

S. F. COLE & N. S. BOWDISH.  
Valves for Engines.

No. 154,585.

Patented Sept. 1, 1874.

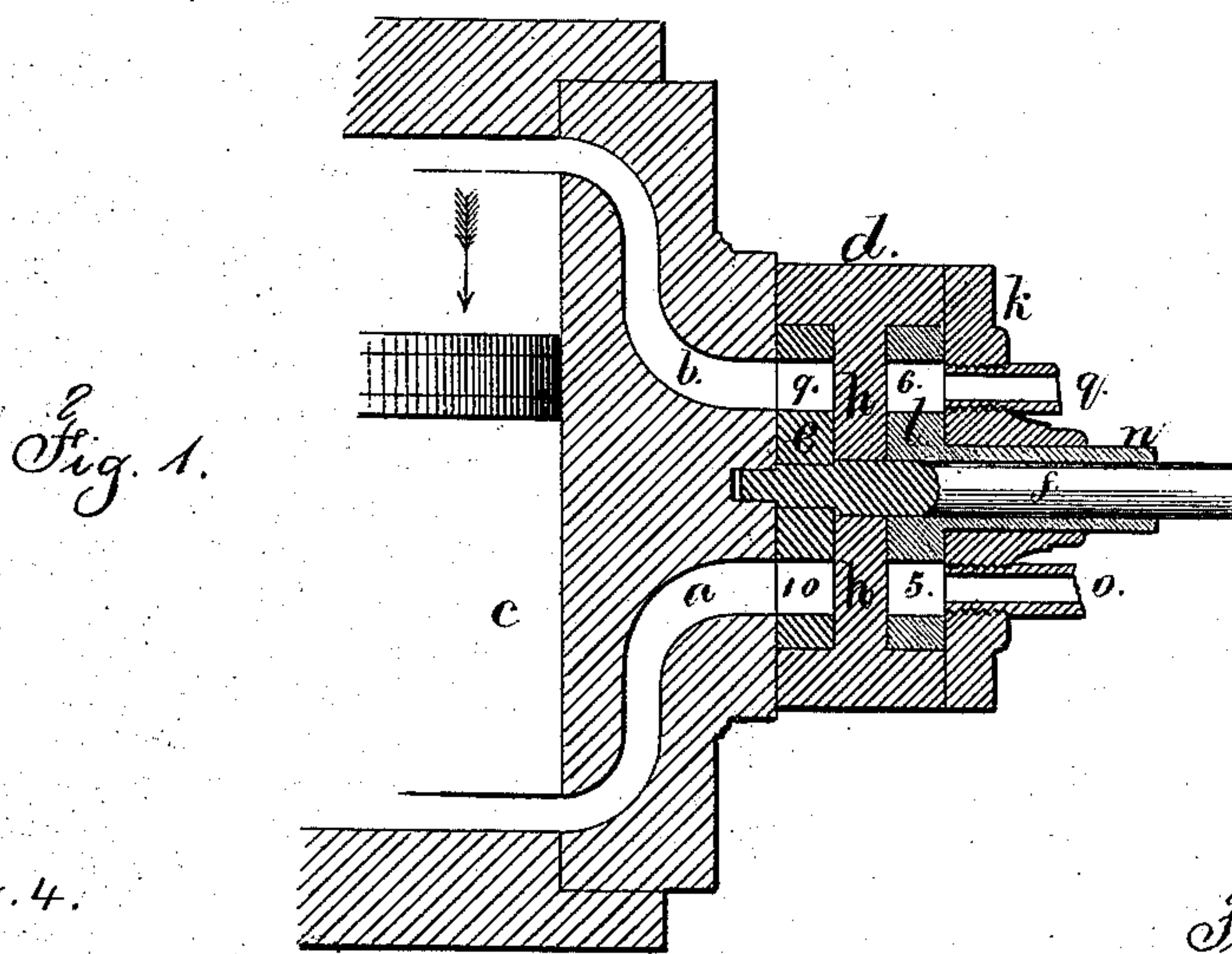
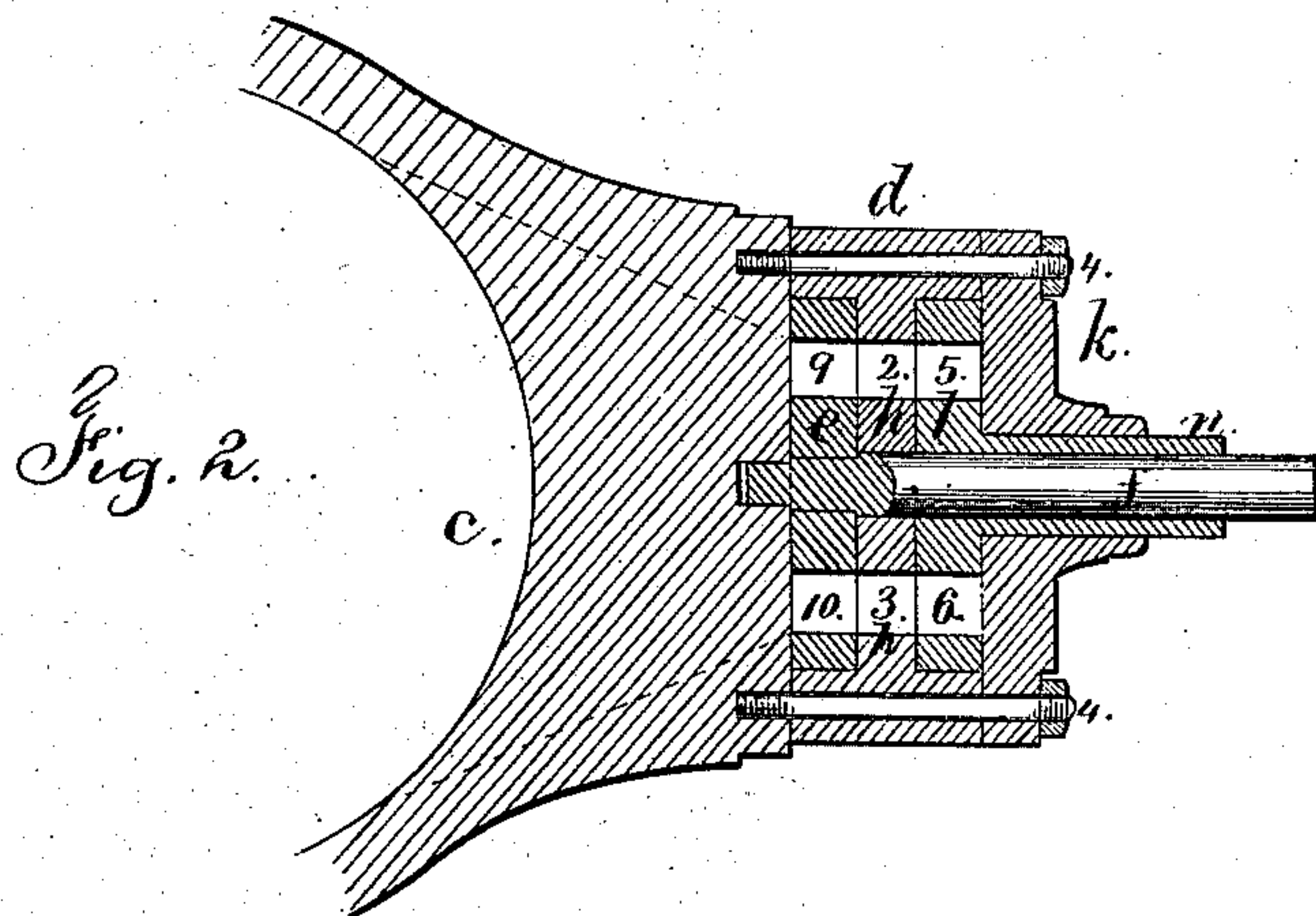
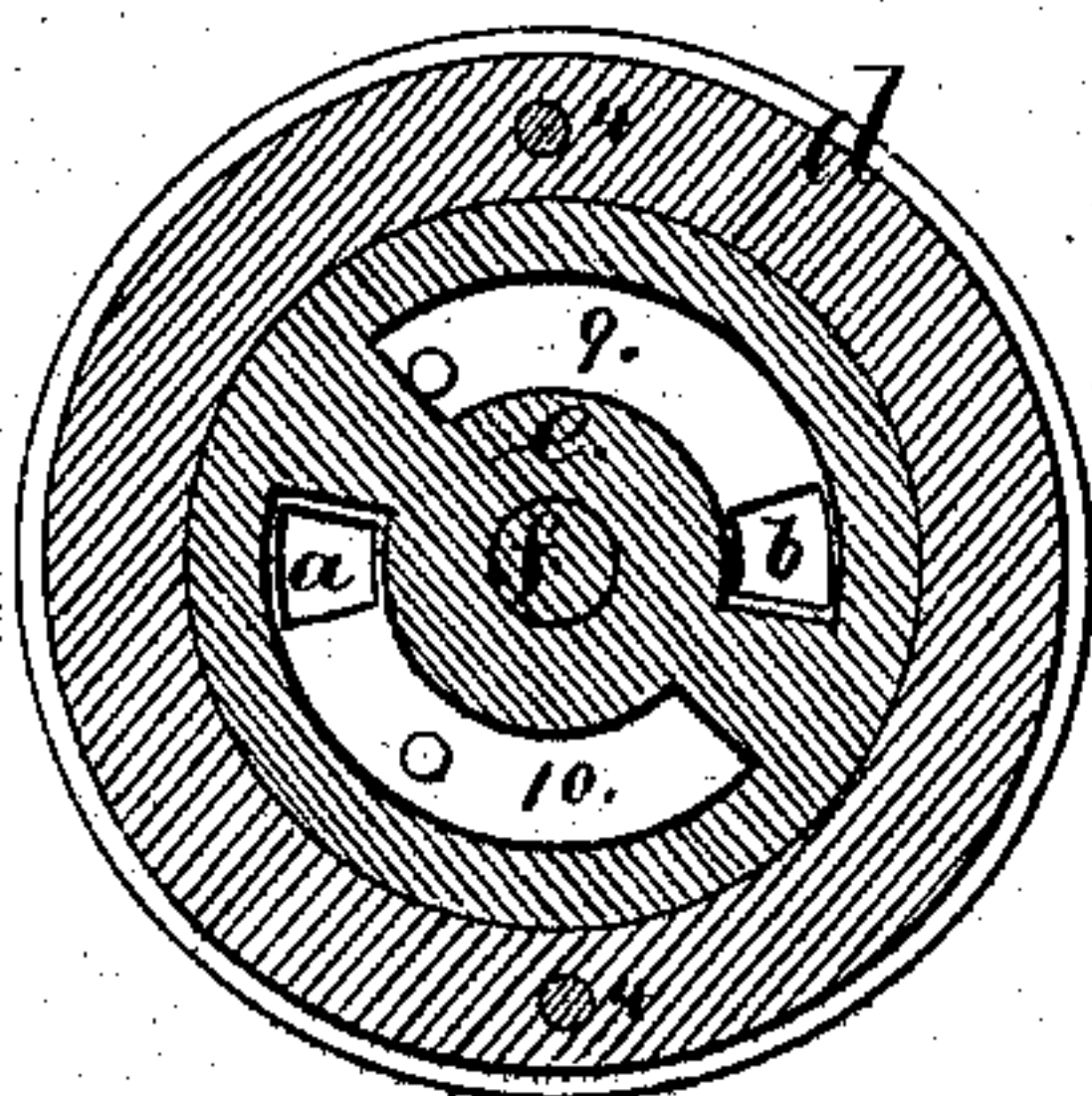


Fig. 4.



Witnesses  
Chas. H. Smith  
Harold Sewell

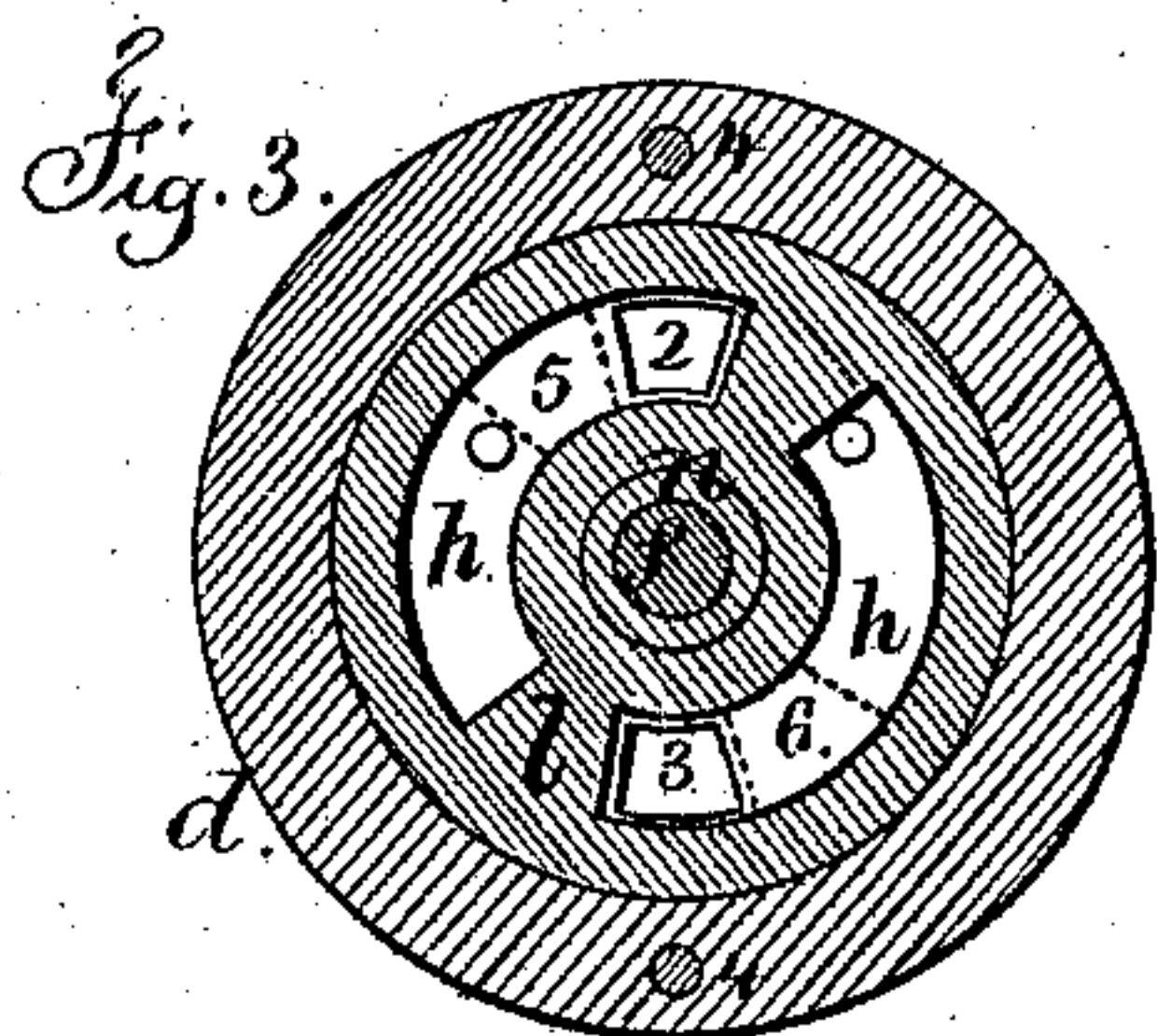
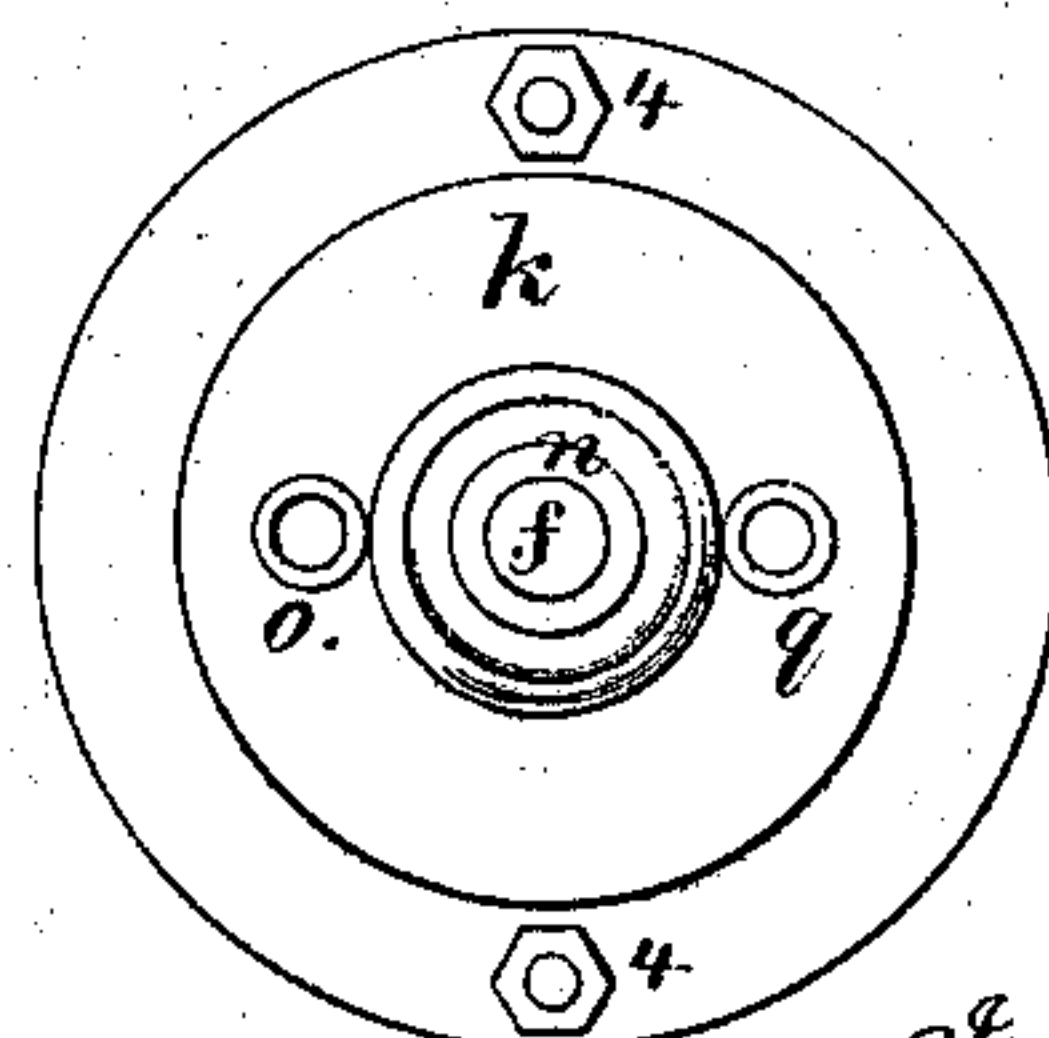


Fig. 5.



Inventors  
Samuel F. Cole  
Nelson S. Bowdish  
per L. W. Perrell atty



# UNITED STATES PATENT OFFICE.

SAMUEL F. COLE AND NELSON S. BOWDISH, OF RICHFIELD SPRINGS, N. Y.

## IMPROVEMENT IN VALVES FOR ENGINES.

Specification forming part of Letters Patent No. **154,585**, dated September 1, 1874; application filed December 11, 1873.

*To all whom it may concern:*

Be it known that we, SAMUEL F. COLE and NELSON S. BOWDISH, of Richfield Springs, in the county of Otsego and State of New York, have invented an Improvement in Valves for Engines, of which the following is a specification:

Our invention relates to two disk-valves applied in a chest between the engine and the steam and exhaust pipes, and actuated by levers upon a stem and tube in such a manner that one valve acts to admit steam alternately to opposite ends of the cylinder, and the other changes the supply and exhaust passages so that an engine can be reversed in the direction of revolution by a simple movement of one of said valves, and that valve also serves to stop the engine when required.

Two rotary valves have before been used in a valve-chest, one to act as an ordinary steam-valve and the other as a cut-off, and the cut-off valve received its motion from the steam-valve, and was not adapted to reversing the engine, as in my arrangement of valves and ports. A disk has also been applied between a stationary valve-seat and the surface of an oscillating engine; but such disk was not inclosed in the valve-chest.

In the drawing, Figure 1 is a sectional plan of the valves and chest. Fig. 2 is a vertical section. Fig. 3 shows the reversing-valve and ports, and Fig. 4 the engine-valve and ports.

The ports *a* and *b* lead to the steam-cylinder *c*, in any usual manner, and they open at their outer ends into the steam-chest *d*, that is cylindrical, having a circular or disk valve, *e*, upon a stem, *f*, that is operated by an eccentric on the engine-shaft, or otherwise, and in this cylindrical steam-chest is a partition, *h*, with ports 2 and 3. The reversing-valve *l* is at the other side of the partition *h*, between that and the head *k*. The head is secured in place by bolts 4, and the parts may be sufficiently adjustable to allow for wear. This head *k* is shown in plan view, Fig. 5. The valve *l* is provided with a tubular stem, *n*, and the proper glands or packing-boxes are provided at the respective stems, if required. Each valve is made with segmental openings, as seen in

Figs. 3 and 4, and the steam-pipe *o* and exhaust-pipe *q* are connected to the head *k* in line, or nearly so, with the ports *a* and *b*; but the ports 2 and 3 in the partition *h* are intermediate at or about ninety degrees from such ports *a* and *b*; hence when the valve *l* is in the position shown in Fig. 3, the port 5 therein forms a channel between the steam-pipe *o* and the port 2, and the other segmental port 6 forms a channel between the exhaust-pipe *q* and the port 3. When this valve *l* is partially rotated to the position shown by dotted lines in Fig. 3, the connections are reversed, and steam passes to the port 3, and the exhaust is by the port 2.

The valve-stem *m* may be provided with a hand-lever, or otherwise fitted so as to be moved, and the width of the valve between the ports 5 and 6 being sufficient to cover the ports 2 and 3, the engine may be stopped by closing the said ports.

The steam-valve *e* is similar to the reversing-valve *l*, and it has the ports or segmental openings 9 and 10, and to said valve an oscillating or partially-revolving movement of about ninety degrees is given, so as to open the communication alternately between the ports *a* and *b* to the cylinder, and the ports 2 and 3 in the partition *h*, so as to allow the steam to act first on one side and then on the other of the engine-piston, and according to which way the valve *l* is placed, so steam will be supplied through either the port 2 or the port 3, and the engine will revolve in either one direction or the other.

We claim as our invention—

The disk-valves *e* and *l* in the steam-chest, and at opposite sides of the partition *h*, and provided with the tubular stem *n* and stem *f*, in combination with the ports *a* and *b*, 2 and 3, and steam and exhaust pipes *o* *q*, arranged and operating substantially as set forth.

Signed by us this 26th day of November, A. D. 1873.

SAMUEL F. COLE.  
N. S. BOWDISH.

Witnesses:

WILLARD A. SMITH,  
IRA STARKWETHER.