

(No Model.)

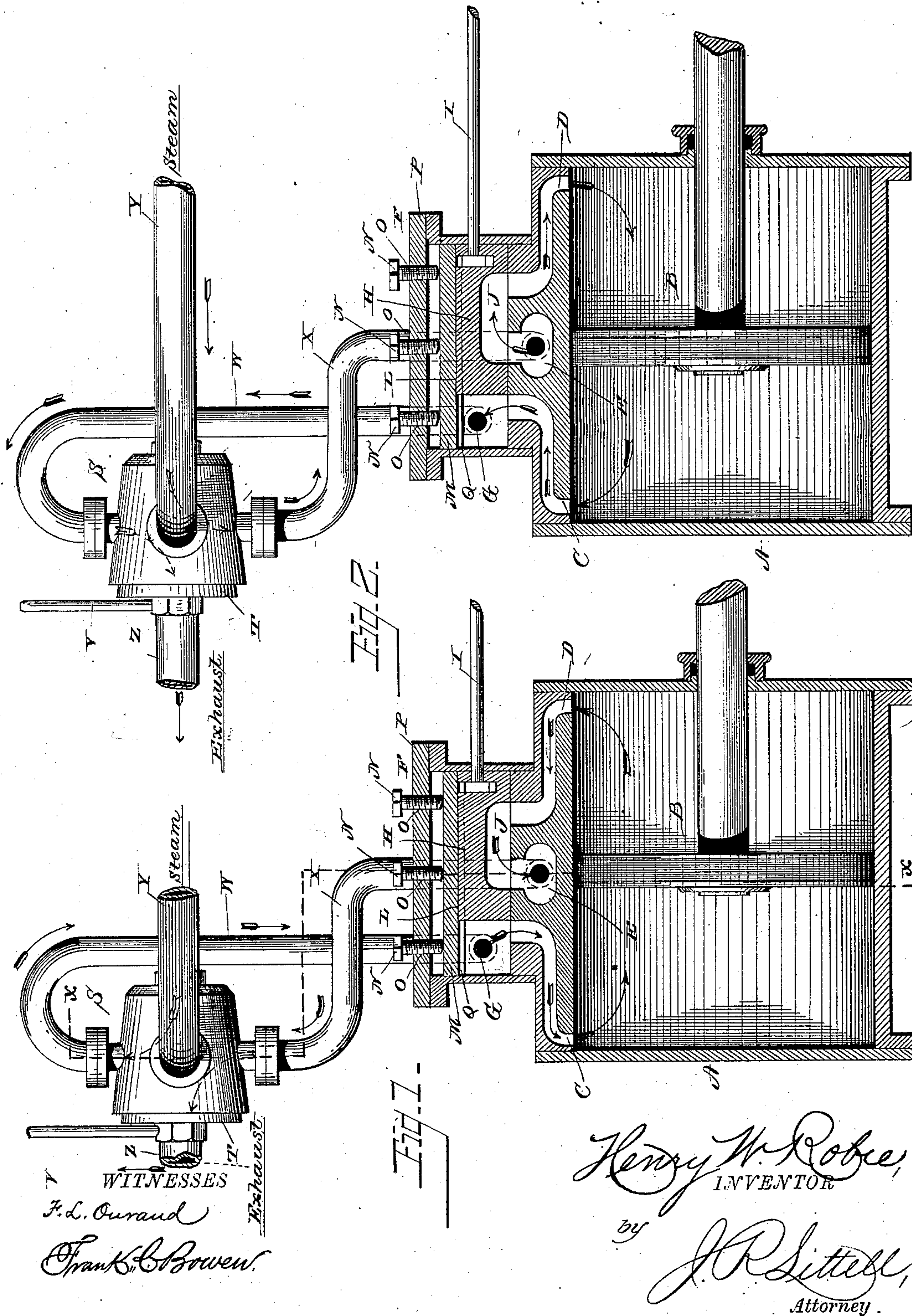
2 Sheets—Sheet 1.

H. W. ROBIE.

REVERSING VALVE FOR STEAM ENGINES.

No. 294,155.

Patented Feb. 26, 1884.



Henry W. Robie
INVENTOR
by *J. R. Little*
Attorney.

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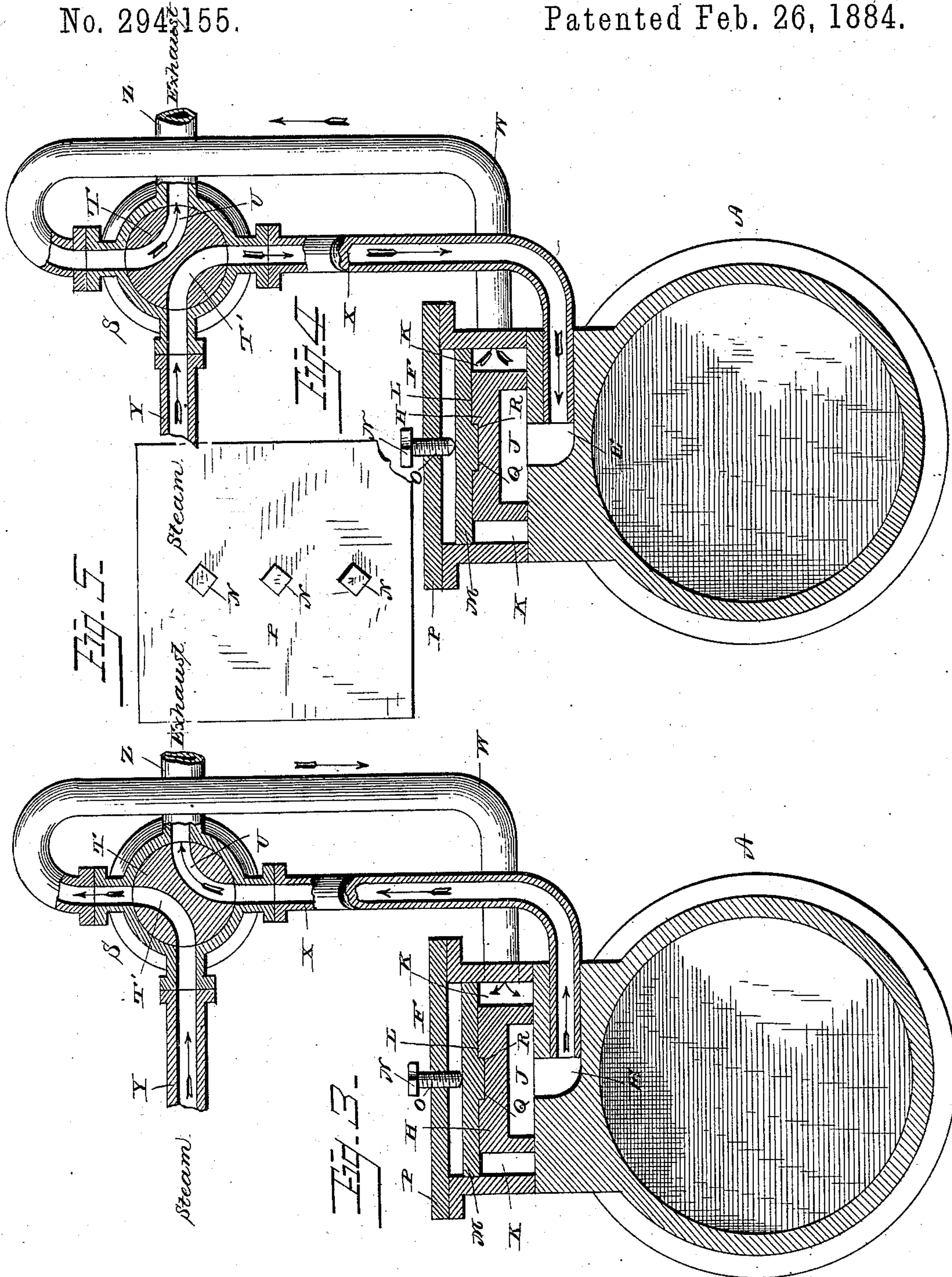
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WITNESSES
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UNITED STATES PATENT OFFICE.

HENRY W. ROBIE, OF PORTSMOUTH, VIRGINIA.

REVERSING-VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 294,155, dated February 26, 1884.

Application filed October 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. ROBIE, a citizen of the United States, residing at Portsmouth, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Reversing-Valves for Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to reversing mechanism for steam-engines; and its object is to provide simple and efficient means for governing the forward and reverse movement of the engine without the employment of the link and double-eccentric mechanism now common in engines.

To this end my invention consists, broadly, in having the steam feed and exhaust pass through a four-way valve, so that by simply giving the valve a quarter-turn the live steam will be cut off from entering through the steam-chest, and will be caused to enter the cylinder at the exhaust-port, while the exhaust will be caused to pass off through the steam-chest. Thus, by simply turning the four-way valve, the motion of the engine is quickly reversed.

My invention further consists in certain improvements in the construction and arrangement of parts, substantially as will be herein-after more fully set forth.

In the drawings, Figure 1 is a vertical longitudinal sectional view taken through the cylinder and steam-chest, and showing the four-way stop-valve mechanism in elevation, the course of the steam on the forward movement of the engine being indicated by arrows. Fig. 2 is a corresponding view, having arrows indicating the course of the steam when the engine is on the reverse movement. Fig. 3 is a vertical transverse sectional view taken through the cylinder and steam-chest, and through the ports of the four-way valve, the arrows in this view indicating the course of steam on the forward movement of the engine. Fig. 4 is a corresponding transverse sectional view, having arrows indicating the course of the steam on the reverse movement. Fig. 5 is a face view of the steam-chest.

Corresponding parts in the figures are denoted by the same letters of reference.

Referring to the drawings, A designates the

cylinder, B the piston, C D the steam-ports of the cylinder, and E the exhaust-port, these parts being of the usual construction.

F is the steam-chest, which is disposed over the ports C, D, and E of the cylinder, and is provided at one end with a steam-port, G, as shown.

H is the valve, which slides in the steam-chest over ports C, D, and E, and is provided with the usual operating-rod, I, this valve being formed with the usual passage or port, J, in its under side, which alternately spans the exhaust-port E and the port D, and the exhaust-port E and the port C. The width of this valve is not as great as the width of the steam-chest, so that a space, K, is formed at the sides of the valve, through which the steam passes from port G to the ports C or D. The slide-valve H is formed with a flat back, L, that slides against a plate or partition, M, arranged in the top of the steam-chest, this plate being adjustable against the back of the valve, to take up wear and retain the valve securely to its seat, by means of a longitudinal series of set-screws, N N N, working through screw-threaded perforations O in the top plate, P, of the steam-chest and against said plate M. This plate M serves to retain the slide-valve to its seat when the feed-steam is admitted through the exhaust-port E under the valve during the reverse movement of the engine and by action of the four-way stop-valve, as hereinafter described. The under face of plate M is provided with a longitudinal rib, Q, that enters a corresponding groove, R, in the back L of the valve, and serves as a guide to the movement of the valve in the steam-chest.

S designates the four-way stop-valve, which is provided with the usual plug, T, having the two channels or ports T' U, the plug being provided with a rod, V, or other suitable means by which it may be operated conveniently. Into one side of this valve S enters a steam-pipe, W, from the steam-port G, and into the opposite side of the valve enters a pipe, X, from the exhaust-port E. Into another side of the valve enters the main steam-pipe Y, extending from the boiler, and into the side opposite from this enters the main exhaust-pipe Z, extending to a condenser or to the atmosphere.

The engine is provided with the usual eccen-

tric mechanism for governing its forward movement.

It is obvious that numerous modifications can be made in the construction and arrangement of parts embodied in my invention without departing from its spirit or scope. I therefore do not limit myself to the precise construction herein shown.

The operation and advantages of my invention will be readily understood. Normally (*i. e.*, on the forward movement) the plug T is turned so that its port T' will register with the steam-pipes Y and W, when its port U will register with the exhaust-pipes Z and X. When the parts are in this position, the steam will have a free passage into the cylinder through the port G of the steam-chest, and there will be a free exhaust through the exhaust-port E, as indicated by the arrows in Figs. 1 and 3. Now, by simply giving the plug T a quarter-turn, its port T' will register with the steam-pipe Y and the exhaust-pipe X, and its port U will register with main exhaust-pipe Z and the steam-pipe W. As indicated by arrows, Figs. 2 and 4, the steam will then enter the cylinder through the exhaust-port E, and will exhaust through the port G of the steam-chest, whereby the movement of the engine is instantly reversed.

I claim as my invention—

1. The combination, with the steam-chest of an engine having an exhaust-port and a feed-port, of an intermediate rotary valve having two independent and direct passages into which the exhaust and feed ports of the steam-chest directly connect on opposite sides of the said valve, the main feed and exhaust being in direct connection with the other ends of said passages and on opposite sides of the valve, whereby the direct feed of the steam is reversed by simply turning the rotary valve, substantially as and for the purpose set forth.

2. An engine embodying the cylinder having the steam-ports and exhaust-ports, the steam-chest arranged over these ports and having the feed-port, a slide-valve working in

the steam-chest and having the passage or port in its under side, the four-way stop-valve from which extends the main steam-pipe and the main exhaust-pipe, and the independent pipes leading from opposite sides of the four-way valve into the exhaust-port of the cylinder and the feed-port of the steam-chest, substantially as and for the purpose set forth.

3. The combination of the cylinder having the exhaust-port, the steam-chest having the feed-port, the slide-valve arranged over said exhaust-port, the plate or partition adjusted against the back of the valve to retain it in its seat, mechanism for adjusting this plate, and the four-way valve receiving the main exhaust and feed pipes and having connection with the exhaust-port under the slide-valve and with the feed-port in the steam-chest, substantially as set forth.

4. An engine embodying the cylinder having the steam-ports and the exhaust-port, the steam-chest having the feed-port at one end, and provided with a top plate or partition having a longitudinal guide-rib on its under side, and the slide-valve of less width than the steam-chest and having the smooth back formed with the groove to receive the rib, substantially as set forth.

5. In an engine adapted to take its feed under the slide-valve, the herein-described steam-chest having a series of screw-threaded perforations in its top plate, the slide-valve having a top partition disposed between the top plate and the back of the valve and fitted neatly between the walls of the steam-chest, and a series of set-screws disposed in a series along the said partition and working from the outside through the top-plate and against the partition, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY W. ROBIE.

Witnesses:

WILLIAM H. BARNES,
SAMUEL W. LYONS.