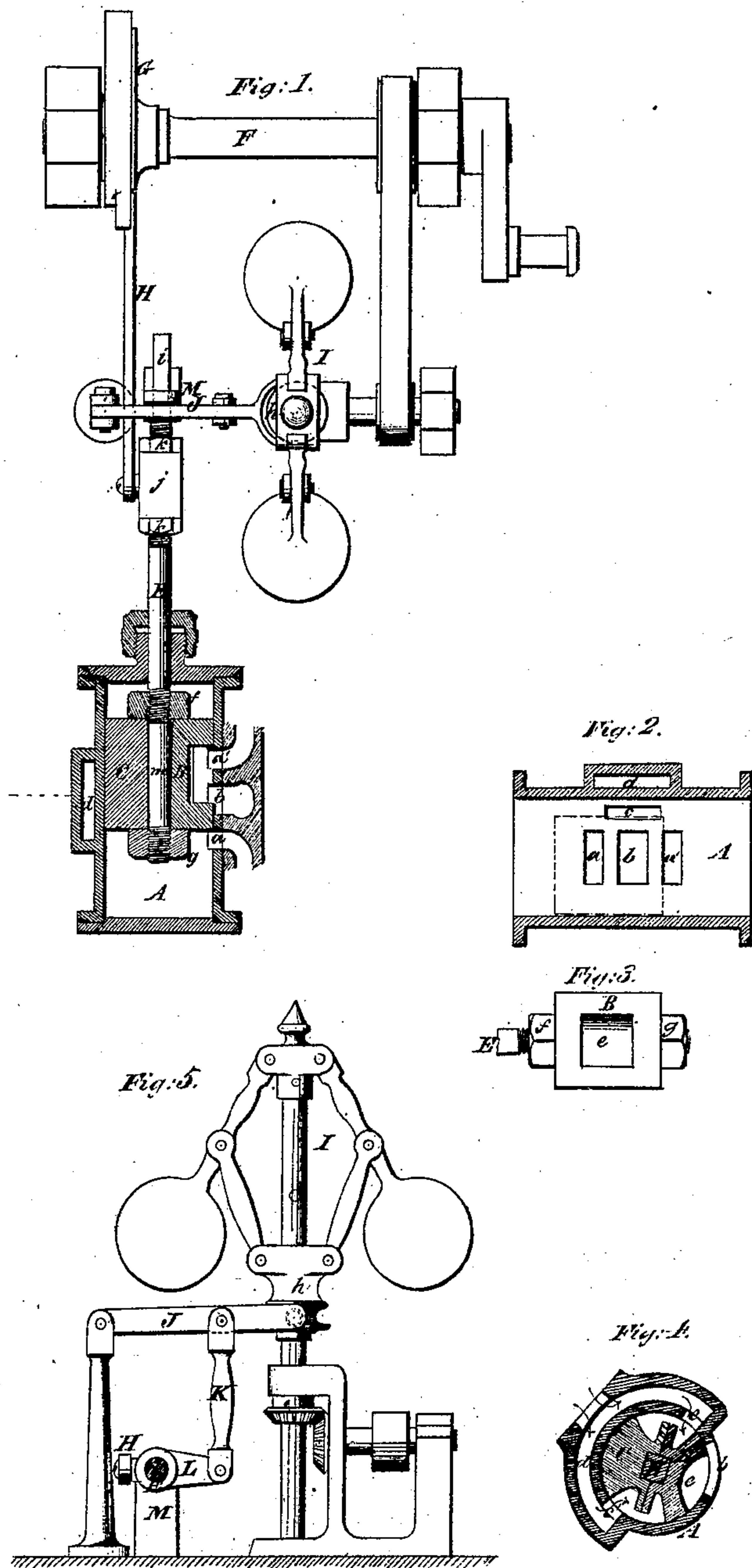


W. Brown,

Cut Off Valve.

No. 102,367.

Patented Apr. 26, 1870.



Witnesses:
Fred. Haynes
R. H. Raben

William Brown

United States Patent Office.

WILLIAM BROWN, OF HOBOKEN, NEW JERSEY.

Letters Patent No. 102,367, dated April 26, 1870.

VARIABLE CUT-OFF VALVE-GEAR AND VALVE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, WILLIAM BROWN, of Hoboken, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Valves and Valve-Gear 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 drawings forming part of this specification.

This invention consists principally in a novel construction of the slide-valve or valves of a steam-engine, a novel construction of the valve-seat, a novel arrangement of the steam-passages, and a novel mode of operating the valve or valves, whereby a separate regulating-valve for regulating the speed of the engine is dispensed with, and the same valve or valves which effect the induction, and the eduction also, if desired, of the steam, serve also as a regulating-valve to regulate the speed of the engine under the control of a governor.

The invention is capable of some modifications, but I have represented in the drawing an example of its simplest form, in which the induction and eduction of the steam and the regulation of the speed are effected by a single valve.

Figure 1 is a plan of the main shaft, the governor, the steam-chest, the valve, and the valve-operating mechanism of a horizontal engine, the valve and steam-chest being shown in section.

Figure 2 is a longitudinal vertical section of the steam-chest.

Figure 3 is a face view of the valve.

Figure 4 is a transverse section of the steam-chest and valve.

Figure 5 is an elevation of the governor and the mechanism connecting it with the valve-stem, the stem being shown in transverse section.

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

A is the steam-chest, of cylindrical form, bored out truly from the valve-seat, and having ports, *a*, *a'*, and *b*, like those commonly provided for what is known as the "three-port" slide-valve, the two ports *a a'* communicating with the opposite ends of the steam-cylinder of the engine, and the intermediate port *b* communicating with the exhaust-pipe. It is provided, also, with two opposite ports, *c c'*, for the admission of steam thereinto from a hollow belt, *d*, with which the steam-pipe is connected. These ports are the cut-off or regulating ports, and their greatest length is parallel with the length of the steam-chest and with the ordinary sliding movement of the valve, by which the induction and eduction of the steam to and from the cylinder are effected.

B C is the valve, made in two pieces or segments,

arranged back to back, and having their faces turned to fit its seat in the cylindrical interior of the steam-chest.

The face of the segment B, which constitutes the valve proper for effecting the induction and eduction of the steam, is (except that it is cylindrical) like that of an ordinary three-port slide-valve, and has those portions of its face at the side of the cavity *e*, commonly provided for the eduction of the steam from the ports *a a'* to that, *b*, in the steam-chest, somewhat wider than usual, to provide for its action hereinafter described on the ports *c c'*.

The segment C has its face perfectly plain, every portion of it fitting to the cylindrical interior of the steam-chest.

The portion *m* of the valve-stem E which is received within the valve, and to which the latter is secured by screw-nuts *f g* on the said stem, is square in its transverse section and taper or wedge-shaped longitudinally, and this portion of the stem is, by the adjustment of the said nuts, made to set out the two segments B C against the interior of the steam-chest, whereby they fit steam-tight therein, thus compensating for the wear of the valve and bore of the chest.

The ports *c c'* are so arranged, one at the side of the ports *a a' b* and the other opposite to it, that the valve, by a motion on its axis, is made to close or contract the opening of both of them, and thus cut off or diminish the supply of steam from the passage in the hollow belt *d* to the interior of the steam-chest, the port *c* being closed or having its opening contracted by the valve proper, B, and that, *c'*, being closed or having its opening contracted at the same time by the segment C.

F is the main shaft of the engine, and G is the eccentric on the said shaft for operating the valve to produce the induction and eduction of the steam to and from the cylinder of the engine, the said eccentric connecting with the valve-stem by a rod, H, and the operation of the valve produced by it being like that of an ordinary three-port valve.

I is the governor, having its slide *h* connected by a lever, J, and rod, K, with a lever, L, which is arranged upon a square or feathered portion, *i*, of the valve-stem, radially thereto, and which is also fitted into a stationary fulcrum-post, M, in such manner as to be capable of oscillating, but not of moving in the direction of the length of the valve-stem.

The square portion *i* of the stem is capable of sliding through the said lever L in the ordinary movement of the valve, before referred to as produced by the eccentric.

The rise and fall of the governor-slide, produced by variations in the velocity of the engine, are made to so act upon the lever L as to turn the valve in its seat in

the steam-chest, in one or the other direction, transverse to the movement by which it effects the induction and eduction of the steam.

When the engine is running steadily at its normal speed, the valve is turned to and held in such a position as to leave the side ports *c c'* as near as may be necessary uncovered by the valve, but, as soon as any tendency to an increased velocity of the engine is developed, the rise of the governor-slide *h* raises the lever *L*, and so turns the valve to a position to close or contract the openings of the side ports *c c'*, and thus cut off or diminish the supply of steam to the engine; or when any tendency to a diminished velocity is developed, the fall of the governor-slide *h* depresses the lever *L*, and so turns the valve in the opposite direction, and thus opens or gives a greater opening of the ports, and an increased supply of steam to the engine. In this way the speed is perfectly regulated by the induction and eduction-valve *C B*. In order to provide for this turning movement of the valve, the connection of the eccentric rod *H* with the valve-stem is made by a sleeve, *j*, in which the said stem is capable of turning freely, but to which it is confined longitudinally by screw-nuts *k k*.

It will readily be understood by those conversant with steam-engines that the invention may be modified to adapt it to two short slide-valves, applied one to each of the cylinder-ports, either in the same or in separate steam-chests; also, that it may be modified to adapt it to slide-valves which are only induction-

valves in engines in which separate eduction-valves are used.

The invention might also be adapted to flat valves, for which a transverse motion, corresponding with the oscillating motion of the valve represented, is provided.

It may also be adapted to any ordinary valve without a back-piece, *D*, in which case one port *c* only is required for the valve to produce its regulating action.

I do not claim the dispensing with a separate valve for regulating the speed of the engine; but

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

1. The combination of the one or more side ports *c c'* in the valve-seat, and the valve having a longitudinal and an oscillating or transverse motion, substantially as and for the purpose herein described.

2. The combination of the two segments *B C* of the valve with the taper interposed portion *m* of the valve-stem, substantially as and for the purpose herein described.

3. The combination of the loose sleeve-connection *j* of the eccentric with the valve-stem and the lever *L*, connecting the said stem, by the square or feathered portion *i*, with the governor, substantially as and for the purpose herein specified.

WILLIAM BROWN.

Witnesses:

FRED. HAYNES,
M. J. SHANLY.