(152.)

CHARLES B. SMITH

Improvement in Valves for Steam Engines.

No. 121,905. Patented Dec. 12, 1871.

Fig. 1

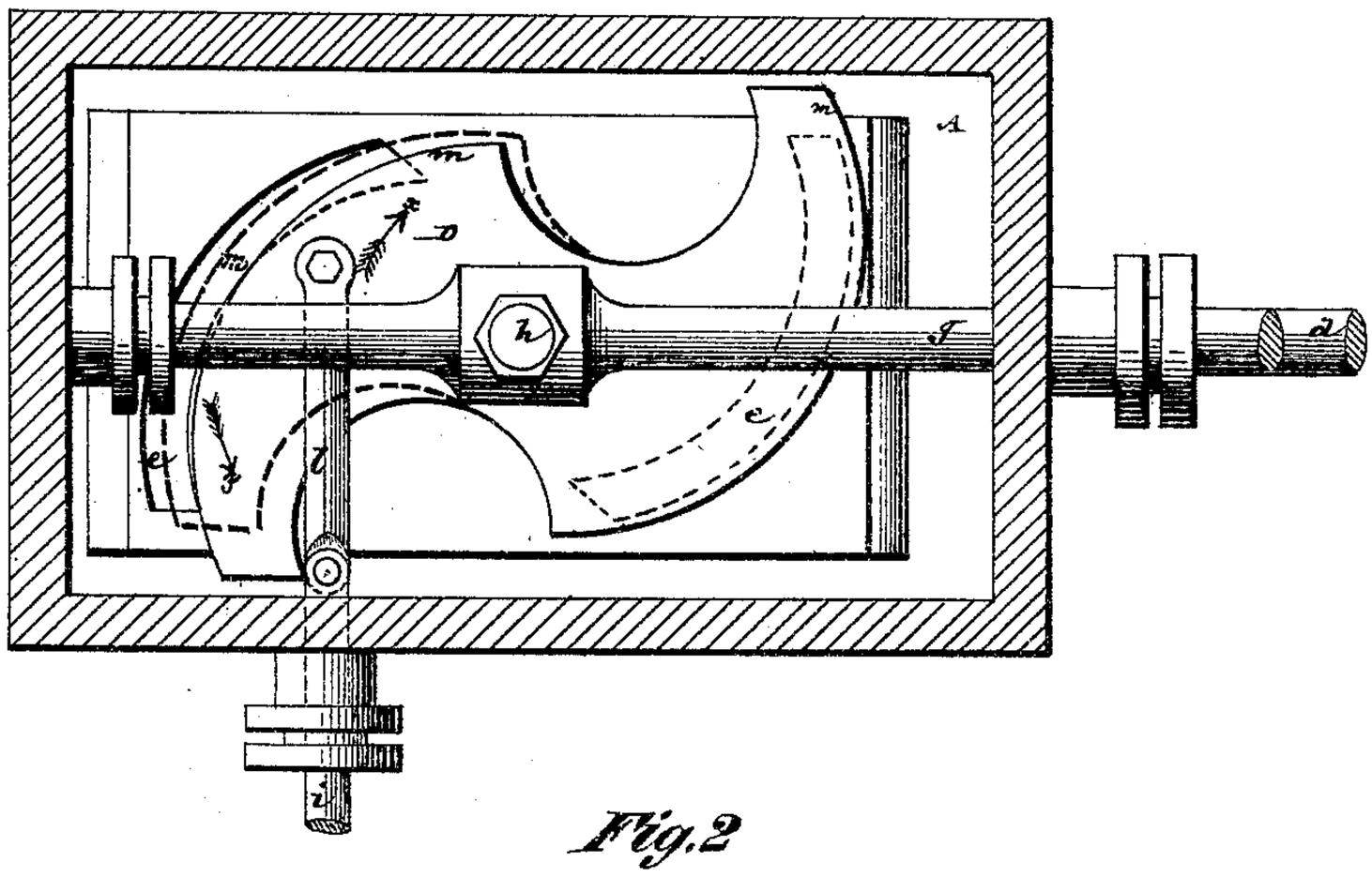
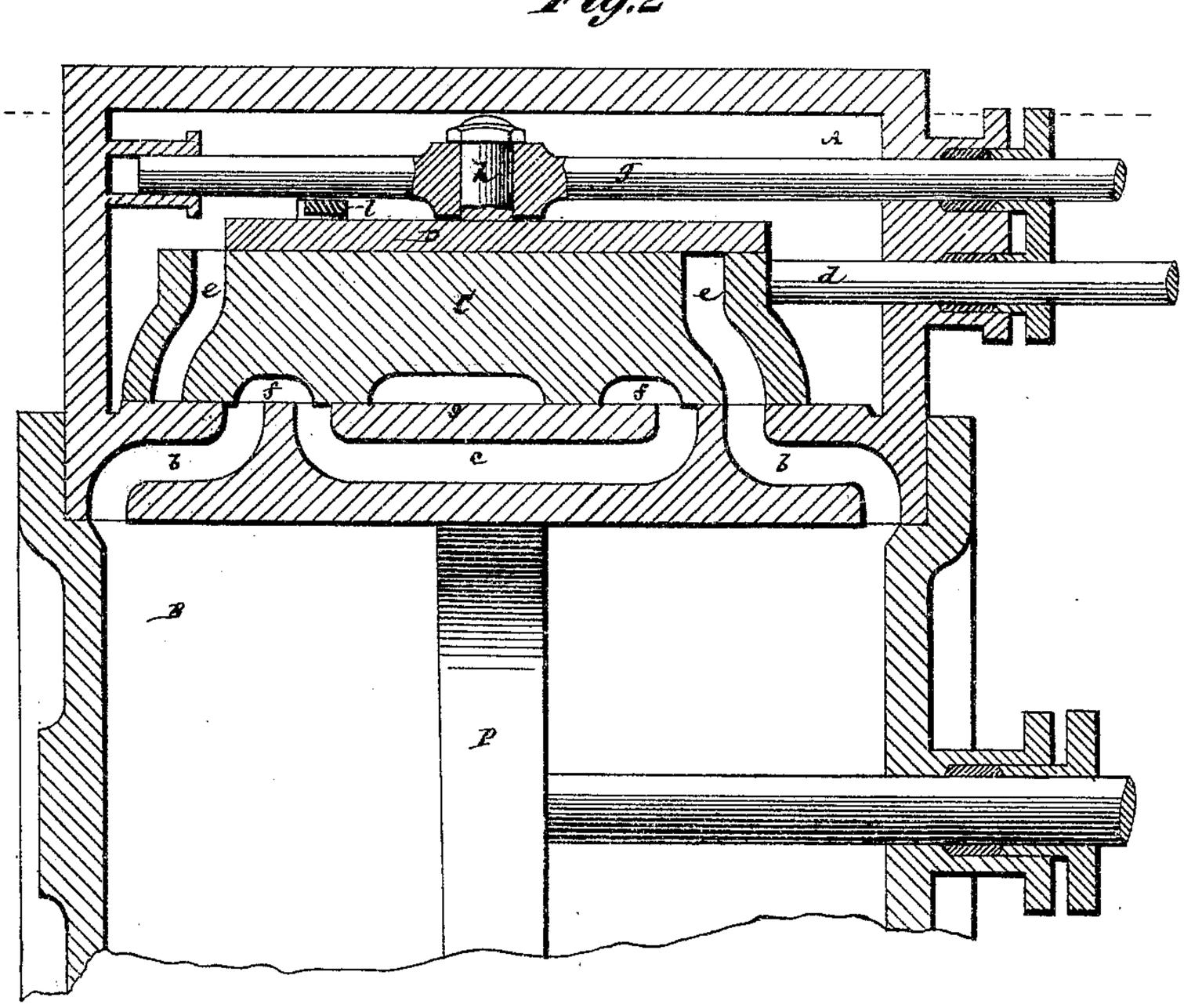


Fig. 2



Witnesses:
Fred Haynes
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AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

121,905

UNITED STATES PATENT OFFICE.

CHARLES B. SMITH, OF NEWARK, NEW JERSEY, ASSIGNOR TO HIMSELF AND LYSANDER WRIGHT, OF SAME PLACE, AND WILLIAM L. CHASE, OF NEW YORK CITY.

IMPROVEMENT IN VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 121,905, dated December 12, 1871.

To all whom it may concern:

Be it known that I, CHARLES B. SMITH, of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Valves for Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 represents an interior view of the valve-chest of an engine with a main valve and cut-off valve, as seen from the rear, arranged therein and constructed for operation in accordance with my invention. Fig. 2 is a longitudinal section of the same in a plane at right angles to the seat of the main valve.

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

My invention consists in a combination, with a main slide-valve, having the outer orifices of its ports made curving, of a cut-off valve of a straight or flat construction on its face for application to the back of the main valve, and with its ends made curving to correspond with the curved shape of the outer orifices of the ports in the main valve, said cut-off valve having an independent sliding motion over the back of the main valve in direction of the travel of the latter, and being hung so as to be capable of swinging on a center or pivot, the axis of which is at right angles to the line of motion of the main valve for the purpose of varying the action of the cut-off.

Referring to the accompanying drawing, A represents the steam or valve-chest of an engine, of which latter B is the cylinder, and P the piston. *b b* are the inlet and outlet-passages at the opposite ends of the cylinder; and *c* an intermediate passage in the valve-seat communicating with the exhaust. C is the main valve, arranged to travel upon or over the seat *s* in directions parallel with the motion of the piston, and being operated by a rod, *d*, through an eccentric or otherwise. Said valve C is constructed with opposite end inlet-ports *e e* through it, and with exhaust cavities *f f* in its face for controlling the movement of the piston by the travel of the valve over the fixed ports or passages *b b* and *c*, as in the case of other slide-valves. The outer orifices in the back of the valve B of the ports *e e* are of an arched or curved form, struck from different centers on opposite sides of the valve-stem or rod *d*, as clearly represented in Fig. 1. D is the cut-off valve, made flat on its face, and arranged to have an independent sliding motion on or over the back of the main valve, but in a like direction with the latter by means of a separate eccentric and stem or rod, *g*, to cut off the steam from entering the ports *e e*, as required, during the travel of the main valve. The ends *m m* of this cut-off valve D are also made curved to correspond with the curvature of the outer orifices of the ports *e e*, and said valve intermediately pivoted, as at *h*, to its stem *g* to provide for the swinging of it about an axis which is at right angles to the line of motion of the main valve for the purpose of varying the action of the cut-off valve, and which may be effected either by hand or by governor through the instrumentality of a rod, *i*, arranged to project through the side of the valve-chest and connected with the valve C by a link, *l*.

When the valve D is swung or adjusted to an extreme point in direction of the arrow *y*, the ports of the main valve will remain open throughout the stroke of the latter; but when adjusted to an extreme point in direction of the arrow *x*, then the ports of the main valve will remain closed throughout the stroke thereof, and any intermediate adjustment of the cut-off valve to the right or to the left will cause it to cut off earlier or later in the stroke. This is not due to any variation in the longitudinal travel of the cut-off valve and main valve, both of which remain the same, (that is, relatively with each other, they being different in extent;) but to the shape and arrangement, as herein shown and described, of the ends of the cut-off valve and of the outer orifices of the ports in the main valve, such construction giving the same result when the cut-off valve is moved on its pivot *h* as would the lengthening and shortening of the throw or longitudinal travel of said valve, or lengthening and shortening of the valve itself. When once adjusted to a fixed point about the axis of the pivot *h*, then the action of the cut-off valve remains the same, and the link *l* should be made sufficiently long to prevent the lengthwise movement

of the valve from producing any objectionable lateral motion of the latter.

The dotted lines *m* at the left hand of Fig. 1 show the one end of the cut-off valve as adjusted in direction of the arrow *x*.

Any other suitable mechanical device may be substituted for the link *l* and rod *i* for the purpose of giving the cut-off valve the movement on the pin *h* required to vary the point of cutting off.

What is here claimed, and desired to be secured by Letters Patent, is—

The cut-off valve D, made flat on its face with curved ends *m m*, and arranged to have a reciprocating independent motion on or over the back of the main valve, also pivoted, as at *h*, for adjustment about an axis which is at right angles to the line of travel of the main valve, in combination with the curved outer orifices of the ports *e e* in the latter, substantially as specified.

CHARLES B. SMITH.

Witnesses:

FRED HAYNES,

R. E. RABEAU.

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