

Patented Apr. 17, 1900.

G. W. CULP.
STEAM ENGINE REVERSING VALVE.

(Application filed Nov. 11, 1899.)

(No Model.)

2 Sheets—Sheet 1.

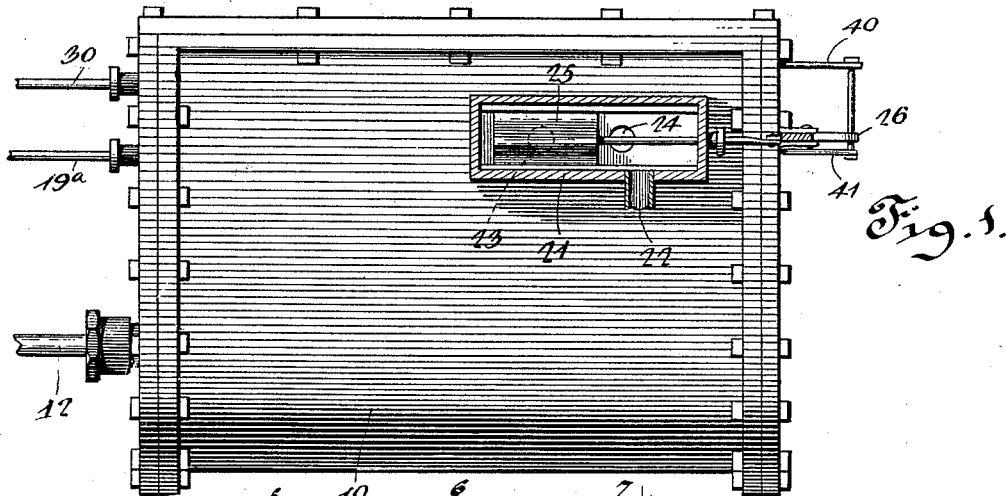


Fig. 1.

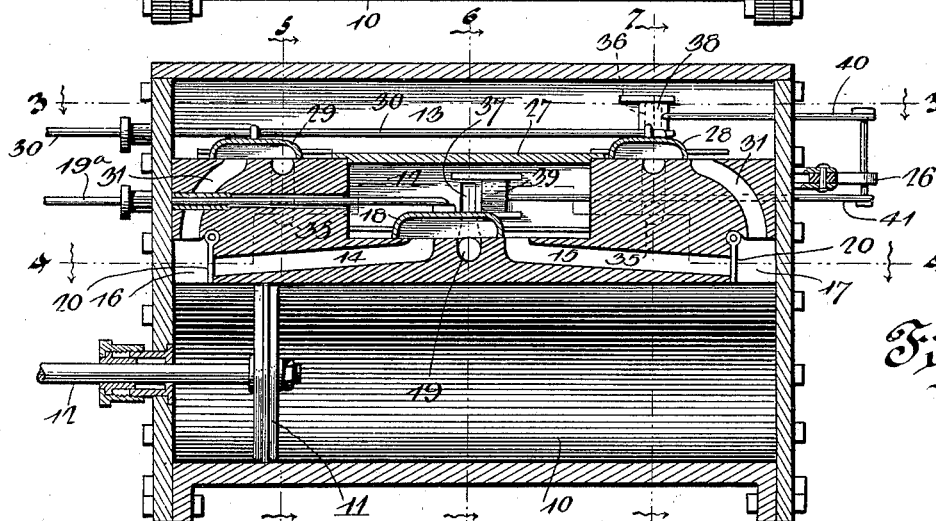


Fig. 2.

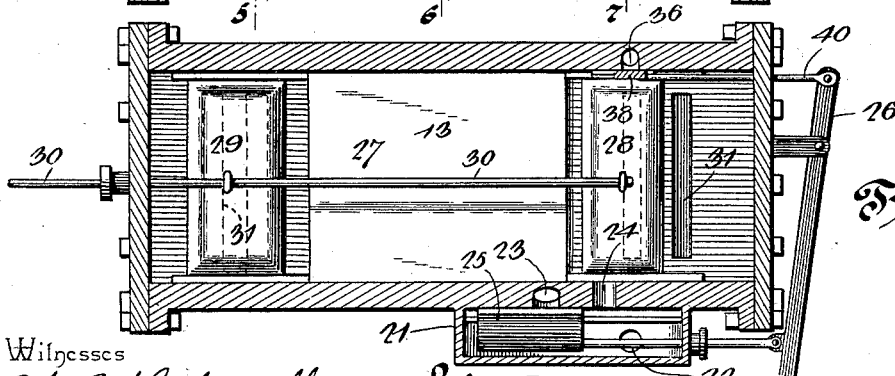


Fig. 3.

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Fig. 4.

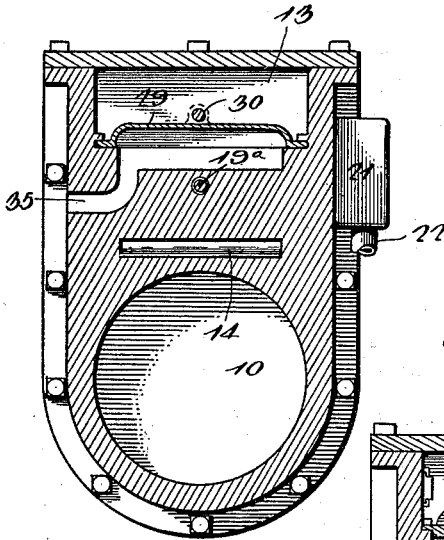
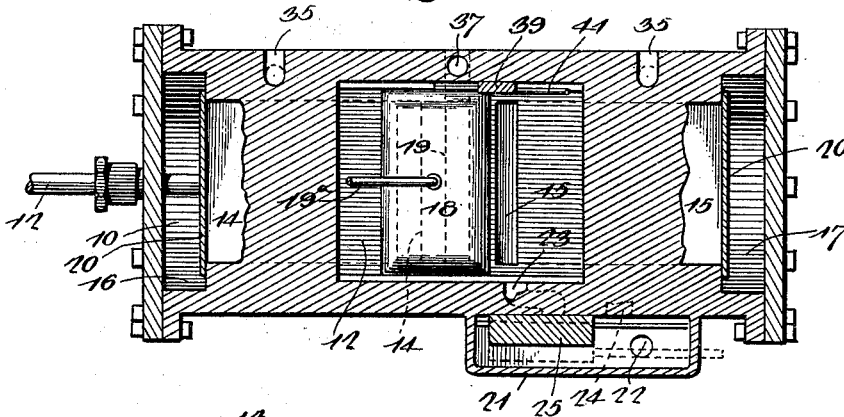


Fig. 5.

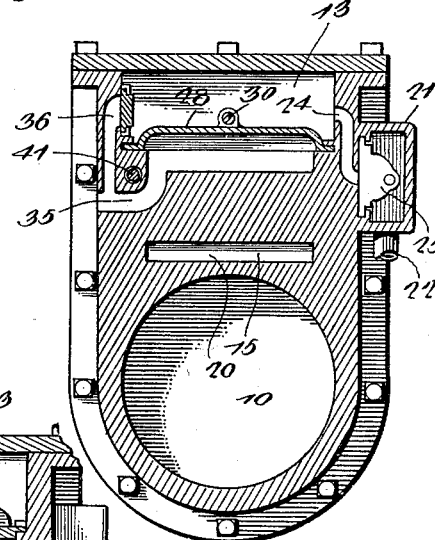
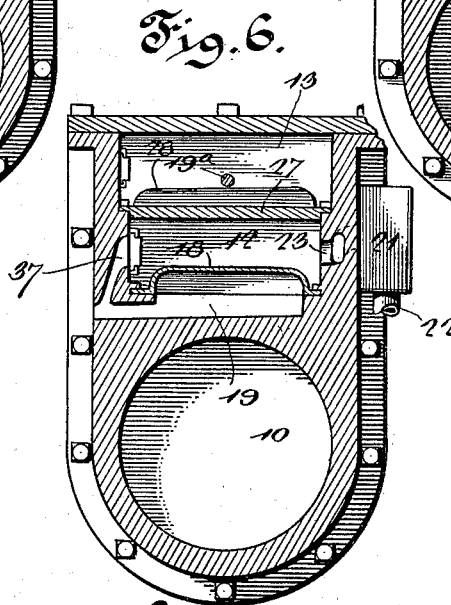


Fig. 7.



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UNITED STATES PATENT OFFICE.

GEORGE W. CULP, OF LYNDON, ILLINOIS.

STEAM-ENGINE REVERSING-VALVE.

SPECIFICATION forming part of Letters Patent No. 647,479, dated April 17, 1900.

Application filed November 11, 1899. Serial No. 736,642. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. CULP, a citizen of the United States, residing at Lyndon, in the county of Whiteside and State of Illinois, have invented a new and useful Steam-Engine Reversing-Valve, of which the following is a specification.

This invention relates to steam-engines in general, and particularly to the reciprocating type, and has special reference to the valve mechanism, the object of the invention being to provide a construction comprising a main steam-chest and a supplemental steam-chest, the valves of which are differently set and which may be alternately thrown into communication with the feed-pipe and the cylinder to reverse the direction of motion of the engine.

In the drawings forming a portion of this specification, and in which similar numerals of reference designate like and corresponding parts in the several views, Figure 1 is a top plan view showing a steam-cylinder and its attached chests, the position and construction of the throttle being also shown. Fig. 2 is a central horizontal section of Fig. 1, the piston being in elevation. Fig. 3 is a section on line 3 3 of Fig. 2 and showing the supplemental steam-chest and its valves, as also the throttle-valve and its casing. Fig. 4 is a section on line 4 4 of Fig. 2 and showing the ends of the steam-passages communicating with the cylinder. Fig. 5 is a section on line 5 5 of Fig. 2 and showing the exhaust port and passages of one of the valve-seats in the supplemental chest. Fig. 6 is a section on line 6 6 of Fig. 2 and showing the drain-port, as also the exhaust port and passage from the main chest. Fig. 7 is a section on line 7 7 of Fig. 2 and taken through the drain-port of the supplemental chest, as also the second exhaust port or passage.

Referring now to the drawings, 10 represents a cylinder having a piston 11 therein, of usual construction, provided with a rod 12, passed outwardly and longitudinally of the cylinder through a suitable stuffing-box. At one side of the cylinder is formed two steam-chests 12 and 13, of which the chest 12 is directly adjacent the bore of the cylinder and the supplemental or second chest is upon the outer wall of the first-named or main chest.

Leading from the chest 12 and from points adjacent the center thereof are steam-passages 14 and 15, which communicate with ports 16 and 17, which open into the cylinder 10 at opposite ends thereof. The outer ends of these passages 14 and 15 open into the chest 12 through a valve-seat formed upon one side of the chest and which seat receives a slide-valve 18, of usual construction, and which valve is adapted to alternately cover the outer ends of these passages 14 and 15 and communicate them with an exhaust-port 19, which leads outwardly of the chest and communicates with the exhaust-pipe in the usual manner. This valve 18 has a rod 19^a connected therewith and which rod is attached at its outer end to an eccentric in the usual manner.

Flap-valves 20 are pivotally mounted in the ports or chambers 16 and 17 and are adapted to normally lie upon and close the inner ends of the steam-passages 14 and 15 and prevent back pressure from the cylinder through these passages under conditions which will be presently explained.

It will be seen from the above description that if steam be admitted to the chest 12 and the valve 18 reciprocated the piston 11 will be correspondingly moved.

The throttle which governs the steam-chests comprises a casing 21, mounted upon the exterior of the cylinder or steam-chests and communicating with which is a supply-pipe 22. From this casing leads a passage 23 to the chest 12 and a separate passage 24 to the chest 13. A slide-valve 25 is disposed within the casing 21 and is connected with an operating-lever 26, through the medium of which said slide-valve may be reciprocated to alternately and successively cover and uncover the passages 23 and 24, and thus to direct the steam to either of the chests.

The chest 12 opens into the chest 13 and is provided with a steam-pipe cover 27 to prevent the passage of steam from one chest to the other, while permitting access to the chest 12 when desired.

At each end of the chest 13 is a valve-seat, and which seats are adapted to receive slide-valves 28 and 29 similar in every respect and having a common valve-rod 30 passed through the end of the chest and connected with a suitable eccentric. From each of the last-

named valve-seats leads a steam-passage 31 to the corresponding port or chamber 16 and 17 and at the opposite side of the valve 20 from the corresponding steam-passage 14 and 15. Opening also through each of the said valve-seats in the chest 13 is an exhaust-port 35, which leads outwardly through the side of the steam-chest.

It has been found desirable when either steam-chest is in an inoperative relation to the cylinder that it be opened to permit the drain of water of condensation therefrom. For this purpose a drain-port 36 is formed in the wall of the chest 13 and communicates with the adjacent passage or port 35. A corresponding drain-port 37 is formed through the wall of the chest 12 and communicates with the port 19. In order to alternately cover and uncover these drain-ports, slide-closures 38 and 39 are provided and have operating-rods 40 and 41, which pass outwardly and through the walls of their respective chests and are connected with one end of the lever 26 of the throttle-valve. The rods 40 and 41 are so proportioned that when moved to one limit of their motion the drain-port of one chest will be opened, while the drain-port of the other will be closed, and vice versa.

The valves in the different chests are oppositely set, so that steam admitted to one chest will drive the engine in one direction and steam admitted to the other chest will drive it in an opposite direction, it thus being seen that by manipulation of the lever 26 the direction of rotation of the engine may be governed.

From the above description it will be seen that when the chest 13 is in operative relation to the cylinder the chest 12 is out of such relation, and to prevent back pressure of steam through the passages 14 when the chest 12 is inoperative the valves 20 are provided, these valves being held tightly over the inner ends of the passages 14 and 15 by the steam-pressure. These valves 20 are also adapted to lie over the inner ends of the passages 31 when the chest 12 is in operative relation to the cylinder, it being understood that the inward passage of steam through the passages 14 and 15 will act to blow the valves to cover the passages 31.

It will of course be understood that in practice any desired proportion, and materials may be employed in the construction of the valve mechanism and also that various modifications may be made without departing from

the spirit of the invention; also, it will be appreciated that the positions of the steam-chests may be changed by placing one above the other below the cylinder or by placing one at each side of the cylinder, in which event suitable mechanism will be employed for communicating motion to the slide-valves.

What is claimed is—

1. The combination with a steam-cylinder having a piston, of a main steam-chest communicating with the cylinder, a valve mechanism for said chest, a supplemental chest communicating with the cylinder and having separate valve mechanism, and valves adapted to alternately close communication between the cylinder and the chests.

2. The combination with a cylinder having a piston, of a main steam-chest, steam-passages connecting said chest with the cylinder, an exhaust for the cylinder, valve mechanism adapted to alternately communicate the steam-passages with the exhaust, the supplemental steam-chest having steam-passages leading to the cylinder, an exhaust-passage adjacent each of said steam-passages, valves adapted to communicate said exhausts with the steam-passages alternately, and valves adapted to cover the steam-passages of the chests alternately, under the influence of steam passing through the uncovered passages.

3. The combination with a cylinder having a piston, of a main chest having steam-passages communicating with the cylinder, an exhaust-passage from said chest, a valve adapted to communicate the exhaust-passage with the steam-passages alternately, a supplemental steam-chest having steam-passages communicating with the cylinder, exhaust-ports from the supplemental chest, valves adapted to communicate the exhaust-ports alternately with their respective steam-passages, a throttle adapted to admit steam to the chests alternately, drain-ports for the chests, closures for the drain-ports, and connections between the closures and the throttle for opening the drain-port of the inactive chest and closing the drain-port of the active chest when the throttle is operated.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

GEORGE W. CULP.

Witnesses:

BYRD R. KIRK,
JOHN WHALLON.