

A. Crosby,
Steam Cut-Off,

No 19,134.

Patented Jan. 19, 1858.

Fig:1.

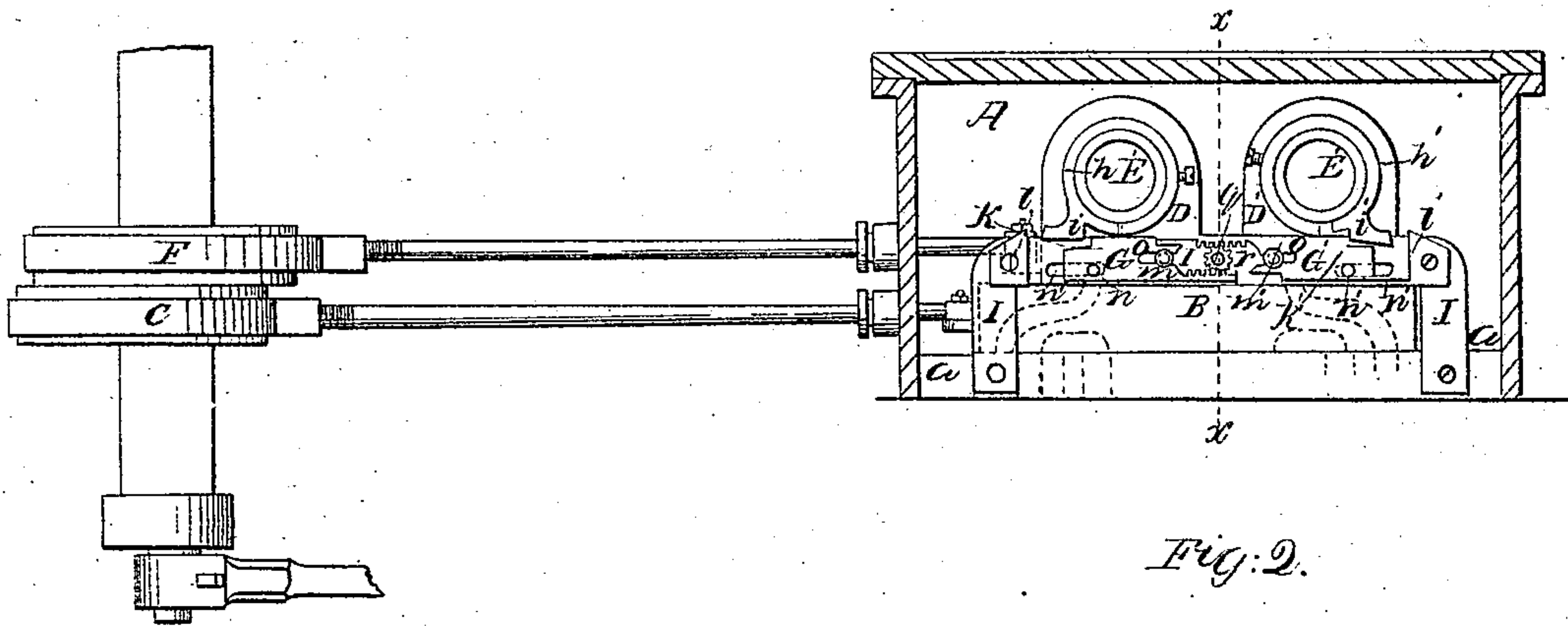


Fig:2.

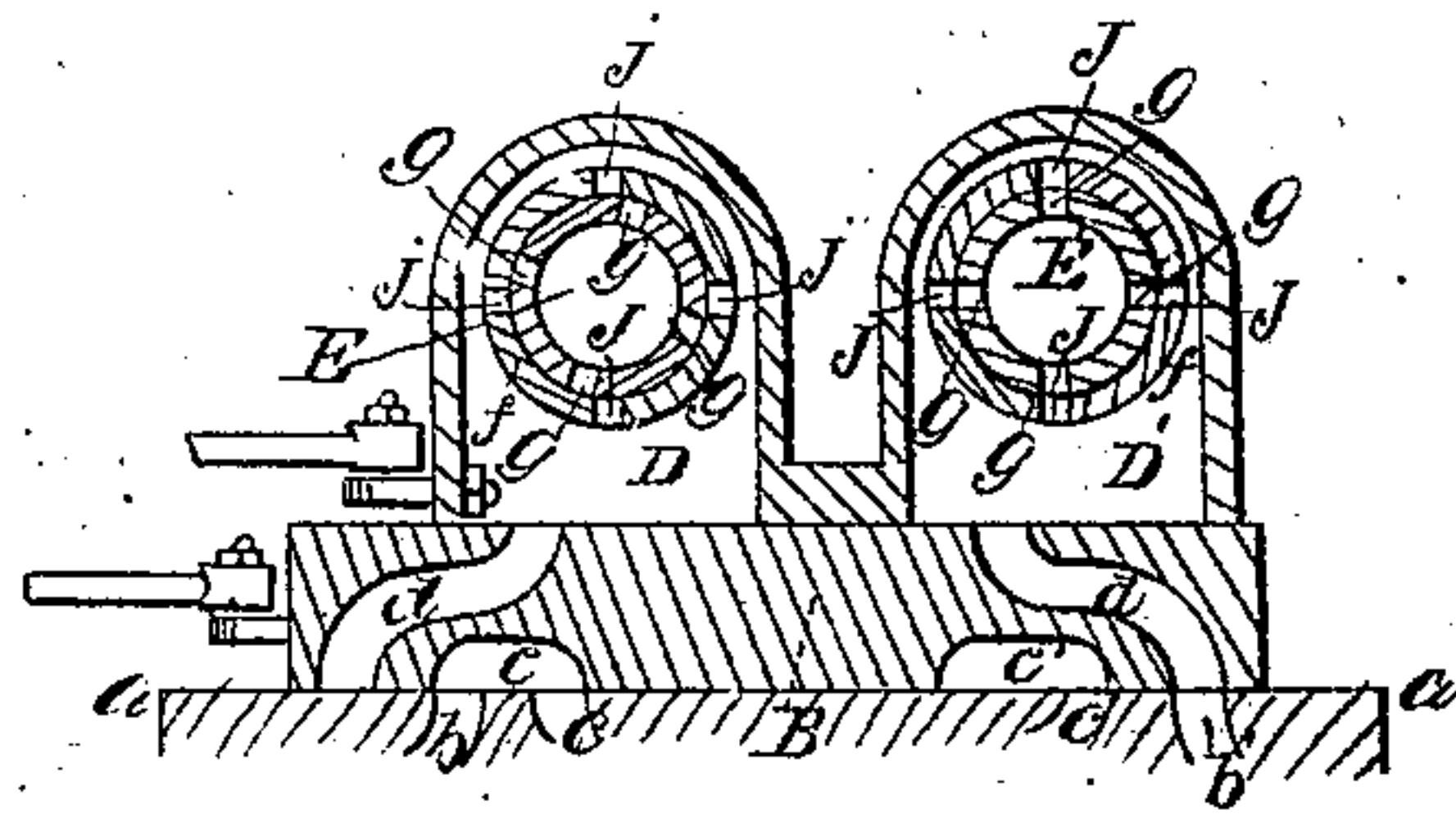


Fig:3.

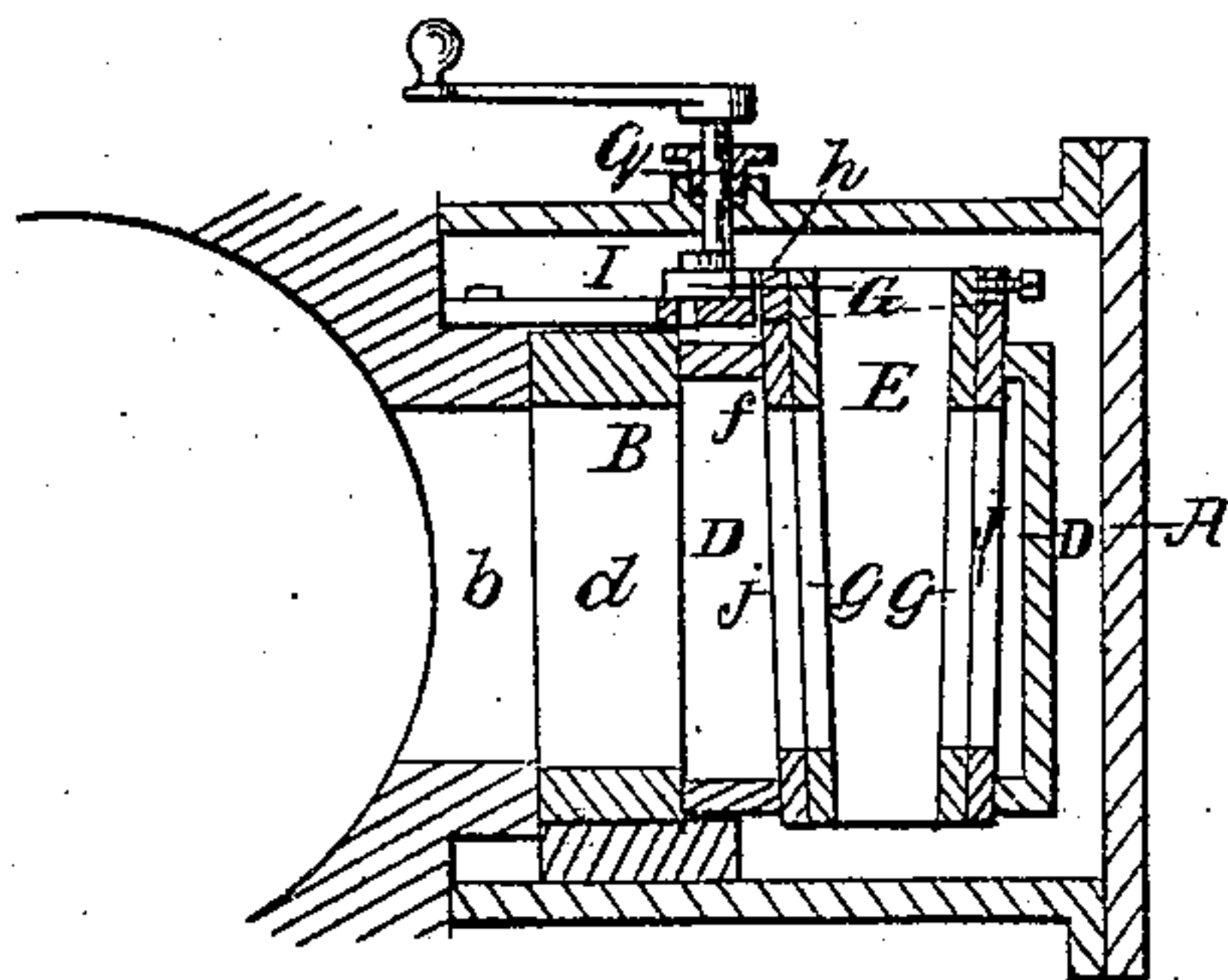


Fig:4

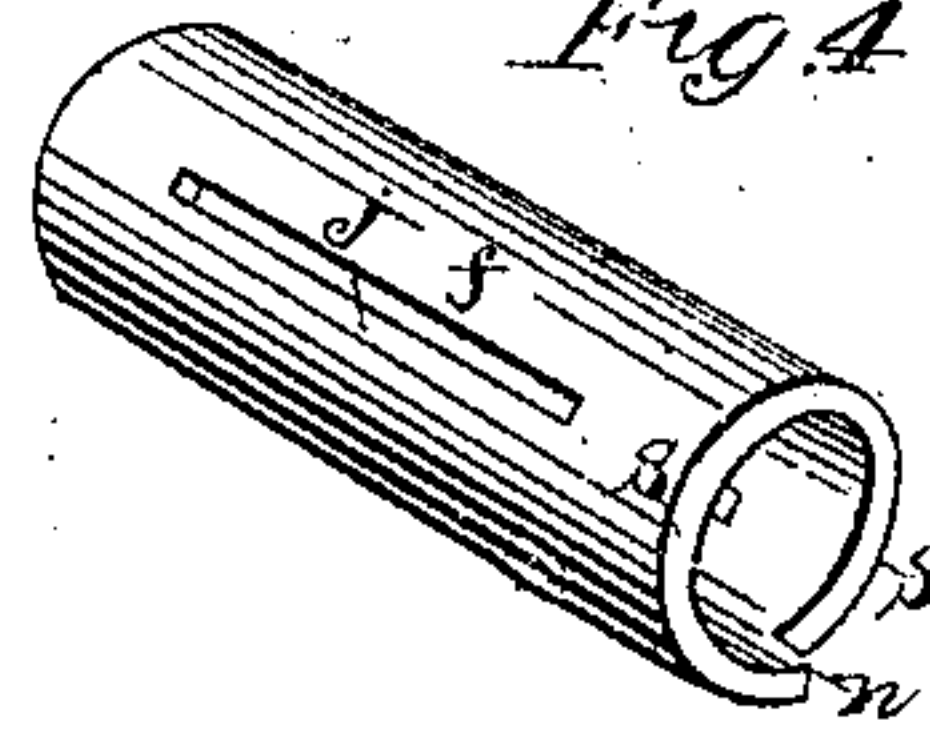
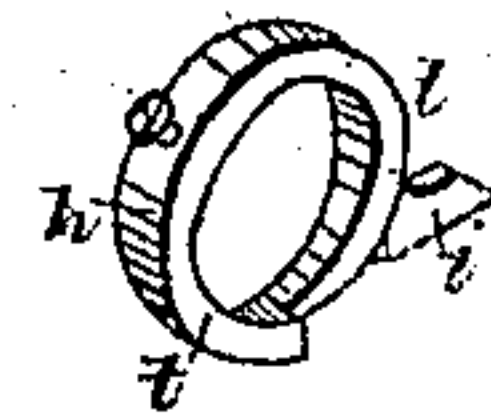


Fig:5.



UNITED STATES PATENT OFFICE.

ADDISON CROSBY, OF FREDONIA, NEW YORK.

VARIABLE CUT-OFF FOR STEAM-ENGINES.

Specification of Letters Patent No. 19,134, dated January 19, 1858.

To all whom it may concern:

Be it known that I, ADDISON CROSBY, of Fredonia, in the county of Chautauqua and State of New York, have invented a new and Improved Variable Cut-Off for Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 exhibits an interior view of the steam-chest of a steam-engine, with a side view of the slide valve, cut-off, and mechanism for operating the latter. Fig. 2 exhibits a longitudinal section of the slide valve and its seat, with a corresponding section of the cut-off. Fig. 3 is a transverse section in the line x, x , of Fig. 1. Fig. 4 is a perspective view of one of the seats of the cut-off valves. Fig. 5 is a perspective view of one of the rings which are attached to the cut-off valves for the purpose of operating them.

Similar letters of reference indicate corresponding parts in the several figures.

A is the steam chest.

B is a slide valve of well-known kind, for the induction and eduction of steam to and from the cylinder, working on a seat a, a , and moved by an eccentric C, on the crank shaft of the engine.

b, b^1 , are steam ports, and c, c^1 , are exhaust ports in the valve seat, the former communicating with the cylinder and the latter with the exhaust pipe.

d, d^1 , are induction passages through the valve, and e, e^1 , are eduction cavities for forming communication between the ports b , and c , and between those b^1 , and c^1 .

D D^1 , is a sliding box containing two steam chambers D and D^1 and fitted to slide on the back of the main valve B, said chambers being separate from each other and open on the side next the slide valve to communicate respectively with the induction passages d, d^1 , of the main valve, but being closed to the steam chest A, except through the two hollow plug cut-off valve E, E^1 , whose seats f, f^1 , extend all the way through their respective steam chambers as is shown in Fig. 3, so as to admit steam at all times to the interiors of the cut-off valve E, E^1 . These valves have each several very narrow openings g, g , in their sides to correspond with the same number of openings j, j , in their respective seats to admit steam from the

chest A to the chambers D, D^1 , to be supplied through the passages d, d^1 , to the cylinder and to cut it off by a very slight movement circularly in their seats.

The two-chambered sliding valve box D D^1 , is connected with an eccentric F, on the crank shaft of the engine, or otherwise so operated that it always moves in the same direction with the engine piston, and through this movement the cut-off valves E, E^1 , derive the necessary movement to admit steam to the chambers D and D^1 , to supply the cylinder and to cut it off. The means by which the movement is given to the valves for the above purpose are as follows: At one end of each valve E, E^1 , is secured a collar h , or h^1 , on which there is a projection i , or i^1 , which from its form (see Fig. 1) may be termed a toe and heel piece, and inside the steam chest there is secured near one end of the valve seat a fixed piece of metal l , and near the other end thereof a similar piece l^1 ; said pieces being arranged on the same side of the sliding valve box in such a manner that the toes of the projections i, i^1 , will strike them as the sliding valve box and the engine piston arrive near the end of their stroke in either direction, and thus cause the cut-off valves to be opened in their proper turn, by the time the piston completes its stroke, ready to admit steam to the cylinder as the slide valve B begins to open the port b , or b^1 . On the same side of the sliding valve box as the toes i, i^1 , there are also arranged two bars G, G^1 , provided respectively with shoulders k, k^1 , on their upper part; said shoulders being so arranged that the heels of the projections i, i^1 , will strike them after the piston and the sliding valve box have made a certain portion of their stroke and thus cause the cut-off valves to be closed in their proper turn to cut off the steam. The cutting off is made to take place sooner or later in the stroke by changing the position of the bars G, G^1 , longitudinally, to throw their shoulders k, k^1 , farther apart or bring them nearer together, and to admit of this, they are attached to a stationary stand I, within the steam chest A, by means of screw bolts m, m^1 , passing through slots o, o^1 , and provided with pins n, n^1 , working in slots p, p^1 , in the stand. The shifting of the bars to vary the point of cutting off is effected by a small shaft q , passing through a stuffing box in the steam chest and carrying a

pinion *r*, gearing with toothed racks on the two bars, the racks gearing with the pinion on opposite sides of the center thereof so that by the rotation of the latter they will
 5 be caused to move in opposite directions, so that the shoulders *h*, *h*¹, will approach or recede from each other. The shaft *q*, may be operated by hand to adjust the bars in the desired position to cut off at the proper
 10 point, or connected with a governor to govern the engine by varying the point of cutting off.

I am aware that hollow valves have been before employed upon the back of a sliding
 15 valve; and therefore I do not claim, broadly, the employment of hollow valves, except as herein described.

It will be readily understood that the cut-off valves being hollow, and receiving steam
 20 at the interior, and having openings at opposite points in themselves and their seats, must receive an equal pressure of steam on all sides, or in other words, are balanced laterally; but owing to their taper form
 25 there is a slight pressure in a longitudinal direction tending to force them into their seats. To prevent the friction that would be produced by this longitudinal pressure in turning the said valves, I cause them to
 30 move a slight distance longitudinally out of

their seats, as they are turned to open the passages *g*, and *j*, by making the larger ends of the valve seats *f*, *f*¹, which project out beyond the side of the valve box *D*, *D*¹, with a spiral inclination, or of the form of a
 35 single turn of a screw-thread as shown at *s*, in Fig. 4, and making the inner faces of the collars *h*, *h*¹, which work close to the said ends of the seat, of a corresponding form, as shown at *t*, in Fig. 5. The jogs *u*, *u*, on
 40 the seats *f*, *f*¹, and collars *h*, *h*¹, serve as stops to prevent the turning of the cut-off valves farther than is necessary in closing.

What I claim as my invention and desire
 45 to secure by Letters Patent is:

The arrangement of the two hollow plug cut-off valves in a double chambered valve box *D*, *D*¹, which has a sliding movement on the back of the main valve for the purpose
 50 of opening and closing the said valves to admit and cut off the steam, by means of toe pieces *i*, *i*, or their equivalents attached to the latter, coming in contact with suitable pieces within the steam chest, substantially as herein described.

ADDISON CROSBY.

Witnesses:

ALLEN HINCKLEY,
 A. Z. MADISON.