W. R. Michener,

Rotary Steam Valve.

No. 19,096. Patented Jan. 12, 1858.

Fig: 1.

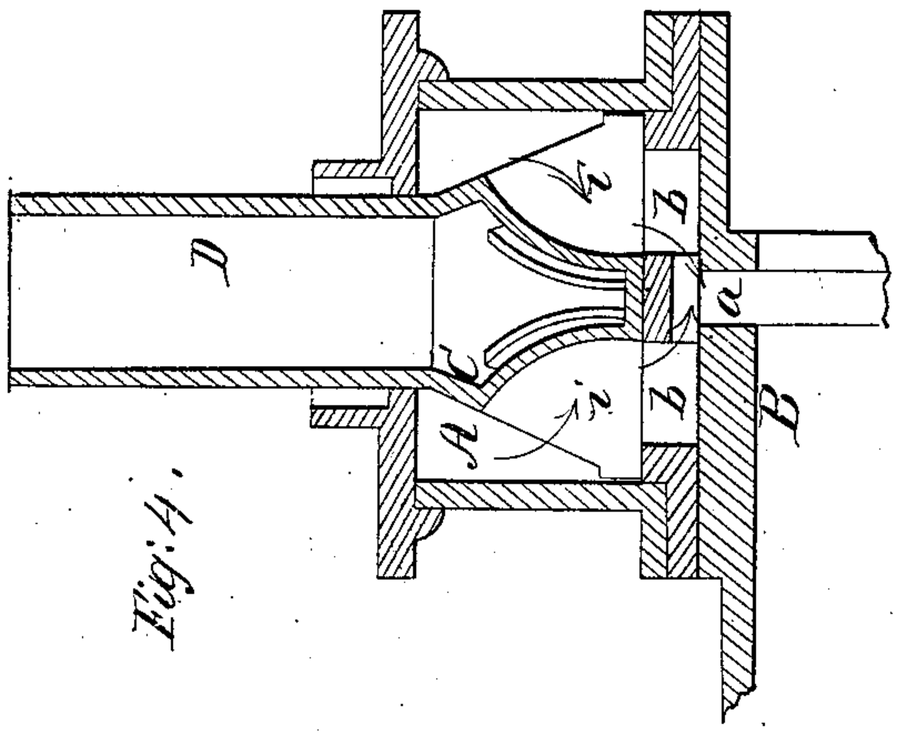


Fig: 2.

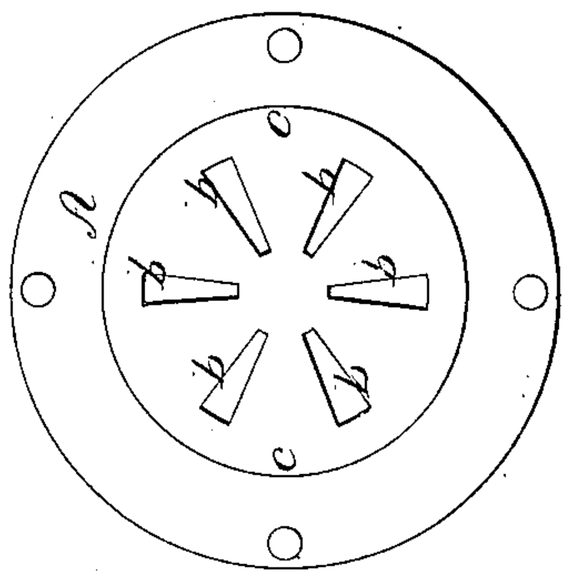


Fig: 3.

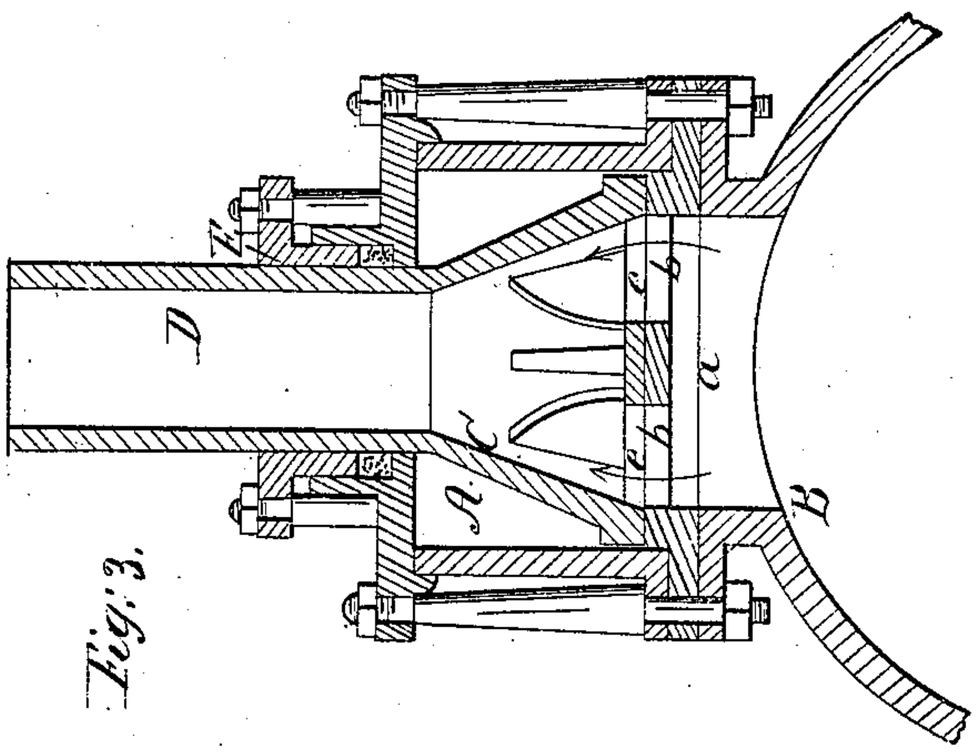


Fig: 4.

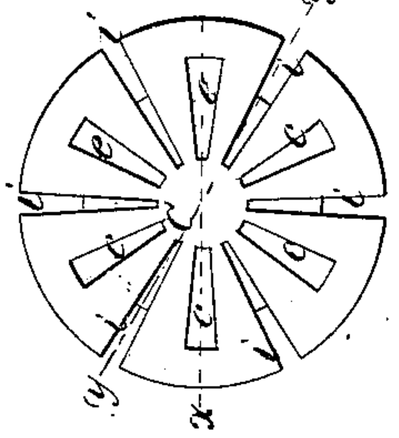
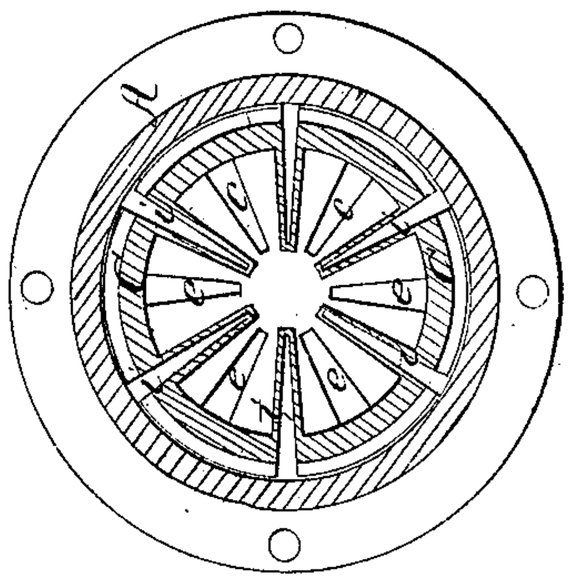


Fig: 5.



UNITED STATES PATENT OFFICE.

WM. R. MICHENER, OF MARLBORO, OHIO.

STEAM-VALVE.

Specification of Letters Patent No. 19,096, dated January 12, 1858.

To all whom it may concern:

Be it known that I, WILLIAM R. MICHENER, of Marlboro, in the county of Stark and State of Ohio, have invented a new and Improved Valve for the Induction and Eduction of Steam to and from the Cylinders of Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a face view of the valve. Fig. 2 is a face view of its seat. Fig. 3 is a section of the valve, in a plane indicated by the line *x*, *x*, of Fig. 1, exhibiting also a transverse section of part of the valve-chest and engine cylinder. Fig. 4 is a section of the valve, in a plane indicated by the line *y*, *y*, in Fig. 1, exhibiting also a section of part of the valve chest and engine-cylinder, taken in a plane passing longitudinally through the center of the cylinder. Fig. 5 is a section of the valve and valve chest, parallel with the face of the valve.

Similar letters of reference indicate corresponding parts in the several figures.

My improved valve is of the circular or disciform kind, and is operated with a reciprocating circular motion. Its novelty consists in the arrangement of its ports and passages for the induction and eduction of the steam, whereby a large amount of opening is obtained by a small amount of motion, and it is relieved to a great extent from the pressure of the steam on its back side.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A, in the drawing, is the valve-chest, one of two, placed one on each end of the cylinder B, each of the main cylinder ports having the induction and eduction of steam effected by a separate valve.

a, is the main cylinder port, with which the valve chest A, communicates through a series of equidistant radially arranged ports *b*, *b*, *b*, (see Figs. 2, 3, and 4) in the flat circular valve seat *c*, *c*.

C, is the valve, having a circular face, hollow, and having a large hollow stem D, which serves also as the exhaust pipe, said stem being perpendicular to its face and working through a stuffing box E, in the back of the chest A. This valve contains a series of equidistant radially arranged ports *i*, *i*, *i*, corresponding in number and width with the ports *b*, *b*, *b*; said ports being in the form of channels in the exterior of the valve, and communicating with the interior of the steam chest A, and constituting the induction ports. Besides these, the valve contains a second series of ports *e*, *e*, *e*, midway between *i*, *i*, *i*, and corresponding in number and size with *b*, *b*, *b*; said ports communicating with the hollow interior of the valve and with the hollow stem D, and constituting the eduction ports. The hollow stem D, connects by a working joint with one of two branches of the main exhaust pipe of the engine.

The operation of the valves is as follows: They receive motion through any suitable mechanical contrivances applied to their stems, the distance of said motion being inversely as the number of the ports, the valve shown having twelve (12) ports requiring to make one-twelfth ($\frac{1}{12}$) part of a revolution, and one with six (6) ports requiring a sixth ($\frac{1}{6}$) part, and so on. The motion takes place quickly, just before the piston arrives at the end of its stroke; the valve at that end of the cylinder which the piston is approaching, moves to such a position that the ports *e*, *e*, *e*, which have previously been in communication with *b*, *b*, *b*, move to a position opposite to the middle of the spaces between *b*, *b*, *b*; and the ports *i*, *i*, *i*, to a position opposite to the ports *b*, *b*, *b*, thereby opening communication from the valve-chest to the cylinders; and at the same time as the valve at the one end of the cylinder makes this movement, that at the other end of the cylinder makes a movement precisely the reverse and changes its position from that last described to that previously described, and permitting the exhaust of the steam from that end of the cylinder through the ports *b*, *b*, *b*, and *e*, *e*, *e*, and through the hollow stem D, of the valve. When the piston arrives near the other end of the stroke, each valve has the same movement its fellow had at the end of the previous stroke, that is to say, moves back to the position it previously occupied; and in this way the movement continues, the valves being stationary during the greater portion of the stroke, and moving in opposite directions alternately, as the piston arrives at the end of its stroke.

By the employment of several ports in the valve and seat, a very small amount of movement is necessary to produce a given

aggregate amount of opening to the ports; and by making the valve with a hollow stem of large diameter, a large portion of its surface is relieved from the pressure of the steam.

I do not claim providing a valve with several ports to obtain a large area of opening by a small movement. Nor do I claim exhausting through the back of a slide valve. But

What I claim as my invention, and desire to secure by Letters Patent, is:—

The hollow circular or disciform valve with its hollow stem and two series of ports, all arranged substantially as described.

W. R. MICHENER.

Witnesses:
ORLANDO CLINE,
JERE MACKEY.