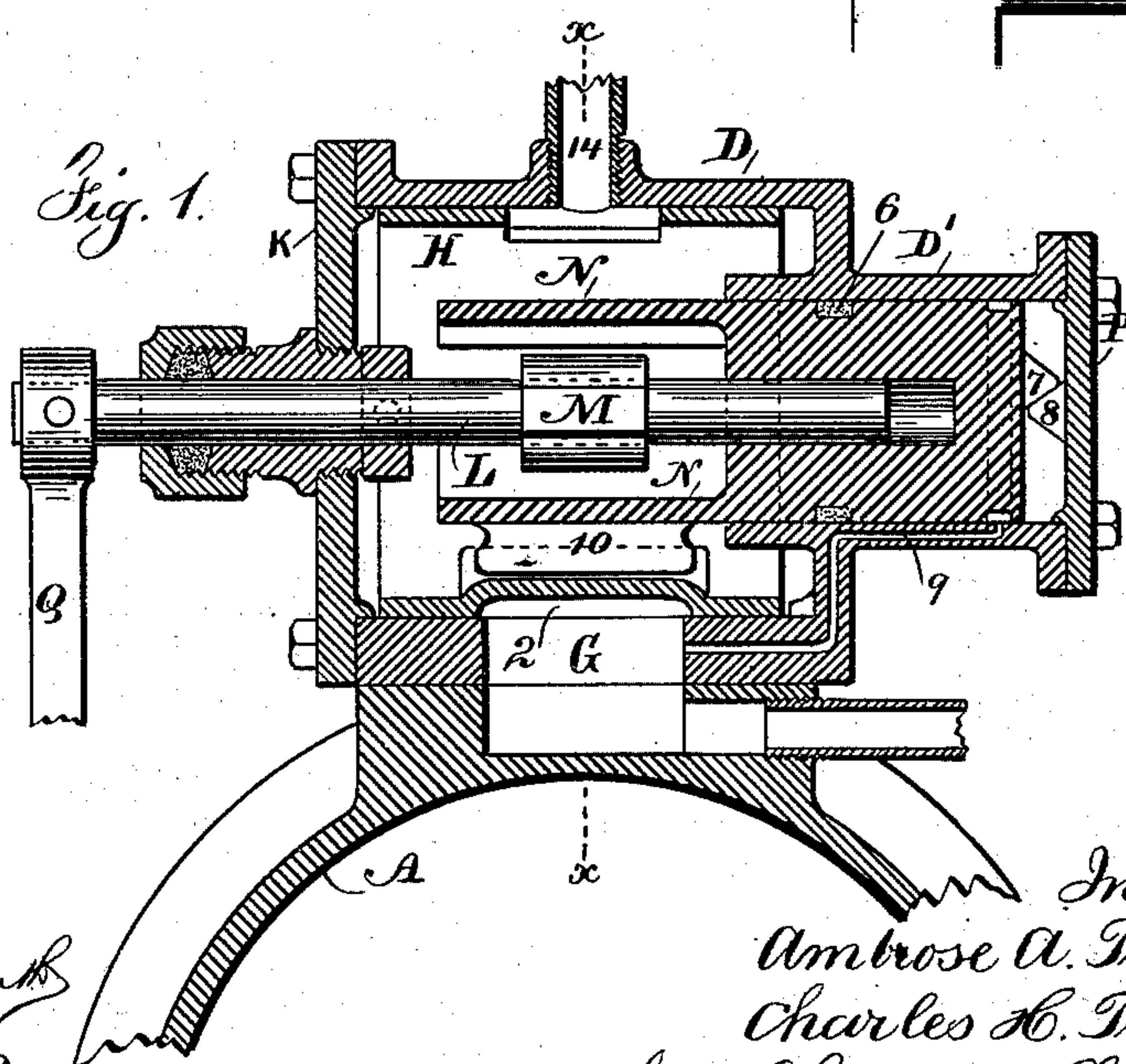
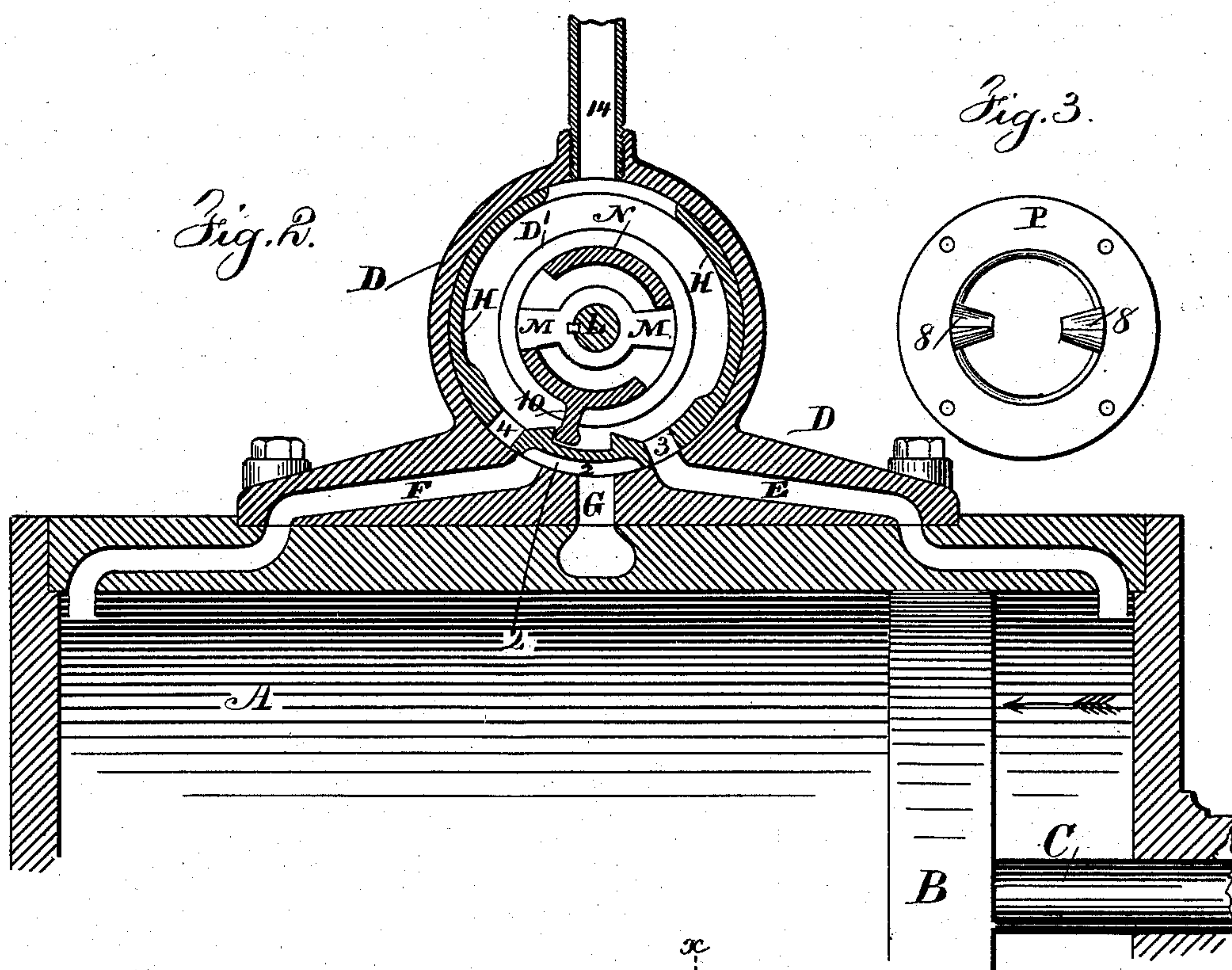


(No Model.)

A. A. & C. H. TRIPOLD.
VALVE FOR STEAM PUMPS.

No. 406,606.

Patented July 9, 1889.



Witnesses
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UNITED STATES PATENT OFFICE.

AMBROSE A. TRIPOLD AND CHARLES H. TRIPOLD, OF BROOKLYN,
NEW YORK.

VALVE FOR STEAM-PUMPS.

SPECIFICATION forming part of Letters Patent No. 406,606, dated July 9, 1889.

Application filed April 15, 1889. Serial No. 307,212. (No model.)

To all whom it may concern:

Be it known that we, AMBROSE A. TRIPOLD and CHARLES H. TRIPOLD, both of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Valves for Steam-Pumps, of which the following is a specification.

In steam-pumps it has been found advantageous to permit the steam-pressure to act upon the piston of the steam-engine during the entire stroke of the pump, and to change the valve at each end of each stroke with rapidity, and to dispense with any fly-wheel or eccentric; but in engines of this character the valve is liable to receive a partial motion, so that the steam reaches both sides of the piston or else is entirely cut off. In either instance the engine stops.

The object of the present invention is to give motion to the steam-valve in such a reliable manner that it cannot stop upon the center, but it will be moved to entirely open the valve. This is accomplished by the pressure of the steam itself, which gives to the valve-moving plunger an endwise motion, and in so doing a further partial rotation is given to the valve by stationary inclines, with which inclines the valve-moving plunger comes in contact.

In the drawings, Figure 1 is a longitudinal section through the valve-chest. Fig. 2 is a cross-section at the line $x x$, Fig. 1; and Fig. 3 is a detached elevation of the rear head of the valve-chest.

The steam-engine for the pump is provided with a cylinder A, within which is a piston B and piston-rod C, leading to the pump. These parts are to be of any desired character, and the steam-chest D is provided with the ports E and F, leading to the respective ends of the cylinder A, and with the exhaust-port G.

The steam-chest D is cylindrical, and within it is the cylindrical valve H, having a recessed exhaust-port 2 and the steam-ports 3 and 4. This steam-valve H is provided with an opening at the top for the steam to pass freely into the same from the inlet steam-pipe 14, and this steam-valve can be moved with very little power, because it is balanced to a considerable extent, the steam acting within the

valve in all directions; hence the friction of that portion of the valve adjacent to the ports E F G is comparatively small, and the valve itself can be moved in either direction to allow the steam to pass by 3 and E into the cylinder A and the exhaust to pass by F and 2 to the exhaust G, or the reverse.

At one end of the steam-chest D is a head K, through which passes the stem L of the tappet M, and within the valve H is a valve-moving plunger N, which is cylindrical and of a smaller diameter than the valve H, and it fits the tubular rearward extension D' of the steam-chest, and it is preferably provided with a packing at 6, whereby the valve-moving plunger is rendered steam-tight; and at the rear end of the valve-moving plunger N there are wedge-shaped projections 7, placed radially and at equal distances around the same, and the rear end of the tubular extension D' of the valve-chest is closed by a head P, and upon the interior surface of this head P are wedge-shaped projections 8, similar to the projections 7, and placed radially and equidistant upon the same, and there is a vent-hole 9, passing from the rear end of the tubular extension on D' to the exhaust, so that in case any steam leaks past the valve-moving plunger N no pressure will accumulate within the tubular extension D'.

The valve-moving plunger N is slotted adjacent to the tappet M, the slots being considerably wider than the tappets, and upon the valve-moving plunger is a rib 10, passing down between the ribs upon the valve, and upon the outer end of the stem L is a crank-arm Q, that receives motion from the cross-head of the engine or from any suitable connection to the piston-rod, so that this crank-arm Q, stem L, and tappet M are turned first one way and then the other way, as the piston B and piston-rod C are reciprocated, and it is preferable for the rear end of the stem L to pass into the valve-moving plunger N, so as to be supported therein while such stem turns freely.

The sizes and shapes of the respective parts are such that when the engine-piston B is moving in the direction indicated by the arrow, Fig. 2, the steam will pass by 3 and E

into the cylinder A, and as the movement of the piston and rod progresses the crank-arm Q is turned and the stem L and tappet M are moved until the tappet comes into contact with the edges of the slots in the valve-moving plunger N, and as such valve-moving plunger is partially rotated the inclines 7 and 8 are in contact, and the valve-moving plunger N is thereby moved bodily and endwise within the valve-chest, and during this motion the valve H may be partially turned, and, as the wedge-shaped inclines 7 pass the ends of the wedge-shaped projections 8, the valve H may have been moved to such a position that the steam is partially shut off from the port E; but the pressure of the steam acting within the valve-chest and against the valve-moving plunger N gives to such plunger an endwise movement, and as the inclines 7 upon such plunger N slide down the inclines 8 upon the head P the valve-moving plunger is partially rotated by the action of such inclines 7 and 8, and the valve H is moved sufficiently to entirely change its position and open the port 4 to the port F and cause the piston B to travel in the opposite direction, the recessed port 2 simultaneously opening the port E to the exhaust G, and of course the reverse movements of the piston B and piston-rod C cause the crank Q to turn the stem L and tappets M and reverse the movement of the plunger N, causing the inclines 7 to pass up the inclines 8 and move the plunger N endwise in the other direction and to turn the valve H back to partially shut off the supply of steam by 4 and F just as the inclines 7 pass over the inclines 8, and by the endwise movement of the valve-moving plunger N, by the pressure of the steam thereupon, such plunger receives (by the inclines) the additional turning motion necessary to complete the movement of the valve to the point of beginning.

In consequence of this improvement it is impossible to arrest the motion of the valve upon the center, as the pressure continues to act in the cylinder until after the points of the inclines 7 and 8 have passed each other, first in one direction and then in the other, to

allow the direct pressure of the steam to give the necessary endwise movement to the valve-moving plunger in completing the stroke of the valve. There will be some power expended in turning the plunger and moving it endwise against the pressure of the steam, and the steam-pressure gives the endwise movement in the other direction and changes the valve; but there is no loss of steam, as is the case where steam passes into a cylinder to give motion to a valve-moving piston and afterward passes to the exhaust.

We claim as our invention—

1. The combination, with the steam-chest, cylinder, piston, and the ports between the steam-chest and cylinder, of a cylindrical valve having ports therein, a valve-moving plunger within the valve and steam-chest and adapted to be rotated and to move endwise, and inclined projections upon the valve-moving plunger and upon the head of the steam-chest, whereby the valve-moving plunger receives an endwise movement by the projections when turned and communicates to the valve a further movement in the same direction by the action of the inclined projections against each other when the plunger is moved endwise by the pressure of the steam, substantially as set forth.

2. The combination, with the steam-cylinder A and the steam-chest D, having ports, and the tubular extension D', of the head P, with inclined projections 8 upon its inner surface, the valve-moving plunger N, with corresponding inclined projections 7 upon the end thereof, the stem L and tappet M within the valve-moving plunger, and mechanism for moving the stem by the connection to the piston-rod of the engine, the valve H, surrounding one end of the plunger N, and the connection between the plunger N and valve H, substantially as set forth.

Signed by us this 9th day of April, 1889.

AMBROSE A. TRIPOLD.
CHARLES H. TRIPOLD.

Witnesses:

WM. F. CORWITH,
E. M. CRISSEY.