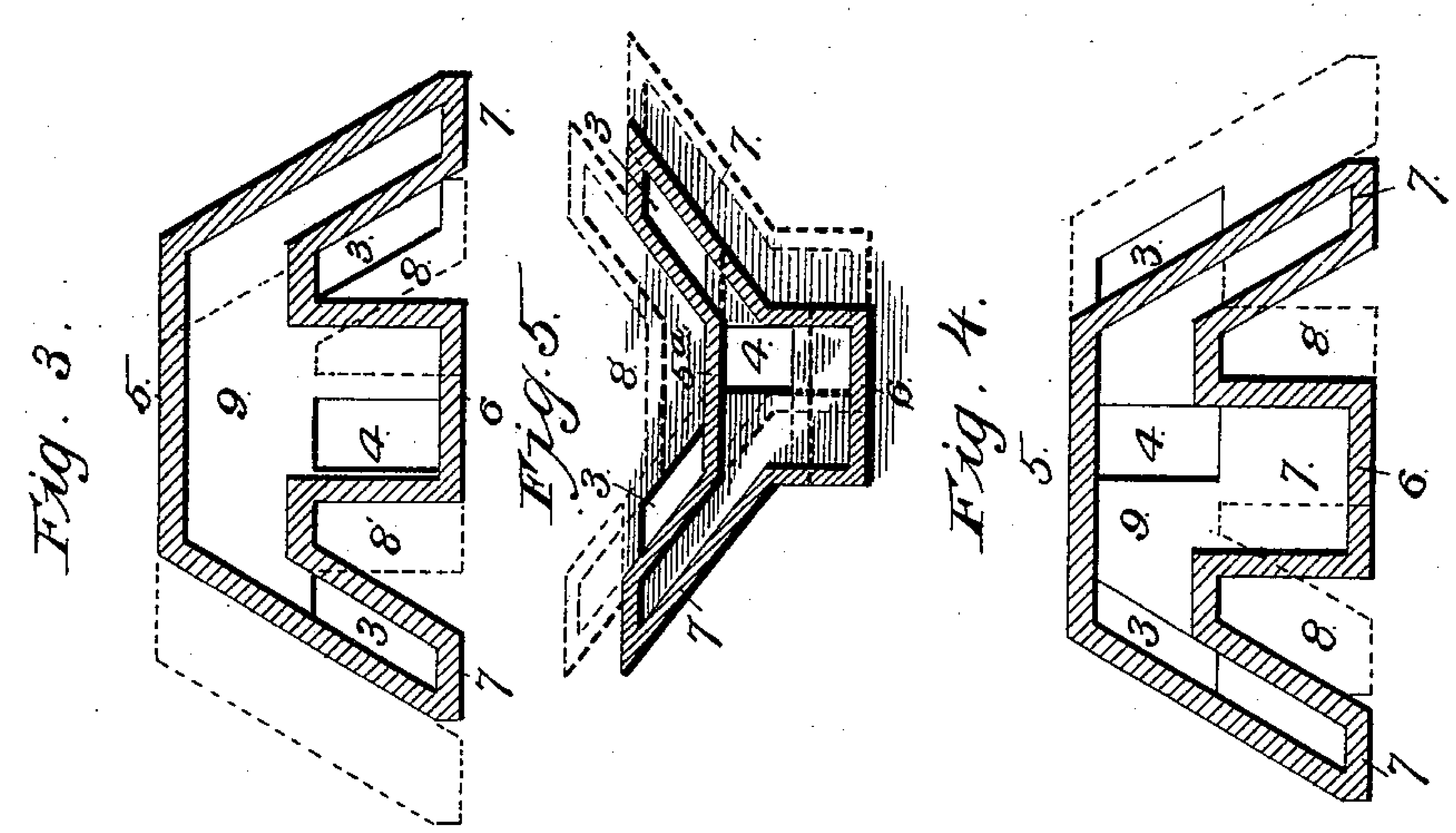
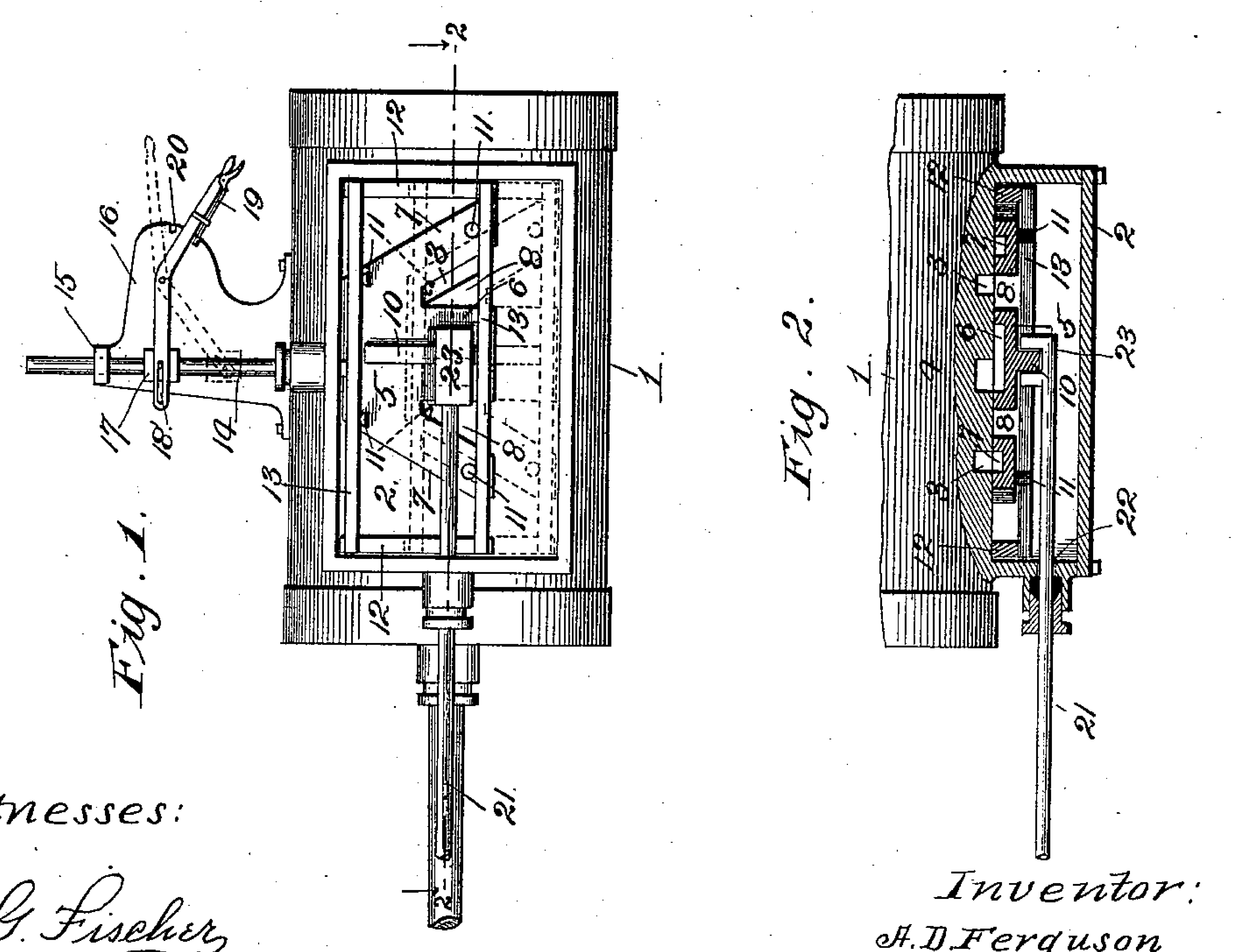
(No Model.)

A. D. FERGUSON.

VALVE FOR STEAM ENGINES.

No. 564,274. Patented July 21, 1896.





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UNITED STATES PATENT OFFICE.

ALFRED D. FERGUSON, OF ODESSA, MISSOURI.

VALVE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 564,274, dated July 21, 1896.

Application filed December 13, 1895. Serial No. 572,055. (No model.)

To all whom it may concern:

Be it known that I, ALFRED D. FERGUSON, of Odessa, Lafayette county, Missouri, have invented certain new and useful Improvements in Valves for Steam-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to improvements in steam-engines, and is designed more particularly as an improvement over the construction embodied in the application for patent on steam-engines filed by R. W. Whitney and myself on the 8th day of May, 1895, Serial No. 548,537. It has been found that the employment of duplicate sets of inlet-ports and duplicate discharge-ports as embodied in said patent may be dispensed with with advantage and yet the same result attained. The advantage lies chiefly in the increased simplicity of construction and in the diminished size of the steam-chest, and therefore results in a saving of material and in a less cumbrous and lighter engine.

To the above purposes the invention consists in the peculiar and novel construction of the slide-valve and in the arrangement of the inlet and discharge ports, as will be hereinafter described, and pointed out in the appended claim.

In order that the invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 represents a cylinder provided with a steam-chest constructed in accordance with my invention. Fig. 2 represents a view partly in section, on the line 2 2 of Fig. 1, and partly in elevation. Fig. 3 represents a horizontal section of the valve and shows it in two different positions relative to the steam-ports. Fig. 4 is a similar view, but shows it occupying different positions from those in Fig. 3. Fig. 5 is a similar view of a slightly-modified form.

Referring to the drawings in detail, 1 designates the steam-chamber, and 2 the steam-chest located relative to the cylinder in the customary manner.

3 3 designate the inlet-ports leading to the cylinder. Said ports converge toward one side, and centrally between them is the discharge-port 4. 5 designates a valve, which is approximately T-shaped, being provided with a stem 6, and with the diverging arms or extensions 7, which arms or extensions extend at the same angle as the inlet-ports 3 at opposite sides of the stem 6, so as to form or leave between them and the stem the spaces 8. Said valve is formed in its under side with an opening which conforms to the outline or contour of the valve, that is, it is provided with an opening 9 and the stem, and the arms are provided with openings or branches which communicate with said opening. The valve is of such length, considering it in the direction in which it reciprocates, that when the extension of the opening of one arm registers with one of the inlet-ports the space between the other arm and the stem may register with the other inlet-port, as shown in Figs. 1 and 3, and also that when the valve has been adjusted to reverse the operation of the engine, as hereinafter more particularly referred to, one of the inlet-ports shall communicate with the opening of the valve and the other shall extend parallel with but outside of the adjacent extension or arm of the valve, as shown clearly in Fig. 4.

Extending transversely of the upper side of the valve is the rib 10, and projecting upwardly from the valve near its corners are the lugs 11. A rectangular frame, whereby the adjustment of the valve is made, comprises the end bars 12, which lie snugly within and against the ends of the steam-chest, and the side or longitudinal bars 13, which are connected to the end bars, are located between the face-plate of the steam-chest and the upper or outer side of the valve. Said side bars 13 are arranged snugly against the outer sides of the lugs 11, against which they bear when the valve is adjusted to reverse the engine. This is accomplished by any suitable mechanism—for instance, by means of the stem 14, which extends through the contiguous side of the chest and through the guide-lug 15 of a bracket 16, bolted or otherwise secured to the cylinder.

17 designates a collar, which is fixed upon said rod, and 18 the slotted end of a lever which engages a pin projecting from said collar.

19 designates a dog carried by said lever

and engaging one or another of the notches 20 in the sector extension of the bracket 16.

21 designates the valve-stem, which extends through an ordinary packing and one end of the steam-chest, and is provided with a hook 23, which slidingly engages the rib 10 of the valve, as in the aforesaid patent.

When the valve is adjusted to the position shown in full lines, Figs. 1 and 3, that is, with the stem and arms of the valve in longitudinal alinement with the ports, the steam, as the valve is reciprocated in the ordinary manner, alternately enters the cylinder by way of the ports 3 3 and exhausts or escapes through the port 4. When the valve is at one end of the stroke, as illustrated in full lines in Fig. 3, the steam enters by way of the right-hand space 8 and the registering port 3 and escapes by way of the other port 3 and the outlet-port 4. When the valve is at the opposite end of its movement, this arrangement is reversed, and the steam enters by way of the space 8 and the left-hand port 3 and escapes by way of the other port 3 and the outlet-port 4.

To reverse the engine, the lever 18 is thrown to the position shown in dotted lines, Fig. 1, and causes the valve to move to the position shown also in dotted lines in said figure, and, more clearly, to the position shown in Fig. 4. The reciprocation of the valve now permits the steam to enter the ports 3 alternately, and escape continuously by way of the port 4.

It will be seen by reference particularly to Fig. 4 that in the new relation which the valve has assumed to the ports the steam enters the cylinder in directions opposite to its entrance when the valve is in the position shown in Fig. 3, and that consequently the operation of the engine is reversed, as will be understood.

The modified form of construction shown in Fig. 5 and numbered 5^a, while substantially the same in construction and arrangement, is more in the form of the letter **Y**, and comprises the stem 6 and the arms 7, as before. The space between the arms corresponds in function with the spaces 8, and is so numbered. In this figure the inlet-ports are not arranged in longitudinal alinement with the outlet-port, but their relation to the valve is precisely the same as that already described, and the engine may be reversed by manipulating said valve in the same manner. The construction and arrangement of the parts shown in Fig. 5 permits of the steam-chest being made smaller, possibly, than it could be when a valve is employed of the construction illustrated in the other figures.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

In a steam-engine, the combination with a cylinder and a steam-chest provided with converging inlet-ports and an outlet-port located centrally between them, of a reciprocating slide-valve, which has arms extending at angles corresponding to and parallel with the converging inlet-ports, and is provided in its under side with an opening which corresponds in contour to said valve, so that when the valve is at either end of its stroke one of the inlet-valves is open and the other is in communication with the outlet-port, and means to adjust the valve in a direction at right angles to its reciprocation, so that when the valve is at the same end of its stroke the inlet-port formerly open will be closed and in communication with the outlet-port, and the inlet-port formerly closed will be open to convey steam to the cylinder, substantially as shown and described.

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

ALFRED D. FERGUSON.

Witnesses:
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