

H. FAIRGRIEVE.

Improvement in Valves for Compound Steam-Engines.

No. 132,648.

Patented Oct. 29, 1872.

Fig 3. End View.

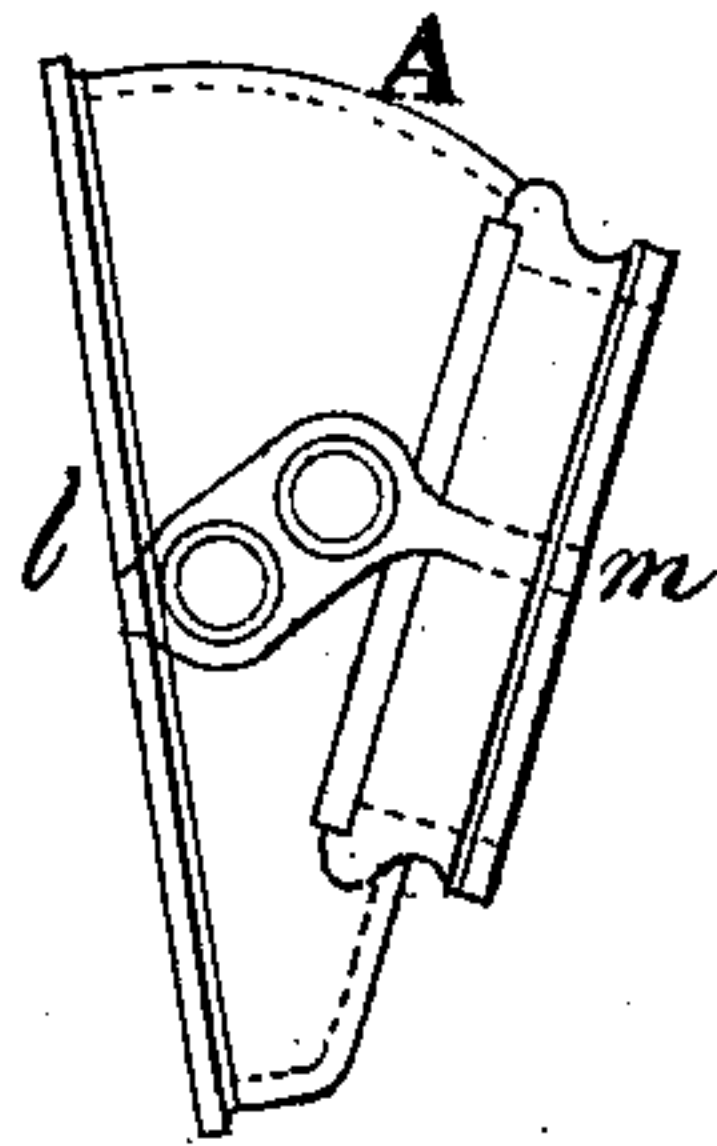


Fig 2. Front View

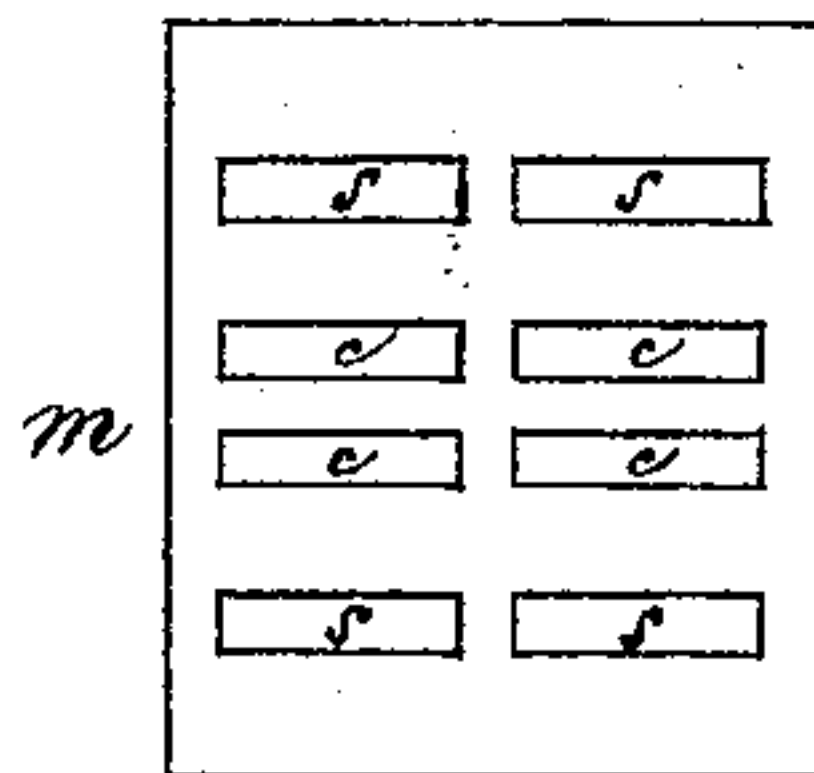


Fig 1. Front View

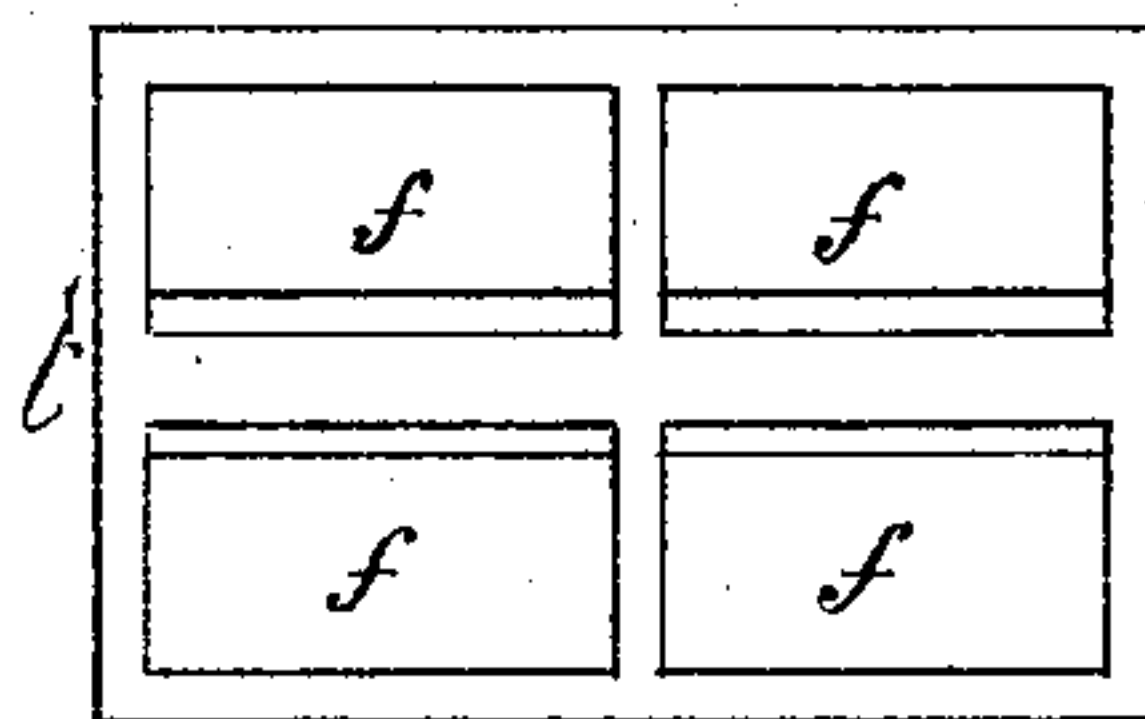


Fig 4. Side View.

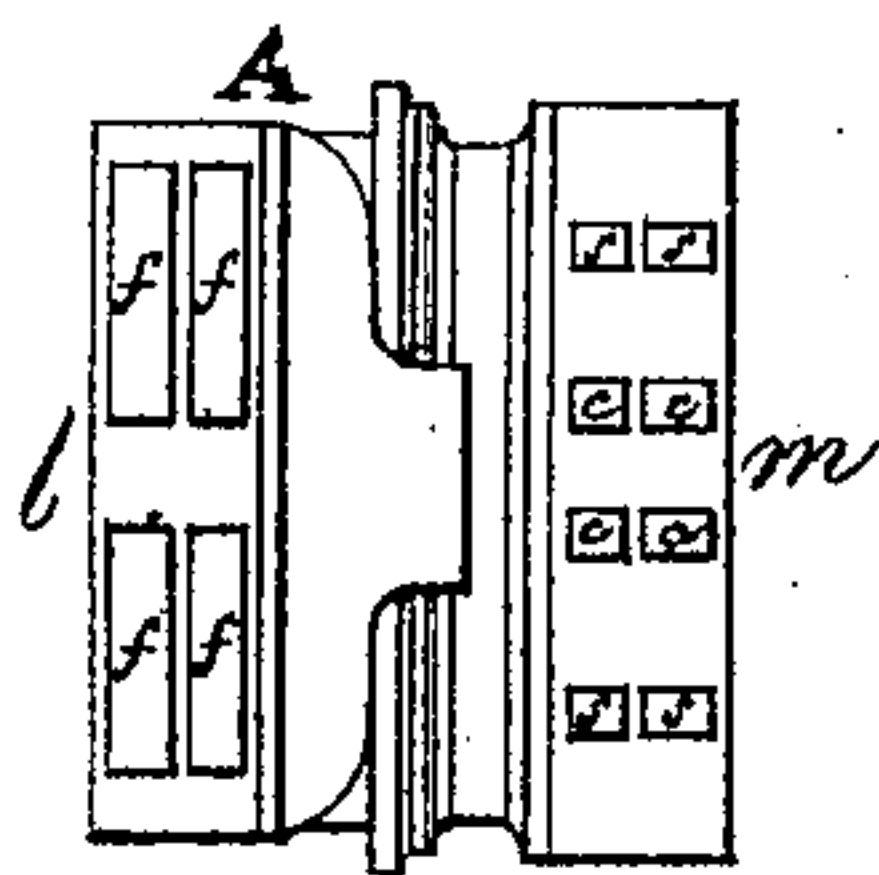
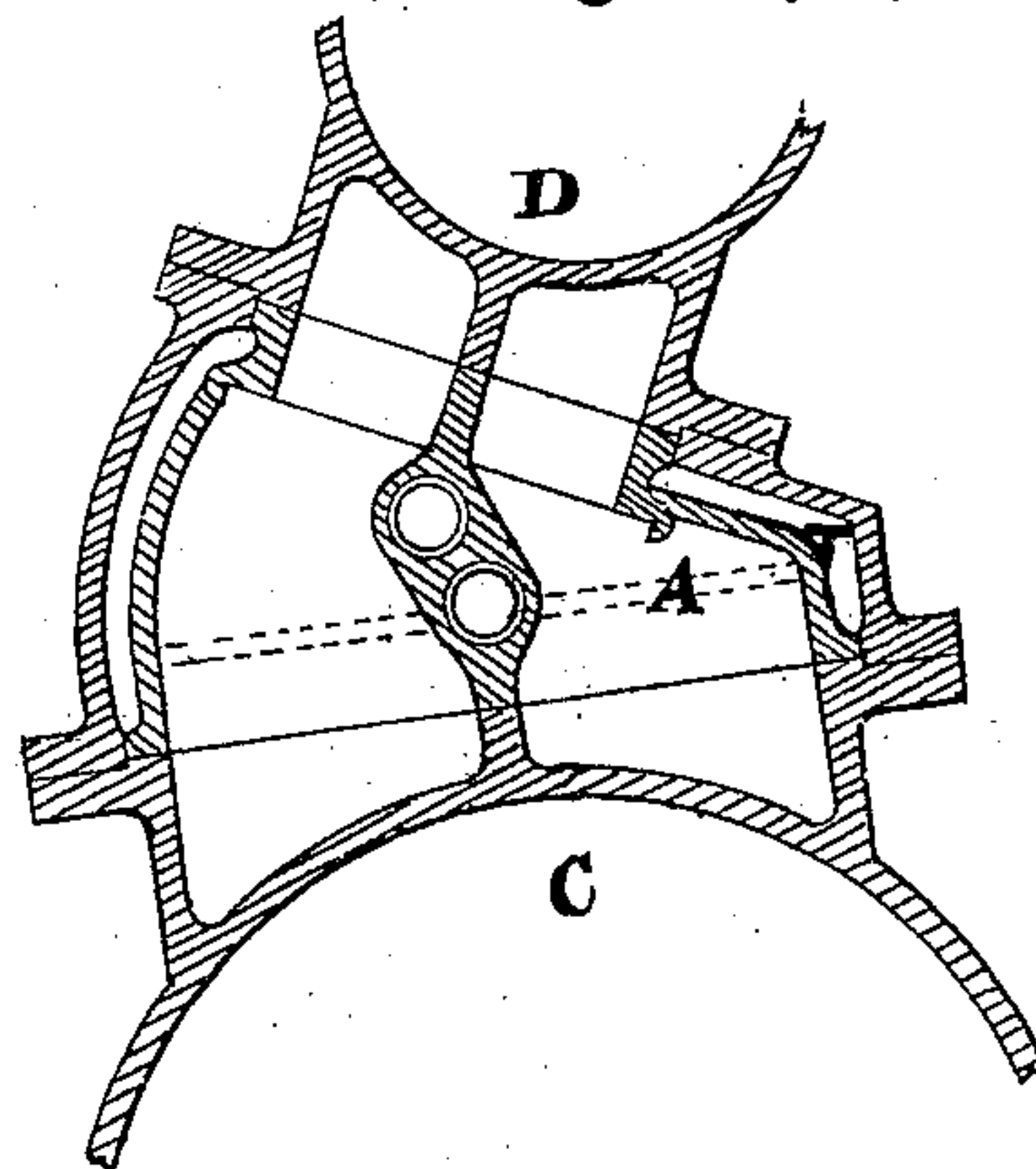


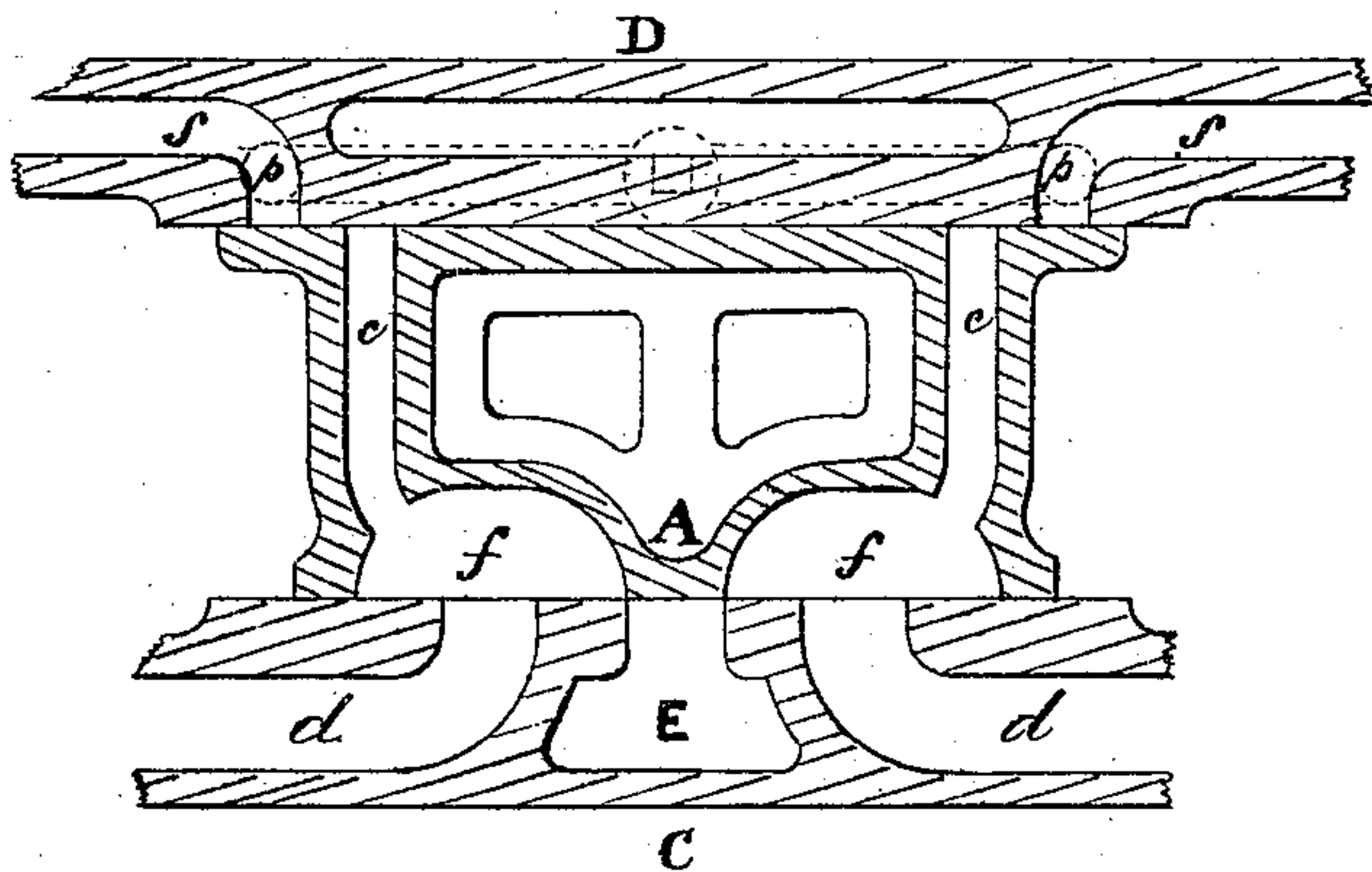
Fig 5  
Transverse Section



Scale for Fig 1, 2, 3, 4, 5  
3/4" = 1 foot.

Fig 6  
Vertical Section

Scale 1 1/2 in. = 1 foot



Witnesses

J. R. Fairgrieve  
William Gill.

Inventor

Hugh Fairgrieve





# UNITED STATES PATENT OFFICE.

HUGH FAIRGRIEVE, OF HAMILTON, CANADA.

## IMPROVEMENT IN VALVES FOR COMPOUND STEAM-ENGINES.

Specification forming part of Letters Patent No. 132,648, 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, 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 two 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.

Sheet 1—Figure 1 is a front view of the working face of valve A for the large cylinder C, showing cavities *ff*. Fig. 2 is a front view of the working face of valve A for the small cylinder D, showing ports *ss* and *cc*. Fig. 3 is a plan or end view of valve A, showing the wedge form of the valve. Fig. 4 is a side view of valve A, looking on the thin side of the same, showing ports *sscc*, and cavities *ff*. (Both valve-faces are shown in a diagonal position.) Fig. 5 is a transverse section through both the cylinders C and D, the valve A, and the steam-chest T. Fig. 6 is a vertical section of the valve A as it might be constructed without the cut-off valves *bb*, and showing, also, the pipe *pp*.

Sheet 2—Fig. 7 is a vertical section of the valve A, cut-off plates *bb*, and the steam-chest T; proximate portions of the cylinders C and D, showing the ports *ss* in the high-pressure cylinder D, and the ports *dd* and E

in the low-pressure cylinder C; also, the steam-ports *mm*, the conducting-ports *cc*, and cavities *ff*, in the valve A; likewise, the pipe *pp* with a tap or stop-valve in it, connecting the ports *ss*.

From the operation of the model it will be perceived that the quantity of steam from the boiler required to be admitted for each stroke in the high-pressure cylinder D, is regulated by the movement of the cut-off plates *bb* over the ports *mm*. It will also be perceived that, while steam is entering through one of the ports *s* to the high-pressure cylinder D, the steam that has just performed its duty in the other end of the said cylinder D is issuing, by the other port *s*, corresponding port *c*, cavity *f*, and port *d*, into the low-pressure cylinder C; while the steam that has just performed its duty in the low-pressure cylinder C is issuing, by the opposite port *d* and cavity *f*, into the exhaust-port E, by which it is conducted to the condenser of the engine.

I do not limit myself to the amount of taper in the valve A, nor to any particular form 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 wedge-shaped valve A, constructed substantially as shown and described, (and with or without the cut-off plates or valves,) for the purpose of regulating the admission and release of the steam to and from both the high and low pressure cylinders C and D of a compound steam-engine, in the manner heretofore set forth.

2. The valve A, having wedge-shaped faces working between the angular faces of the two cylinders C and D, for the purpose of effecting durability in wear, and to preserve its efficiency as a steam-tight valve.

3. The pipe *pp* to connect the ports *ss*, as shown in Figs. 6 and 7, with a stop-valve in it to release any undue cushioning in the cylinder D and also to admit steam from the high-pressure cylinder D directly into the large cylinder C, while working the engines by hand.

HAMILTON, 9th March, 1872.

HUGH FAIRGRIEVE.

Witnesses:

J. B. FAIRGRIEVE,  
WILLIAM GILL.