H. D. Nickes,

Rotary Steam Valve.

No. 22,322. Patented Dec. 14, 1858.

Fig. 3.

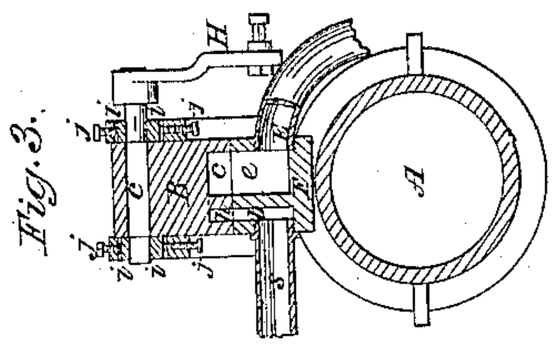


Fig. 2.

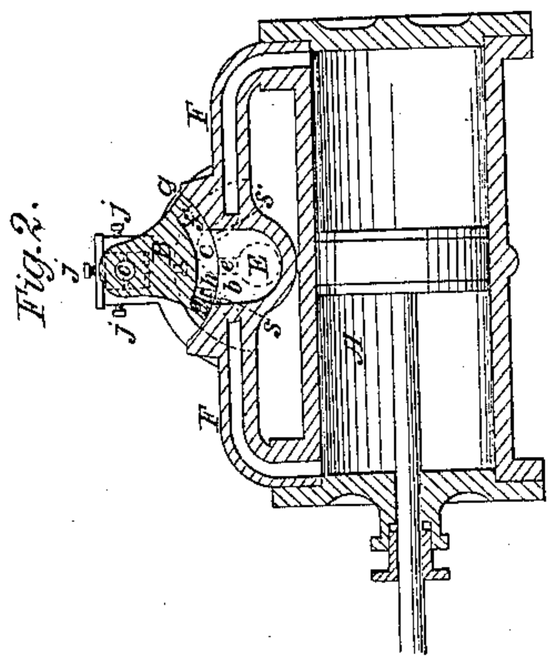


Fig. 5.

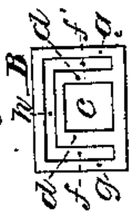


Fig. 4.

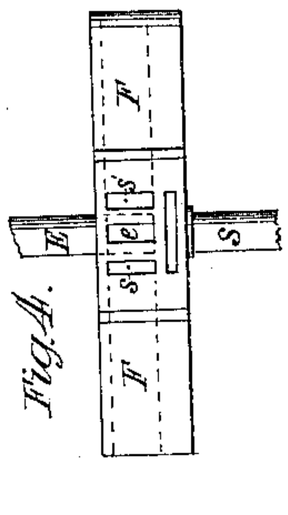
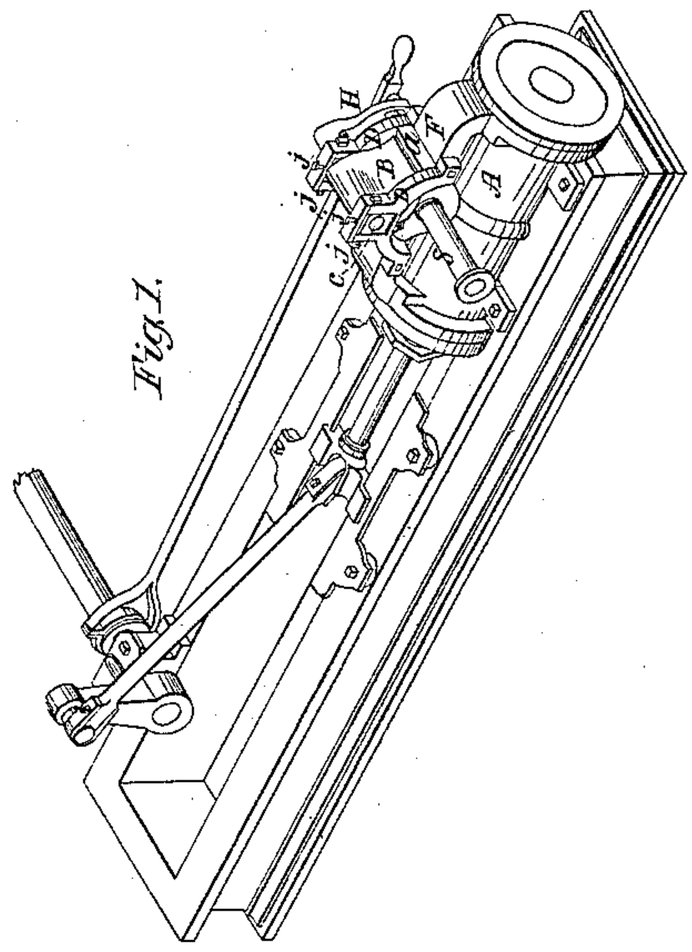


Fig. 1.



UNITED STATES PATENT OFFICE.

H. D. WICKES, OF FLINT, MICHIGAN.

VALVE OF STEAM-ENGINES.

Specification of Letters Patent No. 22,322, dated December 14, 1858.

To all whom it may concern:

Be it known that I, HENRY D. WICKES, of Flint, in the county of Genessee and State of Michigan, have invented a new and useful Improvement in Valves 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, forming part of this specification, in which—

Figure 1 is a perspective view of a horizontal steam engine with my invention applied. Fig. 2 is a longitudinal central section of the cylinders and valve. Fig. 3 is a transverse section of the same. Fig. 4 is a face view of the valve seat. Fig. 5 is a top view of the cylinder passage box and a face view of the valve.

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

The nature of my invention consists in the combination of a peculiarly constructed, and suspended segment or convex valve, with a peculiarly constructed concave valve seat, whereby a steam chest is dispensed with, or in other words, the valve and seat are rendered capable of fulfilling the offices of a steam chest, and consequently the construction of the engine is simplified and the steam is made to act on the valve in such a way that all unnecessary pressure of the valve upon the seat is obviated; and whereby all binding of the axis of the valve is obviated, and every facility afforded for adjusting the valve to its seat in case of wear; and whereby all the set screws are placed beyond the action of the steam.

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

The example of my invention illustrated by the drawing represents its application to stationary cylinder engines, and after this has been described a few remarks will serve to explain its application to oscillating cylinder engines.

A, is the cylinder, and B is the valve. The valve is attached to a rockshaft C, which is fitted to work in bearings in frames D, D, bolted to the engine cylinder, and derives an oscillating motion from an eccentric on the crank shaft of the engine or through other suitable agency.

H, is an arm attached to the rockshaft, for connecting it with an eccentric.

The face of the valve is of the form of an arc of a cylinder generated from the axis of the rockshaft C; and the valve seat *a*, *a*, is of corresponding form. The valve seat contains two steam ports *s*, *s'*, and an exhaust port *e*, arranged in the manner common to reciprocating engines, the steam ports communicating with the two ends of the cylinder, and the exhaust port with the exhaust pipe E, which is attached to the passage box F. Besides these ports, there is a third port *b*, arranged longitudinally in the valve seat at one side of the ports *s*, *s'*, *e*, and extending the whole width of the ports and spaces between them, as shown in Fig. 4, the said port communicating with the steam pipe S, which is secured to the opposite side of the passage box F, to the exhaust pipe, as shown in Fig. 3. The valve contains the exhaust cavity *c*, common to the short slide valve, and the usual width of face *d*, *d*, on each side of it and is extended beyond *d*, *d*, far enough to contain two ports *f*, *f'*, corresponding in width with the steam ports *s*, *s'*, with a proper width of face *g*, *g*, outside of the said ports *f*, *f'*, and these ports communicate both with a longitudinal cavity *h*, which ranges over the port *b*, of the seat.

The operation is as follows: Steam is admitted by the pipe S, and port *b*, to the cavity *h*, of the valve which is always filled, thus constituting a steam chest. From the cavity *h*, it is admitted by the oscillation of the valve from the ports *f*, and *f'*, to the steam ports *s*, and *s'*, of the cylinder alternately; and while steam is being admitted to one end of the cylinder through the port *s*, or *s'*, it is exhausting through the other of the said ports and through the cavity *c*, of the valve, the port *e*, and exhaust pipe E.

During the operation of the valve, the pressure of steam on the valve tends to force it from the seat; but this is counteracted by fitting the journal boxes *i*, *i*, of the valve rockshaft to the frames D, D, in such a manner as to provide for their adjustment by screws *j*, *j*, so that the valve may be confined to its seat, and these screws are so set as to prevent unnecessary friction between the valve and seat.

To apply the invention to an oscillating engine, the valve is made stationary and

with its face concave, to fit a seat on the cylinder, in the form of an arc generated from the axis of oscillation of the cylinder; and the steam and exhaust pipes are attached to the valve instead of to the cylinder; the steam pipe being attached to communicate with the cavity *h*, and the exhaust pipe with the pipe *c*. The cavities and ports of the stationary valve are the same as those in the oscillating valve of the stationary engine represented, but the ports *b*, and *e*, in the cylinder, are dispensed with.

I am aware that it is not new to have a valve constructed so as to serve as a steam chest, but I am not aware that the steam has been admitted to such valves in any other manner than from above the ports, which mode of admitting the steam subjects the valve while operating to a downward pressure that causes it to bind on its seat, whereas by admitting the steam from below the ports the valve is subjected to an upward pressure and thus is relieved from bind and wear while operating.

I do not claim broadly so making a valve that it shall perform the office of a steam chest, but

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

The valve B, having the ports and cavities *f*, *f'*, *h*, *c*, and suspended between screws *j*, *j*, in combination with valve seat *a*, *a*, having the cavity or port *b*, substantially as and for the purposes set forth.

H. D. WICKES.

Witnesses:

JARVIS BAILEY,

ROBERT F. GULICK.