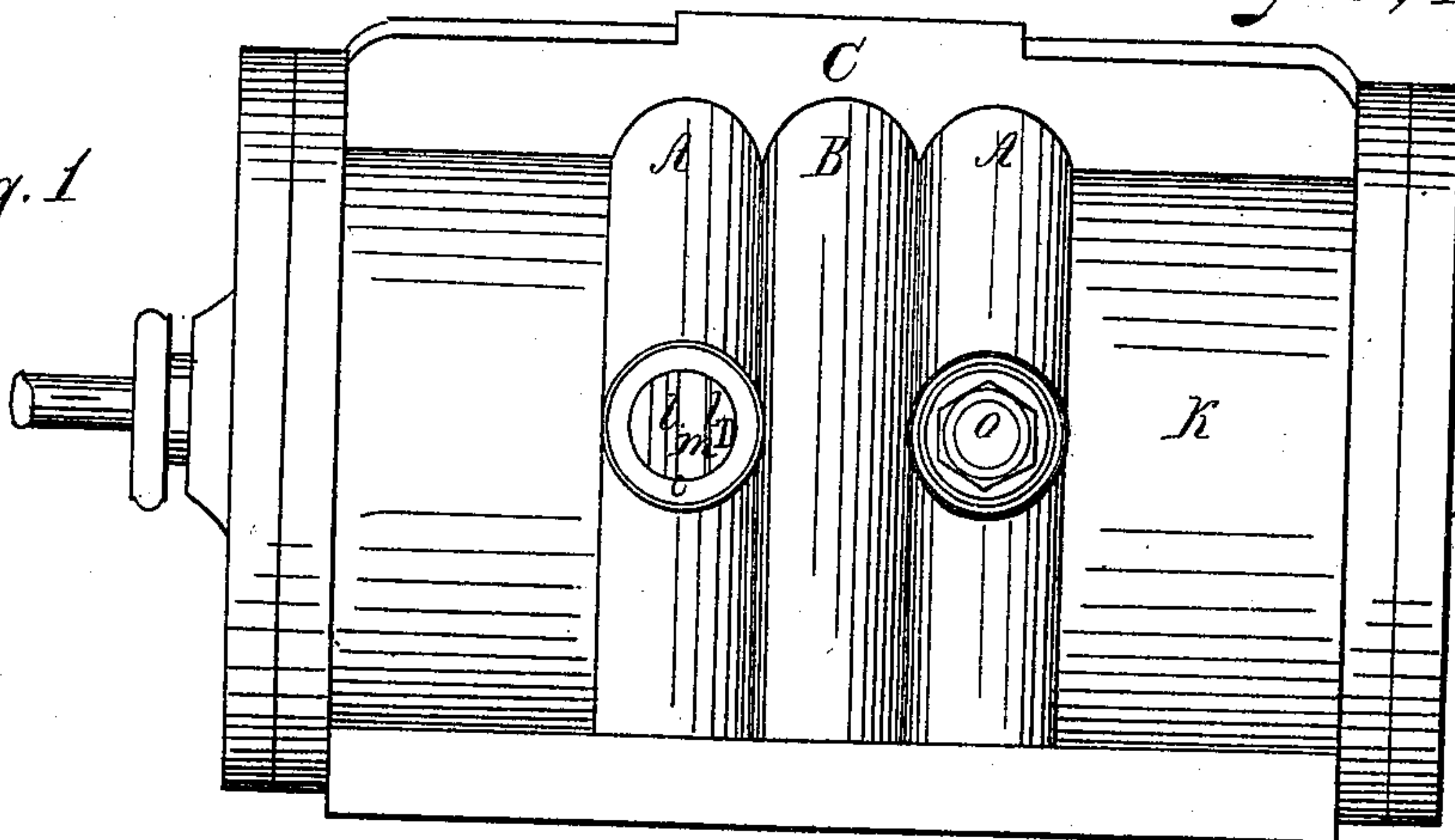
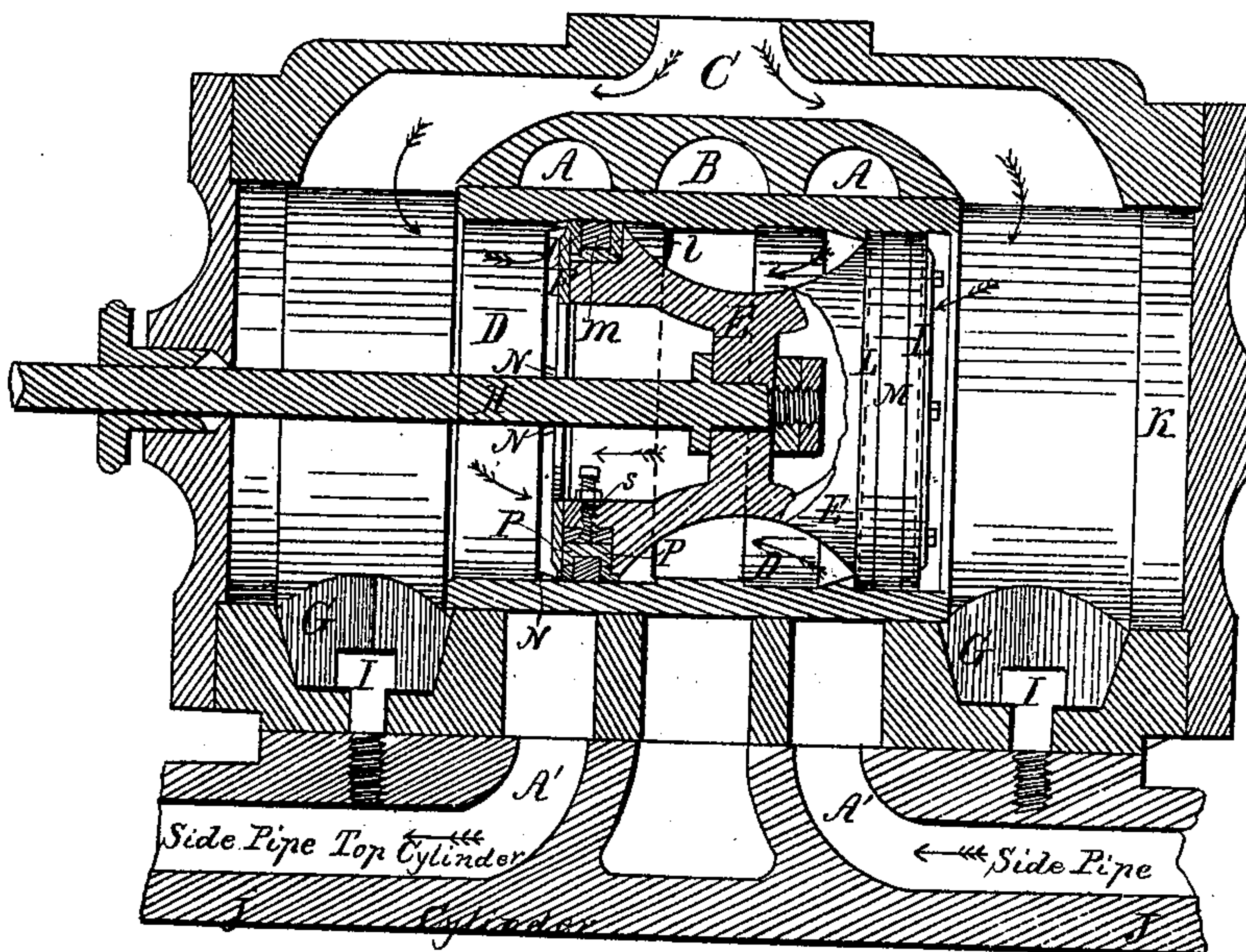


*C. W. Tremain,*  
*Balance Valves,*  
*N<sup>o</sup> 92,231,      Patented July 6, 1869.*

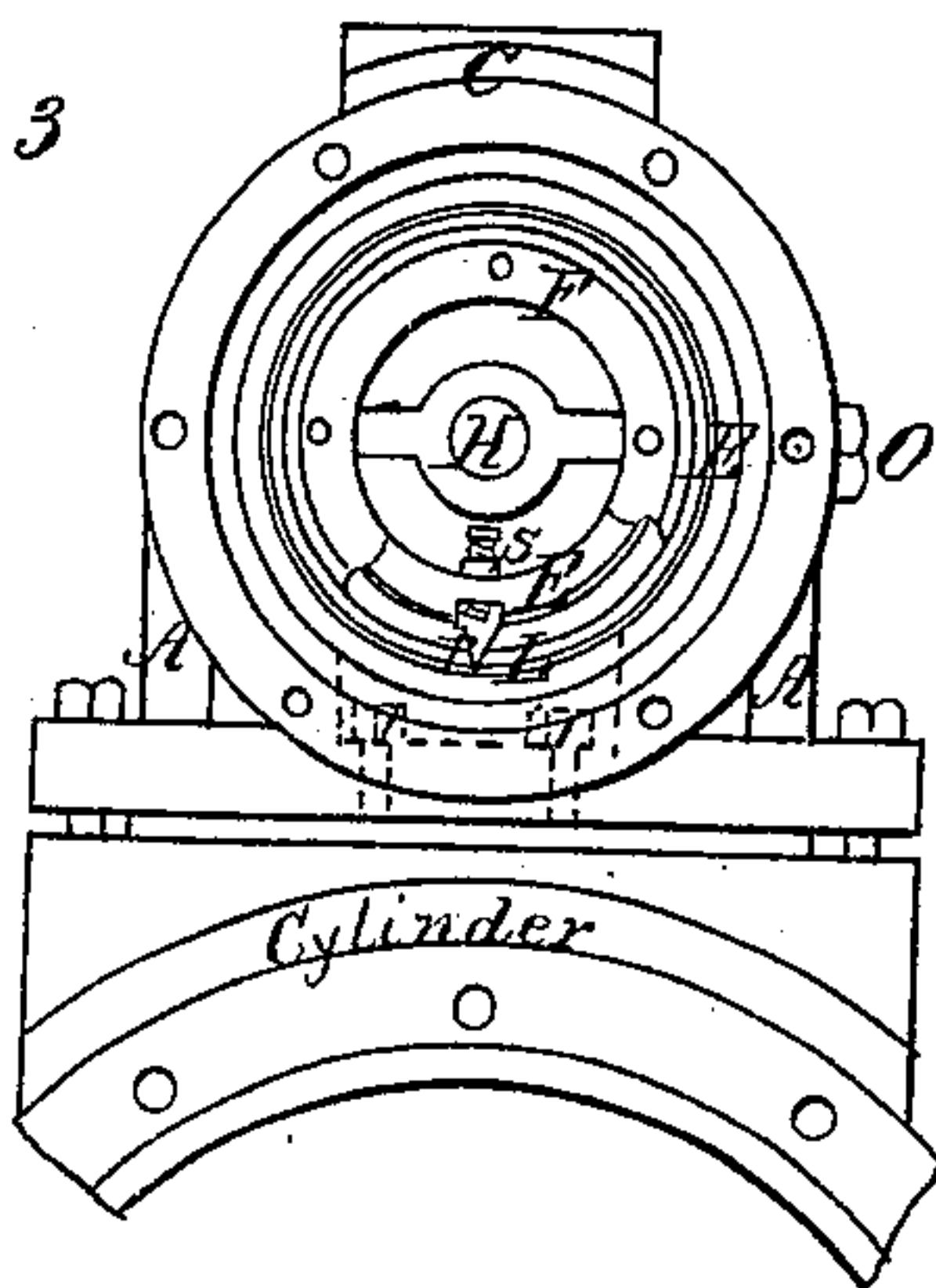
*Fig. 1*



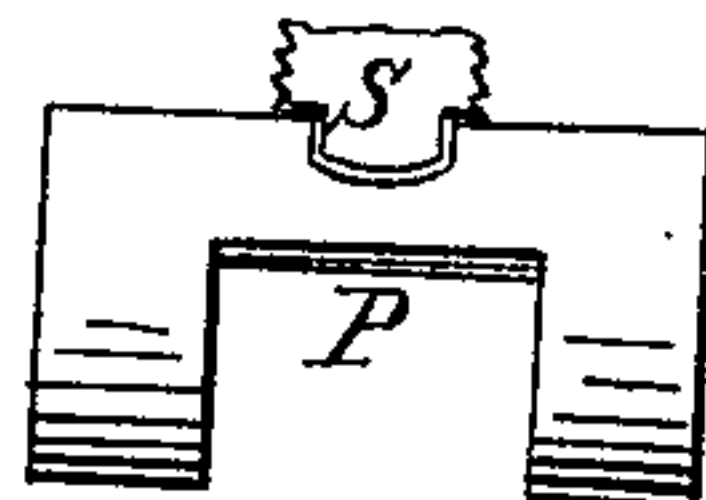
*Fig. 2*



*Fig. 3*



*Fig. 4*



*Witnesses*  
*H. F. Clark*  
*G. E. Hyde*

*Inventor*  
*C. W. Tremain*  
*Per Attorney*  
*Thos. S. Sprague*



# United States Patent Office.

CHARLES W. TREMAIN, OF CHICAGO, ILLINOIS.

*Letters Patent No. 92,231, dated July 6, 1869.*

## IMPROVEMENT IN BALANCE PISTON-VALVES FOR STEAM-ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

### *To whom it may concern :*

Be it known that I, CHARLES W. TREMAIN, of Chicago, in the county of Cook, and State of Illinois, have invented a new and useful Improvement in Balanced Piston-Valves for Steam-Engines ; and I do declare that the following is a true and accurate description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, and being a part of this specification.

Figure 1 is a side elevation of my steam-chest, with one of the peek-hole plates removed, to show the relative position of the valve underneath, with its port.

Figure 2 is a longitudinal section of my steam-chest, as applied to a cylinder of ordinary construction.

Figure 3 is an end view of my steam-chest, with the cover removed, and a portion of the follower broken out, to show the method of setting out the packing-ring.

Figure 4 is a view of my wedge and screw for setting out the rings.

Like letters indicate like parts in each figure.

The nature of this invention relates to an improvement in the construction of balanced piston-valves for steam and water-engines, as secured to me by and described in my Letters Patent, dated September 19, 1865, and numbered 50,053; and consists in such a construction and arrangement of the steam-chest designed for my valve, that it may be easily and readily bolted to the valve-seat of an ordinary cylinder, upon which a slide-valve had been used; in providing the annular steam-passages in the chest with peek-holes and covers, which covers may be removed so as to show the position of the valve-piston while setting the valve; and in a new and novel arrangement of wedges operated by set-screws for expanding or setting out the packing-rings.

In the drawings—

K represents a steam-chest, cylindrical in form, and provided with encircling recesses or grooves A, for the admission of the steam to the steam-ports A' in the valve-seat of an ordinary cylinder, J, to which the chest is attached, while B is a similar recess for exhausting the steam therefrom at the completion of each stroke.

In the construction of large engines, where it is inexpedient to cast the cylinder and steam-chest together, and in applying this improvement to ordinary cylinders, I form a recess, G, in the bottom of the chest at each end, and through the bottom of this recess a hole is drilled, through which passes a headed or stud-bolt and nut, I, which is tapped into the seat of the cylinder J, the bottom of the steam-chest being planed to form a steam-tight joint with the flat valve-seat of the cylinder.

D is an annular seat, perforated at intervals, to allow the steam entering the ends of the chest through the side-pipes C, to pass into the annular recesses A, when said openings are uncovered by the pistons, and from thence into the ports A' of the cylinder alternately, the direction of the flow of steam being shown by the arrows in fig. 2 of the drawings.

E, fig. 2, is a hollow cylindrical valve, with its ends arranged to receive the piston-rings L and M, the last of which is solid, and the former are cut to permit of their being expanded against the seat, to prevent leakage of steam. The ring L being solid, it breaks joints with the divided rings, and prevents the steam from "blowing through" from the steam to the exhaust-side of the piston. The setting out or expansion of the divided rings is effected by the insertion of a wedge, P, between the ends of the rings, and operated by a set-screw, S, tapped through from the interior of the valve. This wedge operates on both rings, and is recessed out in its central portion, so as to straddle the solid ring M, the rings being held in place by a follower, F, bolted to the piston-head.

The valve is secured to the stem H in the usual manner.

O are peep-holes in the annular recesses A, on the side of the steam-chest, through which the position of the valves may be observed while the latter are being set.

N is a bridge, two or more of which are used, as the diameter requires, and so arranged that when the least steam is required, at the commencement of the stroke, the openings are the smallest, and increase in area as the piston moves forward in its stroke.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The steam-chest K, provided with recesses, G, in its bottom, and the bolts I, for securing said chest to the cylinder, arranged as herein set forth.

2. The construction of the annular valve-seat D, with reference to the cylindrical steam-chest, substantially as described.

3. The construction of the recessed double wedge P, and its arrangement with the set-screws S, for expanding the outer packing-rings of piston-valves, substantially as herein set forth.

4. The arrangement of the peep-holes O in the annular steam-passages A, in reference to the valve E, substantially as herein set forth.

C. W. TREMAIN.

Witnesses:

H. F. EBERTS,  
JAS. I. DAY.