

(No Model.)

2 Sheets—Sheet 1.

B. WEBSTER.

CUT-OFF VALVE.

No. 272,809.

Patented Feb. 20, 1883.

Fig. 1.

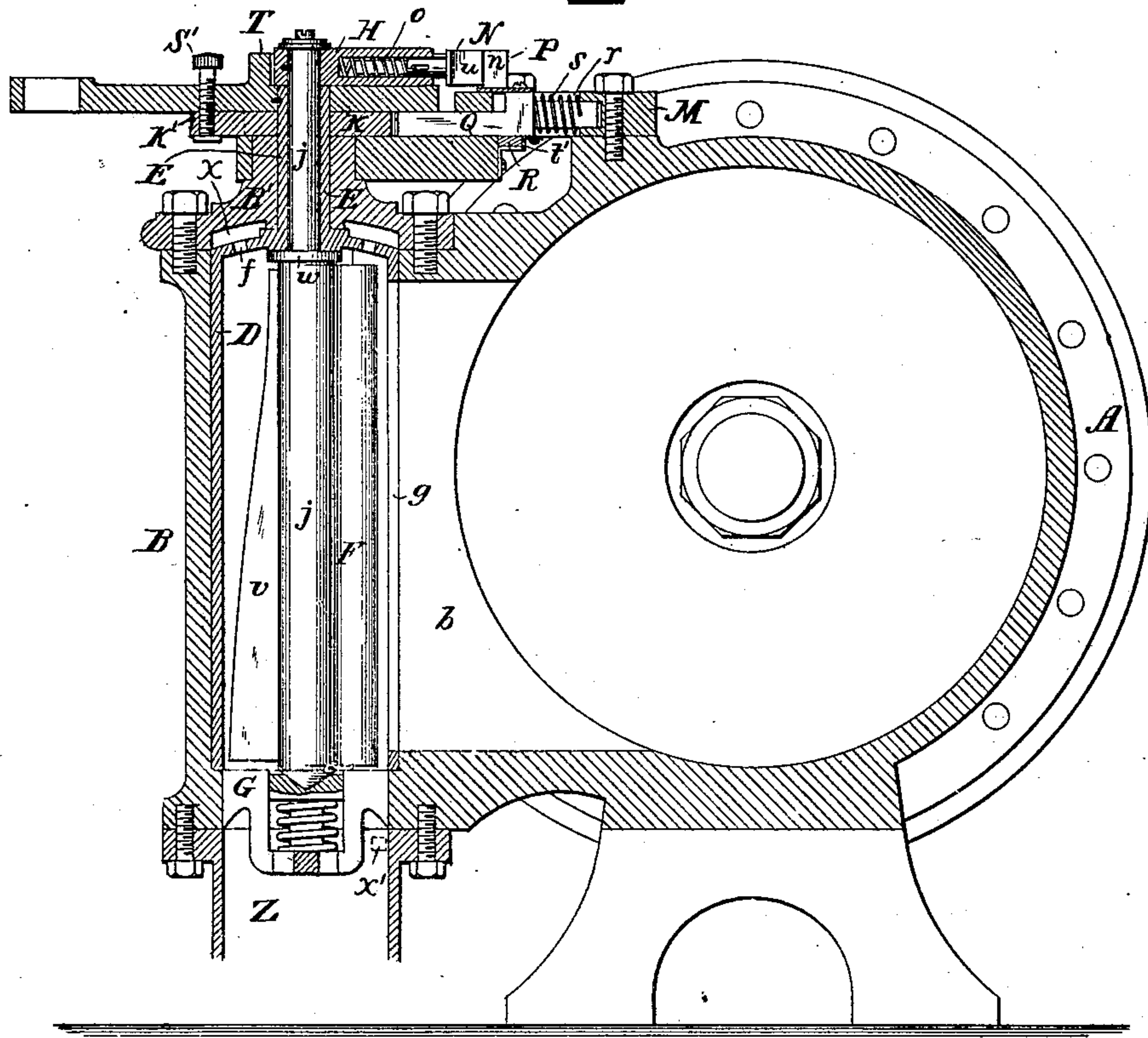
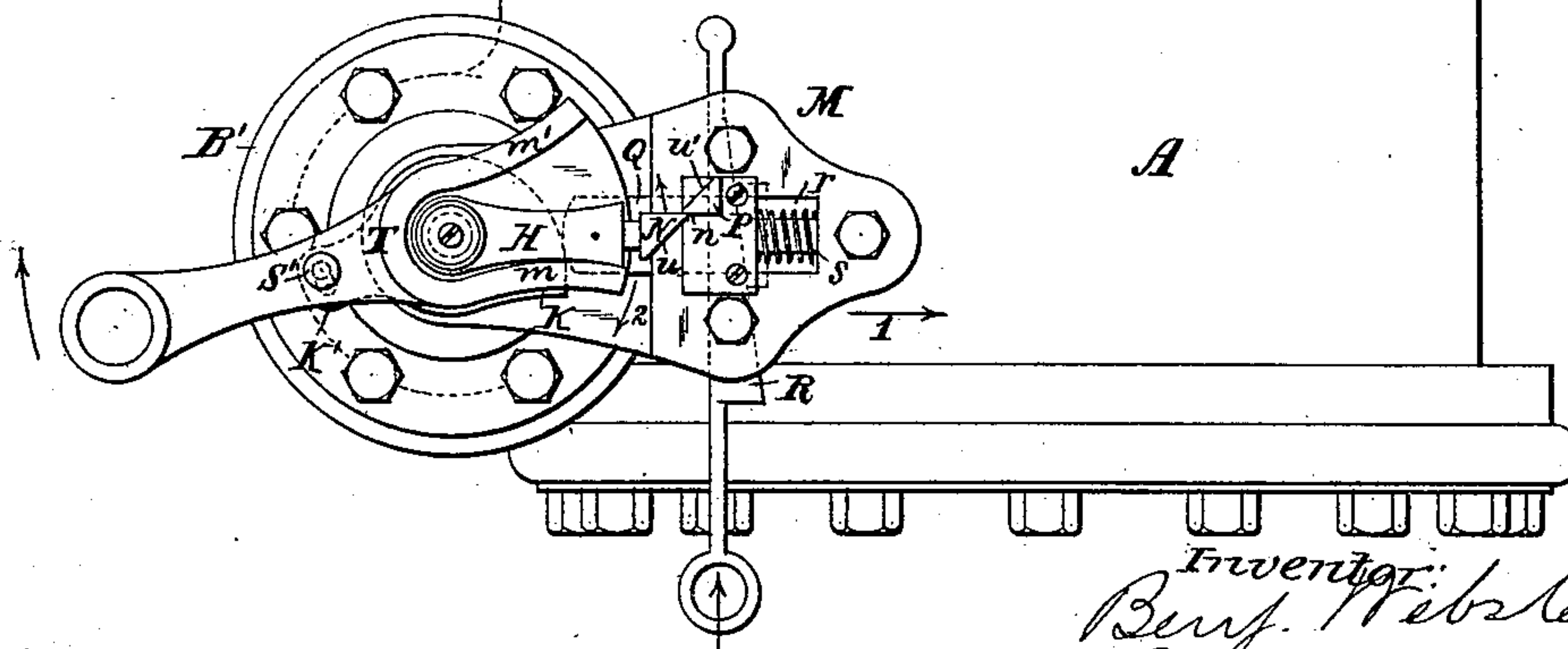


Fig. 2.



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Courtney & Cooper.

A. E. Hansmann.

Inventor:
B. Webster
By Charles E. Foster
his Attorney

(No Model.)

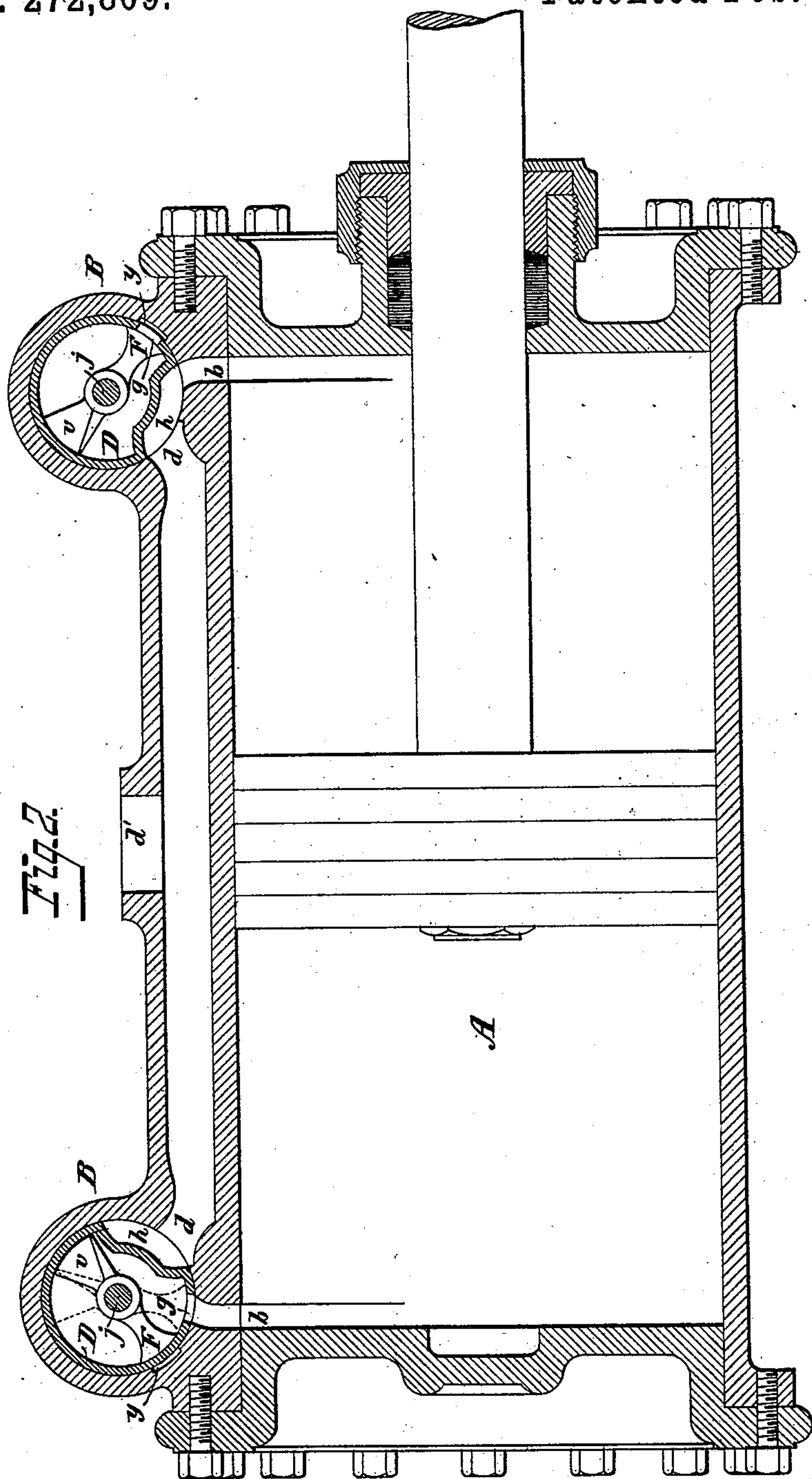
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A. E. S. Samsman.

Inventor:

B. Webster
By Charles E. Foster
his Attorney

UNITED STATES PATENT OFFICE.

BENJAMIN WEBSTER, OF BRIDGEPORT, CONNECTICUT.

CUT-OFF VALVE.

SPECIFICATION forming part of Letters Patent No. 272,809, dated February 20, 1883.

Application filed June 29, 1882. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN WEBSTER, residing at Bridgeport, Fairfield county, Connecticut, have invented certain Improvements in Cut-Off Valves for Steam-Engines, of which the following is a specification.

My invention is a valve device for steam-engines, constructed as fully described hereinafter, to facilitate construction, reduce friction, and secure an automatic cut-off, regulated, if desired, from the governor.

In the drawings, Figure 1 is a transverse section through the cylinder and one of the valves of a steam-engine, showing my improvement. Fig. 2 is a longitudinal section, and Fig. 3 is a plan of Fig. 2.

A is the cylinder, having the usual end ports, *b b*, which communicate each with a hollow vertical valve-casing, B, the two casings being in communication through ports *d d* with the channel leading to the exhaust-port *d'*. With the lower end of each casing B communicates a steam-pipe, Z.

Within each casing B is a hollow cylindrical valve, D, open at the lower end and closed at the upper end, with the exception of one or more small apertures, *f*, by which a communication is formed with a chamber, *x*, in the casing, above the valve, and from the upper end of the valve and through the bonnet or cap B' extends a hollow shaft or sleeve, E, connected to an arm, T, by which the valve is moved through the medium of any suitable appliances.

In each valve D is a port, *g*, which, in the position shown at the left, Fig. 2, coincides with the cylinder port *b*, an external depression or channel, *h*, in the valve communicating with the port *b*, and with the exhaust-port *d'* when the valve is in the position shown at the right, Fig. 2. When the parts thus constructed are in the position shown in Fig. 2 the steam entering the lower end of the valve D at the left passes through the ports *g b* to the piston, while the exhaust-steam passes through the other port, *b*, channel *h*, port *d*, to the exhaust-port *d'*. The moving of each valve so as to reverse its position admits the steam to the right-hand end and puts the opposite end of the cylinder in connection with the exhaust. The steam, passing from the inside of each

valve through the aperture *f* to the chamber *x*, enters a channel, *y*, Fig. 2, in the casing outside of the valve F, and extends to a port, *x'*, Fig. 1, below a spider, G, so as to maintain an equal pressure on both sides of the valve and balance the latter, so that the valve moves with but little friction.

As thus constructed, the parts may be used for engines in which the steam follows the piston for its full stroke; but for engines in which the steam is used expansively I employ cut-off valves F, each secured to or cast with a stem, *j*, the lower end of which rests in a socket of the spider G, while the upper end extends through the valve-sleeve E and carries an arm, H.

A shoulder, *w*, on the spindle supports the valve D. This permits the valve to turn with but little friction. The valve F is a single block extending from the spindle to the inner face of the valve D. These valves F are operated by any suitable appliances, so as to be held stationary until the valve D assumes the position shown at the left, Fig. 2, and until the steam is to be cut off, when by a quick movement the valve F is brought to the position shown in dotted lines, Fig. 2, thereby closing the port *g* and cutting off the steam. Various appliances may be used for imparting these movements to the valves. I will now describe those which I have found to be effective.

A curved blade, *v*, upon the valve-stem is so constructed that the flow of the steam through the valve D toward the port *g* will tend to turn the valve to the position shown in dotted lines at the left, Fig. 2. The cut-off-valve arm H lies between ribs or shoulders *m m'* on the arm T of the main valve, these ribs being so arranged as to permit a limited movement of the arm H independently of the arm T.

In the arm H slides the shaft of a catch, N, capable of a limited longitudinal motion, thrown outward by a spring, *o*, and having a beveled end face, *u*.

Upon a bracket, M, secured in a stationary position upon the casing B, is a stop, P, having a beveled face, *u'*, and a straight face, *n*. The action of the steam on the blade *v* tends to bring the straight face of the catch against the stop-face *n*. When the parts are in this

position the cut-off valve will be in the position shown in full lines at the left, Fig. 2. If, now, the stop P is carried outward in the direction of its arrow 1, Fig. 3, the catch N will
 5 be released and the steam will turn the spindle *j* and bring the arm H rapidly against the shoulder *m'*, carrying the valve F to the position shown in dotted lines, Fig. 2. As the arm T of the valve B moves in the opposite direction the inclined face *u* of the catch N is brought
 10 against the inclined face *u'* of the stop P and the catch N is forced back into the arm H until it leaves the stop, when the spring *o* will throw it outward to its first position.

15 When the cut-off is invariable the stop P may have a uniform motion effected by a cam, K, on the shaft E operating on a slide, Q, carrying the stop P, which slide projects through a slot, *r*, in the bracket M and bears against
 20 a spring, *s*, which will permit the block and stop to move slightly when the catch is carried in the direction of the arrow 2, Fig. 3, or when the cam K bears on the block.

To secure a variable cut-off I combine with
 25 the movable stop P appliances whereby its position is changed so as to carry it farther away from the catch as the governor is thrown out by the increased speed of the engine, thereby cutting off more quickly. Different devices
 30 may be employed for this purpose. I have shown a tapering key or wedge, R, bearing against a side of the bracket M and against a lip, *t'*, of the block Q, so as to set the latter and the stop farther from the catch as the key
 35 R is moved inward in the direction of its arrow as the speed of the governor increases. This causes the cut-off valve to be sooner released, cutting off at a less stroke.

The cam K may swing upon the sleeve E,
 40 and may be provided with an arm, K', and a screw, S', passing through a curved slot in the arm T, which will permit the cam to be set in any desired position.

While I have shown the valves F as provided with blades *v*, the latter may be dis-

pensed with, and the valves may be thrown by springs or otherwise.

I claim—

1. The combination, in a steam-engine, of a cylinder, A, hollow casings B, communicating
 50 with the end ports and with the exhaust, and hollow cylindrical valves D, arranged in said casings, communicating with steam-inlet ports or pipes, and having ports *g* and external channels, *h*, substantially as set forth. 55

2. The combination of the cylinder, hollow cylindrical valves having ports *g* and channels
 60 *h*, and end ports, *f*, and casings B, having chambers *x* and channels *y*, for the purpose specified. 65

3. The combination, with the cylindrical valves D, having ports *g* and channels *h*, of cut-off valves F, arranged within the valves
 65 D, adapted to close the ports *g*, and appliances whereby the valves D and F may be operated independently but relatively, substantially as set forth.

4. The combination, with the valve D, of the inside cut-off valve, F, constructed and provided with a curved blade, *v*, substantially as
 70 and for the purpose specified. 75

5. The combination of the valve D, provided with a rock-arm, T, the valve F, provided with a rock-arm, H, carrying a catch,
 75 N, a stop, P, and appliances, substantially as described, for moving the stop away from the catch, for the purpose specified.

6. The combination, with the stop P and devices for moving the same after its contact
 80 with the catch, of appliances adapted to be connected to and operated by the governor for automatically controlling the position of the stop P, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two
 85 scribing witnesses.

BENJAMIN WEBSTER.

Witnesses:

SAML. T. HOUGHTON,
 W. H. SILLIMAN.