J. C. H. STUT.

VALVE-GEAR FOR STEAM-ENGINE.

No. 187,931. Patented Feb. 27, 1877.

Fig. 1.

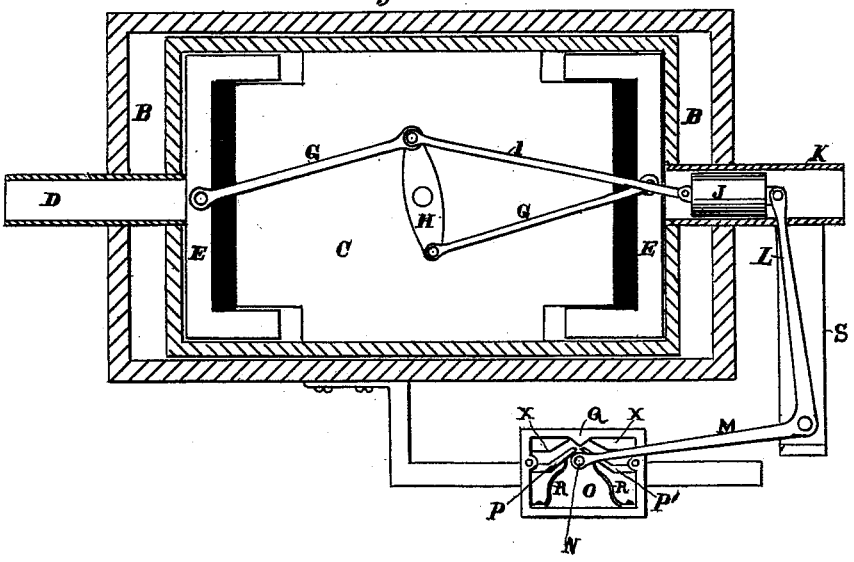


Fig. 2.

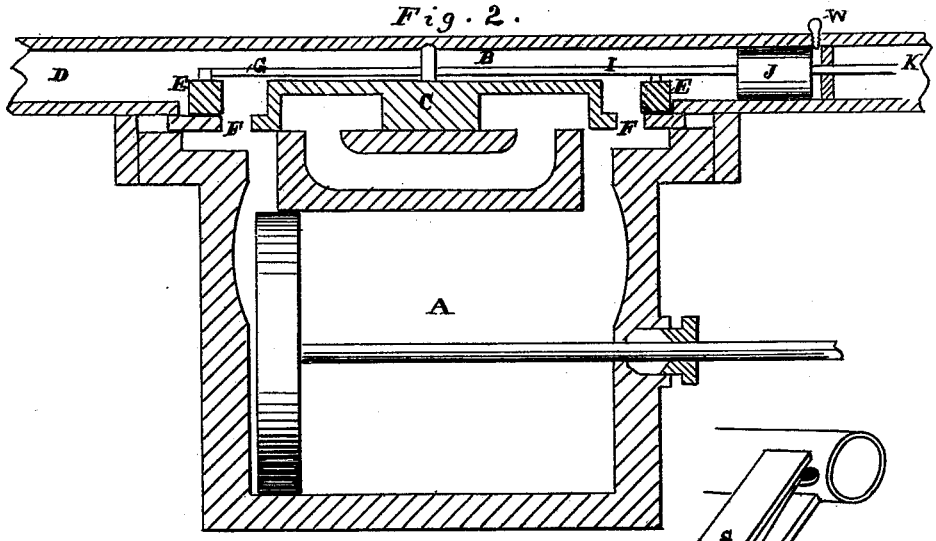
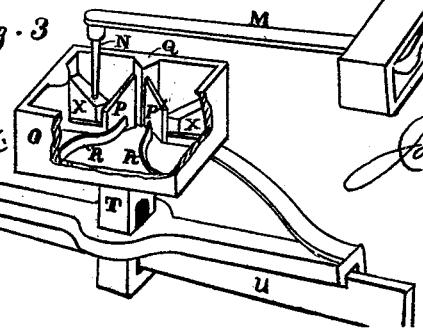


Fig. 3



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN C. H. STUT, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN VALVE-GEAR FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **187,931**, dated February 27, 1877; application filed December 19, 1876.

To all whom it may concern:

Be it known that I, JOHN C. H. STUT, of the city and county of San Francisco, and State of California, have invented an Improved Valve-Gear for Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention relates to certain improvements in valve-gear for engines, and in the several combinations of devices hereinafter explained and claimed.

Referring to the accompanying drawings for a more complete explanation of my invention, A is the cylinder, and B is the valve-chamber, of an engine. Within this valve-chamber is the valve C, which is made hollow, to admit the steam from the boiler, and, as the pressure is outward and equal in all directions, (except at the ends, where openings are made to connect with the ports in the cylinder,) it will be seen that the valve is nearly balanced. In order to admit steam to the valve, a pipe, D, extends out through the end of the valve-chamber, and connects with the steam-pipe by means of a sliding joint. Within this valve are the cut-off plates E E, situated one at each end, so as to control the steam-ports F. These plates have connecting-rods G, leading to opposite ends of a central rocker, H, and a rod, I, leads from one end of this rocker to a piston, J, which works within a cylindrical valve-stem, K. To the back of this piston one arm, L, of a bell-crank lever is connected, while the other arm, M, has at its end a stem, N, which projects into the box O at one side of the steam-chest. Within this box are two plates, P, hinged at opposite sides, and so inclined in the center as to allow their meeting-edges to rest against the side of the box at an angle of about forty-five degrees. A V-shaped projection, Q, is made in the side of the box at the point of meeting of these two plates, so that when they are at rest their upper surfaces are, respectively, in line with the opposite inclined faces of the V-shaped projection, as shown. Springs R hold these plates P down, ordinarily, and return them to their places after the stem N has passed either of them, when in motion. Two horizontal plates, X, having their edges beveled or inclined from the side of the box outward, serve to regulate the cut-off still closer when the box is acted upon by the governor, as will be described hereafter, and by the combination of these two sets of plates steam will be cut off at any point in the stroke. Motion is communicated to the valve by means of the valve-stem K, and this carries with it the arms or frame S, within which the bell-crank is supported. It will thus be seen that motion is given to the stem N within the box O, and it will pass the inclined plates P in the following manner: When the engine starts the pin or stem N lies upon the top of the projection Q, so as to secure a sufficient opening of the ports by the cut-off plates E, and when in motion it reaches this point by gliding up the inclined side. The spring which holds the plate P down will yield, and thus allow the steam to pass to the summit of Q. From this point it moves up the incline of the plate P′ until it reaches the top, and this movement acts upon the bell-crank lever, and through it upon the connecting-rod I. This rod draws the double cam H around and through the rods G. The plates E are gradually moved so as to expose the ports F to admit a larger amount of steam until the stem N reaches the highest point of this incline P′. As it passes this point it will be free to fall against the side of the box O, and the pressure of the steam upon the piston J causes it to drop instantaneously, and this action reverses the movement of the cut-off plates E, thus closing the steam-ports. When the movement of the valve and its stem are reversed the same action of the stem N takes place with reference to the inclined plate P, and the drop is again effected from this plate, and by this device the steam is cut off at each end of the cylinder. In order to relieve the mechanism from the shock caused by the drop, I make an air-cushion behind the piston J, and the amount of air is regulated by a screw, W, as shown. In order to regulate or vary the point of cutting off, I make the edges of the inclined plates P P′ beveled, and the box O is mounted upon a stem, T, so as to be moved up or down by means of a wedge, U, or equivalent device, which is actuated by the governor. This moves the box and its inclined plates P to or from the stem N, and it will be seen that when moved from the stem the latter will drop from the beveled edges of the plates P before

it reaches the entire height, and thus cut off sooner than in the latter case. As the plates or projections X incline in the opposite direction from P P′, the pin will fall upon these plates from the highest points of P P′, and will drop from there to the side of the box when the edge of the incline is reached. When, however, by the action of the governor, the box is withdrawn from the stems N, the latter will fall directly upon the side of the box; and these two sets of inclines regulate the cut-off perfectly.

Having thus described my invention, I do not claim, broadly, the employment of a hollow valve to receive steam, and thus become balanced; but

What I do claim, and desire to secure by Letters Patent, is—

1. The hinged or spring plates P P′, inclined to meet at the V-shaped projection Q, in combination with the stem N and arm M of the bell-crank lever, as set forth.

2. The piston J, operating upon the cam H and its connections, in combination with the bell-crank lever L M and the plates P P′, whereby the pressure of steam upon the piston causes the pin to drop instantaneously and allow the cut-off plates to act and close the ports, as described.

3. The inclined plates P P′, having beveled edges, and springs R R, in combination with the pin N, so that as the plates are withdrawn the pin will fall from their edges sooner, and actuate the cut-off earlier, as described.

4. In combination with the box O, containing the inclined and beveled plates P P′, the slotted stem T and the wedge U, actuated by the governor, substantially as and for the purpose set forth.

5. The plates or projections X, lying below the inclined plates P P′, and having their edges inclined so that the pin N will first fall from the plates P upon them, and thence to the side of the box, or, when the plates P are withdrawn from the pin, the latter will fall directly to the side of the box, substantially as herein described.

In witness whereof I have hereunto set my hand and seal.

JOHN CHRISTIAN HENRY STUT. [L. S.]

Witnesses:
GEO. H. STRONG,
FRANK A. BROOKS.