

C. H. Parshall,
Steam-Engine Balanced Valve.

N^o 43,334.

Patented June 28, 1864.

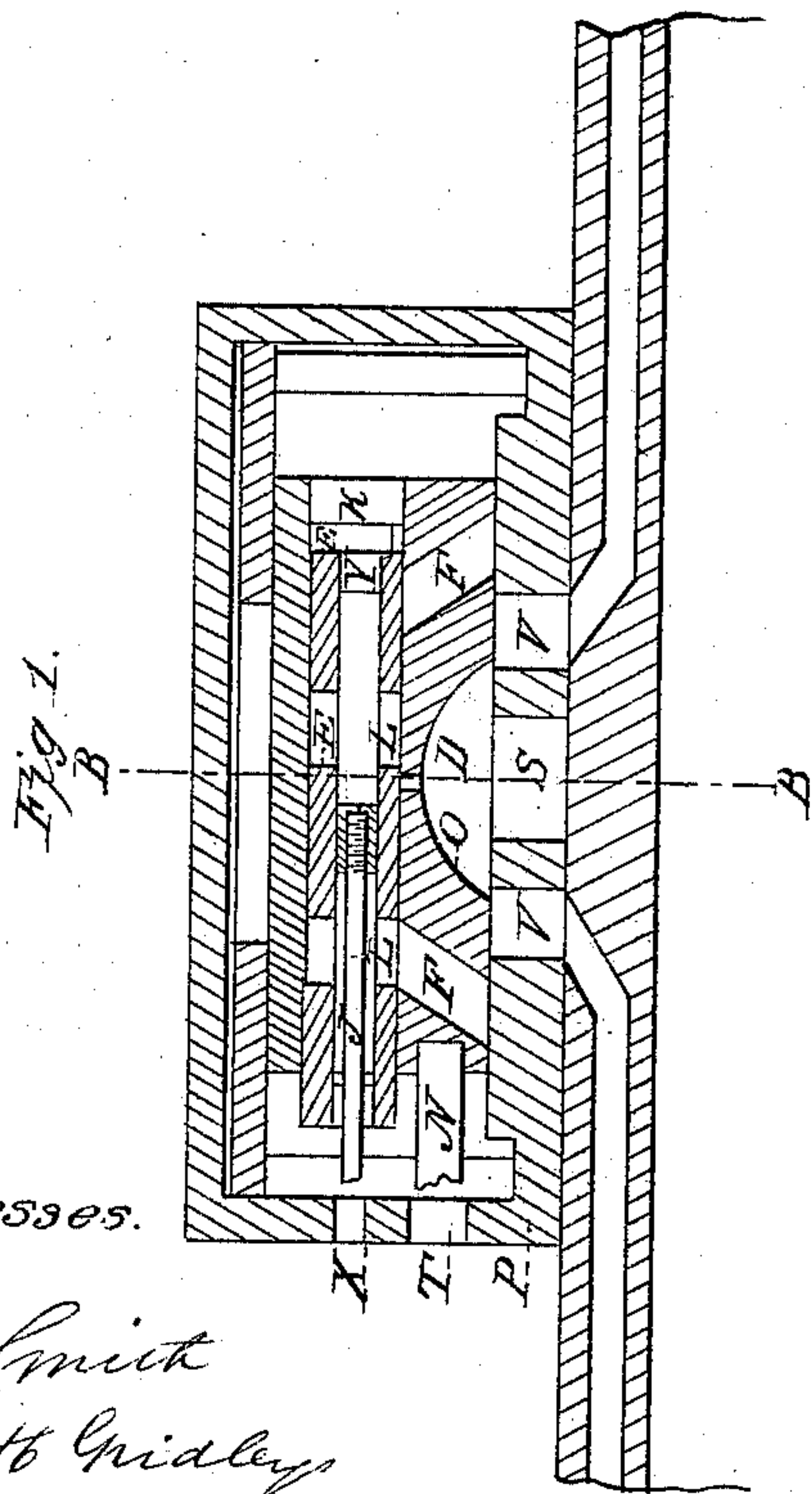
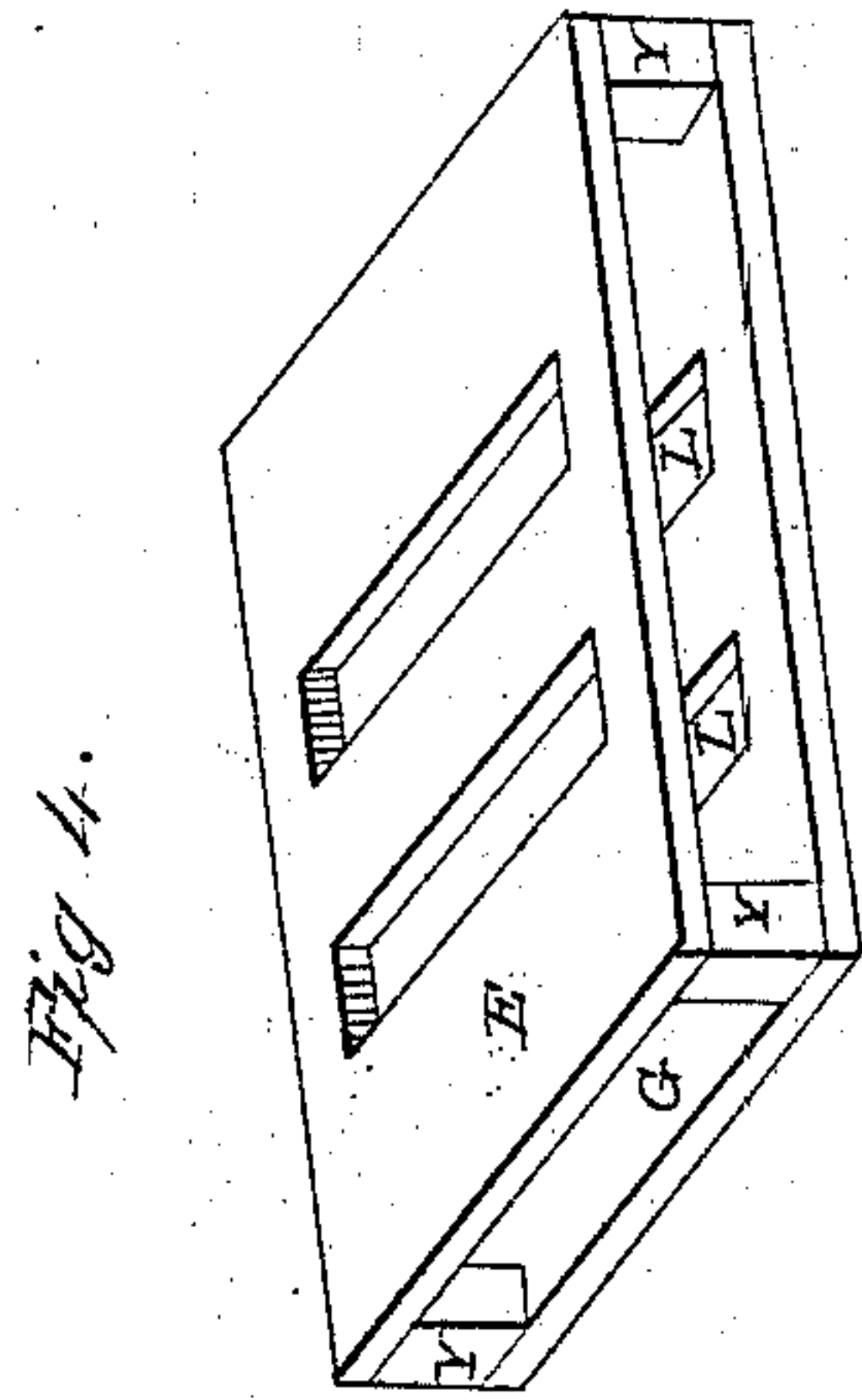
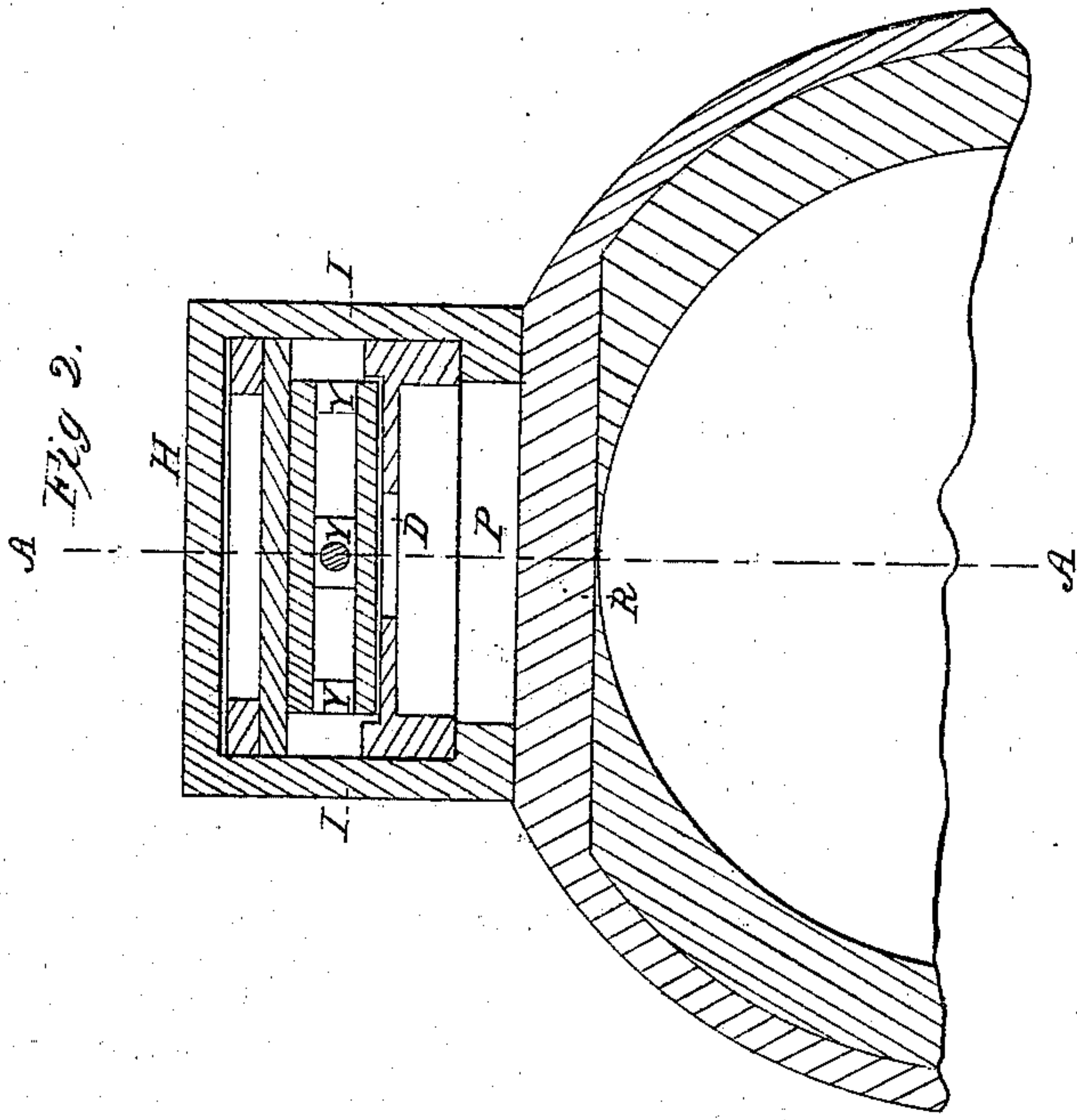
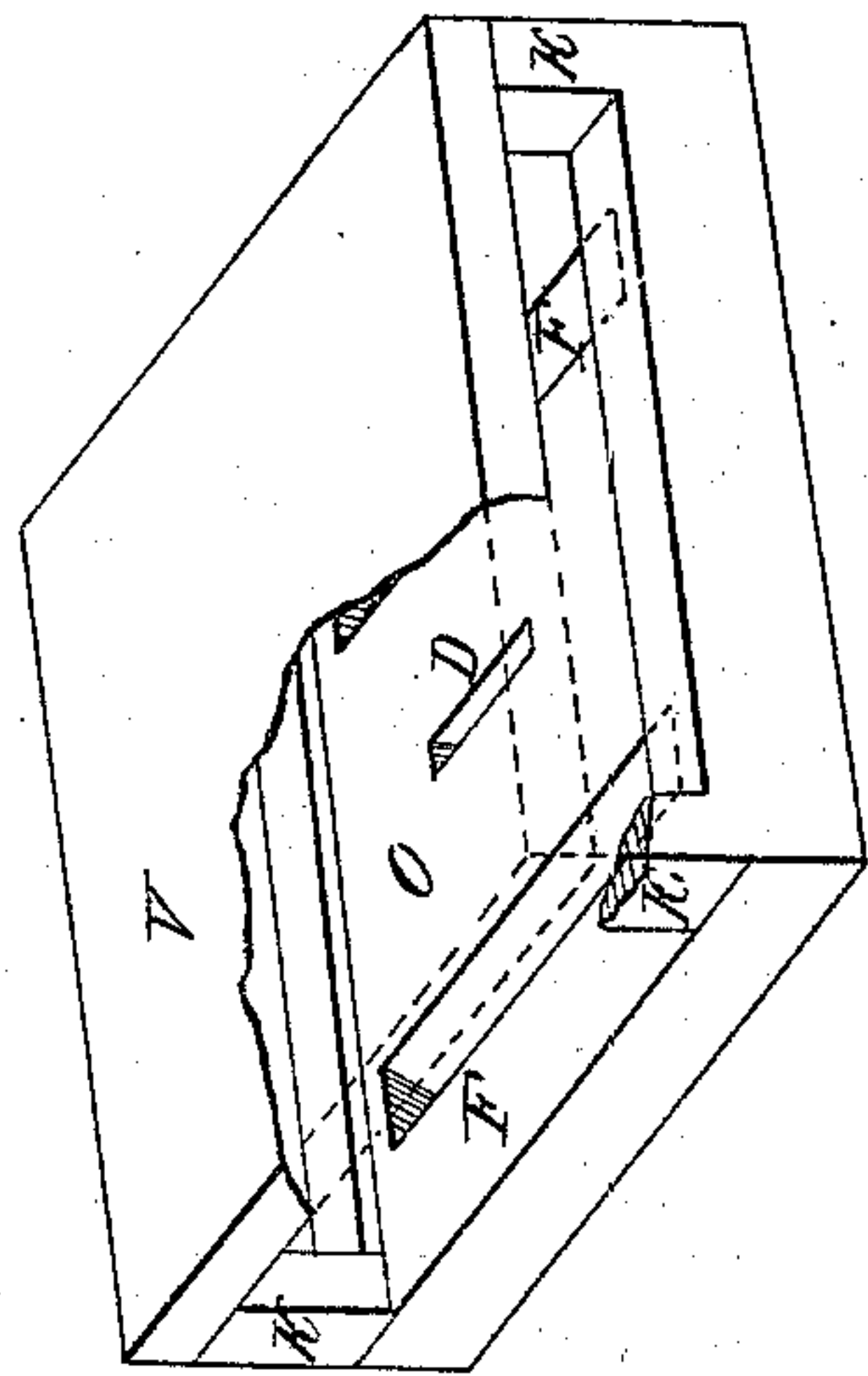


Fig 3.



Witnesses.

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Inventor.

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UNITED STATES PATENT OFFICE.

CHARLES H. PARSHALL, OF DETROIT, MICHIGAN.

IMPROVEMENT IN CUT-OFF VALVES.

Specification forming part of Letters Patent No. 43,334, dated June 28, 1864.

To all whom it may concern:

Be it known that I, CHARLES H. PARSHALL, of the city of Detroit, in the county of Wayne, in the State of Michigan, have invented a new and improved mode of balancing slide cut-offs used in steam-chests for cutting off steam from the cylinders of steam-engines at any point of the piston-stroke; and I do declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming a part of this specification, in which—

Figure 1 is a vertical section, A A', of steam-chest and cylinder, showing my invention. Fig. 2 is a vertical cross section, B B', of steam-chest and cylinder also showing my invention. Fig. 3 is a perspective view of valve O and plate V as fastened to it. Fig. 4 is a perspective view of my cut-off G and plate E as fastened to it.

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

The nature of my invention consists in providing a slide cut-off used in steam-chests for cutting off steam from the cylinders of steam-engines at any point of the piston-stroke, which cut-off will be balanced as to the pressure on it of the steam in steam-chest, and also as to its pressure on the valve from its own weight, whereby I do away with a large amount of friction, also require much less steam-power to perform a given amount of work, and also diminish the natural wear of the machinery.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I construct my valve O and valve-seat P in a well-known mode and form, the valve being a rectangular plate, making a steam-tight joint with the valve-seat, and having in it the usual exhaust concave and ports F F', one for each end of the cylinder R, and to let the steam into it through the corresponding ports U U' of the valve-seat P. My valve-seat has also the usual exhaust-port S, for conveying off the steam after its use in the cylinder. I also give motion to the valve O in the well-known mode by means of a valve-rod, N, to which it is fastened.

I construct my cut-off G in the usual mode and form, being a rectangular plate of suitable

thickness, strength, width, and length for its purpose, and having in it the steam-ports L L', to connect as required with the corresponding ports, F F', of the valve and U U' of the valve-seat. In the usual mode I place it on the valve and give it its sliding motion by means of a cut-off rod, J, to which it is fastened.

By means of connecting-standards Y Y' and screws, or by means of solid casting, or any other convenient means, I fasten a plate, E, of suitable strength and thickness, firmly to and over the cut-off G, parallel to it, and at a suitable distance from it, to allow the steam to pass freely between the plate E and cut-off from one end of the steam-chest to the other. The cut-off G and plate E, when thus either made in one piece or otherwise fastened together, will move in connection with each other as one body, G E; also, I construct the plate E so as to be of the same width and length as the cut-off G, so as to have in it openings opposite corresponding in position and equal in areas to the ports F F' of the cut-off G, and so as to have an upper surface area equal to the lower surface area of the cut-off G.

By means of connecting-standards K and screws, or by means of solid casting or any other convenient means, I fasten firmly to and over the valve, and parallel to it, the plate V, of suitable thickness and strength and of the same upper surface area as the plane lower surface area of the valve. When thus fastened, the plate V and valve O will move in connection with each other as one body, O V; also, I fasten the plate V, as above described, at a suitable distance from the valve O, to receive and allow the sliding between them of my cut-off G in connection with the plate E fastened to it, as herein described; also, by scraping or other convenient means I cause the lower surface of plate V and upper surface of plate E to make with each other a steam-tight joint.

Over the center of the exhaust-port S in the valve-seat, and through the center of the valve O, I make an aperture, D, in order to allow the atmospheric pressure to act through the exhaust-port and through such aperture upon and against the cut-off G, said aperture D to be of the dimensions hereinafter specified.

My invention, being thus constructed, will

operate as follows—that is to say: The pressure of steam in the steam-chest being removed from the lower surface of the cut-off G by means of its steam-tight joint with the valve O, it is also removed from the upper surface of the plate E by means of plate V, which makes a steam-tight joint with it, and it is for this purpose that I use plate V, constructed, fastened, and arranged as herein described. By means of plate E the downward steam-pressure on the upper surface of the cut-off G is balanced by an equal upward and opposite steam-pressure on the lower surface of plate E; and it is for this purpose that I use plate E, constructed, fastened, and arranged as herein described. Thus my cut-off G is balanced so that the pressure of steam in steam-chest neither forces it against the valve O nor presses the plate E against the plate V. By means of the aperture D through the center of the valve and over the exhaust-port S, I subject the cut off G to an atmospheric pressure sufficient, according to the usual estimated weight of the atmosphere, to balance the pressure of the cut-off G on the valve O from its own weight and that of the parts fastened to it, as herein described. In cases where the cut-off works to a perpendicular valve, such aperture is not made or required, and in cases where it works on an inclined valve such aperture will vary in size under varying angles of inclination, and consequent varying pressures of the cut-off G in the valve O from its own weight and that of the parts fastened to it, as herein described.

By thus balancing my cut-off I do away

with a large amount of friction on the cut-off valve and other parts of the engine; also with the increase of steam used to overcome the friction thus done away with, and also with the wear of machinery naturally caused by the friction thus done away with and by the increase of steam to overcome it.

Letters of reference are marked on the accompanying drawings, not before referred to, as follows, viz., H being cover of the steam-chest, I being sides of steam-chest, T being the gland of stuffing-box of valve-rod N, X being gland of stuffing-box of cut-off rod J.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The plate V, constructed, arranged, and used for the purposes and substantially as herein shown and described.

2. The balanced cut-off valve G E, constructed and operating substantially as described.

3. The aperture D, in center of valve and over exhaust-port S, constructed, arranged, and used in combination with the cut-off valve G E, for the purposes and substantially as herein shown and described.

4. The plate V, plate E, aperture D, and cut-off G, in combination, all constructed, arranged, and used for the purposes and substantially as herein shown and described.

Dated at Detroit, this 28th day of December, A. D. 1863.

CHARLES H. PARSHALL.

Witnesses:

CHARLES D. SMITH,
JAMES H. GRIDLEY.