live-steam chamber above the valve proper, for balancing the same. The shell A has a centrally-located vertical annular wall or diaphragm, *p*, which divides the exhaust-passage from the body of the shell-chamber, said annular diaphragm or wall terminating below in the hollow stem P, by which the casing is supported. The wall *p* is perforated above, to communicate with a shallow radial chamber, *d*, that has a port, *d*, through the valve-seat. The hollow stem P is threaded to give support to the shell on a bracket or other desirable support, and also to allow of securing an exhaust-pipe thereto by means of a coupling or other approved means. The interior of shell A, surrounding this exhaust-port is divided, by vertical radiating diaphragms *m*, into two or more chambers, (in the present instance three,) 1 2 3, according to the character of the valve to be constructed. The main chamber 1 is that which receives the live steam, and is provided with an ingress supply-port, *a'*, and a port, *a*, through the valve-seat A'. The lesser chambers 2 and 3 are each provided with its port *b c* through the valve-seat, and with eduction-ports *b' c'* through the shell-section A. The chambers 1 2 3 *d'* are closed above by the valve-seat A', which is ground and finished in the usual manner, and is pierced by the ports *a b c d*, as before specified. The section A is provided with a threaded flange, *r*, for the spanner-nut *q*, and the edge of the valve-seat A' is ground off beveling, as at *t*, to form a close joint with the cover-section B.

B indicates the upper or cover section of the shell, provided with a port for the valve-stem, surrounded by a stuffing-box, *l*, and a gland-nut, *m*. The lower edge of the shell has a plain outer flange, *s*, to engage with a spanner-nut, *q*, and a beveled inner edge, *t'*, to form a ball-joint with the edge of the valve-seat of the lower section. On the interior of cover-section B is a projection or lug, *k*, which engages with like lugs on the top of the valve and limits its motion, and the position of this lug *k* with relation to the valve and valve-ports is insured by means of a dowel-pin, *u*,

on the flange *s*, (see Fig. 2,) and a hole therefor in the flange *r* of the section A.

C indicates the valve which is concave upon its under surface, said concavity being divided by radial bars or partitions *g g'* into chamber 5 or recess *e* for live steam, and chamber *f* for covering ports *b c d* of the valve-seat.

J indicates a hole or port in the top of chamber *e* to admit live steam into shell B above 10 the valve C C, so as to balance the valve by equalizing the pressure on the upper and under surface. This port is preferably made as low down as possible, so that the chamber above the valve may readily free itself of any 15 water of condensation. Upon the upper surface of valve C are lugs or projections *h h*, which form a recess for the reception of the foot of the valve-stem, and also lugs or projections *i i'*, which, in conjunction with the projection *k* on the inside of shell-section B, limit 20 the rotation of the valve. The lugs *i i'* are so located with relation to the chamber or recesses *e f* of the valve that the relation of said chambers to the ports *a b c d* is always preserved.

n indicates the valve-stem, which projects 25 through the stuffing-box *l* of cover-section B, is provided above with a suitable handle or hand-wheel, and below with a foot, O, or equivalent means, engaging with and operating the valve C. The several ports being 30 of the character specified, the stem *n* is passed through the stuffing-box *l*, the valve C is arranged on the valve-seat, with the chamber or recess *f* over the ports *b c d*, the cover-section B is applied, with the lug *k* between the lugs *i i'* 35 of the valve, in the position substantially as shown in Fig. 2. A packing, if desired, is arranged between the sections A B, and the spanner-nut *q* is screwed home to secure the 40 parts, which brings the ball-joint or ground surfaces *t t'* together, making a steam-tight joint.

In describing the operation of the devices we shall suppose the valve to be applied to 45 use in conjunction with a locomotive and a tender-brake, *a'* being the opening through which the steam enters the shell; *b'*, the egress leading to the cylinder of the tender-brake; *c'*, the egress leading to the cylinder of the 50 driver-brakes, and *d'* the hollow stem forming the exhaust-passage. It will be noted that all these openings are in the lower section, A, of the shell. The operation of the devices will then be as follows: The live steam which enters 55 by *a'* into chamber 1 will pass through port *a* of the valve-seat into chamber or recess *e*, and through hole *j* in the valve into shell-section B, above the valve C, so as to measurably equalize the pressure and partially balance the valve. If, now, the valve C be rotated 60 so that bar *g* just passes over port *b*, the steam will pass through port *b* into chamber 2, and by egress *b'* to the cylinder of the tender-brakes. If the valve is still further rotated 65 in the same direction until the bar *g* just passes the port *c*, the steam will then pass from recess

e through port *c* of the valve-seat into chamber 3, and thence by egress *c'* to the cylinder of the driver-brakes. The reverse movement of the valve passes bar *g* back over port *c* and 70 permits the steam from the driver-cylinder to exhaust through chamber 3, port *c*, recess *f*, port *d*, and way *d'* into the hollow central exhaust; and a still further reverse movement of the valve carries the bar back over port *b* 75 of the valve-seat, and permits the steam from the tender-cylinder to exhaust through chamber 2, port *b*, recess *f*, port *d*, and the central exhaust-passage, *d'*. It will be noted that in this application of the valve the arrangement 80 of the ports and connections is such that the tender-brakes are the first to be applied and the last to be released. This is of special advantage in applying brakes to trains in slowing 85 down or taking up the slack of a long train preparatory to applying a powerful driver-brake, and therefore has been here mentioned, but without the intention of limiting the manner in which the arrangement of the connections shall be made. 90

The advantages of my invention are, first, that all the steam-ports being located under the valve proper, a partially-balanced valve is obtained by simple means, and also one 95 which will readily free itself from any water of condensation; secondly, the forming of the shell stem or support hollow reduces the number of external openings required in the shell-section; and, finally, the arrangement of the stop-lugs within the valve-shell prevents 100 any tampering with or disarrangement of the valve.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is— 105

1. In a valve, the combination, with a valve-seat having both ingress and egress ports therethrough, of a rotary cup-valve which receives and discharges the steam continuously from or through the same chamber of the 110 valve, substantially as and for the purposes specified.

2. A valve having two chambers or recesses opening downward or toward the valve-seat, in combination with a valve-seat having an 115 ingress-port opening upward through the seat into one of such chambers or recesses, and an egress port or ports opening downward through the seat from one or the other of said recesses or valve-chambers, according as the 120 valve is turned to the right or left, substantially as and for the purpose specified.

3. A valve having lugs on the valve and on the interior of the valve-shell, to limit the movement of the valve, substantially as and 125 for the purpose specified.

4. A valve-shell having a hollow supporting-stem, which is arranged to form a steam-way for the valve, substantially as and for the purposes specified. 130

5. A shell having the central and the radiating passages which open through the valve-

seat from below, and the rotating cupped valve having the recesses or chambers on its under surface, substantially as and for the purposes specified.

5 6. The shell-section having the hollow stem, said section divided into two or more chambers having ports through the shell and through the valve-seat, a valve-seat which closes the chambers of the shell, and a rotating
10 valve having two recesses on its under surface and a port through its walls to admit pressure to the upper surface of the valve, substantially as and for the purposes specified.

7. The combination, with a valve-seat hav-

ing its several ports, of a valve having re- 15
cesses on its under surface and lugs or stops on its upper surface, and a shell having a lug or projection on its interior to engage with the lugs on the upper surface of the valve, substantially as and for the purposes specified. 20

In testimony whereof I affix my signature, in presence of two witnesses, this 12th day of March, 1884.

GEORGE H. POOR.

Witnesses:

E. B. LEIGH,

I. W. McMUNN.