(No Model.) 2 Sheets—Sheet 1.

W. M. CARY.

STEAM ACTUATED VALVE.

No. 334,108. Patented Jan. 12, 1886.

Fig. 1.

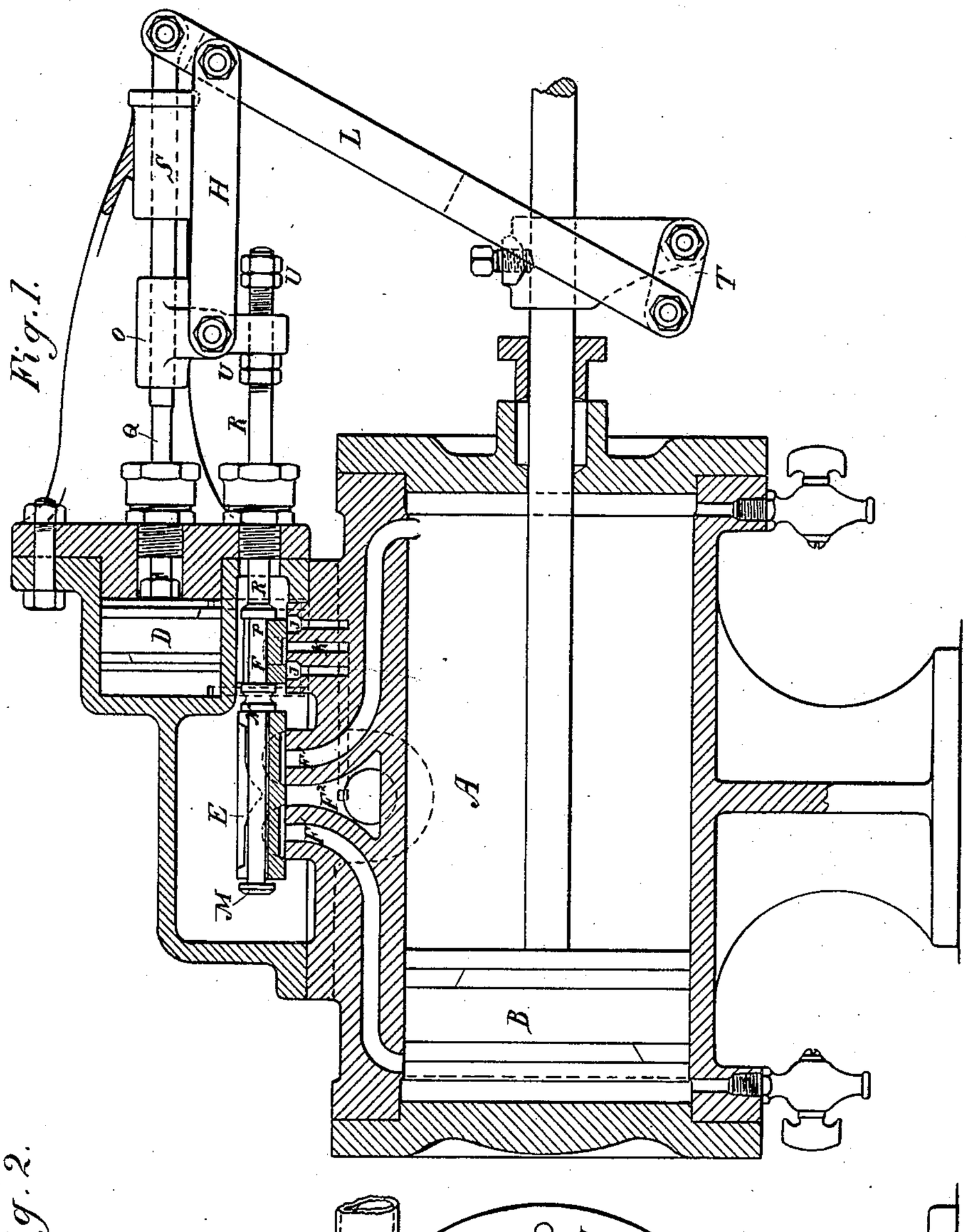
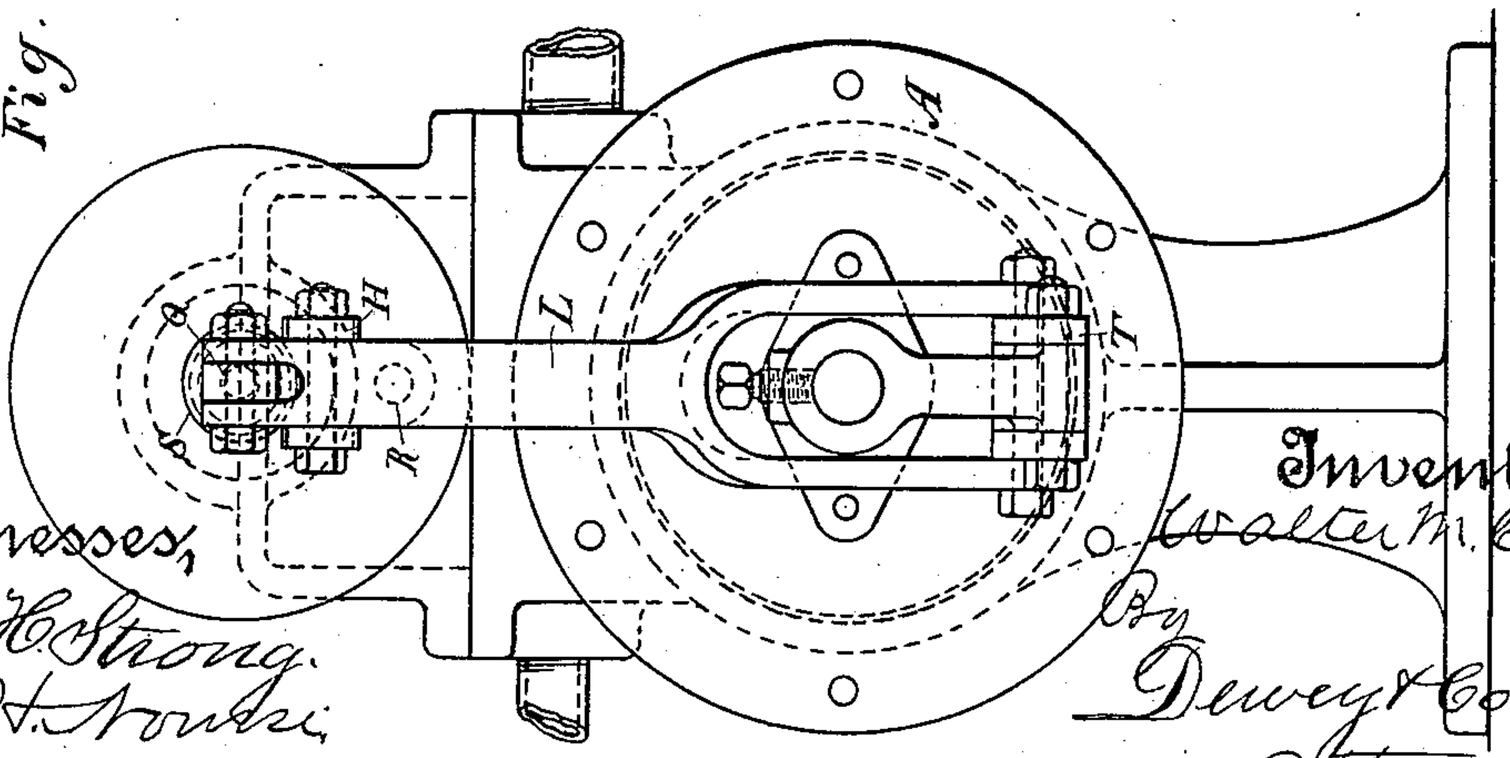


Fig. 2.



Witnesses,
Geo. H. Strong.
J. L. Norris.

Inventor,
Walter M. Cary.
By
Dewey & Co.
Attorneys

(No Model.) 2 Sheets—Sheet 2.

W. M. CARY.

STEAM ACTUATED VALVE.

No. 334,108. Patented Jan. 12, 1886.

Fig. 3.

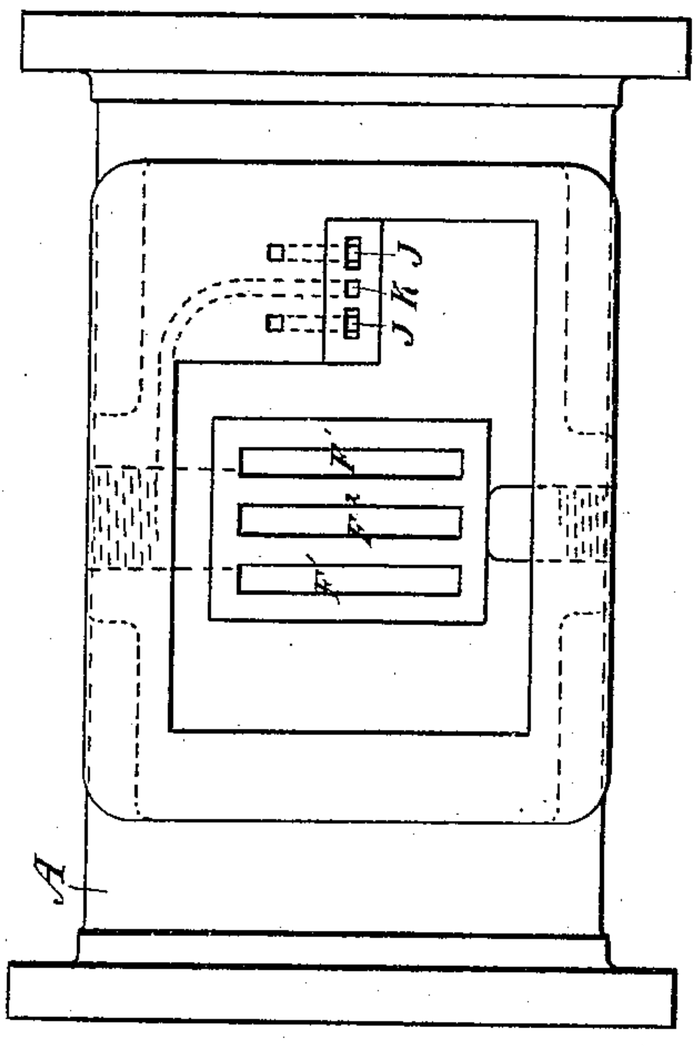
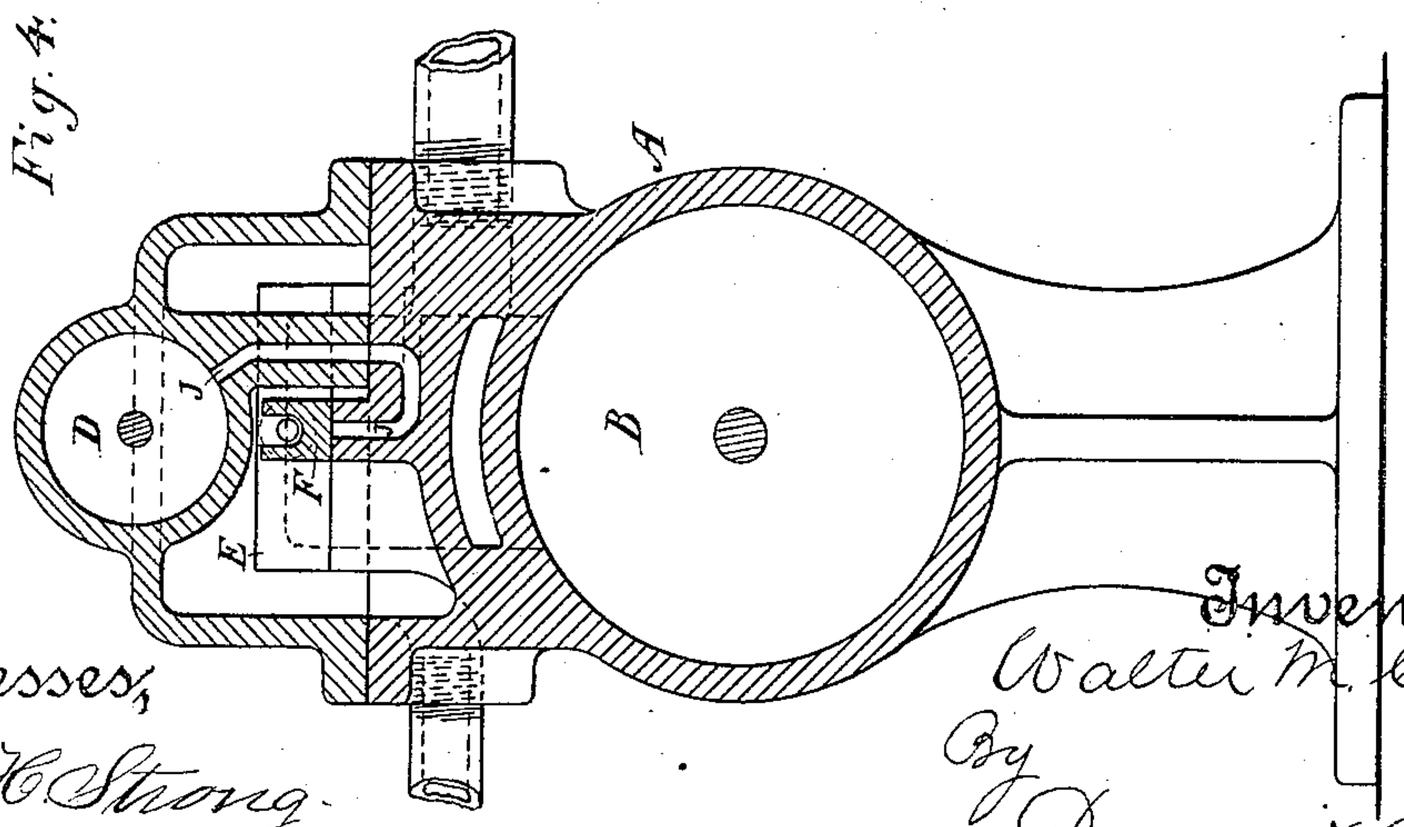


Fig. 4.



Witnesses;
Geo. H. Strong.
J. B. Towle.

Inventor,
Walter M. Cary.
By
Dewey & Co.
Attorneys

UNITED STATES PATENT OFFICE.

WALTER M. CARY, OF SAN FRANCISCO, CALIFORNIA.

STEAM-ACTUATED VALVE.

SPECIFICATION forming part of Letters Patent No. 334,108, dated January 12, 1886.

Application filed June 29, 1885. Serial No. 170,162. (No model.)

To all whom it may concern:

Be it known that I, WALTER M. CARY, of the city and county of San Francisco, State of California, have invented an Improvement in Steam-Actuated Valves; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in direct-acting engines.

It consists of a main cylinder and piston, a main and supplemental valve operated by a single valve-stem and in line with each other, so that the auxiliary valve has a certain lead over the main valve, a short supplemental piston having its rod, as well as the valve-rod, connected with the exterior valve-gear, which is also connected with the main piston-rod.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a longitudinal vertical section taken through the center of the cylinder, valve-chamber, and supplemental cylinder. Fig. 2 is an end view of the valve motion. Fig. 3 is a plan view of the valve-ports. Fig. 4 is a transverse vertical section taken across the auxiliary valve and supplemental cylinder.

A is the main cylinder, having a piston, B, working within it, its rod extending out through a stuffing-box at one end and connected with the valve-gear, as will be hereinafter described.

E is the main valve, working within a main chamber and over suitable ports, F′ F², as shown.

F is the auxiliary valve, working over ports J and K, by which steam is admitted to and exhausted from the supplemental cylinder.

The valves E and F are placed in line with each other, and the valve-stem R, which passes through or above the upper part of the valve, has collars M, N, and P fixed to it to inclose the valve between them, so that the movements of the valve-rod will also move the valve. The collars N and P fit closely against the auxiliary valve F, so that it moves simultaneously with the valve-stem; but the collars M and N are sufficiently separated, so that the main valve E will have a certain amount of lost motion between them, and this allows the auxiliary valve to be first moved, so as to admit steam to drive the supplemental piston to the end of its stroke before the main valve is opened by the farther movement of the valve-stem.

D is the supplemental piston, fitted to move within the short cylinder, which in the present case I have shown arranged above the auxiliary valve and chamber and extending only a portion of the length of the steam-chest. The ports J J of the auxiliary valve lead to opposite ends of this cylinder, so that when opened the valve-piston may be driven alternately from one end to the other.

Q is the supplemental piston-rod, which extends outward through a guide, S, and has its outer end connected with the main piston-rod by a lever, L, and a link, T. A collar, O, slides loosely upon the supplemental piston-rod Q, the lower end or projection of this collar receiving the end of the valve-rod R, which has adjusting nuts or collars U upon each side, so that as the collar moves it will also move the valve-rod, the amount of lost motion being determined by the position of the nuts U. A link, H, connects this collar O with the lever-arm L, and the operation will then be as follows: The piston B standing at the left-hand end of the cylinder, the valves will then be in the position shown in Fig. 1, having been moved to this position by the lever L, so as to cut off steam gradually and at the same time furnish a very superior cushion to the piston, as the slightest movement farther in the same direction would admit steam to the opposite side of the piston. The supplemental piston D is at the right-hand end of its cylinder, and the lead or advance which the auxiliary valve has over the main valve will open the supplemental cylinder-port J, and steam will be admitted to the right-hand end of the supplemental cylinder, causing the supplemental piston to make a stroke from the right to the left, and carry with it the main and auxiliary valves, by means of the outside valve-gear before described, thus reversing the motion of the main piston. By this construction I am enabled to accomplish the reversal of the valve with only one-half the travel of supplemental piston employed in other engines of this class, and in consequence I effect a very material saving of steam. The supplemental cylinder-ports are also much shorter than in other direct-acting engines, thus effecting a further saving. This construction and arrangement

of the valves in the chest enables me to make the supplemental piston with a single instead of a double head, which is the usual form in a direct-acting engine, thus simplifying the mechanism and reducing friction.

It will be manifest that if the engine is to stand vertically the auxiliary valve could be reversed, the ports opening directly into the supplemental cylinder, instead of passing through the opposite face, as here shown.

I am aware it is not new to place an auxiliary valve and a main valve side by side to be operated by a supplemental piston, and such construction I therefore do not claim as my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a direct-acting engine, a main and supplemental piston having their rods connected at the outer end by a link and lever, as shown, in combination with the main and auxiliary steam-valves placed in line and operated by the single valve-stem, the collar O, and link H, substantially as herein described.

2. In a direct-acting engine, the main and supplemental cylinders with pistons moving therein, piston-rods having the outer ends connected by a link and lever, as shown, in combination with the main and auxiliary valves placed in line, the single valve-stem having the collars, between which the valves are held and moved, and the collar O upon the supplemental piston-rod, and the link H, substantially as herein described.

In witness whereof I have hereunto set my hand.

WALTER M. CARY.

Witnesses:
GEO. H. STRONG,
S. H. NOURSE.