

(No Model.)

B. F. OLMSTED.

CUT-OFF VALVE.

No. 301,142.

Patented July 1, 1884.

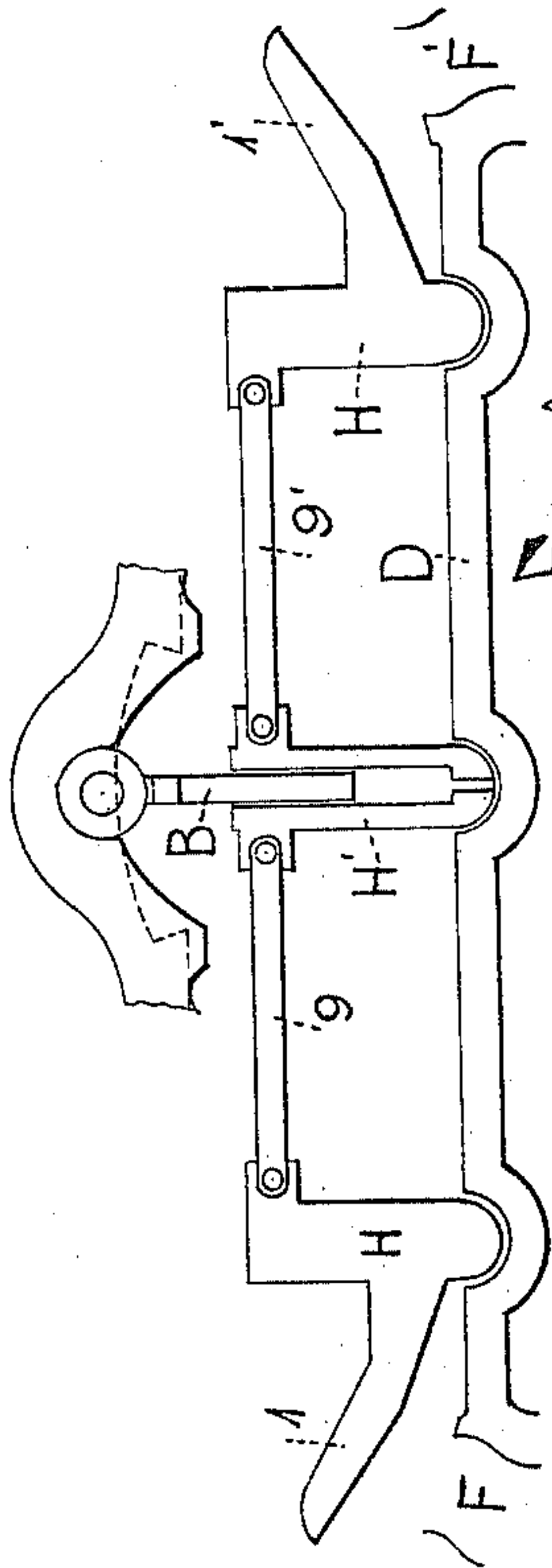


Fig. 4.

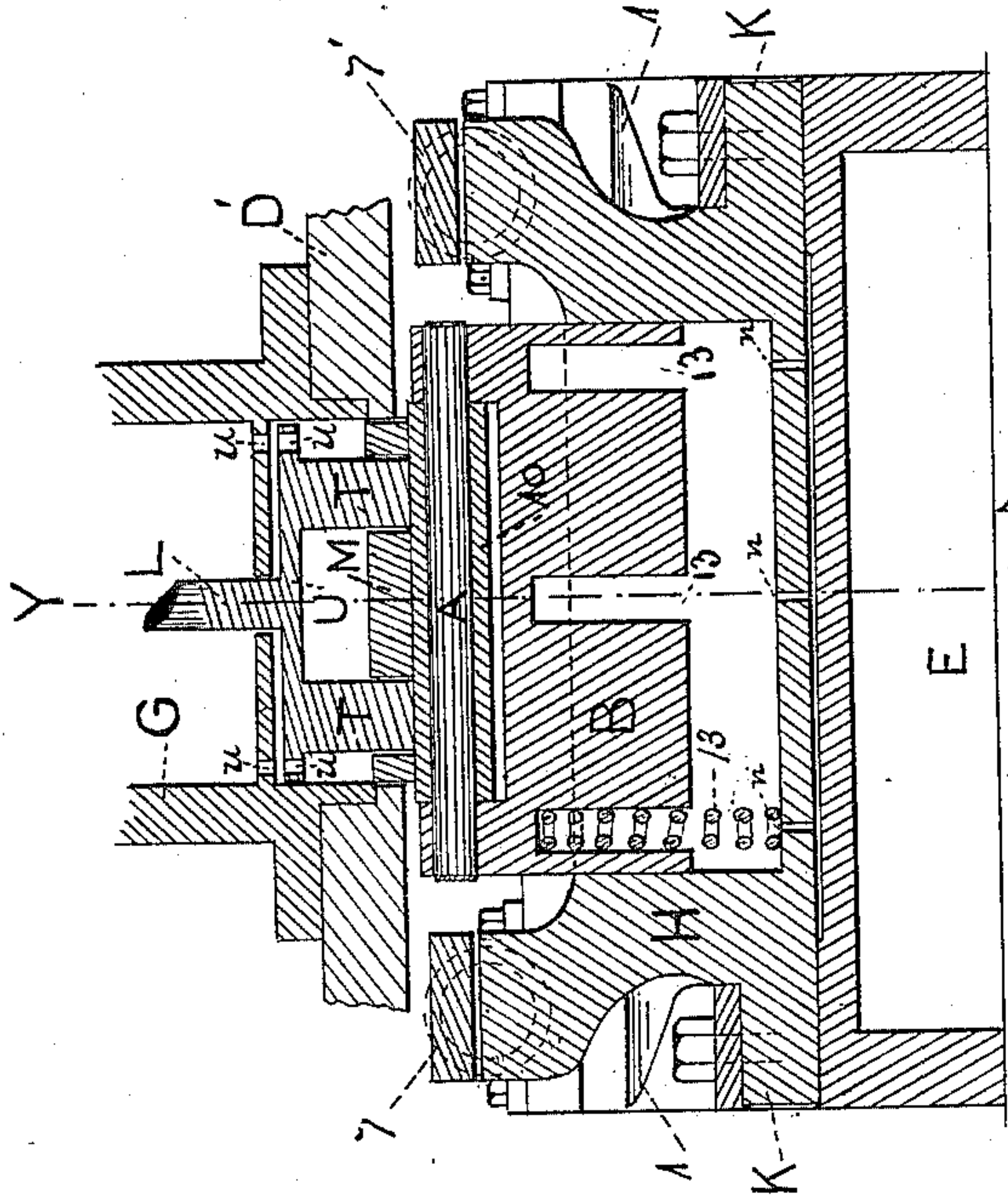


Fig. 2.

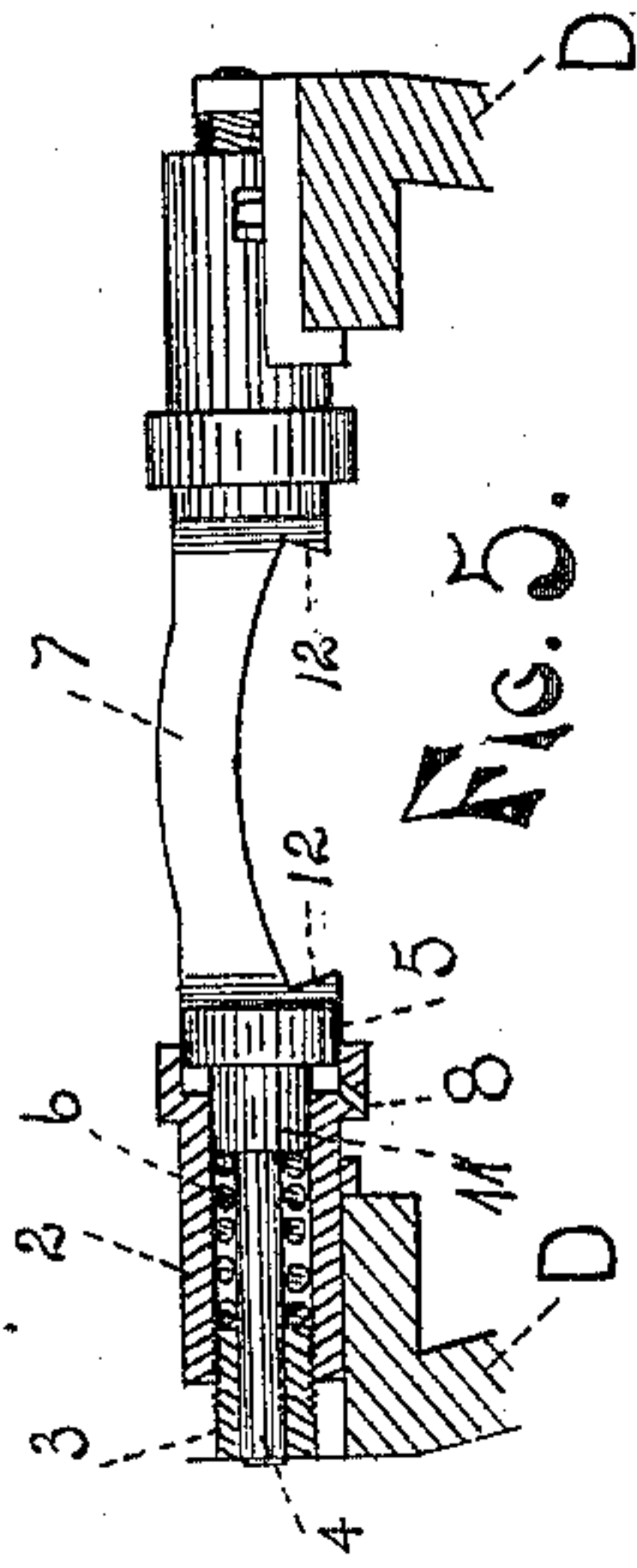


Fig. 5.

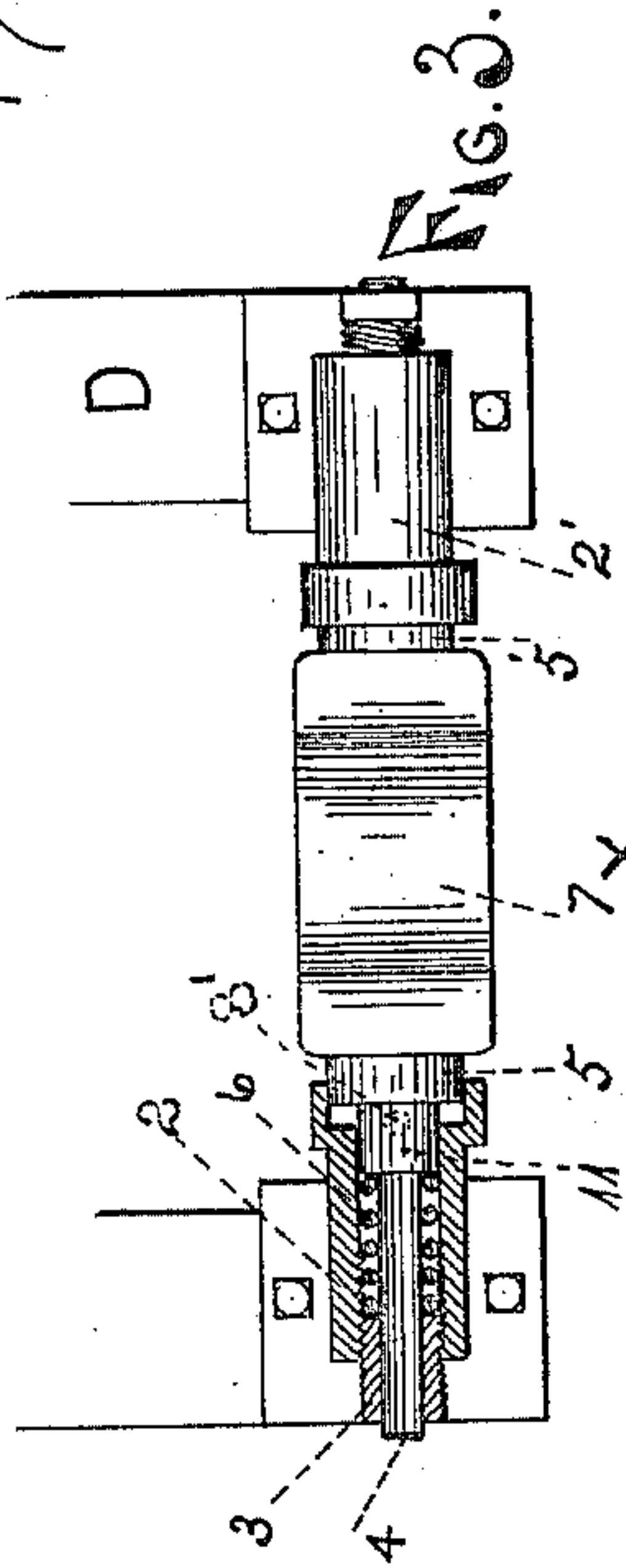


Fig. 3.

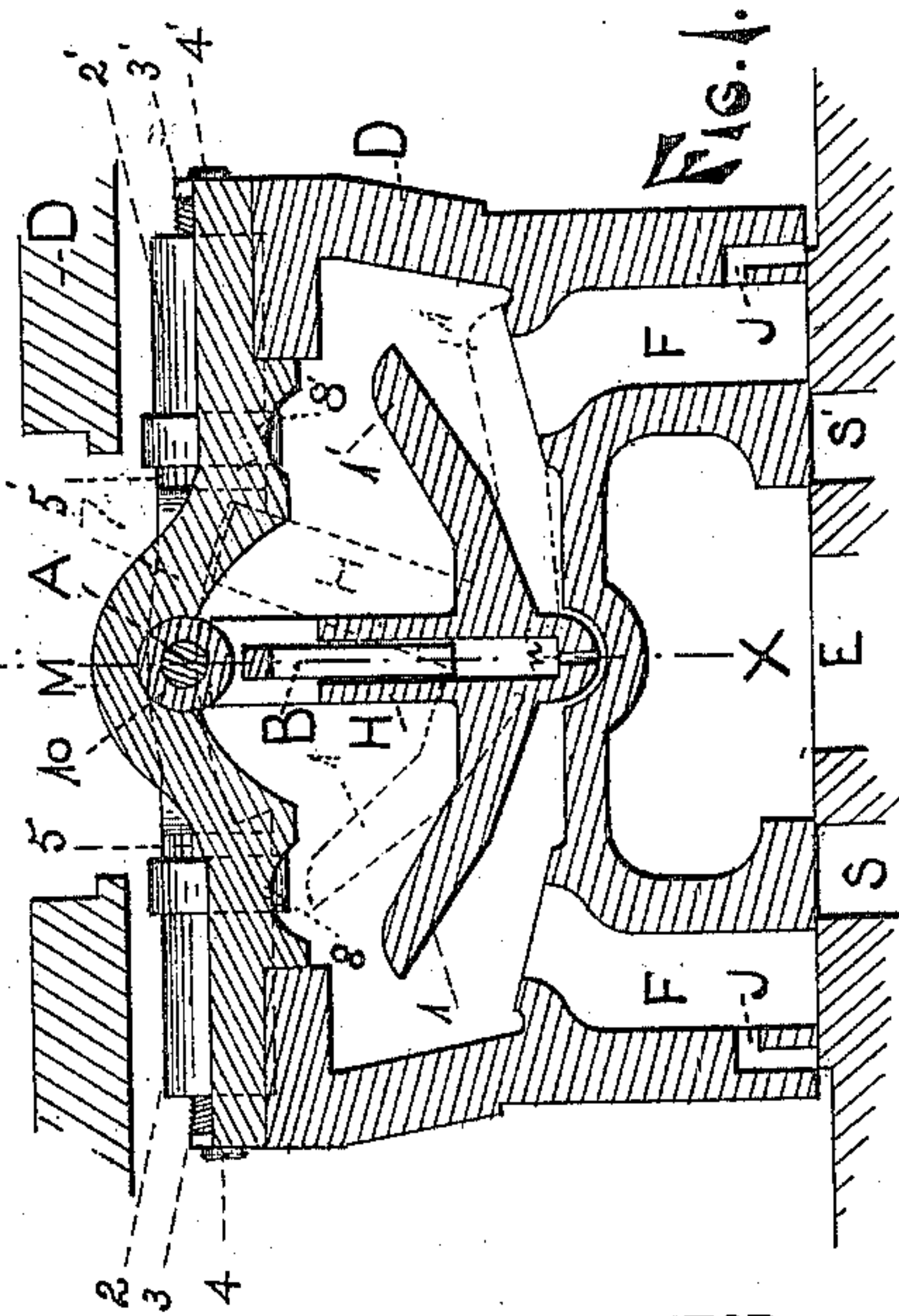


Fig. 1.

WITNESSES:

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BENJAMIN F. OLMSTED, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO SARAH
L. OLMSTED, OF SAME PLACE.

CUT-OFF VALVE.

SPECIFICATION forming part of Letters Patent No. 301,142, dated July 1, 1884.

Application filed March 14, 1884. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. OLMSTED, a citizen of the United States, residing at the city of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Automatic Cut-Off Valves for Steam-Engines, of which the following is a specification.

My invention relates to improvements in cut-off valves for steam-engines, and more especially to improvements in the cut-off valve patented to me September 4, 1883, and the object of my invention is to render more effective and useful the principle embodied in the invention so patented to me. I attain this object by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical sectional view of my invention (with such other parts of an engine as are attached to the part by me invented) on the line Y Y of Fig. 2. Fig. 2 is a vertical sectional view of the same on line X X of Fig. 1. Fig. 3 is a plan view of cushion-cylinders and piston, with the left-hand cylinder in section, so as to show the form of the piston and internal arrangement for cushioning the valve, as fully described below. Fig. 4 is a skeleton view of a double valve with parts separated a considerable distance from each other. Fig. 5 is a side elevation of the same part shown by plan view in Fig. 3.

Similar letters refer to similar parts throughout the several views.

In the drawings, L is the compression-rod operated by the governor, which governor is not shown in the drawings, as it is no part of my invention. A spring may be applied to counteract the pressure from the governor similar to springs now in use.

U is a piston, so placed that it is depressed by the action of the rod L, and in turn depresses the parallel planes T T, which planes are placed above the rollers 10 and in contact with them, as shown in Fig. 2.

A A are the journals of the roller 10. The roller 10, with the blades B B journaled upon A, is also depressed through the piston U and planes T T by the action of the rod L. The operation thus far is identical with the operation shown in my cut-off valve, patented September 4, 1883, above referred to.

H is a cut-off valve, so constructed that it receives the sliding blade B and its upper end oscillates its lower end or bearing, being held in a groove, as shown in Fig. 1.

13 13 13 are springs placed in openings in valve H, beneath the edge of the blade, so as to press outwardly on the blade and to press the roller 10 into the arc or socket formed by the yoke M, and when the engine is not in motion to hold it there, being the position shown in Fig. 1. The upper socket beneath M, as well as the lower arch shown in Fig. 1, is the same as shown in my previous patent; but the valve H in my present invention has its resting point at its bottom, as above described.

n n n are vents in the valve H to allow the steam to enter and surround the blade and hold it in equilibrium.

D is an ordinary D-valve.

S and S' are steam-ports, which receive the steam from the steam-passages F and F' and convey it to the cylinder, thereby creating a current of steam alternately through the passages F and F', which steam-current acts first on one wing of H and then on the other.

J J are steam-vents, for the purpose of equalizing the steam-pressure on valve H, allowing the springs 13 to bring the valve to its normal position, when the pressure is equalized.

E is an exhaust for main D-valve.

G is the steam governor chest, resting on the top of D' of the main steam-chest.

u u u are vent-holes extending through the piston U and the base of the steam governor chest, in order to equalize the steam-pressure in the steam governor chest G, as also over and around the governor-piston.

K K are journals on which the valve H turns or oscillates. The sockets beneath M may or may not be the arcs of a circle, but the arcs are so placed that as the roller 10 passes from the upper arc to the lower one it passes over an angle or obstacle. The valve H has two wings, 1 and 1'—one on either side, as shown in Fig. 1—wing 1 seating on passage F, and wing 1' seating on F'. The object of this construction is to bring the valve more quickly to the valve-seat, and decrease its oscillatory motion. The dotted lines in Fig. 1 show the position of the valve when seated on F'. Just back of the yoke M are placed the steam-cush-

ion cylinders 2 and 2', with double piston. In each of the cushion-cylinders is a piston, and each piston is precisely like the other, and they are connected by a bridge, 7, thus making them act as a double piston.

11 is a shoulder on the piston, and 4 is the small portion of the piston that projects beyond the shoulder, and is surrounded by the spiral spring 6. One end of this spring rests against the shoulder 11 and one end against the screw 3, which screw adjusts the piston to the required position, the piston moving in the screw 3 longitudinally. By turning screw 3 in one direction the spring 6 is compressed, and by turning it in the other direction the pressure is lessened.

12 and 12' are shoulders on the piston, and they are shown by dotted lines in Fig. 1.

5 and 5' are portions of the piston that pass into the cylinder 2 and 2'.

8 and 8' are steam-vents in the cushion-cylinders for admitting steam to equalize the pressure in such cylinders and to form a steam-cushion in each. The object of the springs is merely to hold the pistons in position, so as to have the steam-space in each steam-cushion cylinder equal, and in case a strong spring is used the spring acts also as a cushion.

The operation of my invention is as follows: When the engine is set in motion, as the speed increases, the governor-rod L depresses the piston U, planes T T, and roller 10 until the steam, entering the cylinder through port S', causes a current in F', which carries the wing 1' of valve H to its valve-seat, as shown by the dotted lines in Fig. 1. Just before the wing 1' reaches its seat the stem of valve H is brought in contact with the shoulder 12' on the cushion-piston in cushion-cylinder 2, thus retarding the motion of the valve H, and bringing the wing 1' to its seat without pounding. The wing 1', reaching its seat, cuts off the

steam from passage F', and as the main D-valve reverses its motion the steam, prior to the opening of port S, passes by means of vent J into passage F', when the spring brings H to its normal position, as shown in Fig. 1, and when S is opened a reverse current is created, and wing 1 of valve H is carried to its seat, its stroke being modified by the contact of the stem of valve H with shoulder 12 of the cushion-piston, and the operation is thus continued and the steam is alternately cut off from passages F and F'. In long D-valves I use the same principle, but separate the wings 1 and 1' from the stem of the valve, and connect them thereto by means of connecting-rods 9 and 9', as shown in Fig. 4.

The operation of the device shown in Fig. 4 is precisely the same as that shown in Fig. 1, and I use the cushion-cylinders and piston in the same manner.

Having thus described my invention, what I claim to have invented, and desire to secure by Letters Patent, is—

1. In an automatic cut-off valve, the oscillating valve H, provided with the wings 1 and 1', in combination with the sliding blade B, springs 13 13 13, roller 10, and socket under yoke M, all substantially as described.

2. The combination of the automatic oscillating valve H, the piston 7, provided with shoulders 12 and 12', and shoulder 11, the adjustable screws 3 and 3', cushion-cylinders 2 and 2', and springs 6 6, all substantially as described.

3. The combination of the separated wings 1 and 1', as shown, the blade B, valve-stem H', and connecting-rods 9 and 9', for the purpose set forth.

BENJAMIN F. OLMSTED.

Witnesses:

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FRED W. STEVENS.