

H. FAIRGRIEVE.

Improvement in Valves for Compound Steam-Engines.

No. 132,650.

Patented Oct. 29, 1872.

Fig 2

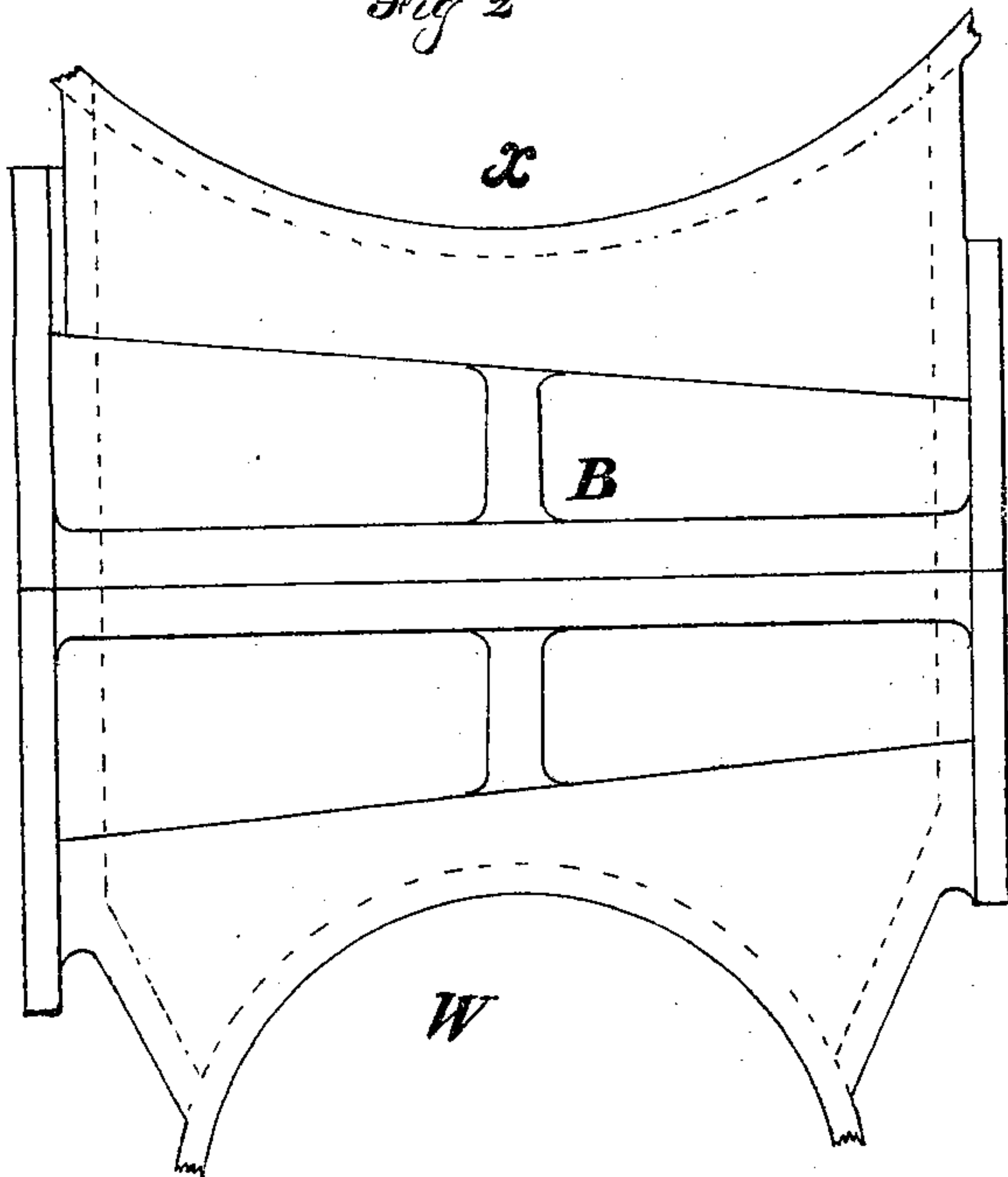


Fig 1. Cross Section

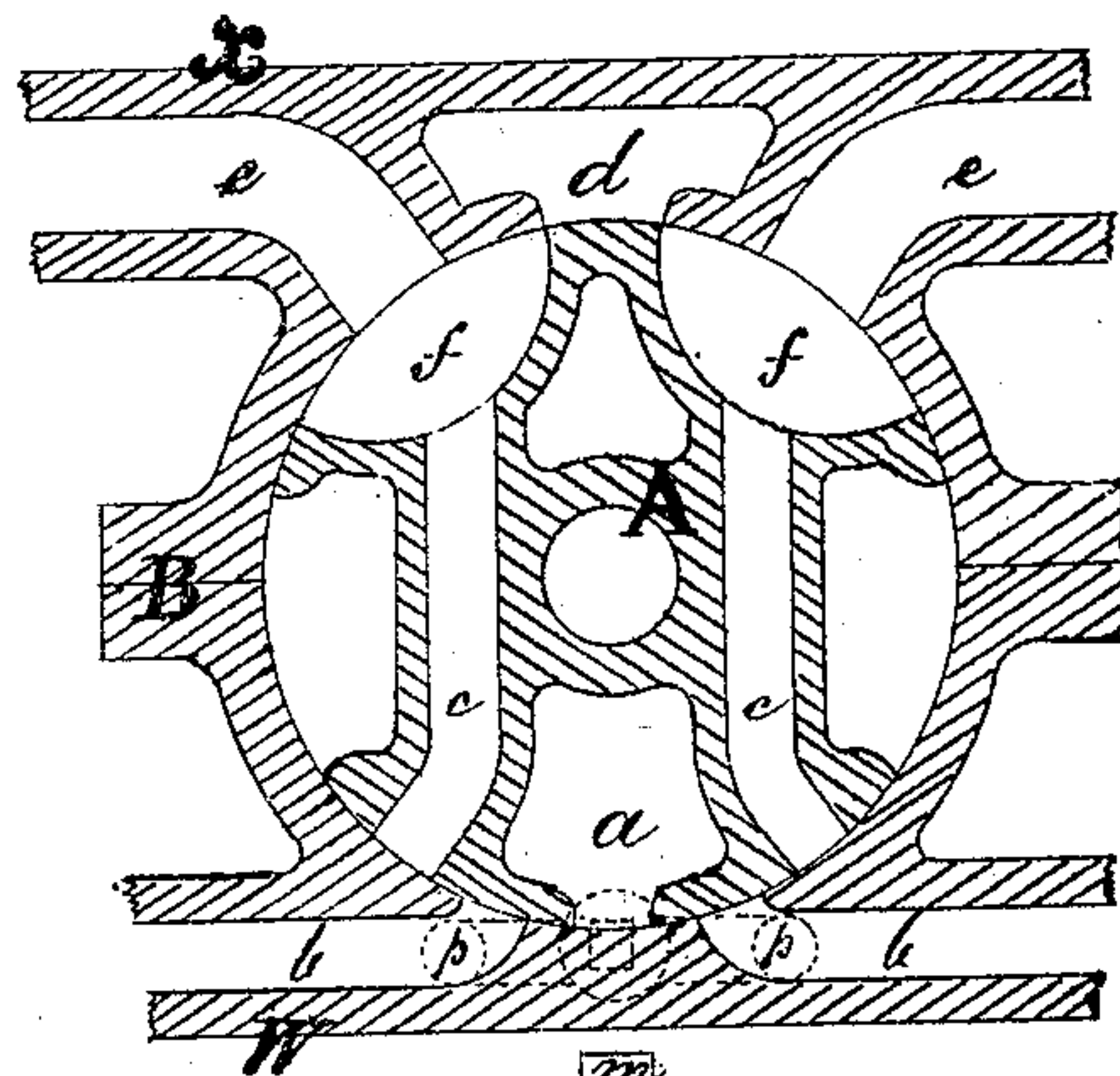


Fig 4

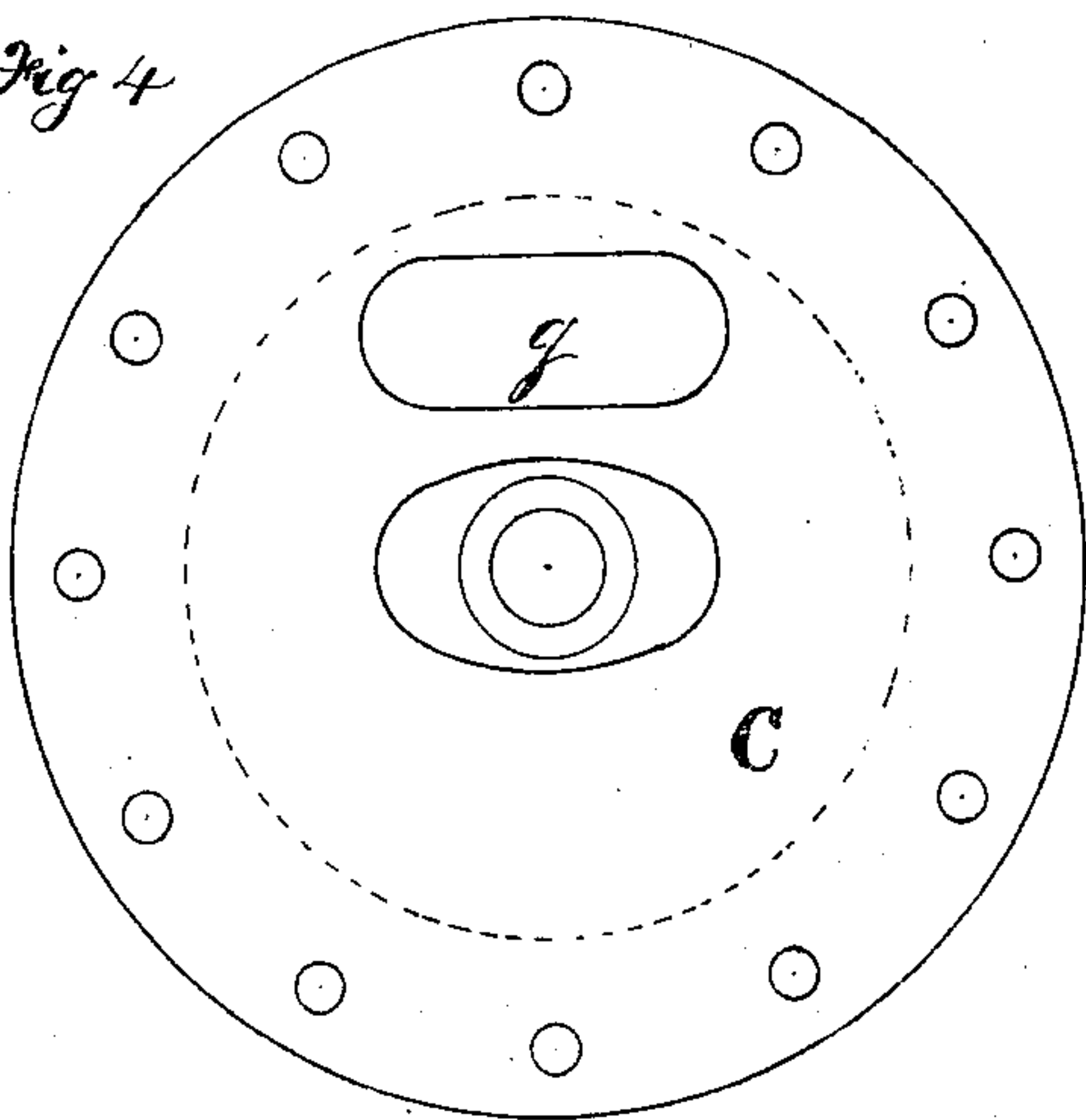
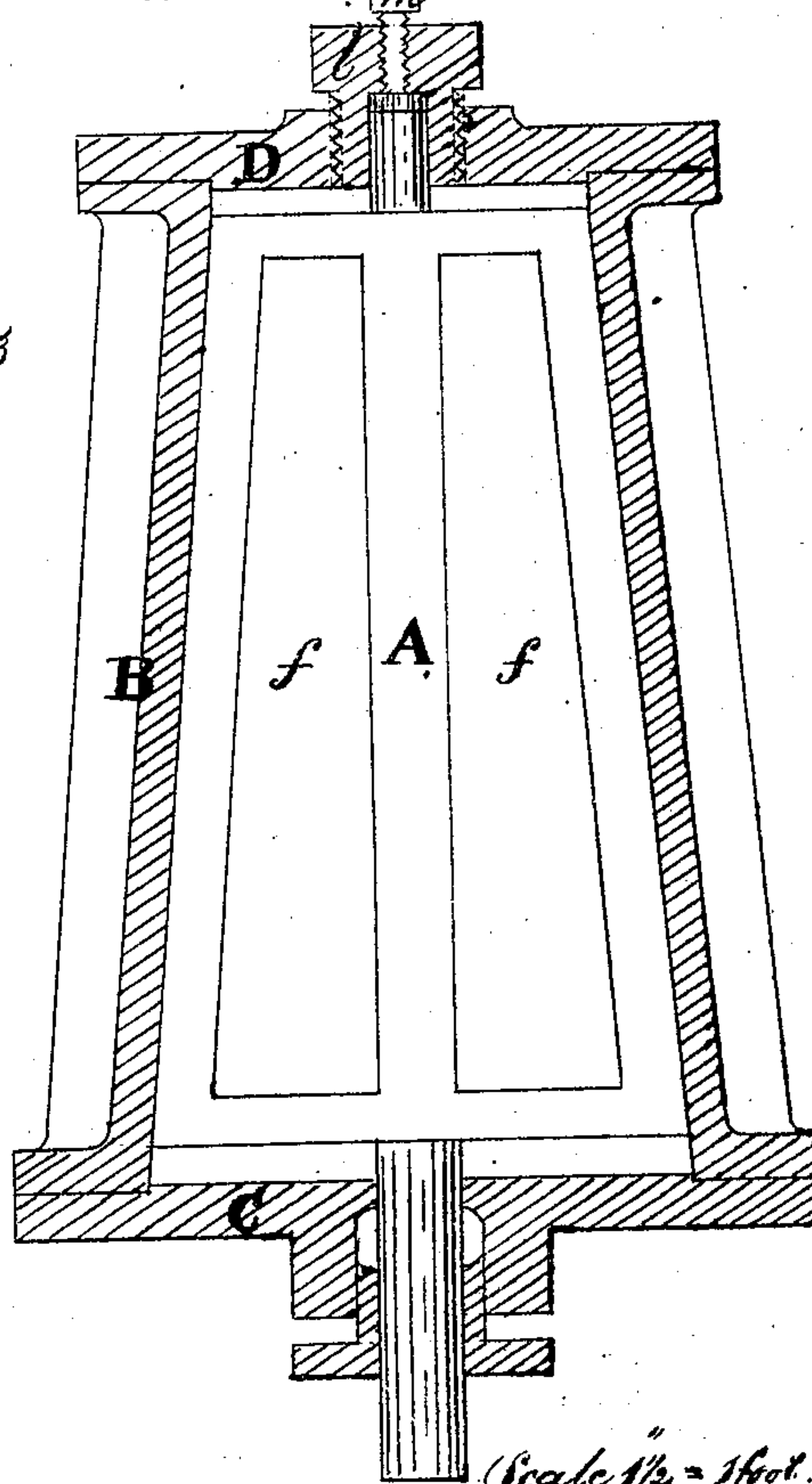


Fig 3



Scale 1/2" = 1 foot.

Witnesses

J. B. Fairgrieve  
William Gill

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# UNITED STATES PATENT OFFICE.

HUGH FAIRGRIEVE, OF HAMILTON, CANADA.

## IMPROVEMENT IN VALVES FOR COMPOUND STEAM-ENGINES.

Specification forming part of Letters Patent No. 132,650, dated October 29, 1872.

*To all whom it may concern:*

Be it known that I, HUGH FAIRGRIEVE, of the city of Hamilton, county of Wentworth, Province of Ontario, Canada, have invented a new and useful Improvement in the Valves of Compound Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

The object of this invention is to effect a greater economy in the working and using of compound steam-engines, first, by the removal of friction from the valve, which is effected by the removal of all unnecessary pressure from the working-surfaces of the valve and chamber by the balancing principle involved in the construction of the said valve; second, from the saving of steam effected by the adoption of the shortest passages possible for conducting the steam from the high to the low pressure cylinder, thereby avoiding as much as possible unproductive expansion between the cylinders; third, from the non-exposure of the steam to condensing influences in its passage from the high to the low pressure cylinder, owing to the said passages being so very short and surrounded by the full pressure of live steam.

In the accompanying drawing, similar letters of reference indicate corresponding parts.

Figure 1 is a cross-section through the middle of the circular valve A, its casing B, and the proximate portions of the cylinders W and X, showing the ports *b b* in the small or high-pressure cylinder W, the ports *e e* and *d* in the large or low-pressure cylinder X, the chamber *a*, port *o*, conducting-ports *c c*, and cavities *f f* in the valve A, also the pipe *p p* connecting the ports *b b*, with a tap or stop-valve in it, as hereinafter described in the claim of application. Fig. 2 is a ground view or plan, showing the construction of the casing B, of the valve A, and portions of the two cylinders W and X, one half of which casing B is cast upon each cylinder and secured with bolts to each other, connecting the two cylinders W and X, and

forming a chamber or casing for the steam-valve A oscillating therein. Fig. 3 is a longitudinal section of the casing B, heads C and D, socket *l*, and screw *m*. Fig. 4 is a front view of the head C, showing the orifice *g* by which the steam enters the casing B.

From the model it will be observed, in the operation of the valve A, that while the steam from the boiler is entering one end of the high-pressure cylinder W from the chamber *a*, through port *o* and one of the ports *b*, that it is issuing from the other end of the said cylinder W by the other port *b* and the corresponding port *c*, cavity *f*, and port *e*, into the large or low-pressure cylinder X, while at the same time the steam that has just performed its duty in the other end of the said cylinder X is issuing through the other port *e* and cavity *f* into the exhaust-port *d*, which leads to the condenser of the engine.

I do not limit myself to the amount of taper on the valve A, nor to any particular form of any of its parts, as I am aware that these may be varied and yet accomplish the same object.

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

1. The valve A, constructed substantially as shown and described, for the admission and release of the steam to and from the cylinders W and X, in the manner set forth.

2. The combination of the valve A, constructed substantially as described, with the ports *b b*, having a tap or stop valve in the same for the purpose of relieving any undue cushioning in the high-pressure cylinder W, and also to admit live steam from the small cylinder directly to the large cylinder X while working the engines by hand.

3. The combination of the valve A, constructed as described, with or without a cut-off valve on the orifice *g* in the head C, substantially as set forth.

Hamilton, March 9, 1872.

HUGH FAIRGRIEVE.

Witnesses:

J. B. FAIRGRIEVE,  
WILLIAM GILL.