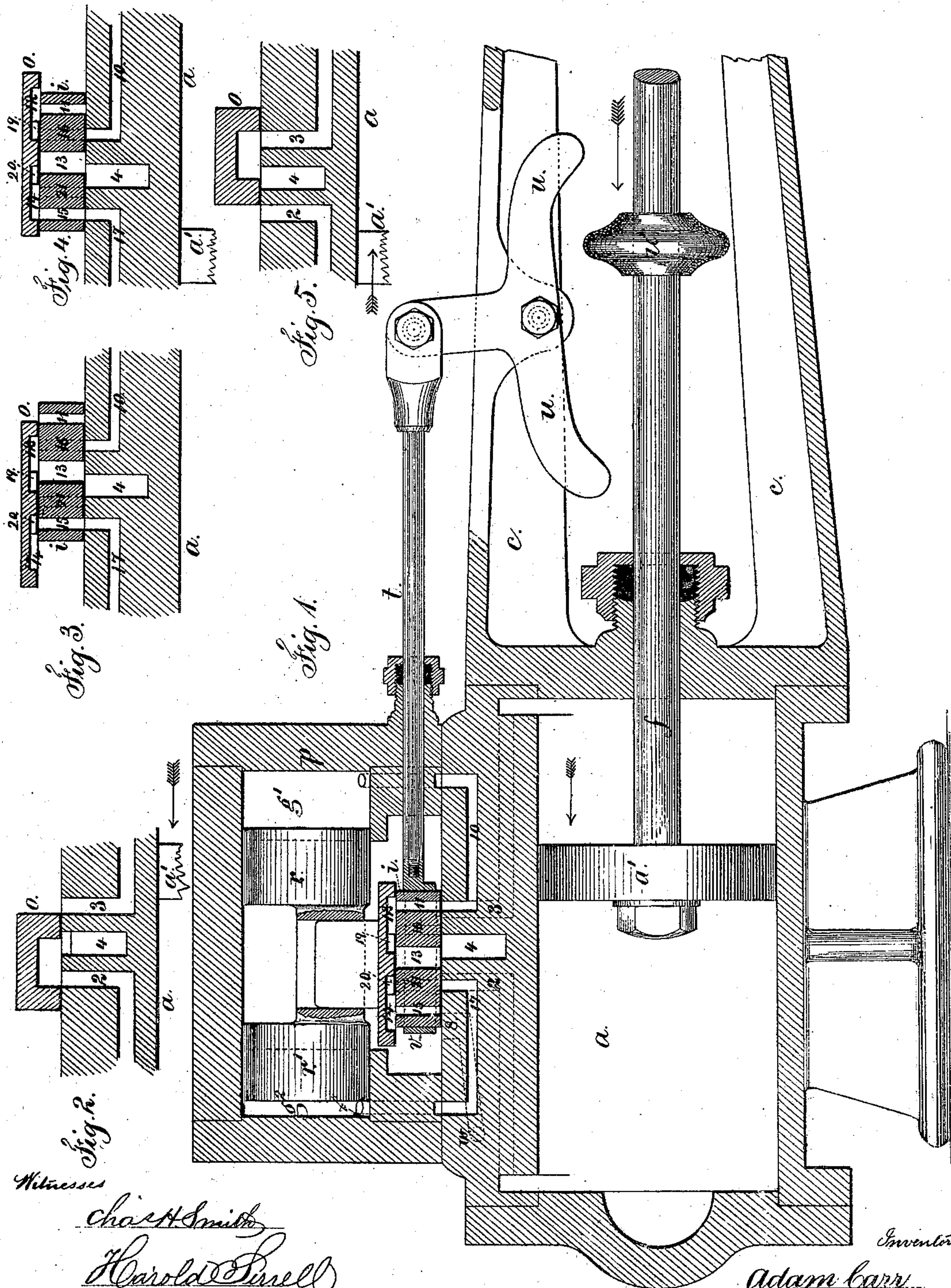


A. CARR.

Valves for Steam-Engines.

No. 143,807.

Patented Oct. 21, 1873.



Witnesses

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Harold Sirell

Inventor

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for Lemuel W. Perrell

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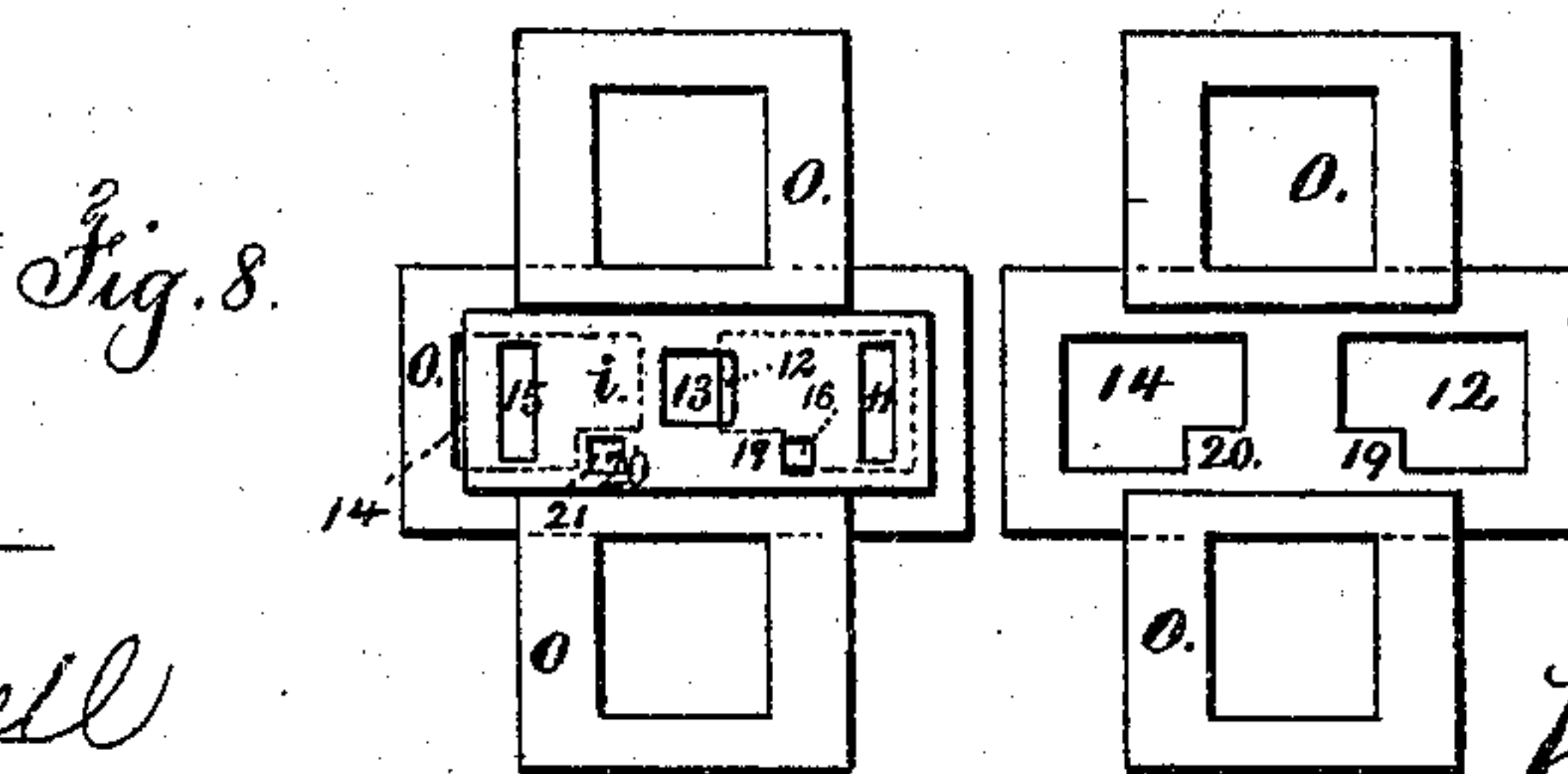
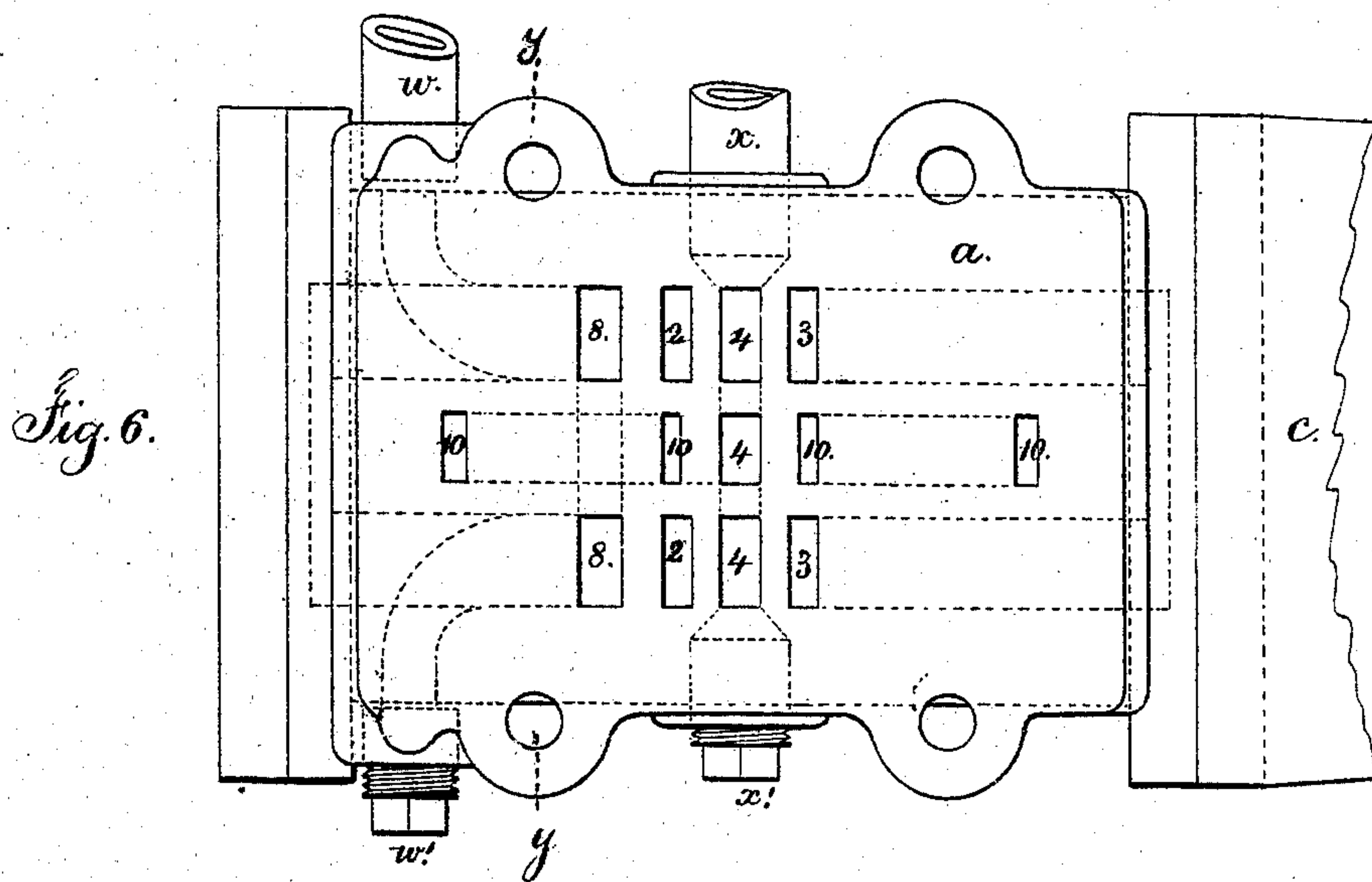
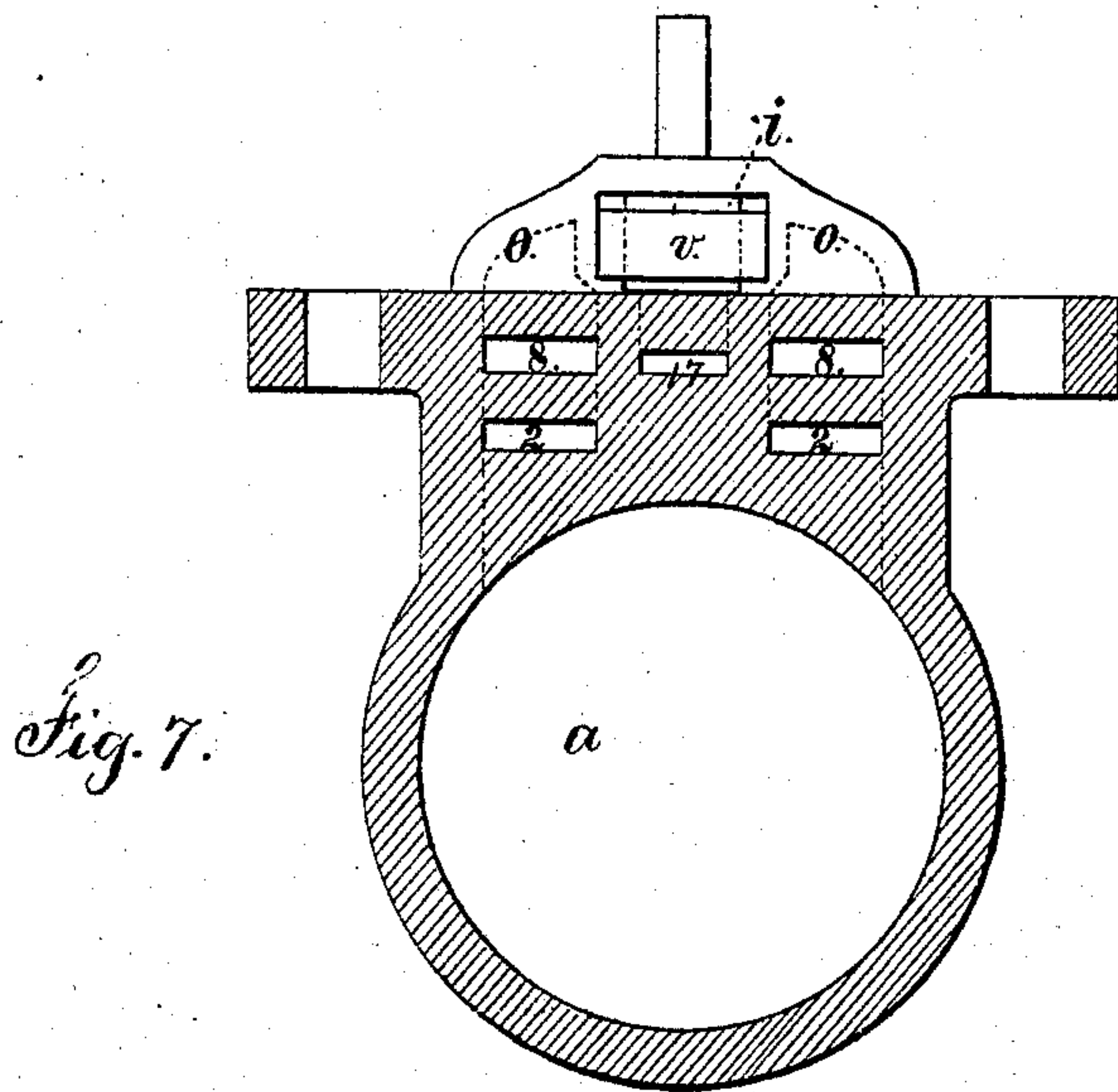
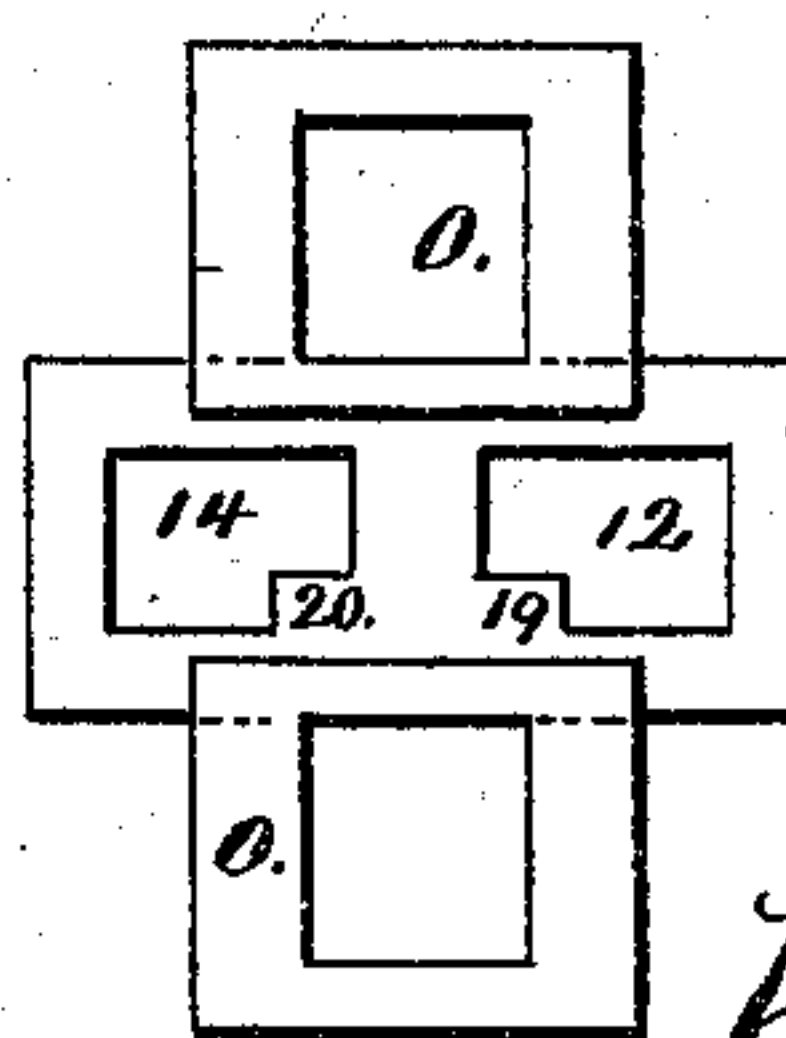


Fig. 9.



Witnesses

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UNITED STATES PATENT OFFICE.

ADAM CARR, OF PATERSON, NEW JERSEY.

IMPROVEMENT IN VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **143,807**, dated October 21, 1873; application filed August 1, 1873.

To all whom it may concern:

Be it known that I, ADAM CARR, of Paterson, in the county of Passaic and State of New Jersey, have invented an Improvement in Valves for Engines, of which the following is a specification:

This invention is an improvement upon that set forth in Letters Patent Nos. 105,986 and 110,294; and the improvement relates to the arrangement of the ports and passages of the valves and valve-seat.

In the drawing, Figure 1 is a vertical section of an engine fitted with my improvement. Figs. 2, 3, 4, and 5 are sectional views, illustrating the movement of the valves. Fig. 6 is a plan of the valve-seat. Fig. 7 is a sectional view at the line *y y*, Fig. 6; and Fig. 8 is an inverted plan of the main and secondary valves. Fig. 9 is a similar view of the main valve without the secondary valve.

The cylinder *a*, piston *a'*, piston-rod *f*, tappet *w'*, lever *u*, and connecting-rod *t* are similar to corresponding parts in aforesaid patent, and said rod *t* gives a positive movement to the secondary valve *i*, first in one direction and then in the other, as the lever *u* is moved by the tappet *w'* striking its respective ends. The rod *t*, however, passes into the steam-chest through a stuffing-box. The secondary valve *i* is in a frame, *v*, to which the rod *t* is connected, and said valve is independent of the main valve *o*, but slides in a groove therein between it and the valve-seat upon the cylinder *a*. The pistons *r r'* give movement to the valve *o*, and said pistons move in cylinders *g¹* *g²* in the steam-chest *p*. The steam passes to this chest *p* by the pipe *w* and one of the ports 8; and said ports are always open, as the valves do not move sufficiently far to cover them. These ports 8 are in the cylinder *a*, and there are connections upon both sides of said cylinder for the pipe *w* or exhaust-pipe *x*; hence they can be connected to whichever side of the cylinder *a* is most convenient, the openings in the other side being closed by screw-plugs, as at *w' x'*. This arrangement allows for removing the steam-chest without disconnecting either the steam or exhaust pipes.

The operation of the steam-valves is as follows: Referring to Figs. 1 and 2, the piston

a' is moving in the direction of the arrow, and steam is being admitted to the cylinder *a* by the port 3, and the exhaust passes by 2 to 4 through the main valve *o*, Fig. 2. Steam is shut off to the cylinder *g²*; but the exhaust from *g¹* is open through the ports 10 11 12 13 to 4. As the piston *a'* completes its movement, the lever *u* and connecting-rod *t* are moved, and the valve *i* moved to the position shown in Fig. 3, which opens the port 17 for steam passing by 14 15 17 to the cylinder *g²*, and the pistons *r r'* and main valve *o* are moved, and the main and secondary valves assume the positions shown in Figs. 4 and 5. In this movement the exhaust from *g¹* remains open through 10 and a hole, 16, in *i* to 12, 13, and 4; but the moment the steam through 14 and 15 is cut off by the surface of the valve *o* coming to the end of the valve *i*, the exhaust of *g¹* is stopped by the surface of *o* at 19 closing the hole 16, so as to confine any small quantity of vapor in *g¹* to cushion the piston *r*, and at the same time the exhaust from *g²* is opened through 17 15 14 13 to 4. The valve *o* during its movement closes the port 3, and then opens the exhaust from 3 to 4 simultaneously, admitting steam to the cylinder *a* by the other ports 2 to move the piston *a'*. When the piston *a'* completes its movement in this direction, the lever *u* and rod *t* are again moved, and the valve *i* is moved to the position shown in Fig. 1; and during the movement of the valve *o* from the position Fig. 4 to that of Fig. 1 the exhaust from *g²* is cut off by the surface of *o* at 20 closing the hole 21, so as to confine a small quantity of steam in *g²* to cushion the piston *r'*, and then the exhaust to *g¹* is instantly opened, thus providing for exhausting the steam from the respective cylinders *g¹* *g²* by the movement of the main valve; and the distance between the end of the valve *i* and the exhaust-port 13 being the same as the width of the port 12 or 14, the exhaust from the valve-moving cylinder *g¹* or *g²* is opened at the same instant that the steam is cut off from that cylinder, thereby taking off the actuating-pressure, and thus preventing concussion on the valve-pistons.

I claim as my invention—

1. The ports 8 8 in the valve-seat of the cyl-

inder a , in combination with the connections for the pipes w and x upon opposite sides of said cylinder, substantially as described.

2. The slide-valve o , provided with the ports 12 and 14, and the secondary valve i , with the ports 11, 13, and 15, constructed and arranged as specified, so that the motion of the main valve o closes the port to the valve-moving cylinder g^1 or g^2 , and simultaneously opens the

exhaust from that cylinder, as and for the purposes specified.

Signed by me this 29th day of July, A. D. 1873.

ADAM CARR.

Witnesses:

GEO. T. PINCKNEY,
CHAS. H. SMITH.