

(No Model.)

D. H. DUGAR.

CUT-OFF VALVE.

No. 335,995.

Patented Feb. 9, 1886.

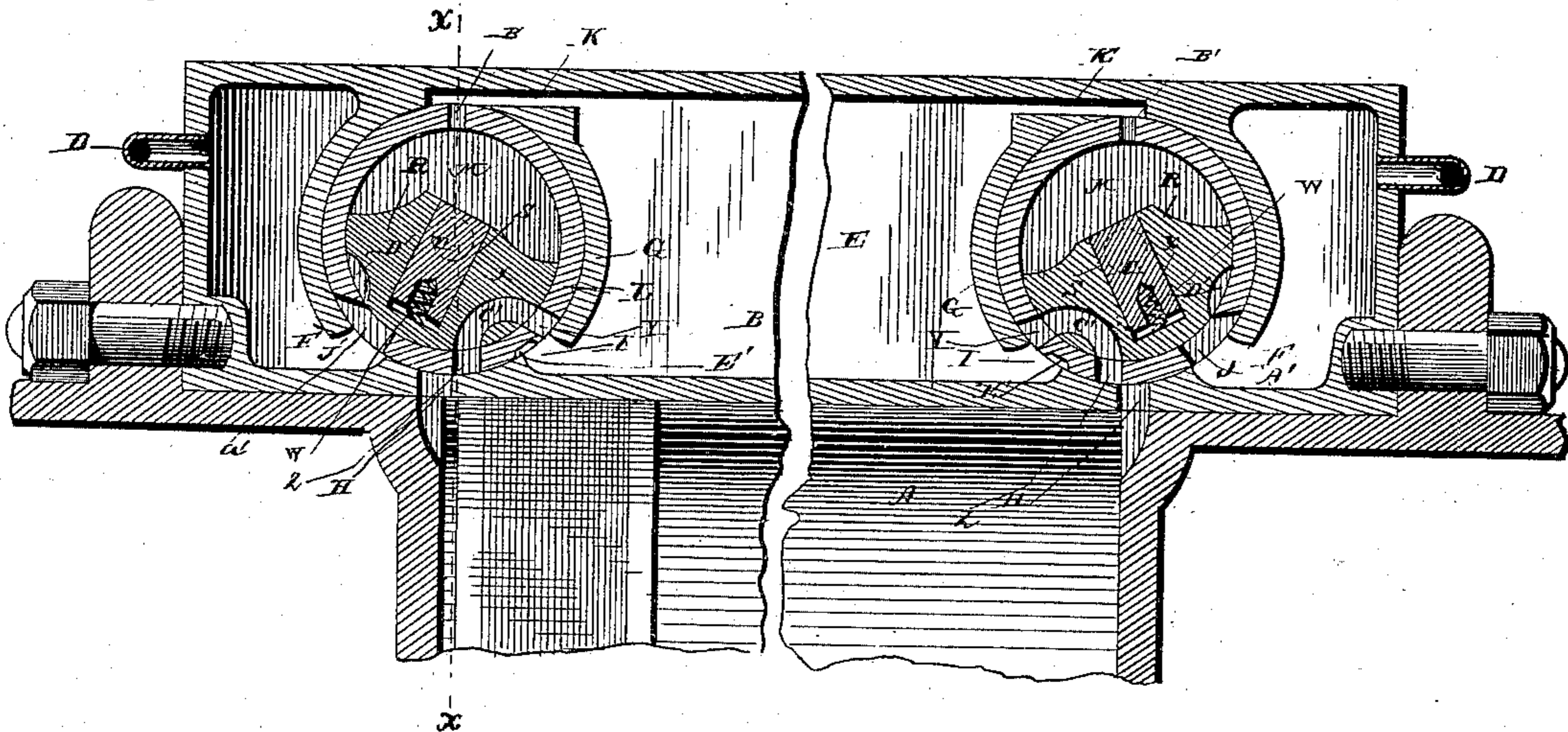
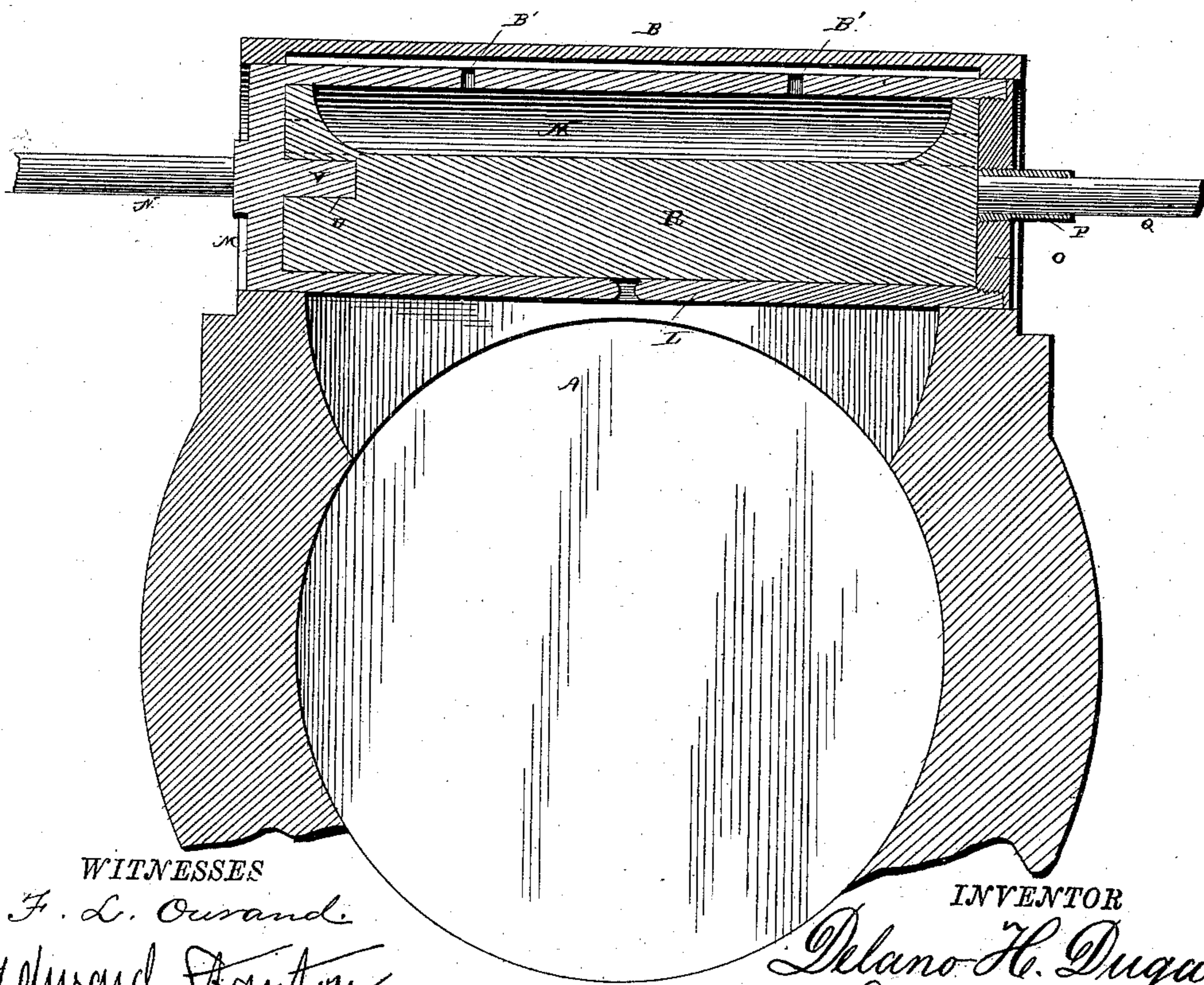


Fig. 2



WITNESSES

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UNITED STATES PATENT OFFICE.

DELANO H. DUGAR, OF CEDARTOWN, GEORGIA.

CUT-OFF VALVE.

SPECIFICATION forming part of Letters Patent No. 335,995, dated February 9, 1886.

Application filed November 13, 1885. Serial No. 182,725. (No model.)

To all whom it may concern:

Be it known that I, DELANO H. DUGAR, a citizen of the United States, and a resident of Cedartown, in the county of Polk and State of Georgia, have invented certain new and useful Improvements in Cut-Off Valves; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a longitudinal sectional view of a steam-cylinder provided with my improved valves; and Fig. 2 is a transverse section on line *x x*, Fig. 1.

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

My invention has relation to balanced rotary valves for steam-engines having cut-off; and it consists in the improved construction and combination of parts of such a valve, as hereinafter more fully described and claimed.

In the accompanying drawings the letter A indicates the cylinder of a steam-engine, to one side of which cylinder is secured a chamber, B, into the middle of which the usual live-steam pipe, which I have not deemed it necessary to illustrate in the drawings, enters, while the exhaust-pipes D D, which are preferably united to form one exhaust-pipe at a distance from the chamber, enter the ends of the chamber. The central steam-chamber, E, and the exhaust-chambers F F at the ends of chamber B are separated by means of cylindrical valve-casings G G, which communicate through steam-ports H H with the ends of the steam-cylinder, and through live-steam ports I I with the live-steam chamber, and through exhaust-ports J J with the exhaust-chambers, the said three ports in each valve-casing being placed close together. A channel, K, opens from the live-steam chamber into each valve-casing at a point diametrically opposite to the steam-port in the same. The valves L consist each of a hollow cylinder, M, closed at one end and provided with an axial-stem, N, at that end, and having a head, O, removably secured into the other end, preferably screwed into the end, as shown in the drawings, and this head is formed with a cen-

tral box or bearing, P, through which the stem Q of the cut-off valve R passes, and in which it may turn freely. The cut-off valve has a cylindrical face, which fits upon the inner surface of the hollow valve, and in the back of the cut-off valve, the cylindrical face of which covers about one-half of the inner surface of the hollow valve, is formed a longitudinal groove or recess, S, within which fits a wing, T, projecting from the valve-stem of the cut-off valve, the inner end of which stem has an axial bore, U, into which a lug, V, projecting axially from the inner side of the closed end of the hollow valve fits, the valve-stem rocking upon the said lug. The wing upon the valve-stem is formed with a longitudinal groove, W, in its outer edge, or with a number of recesses, and in this groove or recesses a number of springs, *x*, fit, which bear against the bottom of the recess in the cut-off valve and against the bottom of the groove or the recesses in the wing, thus allowing the cut-off valve a certain amount of play upon its stem. The hollow-valve is formed with two ports, Y and Z, which may register with the steam-port and the live-steam port in the valve-casing, and with an exhaust-aperture, A', which may connect the steam-port and the exhaust-port in the valve-casing and at a point nearly diametrically opposite to the port in the hollow valve registering with the steam-port the hollow valve is formed with a number of apertures, B', which may register with the channel in that part of the valve-casing. The cut-off valve is formed in its cylindrical face with a curved channel, C', the ends of which may register with the steam-ports of the hollow valve and with a recess, D', which may register with the exhaust-aperture in the hollow valve. The outer face of the hollow valve is preferably formed with a longitudinal groove or recess, E', in the space between the two live-steam ports in the same, which groove or recess may communicate with the live-steam port of the valve-casing when the exhaust-aperture of the hollow valve registers with the exhaust-port in the valve-casing. It will now be seen that the hollow valve and the cut-off valve will at the beginning of each stroke rock in the same direction, having their respective ports (either steam or exhaust ports) register-

ing with each other, but that at the end of each stroke in either direction the cut-off valve will commence to rock in a direction opposite to the direction in which the hollow valve rocks, and will consequently cut off the flow of steam—live steam or exhaust-steam, as the case may be—in the usual manner of cut-off valves, the time for reversing the revolution of the cut-off valve being capable of adjustment by suitable mechanism, which is not shown here, and which may be of any suitable construction. The valve being at one side exposed to the full boiler-pressure of the steam in the live-steam chamber, and being at the other side (at the exhaust) only exposed to the atmospheric pressure, the valve would be forced toward the exhaust side of the casing and would cut and wear the same if means did not exist for balancing this uneven pressure, and the channel in the upper part of the valve-casing will allow the steam to press against the hollow valve with the same pressure with which it presses against the lower side of the valve, so that the pressure is equalized; but at the time when the steam-ports in the hollow valve register with the steam-port and with the live-steam port of the valve-casing the live steam has no place to press against the hollow valve from below, while it will press upon the upper side of the valve, and for this purpose the space between the steam-port and the live-steam port of the hollow valve is formed with the longitudinal groove or recess, which will counteract the pressure from above. The pressure from below upon the cut-off valve is counteracted by the live steam entering the hollow valve from above through the apertures in the same, so that the cut-off valve, which has free play upon its stem, may be pressed against its seat upon the inner surface of the hollow valve, while the pressure of the live steam from below will prevent it from bearing too hard against its seat and from cutting or wearing it. It will be seen that all the steam used for balancing the valves passes back into the live-steam chamber again, so that there will be no waste of steam, as in the case of several balanced valves where the steam used for balancing the valve will pass out with the exhaust without doing other work than balancing the valve.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination of a cylindrical valve-casing having the distributing-ports at one side, and having a channel communicating with the live-steam chamber at the diametrically-opposite side, a hollow cylindrical valve fitting within the casing and having distributing-ports registering with the ports of the casing, and having perforations registering with the channel communicating with its interior, and a cut-off valve having a semi-cylindrical face formed with distributing channels or apertures registering with the aper-

tures in the hollow valve and bearing against the apertured inner surface of the said valve, as and for the purpose shown and set forth. 70

2. The combination of a live-steam chamber, an exhaust-chamber, a cylindrical valve-casing placed between the chambers, and having at its lower side a live-steam port and an exhaust-port and a steam-port into the cylinder, and having at its upper side a live-steam channel, a hollow cylindrical valve fitting in the casing, and having two steam-ports and an exhaust-aperture registering, respectively, with the steam-port and the live-steam port of the valve-casing and with the steam-port and exhaust-port in its lower portion, and having in its upper portion apertures registering with the live-steam channel, and a cut-off valve having a semi-cylindrical face formed with a steam-channel and with an exhaust-recess, and rocking against the apertured lower portion of the inner surface of the hollow valve, as and for the purpose shown and set forth. 80 85 90

3. The combination of a valve-casing cylindrical in shape, and having a steam-port and a live-steam port and exhaust-port in its lower side, and a live-steam channel in its upper side, with a cylindrical valve having ports registering with the ports of the valve-casing, and having a groove or recess in the space between the ports registering with the live-steam port and the steam-port of the casing, as and for the purpose shown and set forth. 95 100

4. The combination of a cylindrical valve-chamber having steam-port and live-steam port and exhaust-port in its lower side, and having a live-steam channel in its upper side, a hollow cylindrical valve fitting in the valve-chamber, and having steam and exhaust ports registering with the ports of the valve-chamber, and having apertures in its upper side registering with the live-steam channel, an axial valve-stem having a wing at one side formed with a groove in its outer edge provided with springs, and a semi-cylindrical cut-off valve having channels in its cylindrical face registering with the ports of the hollow valve, and having a recess in its back receiving the wing of the valve-stem, with the springs bearing against its bottom, as and for the purpose shown and set forth. 105 110 115

5. The combination of a live-steam chamber, an exhaust-chamber, a cylindrical valve-casing placed between the chambers and having a steam-port into the steam-cylinder and a live-steam port and an exhaust-port at the sides of the steam-port, and provided with a live-steam channel at a point opposite to the steam-port, a hollow cylindrical valve fitting in the casing and having steam-ports registering with the steam-port and with the live-steam port, and having an exhaust-aperture registering with the steam-port and with the exhaust-port, and formed with apertures registering with the live-steam channel, and with a longitudinal groove or recess in the space between the steam-ports, an axial cut-off- 120 125 130

valve stem having a laterally-projecting wing
formed with a longitudinal groove in its outer
edge provided with springs, and a semi-cy-
lindrical cut-off valve having a curved steam-
5 channel registering at its apertures with the
steam-ports of the hollow valve, and an exhaust-
recess registering with the exhaust-aperture
of the hollow cylinder, and having a longi-
tudinal recess in its back for the wing of the
10 valve-stem, with the springs bearing against

the bottom of the same, as and for the purpose
shown and set forth.

In testimony that I claim the foregoing as
my own I have hereunto affixed my signature
in presence of two witnesses.

DELANO H. DUGAR.

Witnesses:

THOMAS BURRY,
FRANK S. RUTTER.