

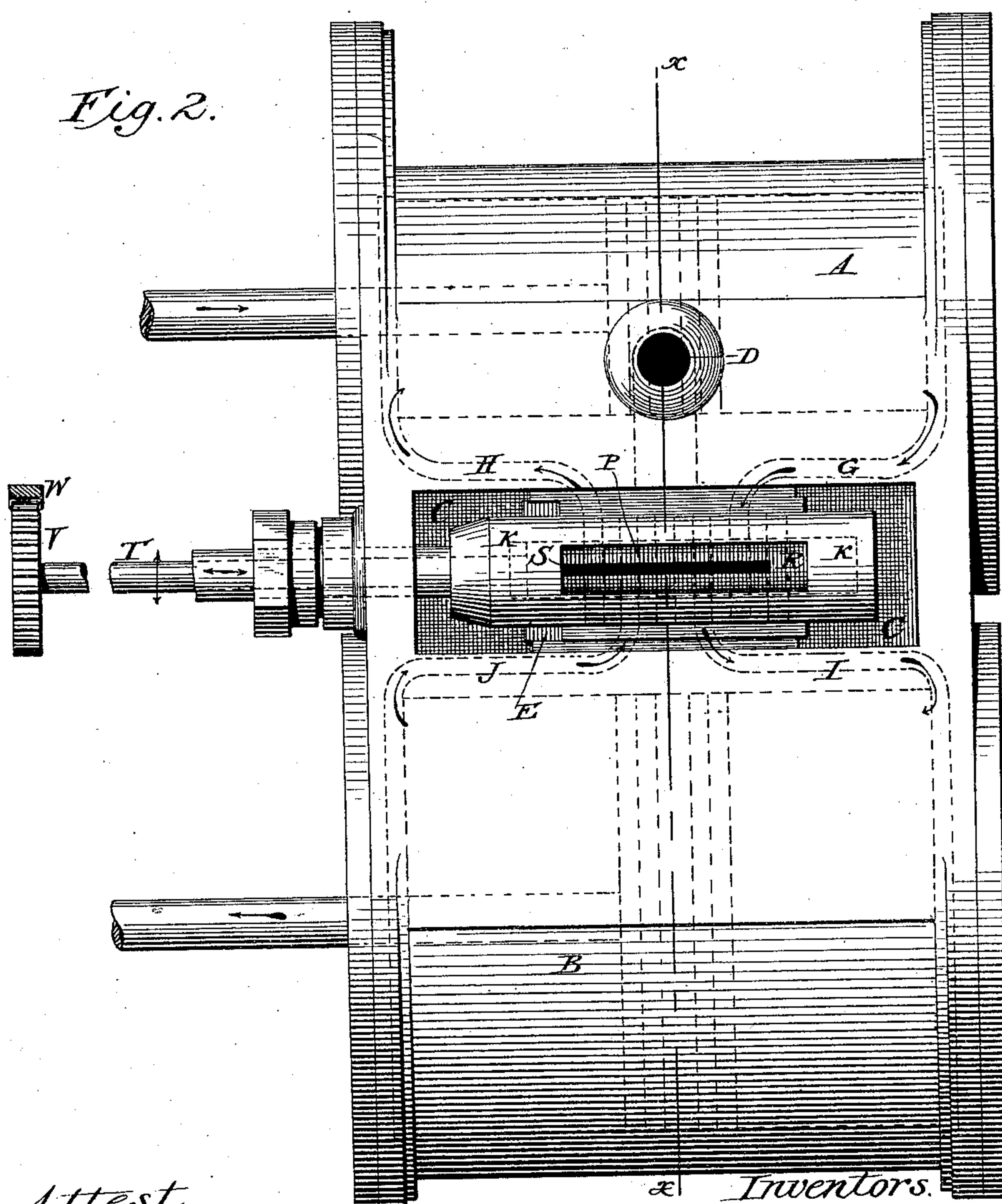
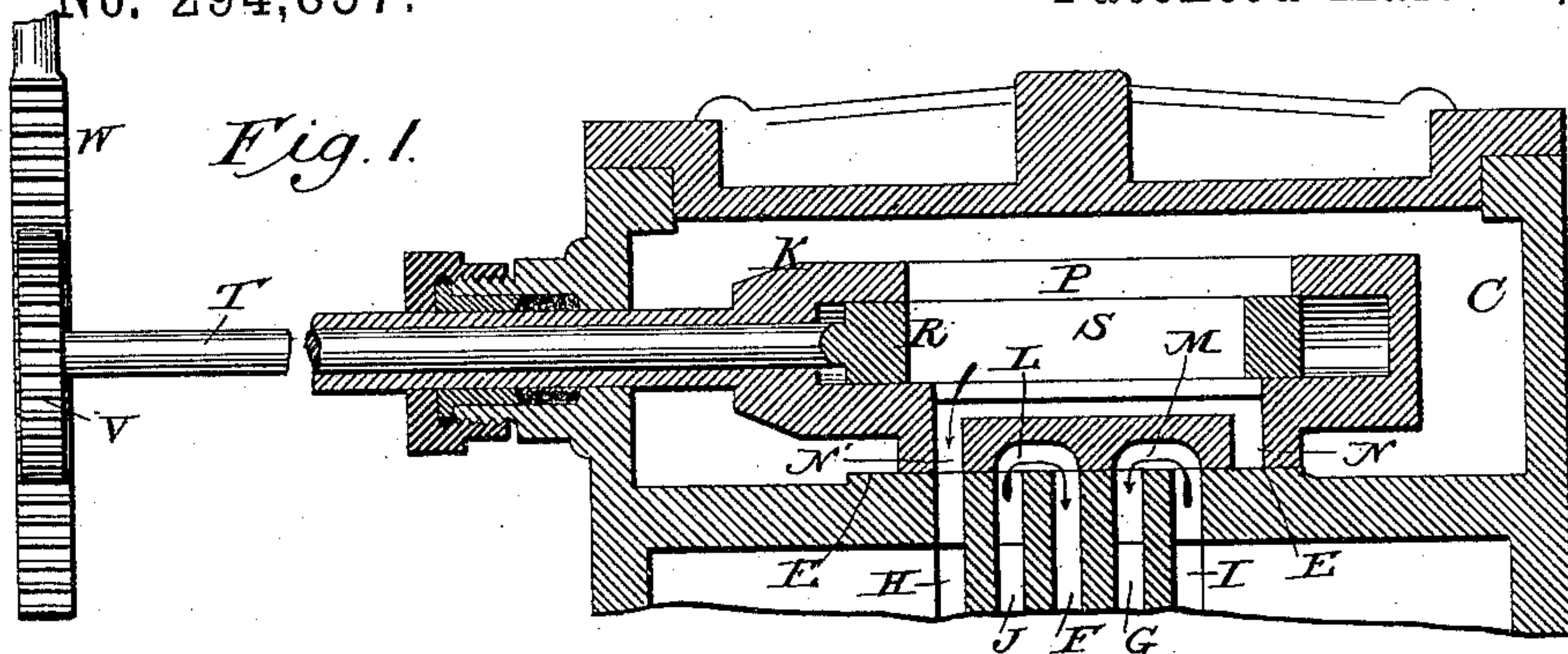
(No Model.)

2 Sheets—Sheet 1.

I. B. DAVIS & W. L. SHEPARD.
CUT-OFF VALVE.

No. 294,857.

Patented Mar. 11, 1884.



Attest.
Sidney P. Hollingsworth
Harry Shipley

Inventors.
I. B. Davis.
W. L. Shepard.
By Philip T. Dodge, Atty.

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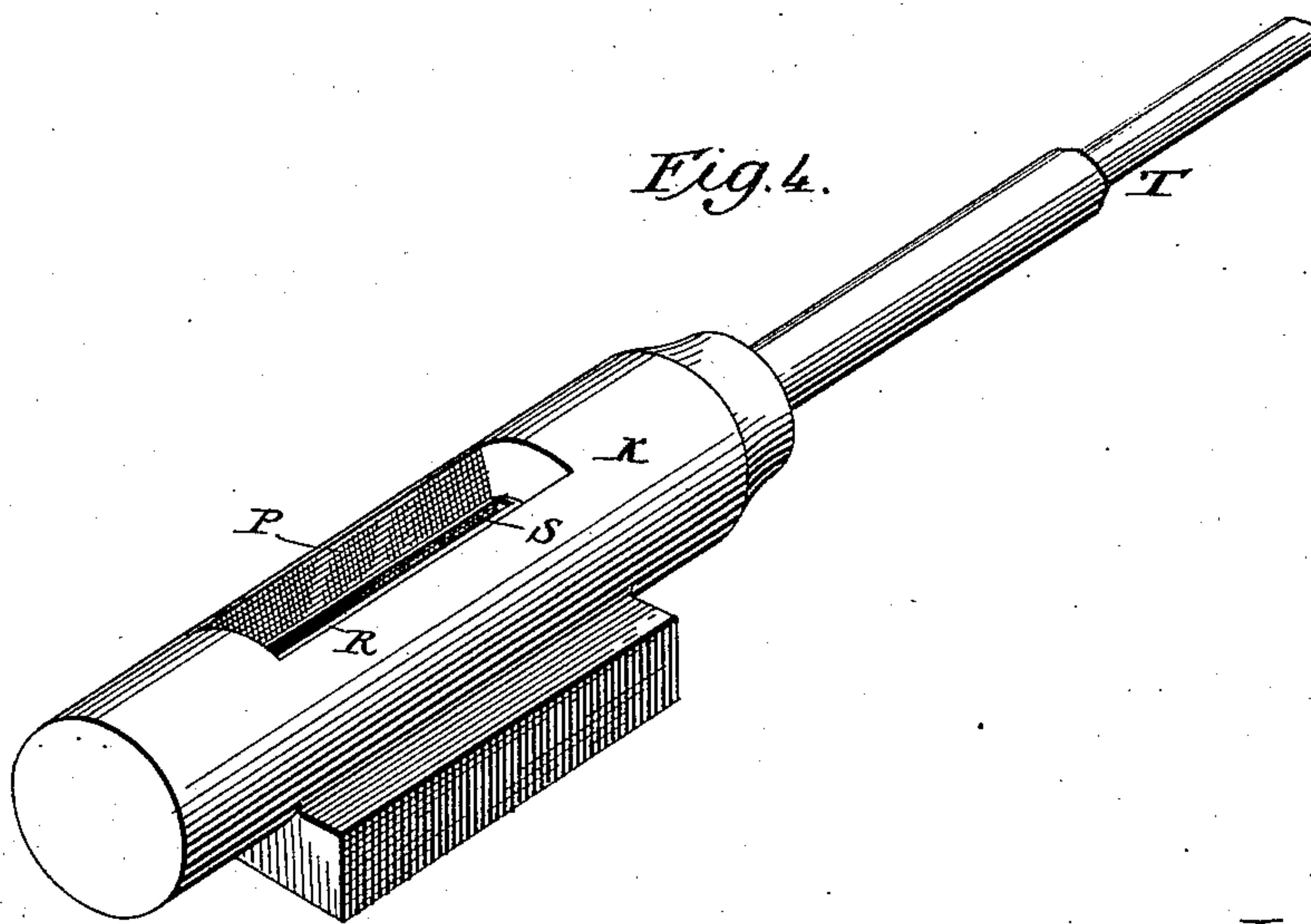
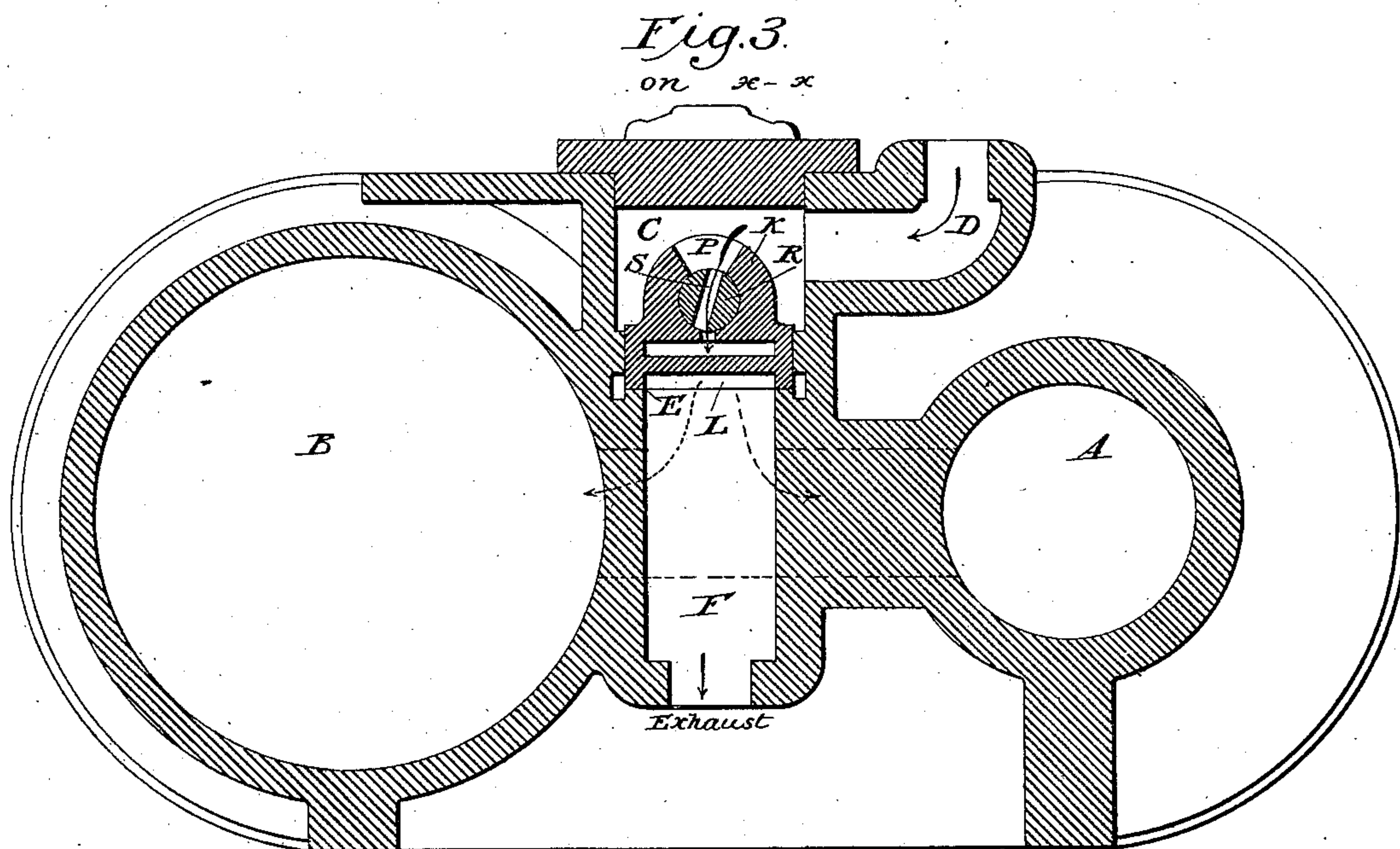
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Attorney

UNITED STATES PATENT OFFICE.

ISAAC B. DAVIS AND WILBUR L. SHEPARD, OF HARTFORD, CONNECTICUT.

CUT-OFF VALVE.

SPECIFICATION forming part of Letters Patent No. 294,857, dated March 11, 1884.

Application filed October 30, 1883. (No model.)

To all whom it may concern:

Be it known that we, ISAAC B. DAVIS and WILBUR L. SHEPARD, of Hartford, in the county of Hartford and State of Connecticut, have invented certain Improvements in Cut-Off Valves for Steam-Engines, of which the following is a specification.

The object of this invention is to provide a simple valve by which the admission of steam to and from both cylinders of a compound engine may be properly controlled.

To this end it consists, essentially, in a slide-valve having four ports in its face, to co-operate with five ports in the valve-seat, combined with a rotary or oscillating cut-off valve seated in and extended lengthwise of the slide-valve, to control the admission of steam through the same to the induction-ports, as will be hereinafter more fully explained.

Referring to the accompanying drawings, Figure 1 is a longitudinal vertical section through the valve mechanism and the ports connecting therewith. Fig. 2 is a top plan view of the valve mechanism in connection with the steam-chest ports and cylinders, the top of the valve-chest being removed to expose the internal parts to view. Fig. 3 is a vertical cross-section on the line *x x*. Fig. 4 is a perspective view of the valve proper.

Referring to the drawings, A and B represent the high and low pressure cylinders of the engine, arranged side by side in the ordinary manner; and C, the intermediate valve-chest, provided with the inlet-opening D, for the admission of live steam thereto. The valve-chamber is provided at the inner side with the flat seat E for the slide-valve. Through the center of this seat there extends a port, F, opening outward between the two cylinders, for the purpose of delivering the exhaust-steam from the engine.

From opposite ends of the cylinder A steam-ports G and H extend to the valve-chest, opening through the seat E in the positions indicated in Figs. 1 and 2. From opposite ends of the larger cylinder B steam-ports I and J are also extended to the steam-chest through the valve-seat E, in the positions represented in Figs. 1 and 2, these last-named ports being located on opposite sides of the exhaust-port, and between said port and those which com-

municate with the high-pressure cylinder, as plainly represented in Fig. 1.

Within the steam-chest is mounted a slide-valve, K, the lower face of which is provided with two independent ports, L and M, and also with two end ports, N and N', both of which communicate with a longitudinal opening or mortise, P, which extends upward through the back of the valve, for the purpose of admitting steam through the same to the ports. For the purpose of controlling this admission of steam through the valve a longitudinal rolling valve, R, is mounted therein, made of cylindrical form in cross-section, and provided with a longitudinal slit or port, S, extending diametrically through the same. When the opening of this valve registers with the opening P of the slide-valve, steam will be permitted to pass freely through the two valves from the back to the ports N N' in the front. By turning the valve R in either direction, so as to throw its port wholly or partly out of registration with the opening P, the admission of steam through the slide-valve will be diminished or entirely cut off. The cut-off valve R will be fixed ordinarily against end motion, but will be rotated by means of a stem or spindle, T, extended therefrom centrally through the operating-spindle U of the slide-valve. The outer end of the cut-off spindle T will be connected by a pinion, V, with a rack-bar, W, connected with a ball-governor, or a governor of any other approved form. The spindle of the slide-valve we will connect with eccentrics or other operating devices in the usual manner.

The ports of the slide-valve being proportioned and arranged as represented in the drawings, it will be perceived that when the spindle is moved to the left, as in Fig. 1, live steam will pass through the valves and through the port H to the left end of the high-pressure cylinder, while at the same time the high-pressure exhaust from the opposite end of said cylinder will be delivered therefrom through the port G and port M of the valve to the port I, and thence into the right-hand end of the low-pressure cylinder. The exhaust from the left-hand end of the low-pressure cylinder will escape through the port J and port L of the valve to the exhaust-port F, by which it will be delivered from the engine. On moving the slide-

valve to the right, the steam will be caused to pursue a reverse direction, live steam being admitted through the ports N, M, and G to the right-hand end of the high-pressure cylinder, while the exhaust-steam from said cylinder will pass through the ports H, L, and J to the left end of the low-pressure cylinder, which latter will exhaust from its right end through the ports I, M, and F. The rotation of the cut-off valve R, by varying the size of or closing the port P, will regulate the admission of live steam through the slide-valve, and will thus control the admission of steam at all times, regardless of the position in which the slide-valve may stand.

It is to be understood that the essence of our invention consists in the combination of the slide-valve for opening and closing the steam-ports of an oscillating valve extending lengthwise of said slide-valve, to control the admission of steam through the same to the ports, and, provided these characteristics are retained, the form and arrangement of the details may be modified to any extent which circumstances may render advisable.

It will also be understood that the slide and cut-off valve constructed on our plan may be operated by mechanism of any appropriate character.

We are aware that a single slide-valve has been arranged to control the admission and delivery of steam to and from both cylinders of a compound engine, also that an oscillating valve has been arranged transversely within a slide-valve, and to such constructions we lay no claim. The present invention is restricted to those matters and things which are herein-after claimed, and as to all matters which may

be described or shown, but which are not claimed, the right is reserved to make the same the subject of a separate application.

Having thus described our invention, what we claim is—

1. In a compound engine, the two cylinders, each with two steam-ports, the exhaust-port, the slide-valve constructed, as described, with a steam-passage through the same from front to back, and the oscillating cut-off valve mounted lengthwise within the slide-valve, substantially as described.

2. The combination, with the slide-valve having the tubular stem or spindle and the steam-passage through its body, of the oscillating cut-off valve mounted lengthwise therein, with its spindle extended centrally through the tubular spindle.

3. In combination with the high and low pressure cylinders and the five ports opening into the steam-chest, as described, the slide-valve provided with the ports L, M, N, N', and P, and the longitudinal oscillating cut-off valve R, as described and shown.

4. In combination with a slide-valve having a longitudinal slit or passage for the admission of live steam through the same from the outside, substantially as described, the oscillating valve R, mounted lengthwise therein, with a corresponding longitudinal port or slit, said oscillating valve being fixed against end motion.

ISAAC B. DAVIS.

WILBUR L. SHEPARD.

Witnesses:

HOSMER P. REDFIELD,
ALLEN H. NEWTON.