

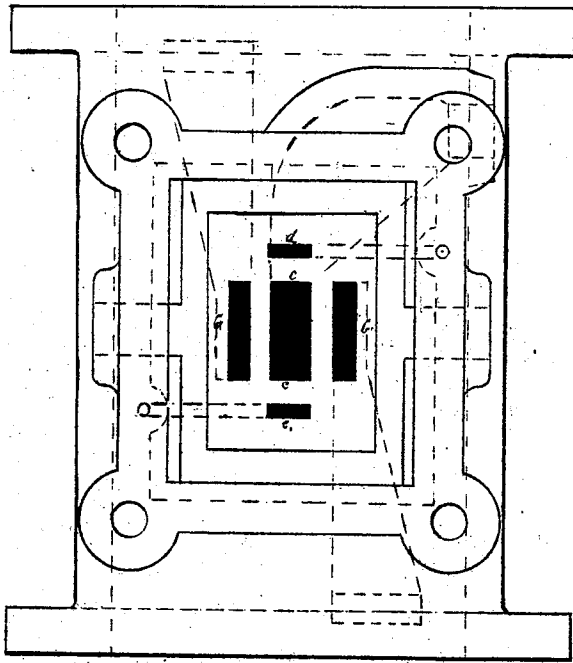


Fig. 2.

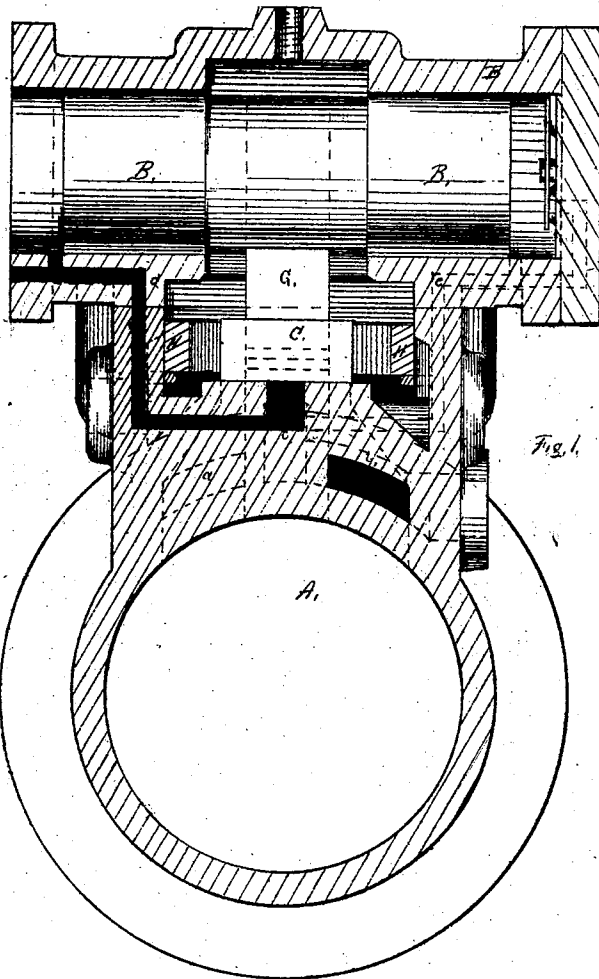


Fig. 1.

GEO. F. BLAKE'S
 Improvements in
 Valves & Direct-Acting Engines.
 BOSTON MASS.

No. 121,320.
 Patented Nov. 28, 1871.

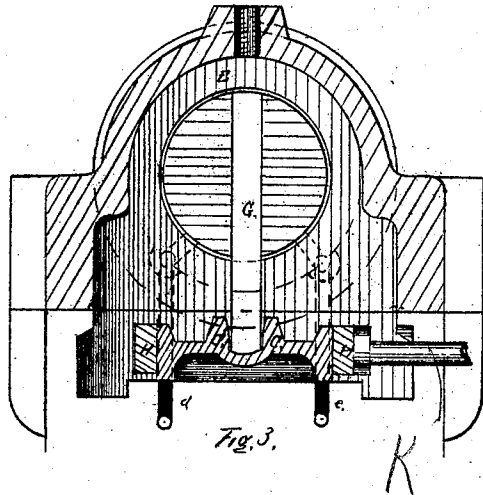


Fig. 3.

Inventor,
 Geo. F. Blake
 Witnesses,

E. R. Stansbury.
 Chas. F. Stansbury
 atty.

Received Oct. 1st 1872.

121,320

UNITED STATES PATENT OFFICE.

GEORGE F. BLAKE, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN VALVES FOR DIRECT-ACTING ENGINES.

Specification forming part of Letters Patent No. 121,320, dated November 28, 1871.

To all whom it may concern:

Be it known that I, GEORGE F. BLAKE, of Boston, county of Suffolk, Commonwealth of Massachusetts, have invented certain Improvements in Valves for Direct-Acting Engines, of which the following is a specification:

My invention consists in arranging a single slide valve, in combination with a plunger and suitable parts, in such a manner that the said slide-valve, operated directly from the main piston, causes the movement of the plunger carrying the said slide-valve into position to reverse the main piston.

In the drawing accompanying this specification, Figure 1 is a cross-section of the cylinder and longitudinal section of the plunger-top. Fig. 2 is a plan of the cylinder. Fig. 3 is a cross-section of the plunger-top and longitudinal section of the upper part of the cylinder.

A is the cylinder of the engine; B, the plunger; C, the slide-valve; E, the plunger-cylinder, placed on the cylinder with its center line at right angles to the center line of the cylinder. The ports *a b* are the leading ports of the engine, and communicate with the ends of the cylinder. C is the main exhaust-port. *d e* are the ports through which steam is conducted to and exhausted from the plunger-cylinder. The connection between the plunger and slide-valve is formed by means of the flat pin G, which passes through the plunger and enters the top of the slide-valve C in such a manner that said plunger carries the slide-valve with it when it moves in the direction of its length, and when the slide-valve is moved by the valve-rod the plunger receives a slight partial rotation. A yoke, H, surrounds the slide-valve C, to which the valve-rod K is rigidly attached. The valve G is free to move in said yoke in the direction of the longitudinal center line of the plunger, but is confined in and moved by the said yoke and the valve-rod attached in the direction of the longitudinal center line of the main cylinder.

In operation, the valve-rod operated by the main piston moves the valve C until steam is let

into one end of the plunger-cylinder and exhausted from the other through the ports *d e*. This causes the plunger to move the valve C in a direction at a right angle to its previous movement by the valve-rod, it being free to move within the yoke H, and reverses the motion of the main piston. In the first movement of the valve C by the valve-rod the action of the valve on the plunger by means of the connecting-pin G gives the plunger a slight partial rotation, so that it is free to move when steam is let on to it and starts more readily than if in a state of rest at that time. It will be seen that in a full revolution of the engine the valve is moved in four directions: First, in the direction of the longitudinal center line of the cylinder by the valve-rod; second, in a direction at a right angle to the first movement by means of the steam let on to the plunger by the first movement; third, a movement similar to the first, but opposite in direction; fourth, a movement similar to the second, but opposite in direction. Also, by my arrangement of valve-ports and plunger I am able to operate my engine with a single valve, the whole being combined and arranged in a simple manner.

I claim as my invention—

1. The slide-valve C, constructed as described, and operating both the plunger and piston, thus performing the function usually performed by two valves, as fully set forth and shown.

2. The combination and arrangement of the slide-valve C, rod K, yoke H, ports *a b c d e*, plunger B, and flat pin G with the main piston of a direct-acting engine, all constructed and operating in the manner and for the purpose specified.

The foregoing specification signed and witnessed at Washington this 9th day of June, A. D., 1871.

GEO. F. BLAKE.

Witnesses:

CHAS. F. STANSBURY,
E. R. STANSBURY.

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