

(No Model.)

4 Sheets—Sheet 1.

H. C. BEHR.  
BALANCED ROTARY VALVE.

No. 305,130.

Patented Sept. 16, 1884.

Fig. 4.

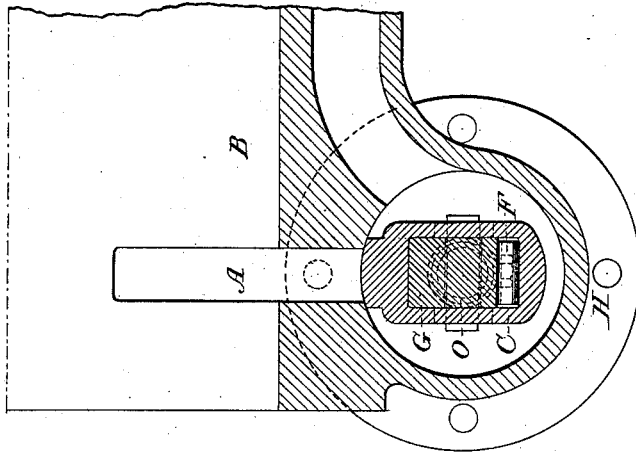


Fig. 1.

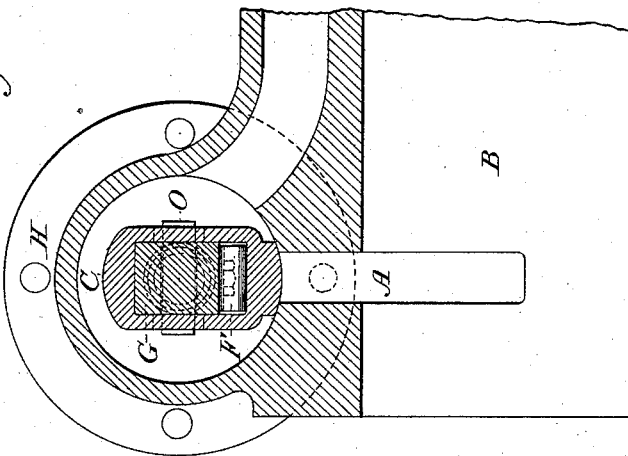
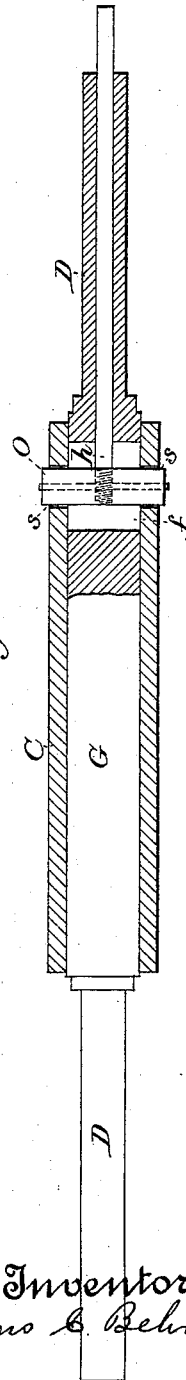


Fig. 3.



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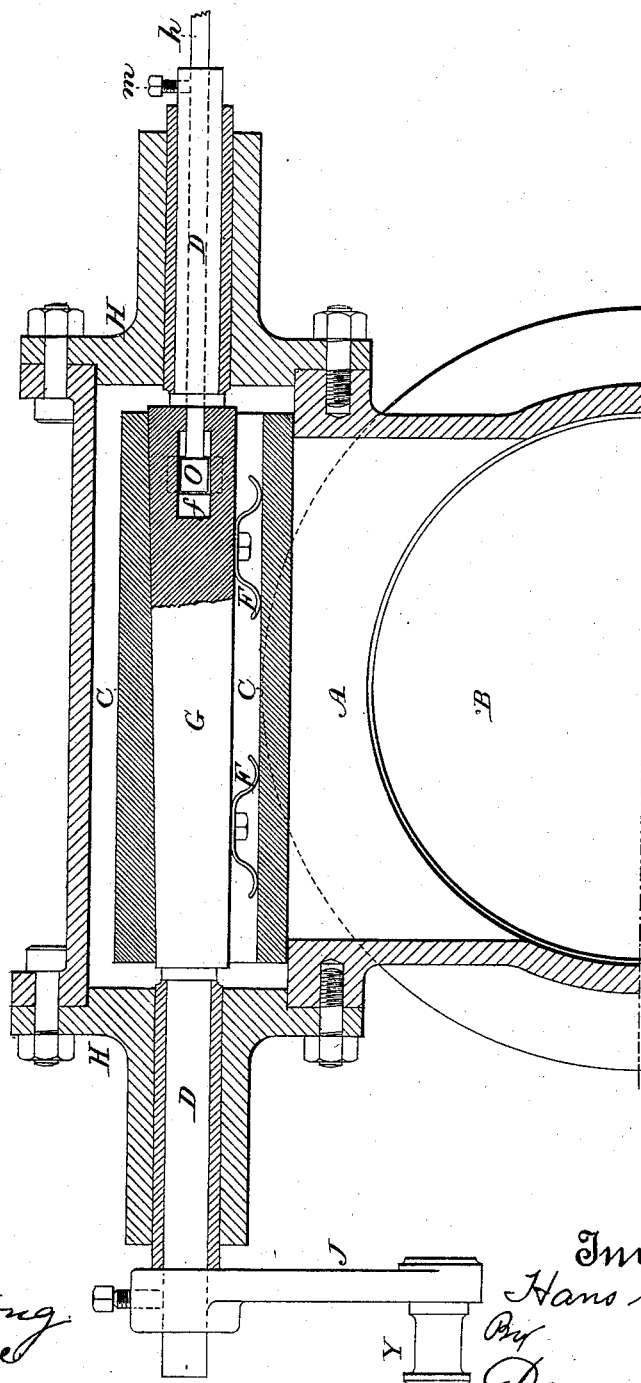
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Fig. 2.



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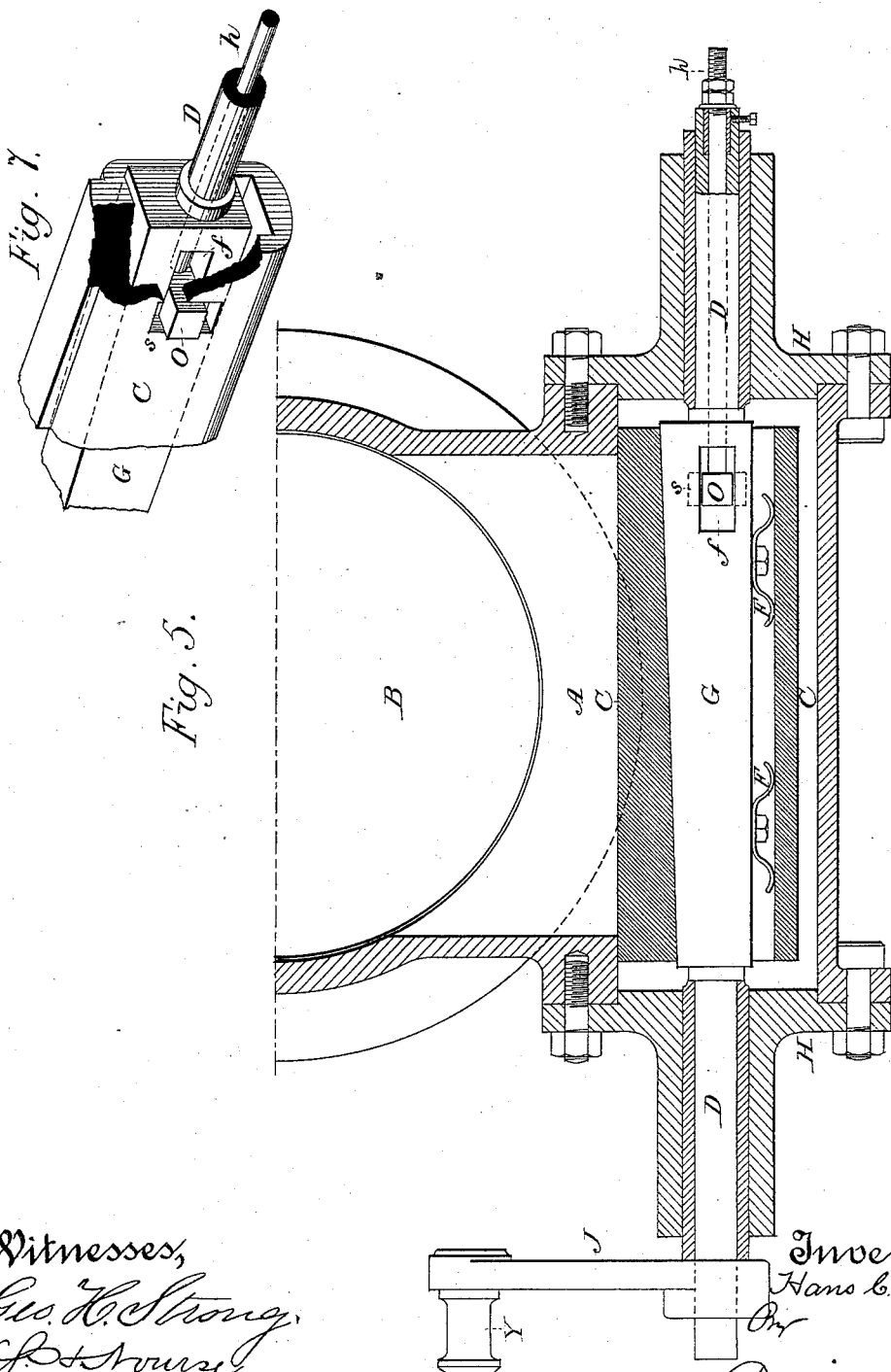
4 Sheets—Sheet 3.

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(No Model.)

4 Sheets—Sheet 4.

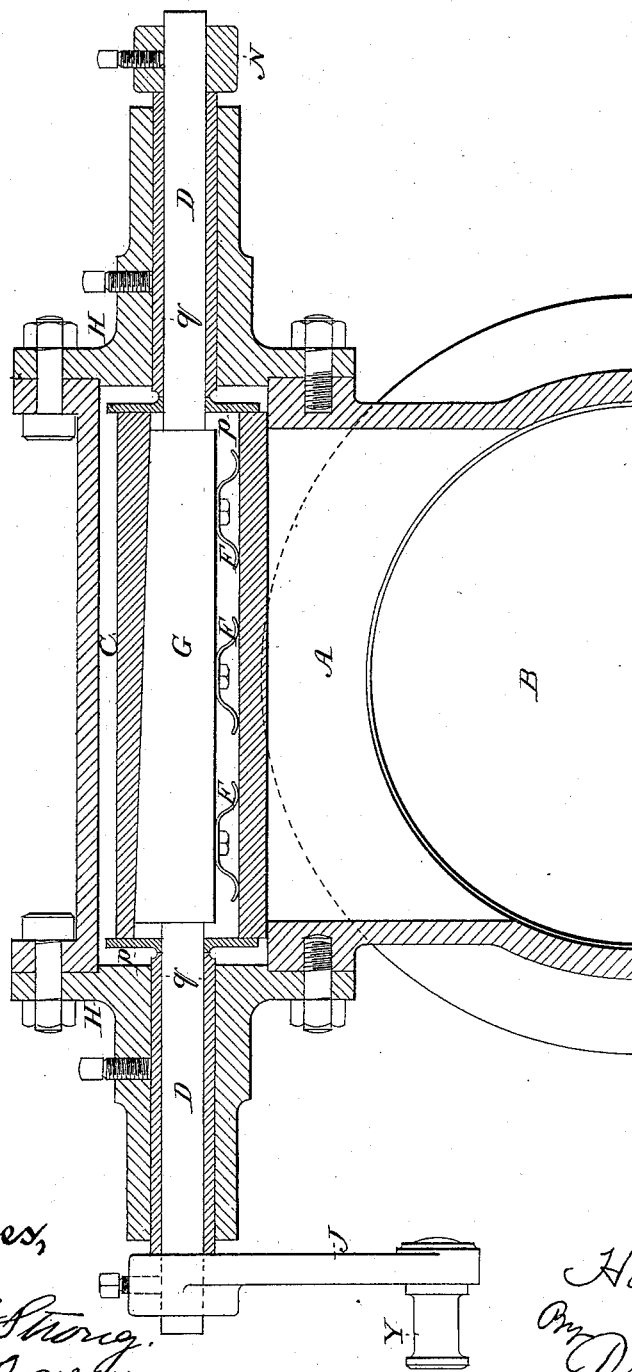
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Fig. 6.



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# UNITED STATES PATENT OFFICE.

HANS C. BEHR, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF  
TO W. I. SALKELD, OF SAME PLACE.

## BALANCED ROTARY VALVE.

SPECIFICATION forming part of Letters Patent No. 305,130, dated September 16, 1884.

Application filed January 17, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, HANS C. BEHR, of the city and county of San Francisco, and State of California, have invented an Improvement in Balanced Rotary Valves; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to certain improvements in that class of valves which fit a concave cylindrical seat and vibrate or oscillate about their longitudinal axes to open and close the steam-ports in the valve-face.

It consists of a valve having a longitudinal rectangular opening through it, a trunnion-bar extending through this opening, and having trunnions at each end, springs to hold one side of the valve in contact with the bar, and an inclined face or faces of contact which may be moved upon each other for the purpose of adjusting the valve, together with means for making this adjustment, and certain details of construction, all of which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a section taken transversely across the valve-chamber, valve, and trunnion-bar. Fig. 2 is a longitudinal vertical section of the valve-chamber and valve transverse to the axis of the cylinder. Fig. 3 is a horizontal section of the valve and a partial section of the trunnion-bar, showing the adjusting mechanism in which the valve is moved for adjustment. Figs. 4 and 5 show a similar arrangement as applied to exhaust-valves. Fig. 6 shows the adjusting mechanism in which the valve remains stationary lengthwise, and the trunnion-bar moves within it. Fig. 7 is a perspective view showing the connection of the adjusting-bar with the valve.

Similar letters in each of the drawings indicate like parts.

A is the steam-port leading from the valve-chamber to the cylinder B, and it is shown covered by the valve C in its closed position. This valve is rotated upon axial trunnions D, like the ordinary Corliss valve, to open and close it, the trunnion turning in bearings in the valve-chest covers H, and having a rocker-arm, J, attached to one end, and a crank-

pin, Y, upon the arm, through which connection is made with valve-gear, in the usual manner. The valve C is made hollow, with a rectangular opening extending axially through it, and is mounted upon a rectangular trunnion-bar, G. The opening in the valve through which the trunnion-bar extends is larger than the bar in the direction vertical to the valve-face; and the bar is provided with springs F below, which press upon the lower part of the valve, and thus hold it down so that its upper part rests upon the top of the bar. These springs permit the valve to rise from its seat under any excess of pressure within the cylinder over that above the valve. This rising of the steam-valve under compression, or when there is water in the cylinder, often prevents damage to the engine.

The principle involved in this invention is the keeping of the valve from actual frictional contact with its seat, the pressure being thrown upon the trunnion. The trunnion-bar is formed with its back inclined to the face of the valve, and that side of the interior of the valve C which fits upon it is also correspondingly inclined. The valve is thus raised or lowered with relation to its seat by sliding it endwise upon the bar. This is effected by means of a rod, *h*, passing through one of the trunnions, and having the transverse block O, the ends of which extend through into slots *s* in the sides of the valve, as shown in Fig. 7. The bar is slotted at *f*, to allow the block to move longitudinally in it when adjusting the valve; and the slots *s* in the valve are elongated vertically or transversely to the slot *f*, so that the ends of the block O may move in the slots as the valve is moved along the inclined back of the bar in its adjustment. The rod *h* extends out through the end of the trunnion, and may have a device at its outer end by which to move it for the purpose of adjustment, and a set or holding screw, *m*, to retain it in the desired position.

Figs. 4 and 5 show the application to exhaust-valves in which it may be desirable to have the pressure act upon the face of the valve C. This is accomplished by placing the inclined edge of the trunnion-bar nearest the

valve-face, and having the corresponding inclined interior surface of the valve upon the same side. The springs F are placed upon the opposite side of the bar from the inclined edge.

5 The adjustment is the same as shown in Fig. 2.

Fig. 6 shows an adjustment in which the bar is moved endwise instead of the valve, the latter having no end motion, but having a motion to and from the seat, as before described.

10 In this case the valve is prevented from moving endwise by circular plates *p*, which bear against the bushings *q* in the valve-chest covers. The bar *G* is secured in its adjustment by the collar *N* and the arm *J*, which are both secured  
15 by set-screws upon the trunnions, and bear against the bushings *q*. This valve may be inverted when used as an exhaust-valve, as in Fig. 5.

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

1. A valve fitting a concave cylindrical valve-seat so as to open or close the steam-port, and having a longitudinal rectangular  
25 opening to receive a rectangular trunnion-bar, by which it is oscillated, the top of the trunnion-bar and the corresponding interior face of the valve being inclined from one end toward the other, so that the valve may be ad-  
30 justed to or from the valve-face by moving it along the bar, substantially as herein described.

2. A valve fitting a concave cylindrical valve-seat, a rectangular trunnion-bar journaled at opposite ends and passing through a  
35 corresponding opening in the valve, the upper

face of the bar and the corresponding interior face of the valve being inclined to the valve-seat from one end to the other, in combination with springs *F* between the bar and the interior  
40 of the valve, substantially as herein described.

3. A valve fitting a concave cylindrical valve-seat, a rectangular trunnion-bar passing through a similarly-shaped opening in the valve, journaled at opposite ends, and having  
45 its upper face inclined longitudinally to the valve-seat, and springs by which the corresponding interior face of the valve is kept in contact with this face of the trunnion-bar, in combination with a rod extending through one  
50 of the trunnions, and connecting through slots with the valve, substantially as herein described.

4. A valve fitting a concave cylindrical valve-seat, a rectangular trunnion-bar passing through a similarly-shaped opening in said  
55 valve, journaled at its ends, and having its upper face inclined to the valve-seat, springs by which the corresponding interior face of the valve is kept in contact with the top of the bar, and a mechanism by which either the  
60 valve or the bar may be moved so that the inclined faces shall act to adjust the valve-face to or from its seat, substantially as herein described.

In witness whereof I have hereunto set my  
65 hand.

HANS C. BEHR.

Witnesses:

S. H. NOURSE,

C. D. COLE.