

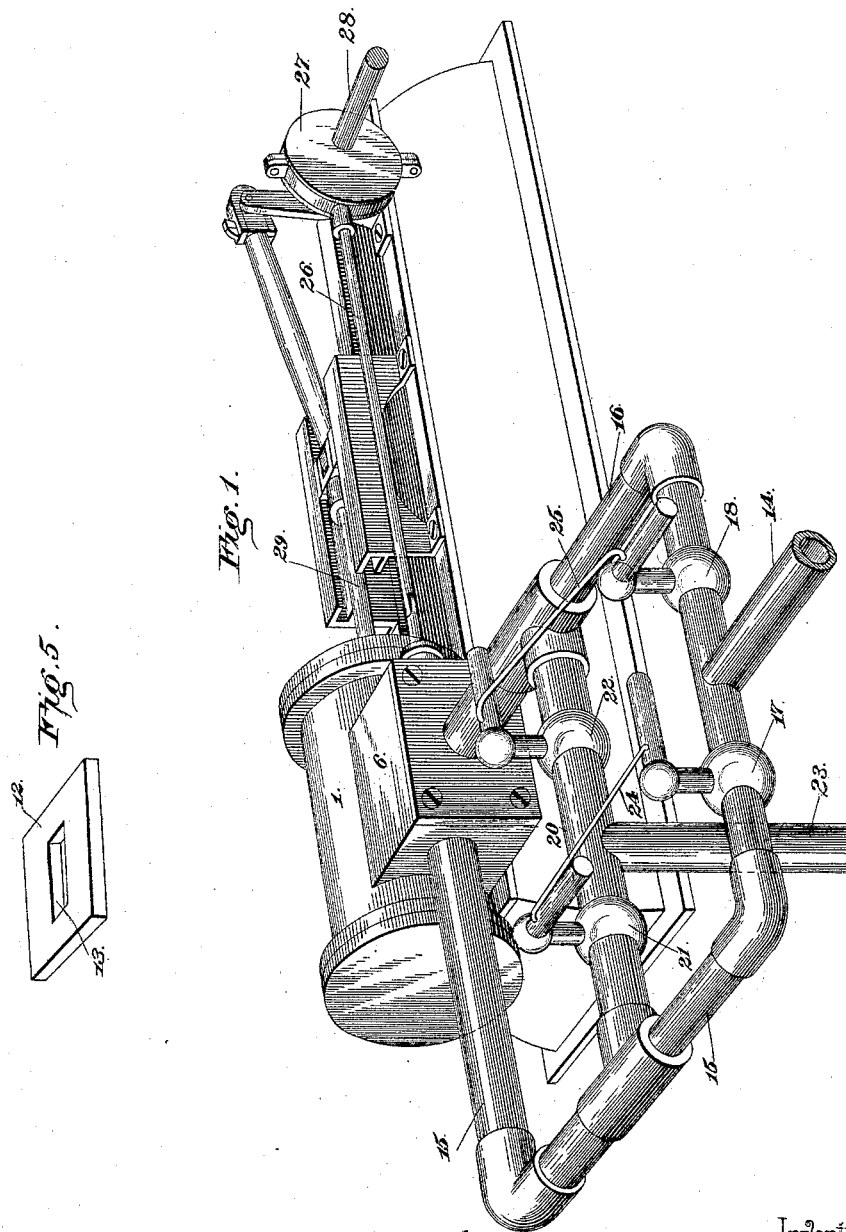
(No Model.)

2 Sheets—Sheet 1.

C. F. CHRISTOPHER.  
REVERSING VALVE FOR ENGINES.

No. 474,212.

Patented May 3, 1892.



Witnesses

*M. S. Fowler*  
*A. H. Riley*

Inventor

*Calvin F. Christopher*

By his Attorneys,

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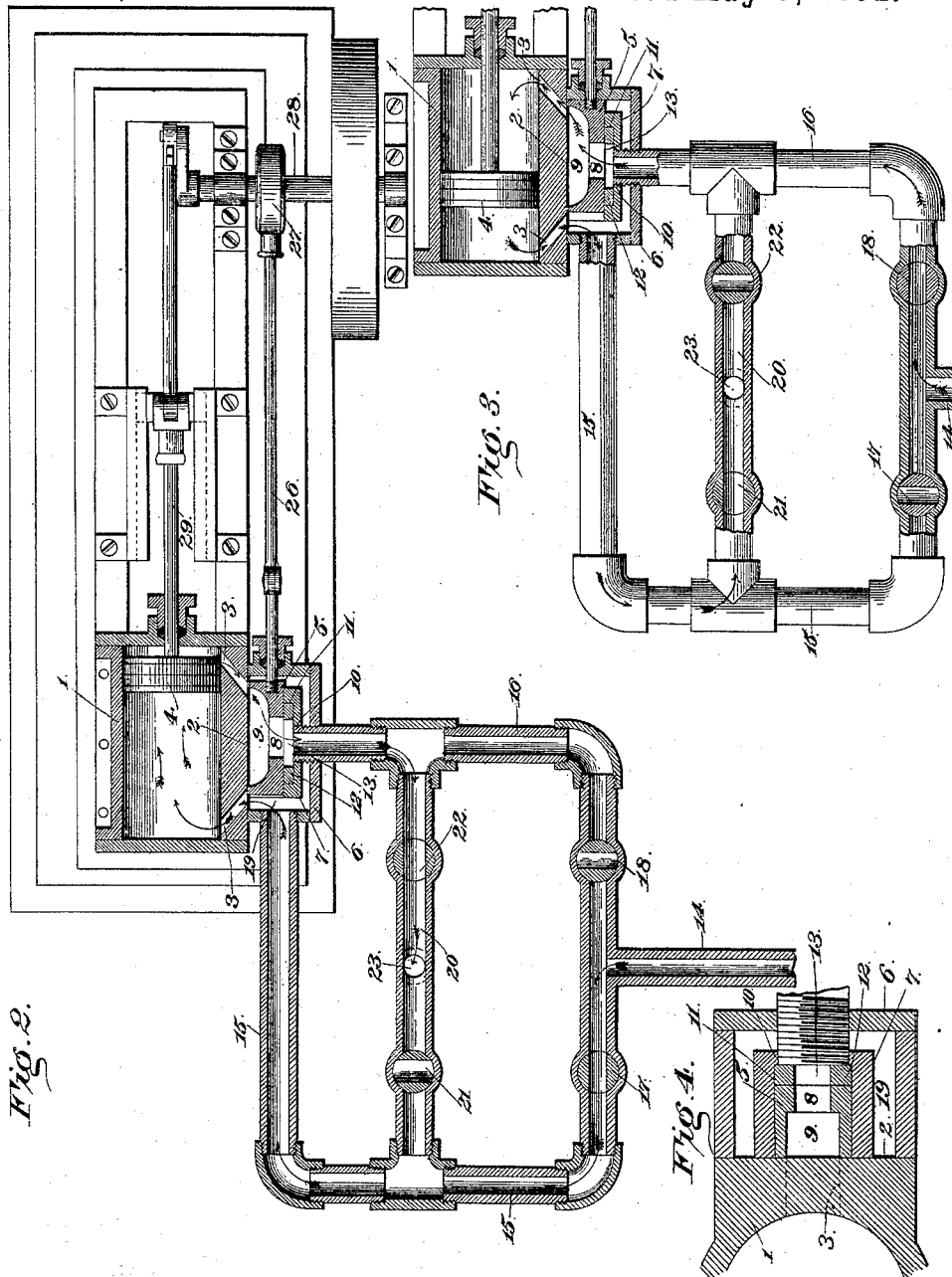
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# UNITED STATES PATENT OFFICE.

CALVIN F. CHRISTOPHER, OF SPARTANBURG, SOUTH CAROLINA.

## REVERSING-VALVE FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 474,212, dated May 3, 1892.

Application filed September 14, 1891. Serial No. 405,668. (No model.)

*To all whom it may concern:*

Be it known that I, CALVIN F. CHRISTOPHER, a citizen of the United States, residing at Spartanburg, in the county of Spartanburg and State of South Carolina, have invented a new and useful Reversing-Valve for Engines, of which the following is a specification.

The invention relates to improvements in slide-valves for steam-engines.

10 The object of the present invention is to simplify and improve the construction of slide-valves of steam-engines and to enable an engine to be reversed without changing the position of the slide-valve and by employing a single slide-valve.

15 The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended.

20 In the drawings, Figure 1 is a perspective view of a stationary engine provided with a slide-valve constructed in accordance with this invention. Fig. 2 is a horizontal sectional view showing the position of the parts when steam is admitted on the exterior of the slide-valve. Fig. 3 is a similar view showing the position of the parts when steam is supplied through the slide-valve. Fig. 4 is a transverse sectional view of the steam-chest. Fig. 5 is a detail view.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

35 1 designates a cylinder having a valve-seat 2 and provided at the ends thereof with steam-ports 3, adapted to supply and exhaust steam at both sides of a piston 4, arranged within the cylinder 1. A reciprocating slide-valve 5 is arranged on the seat 2 within a steam-chest 6 and in an inner casing 7, which is open at the ends to allow the slide-valve to reciprocate to cut off the supply of steam from one of the ports 3 and introduce the steam through the other port 3, as will be readily understood. The slide-valve 5 is rectangular and hollow and is provided with a central opening 8, and it is arranged so that when one of the ports 3 communicates with its interior chamber 9, the valve being hollow, the other port will communicate with the space between the inner casing and the walls of the steam-chest. The

inner casing 7 is provided with a central opening 10 and with a recess 11 in its inner face, in which is arranged a packing or follower plate 12, which is provided with a slot 13 and is adapted to preserve a steam-tight connection between the inner casing and the slide-valve. The steam from a conduit 14 is conducted to the engine by supply-pipes 15 and 16, having throttle-valves 17 and 18 and communicating, respectively, with the steam-chest and with the inner casing thereof, and steam passing through the supply-pipe 15 will enter the steam-chest, filling the space 19 between the steam-chest and the inner casing, while steam which is supplied by the pipe 16 is conducted directly to the inner casing and through the valve 5 to the steam-chest. By this arrangement it will be seen that by turning the throttle-valves 17 and 18 steam may be admitted on either side of the piston 4, thereby enabling the latter to be moved in either direction and to be reversed by simply turning the throttle-valves to direct steam on one side of the piston or the other. It will also be seen that a single slide-valve is employed instead of a pair of valves and that the operation of reversing is accomplished without changing the position of the valve.

80 The supply-pipes 15 and 16 are connected by an exhaust-pipe 20, which is provided with exhaust-valves 21 and 22 and connects the supply-pipes at points intermediate their ends. When steam is admitted by means of the supply-pipe 15, the valve 17 will be open and the exhaust-valve 21 will be closed, while the throttle-valve 18 will be closed and the exhaust-valve 22 will be open, the steam exhausting through the inner portion of the supply-pipe 16, thence to the exhaust-pipe 20, and then out through a suitable pipe 23.

95 In order that the throttle and exhaust valves may be readily controlled, they are respectively connected by rods 24 and 25, having their ends attached to the valve-handles, which are disposed at an angle, whereby when a throttle-valve is opened its companion exhaust-valve will be closed, and vice versa.

100 The slide-valve is reciprocated by a valve-rod 26, connected with an eccentric 27, mounted upon a shaft 28, which is rotated by the piston-rod 29 of the piston 4, all arranged in the usual well-known manner.

The herein-described improvements are applicable to all classes of slide-valves, whether rectangular or cylindrical in cross-section, and I desire to be understood that I do not  
5 limit myself to the precise details of construction herein shown and described, as I may without departing from the spirit of my invention make minor changes therein.

What I claim is—

- 10 1. The combination of a cylinder provided with steam-ports, a steam-chest having an inner casing provided with a recess, a slide-valve arranged within the valve-casing and having an interior chamber and provided  
15 with an opening, a follower-plate arranged within the recess and having a slot communicating with the opening of the valve, and separate supply-pipes communicating, respectively, with the steam-chest and with the  
20 valve-casing, substantially as described.

2. The combination of a cylinder provided with steam-ports, a steam-chest, a slide-valve having an interior chamber and arranged within the steam-chest, supply-pipes communicating, respectively, with the chamber of  
25 the valve and with the steam-chest and provided with throttle-valves, an exhaust-pipe connecting the supply-pipes and provided with exhaust-valves, and rods connecting the  
30 throttle-valves with their companion exhaust-valves, whereby a throttle-valve and its companion exhaust-valve will be simultaneously operated, substantially as described.

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

CALVIN F. CHRISTOPHER.

Witnesses:

J. A. SAUL,  
H. F. RILEY.