R. SCHMIDT.

Steam-Engine Valve.

No. 162,196. Patented April 20, 1875.

Fig. 1.

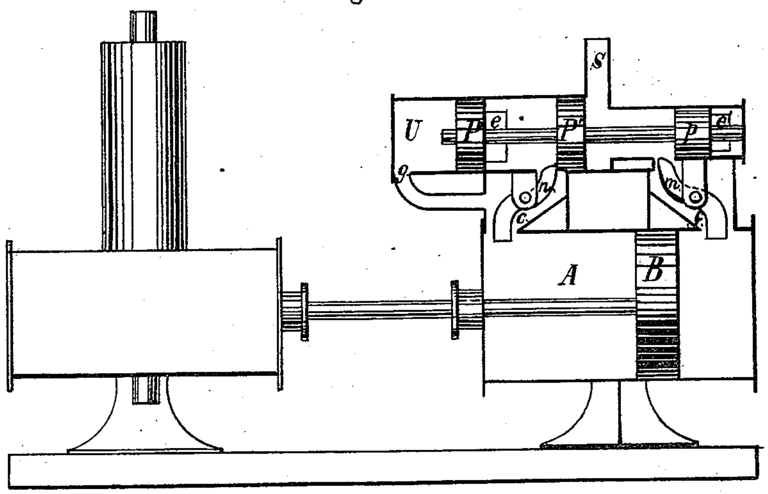


Fig. 2.

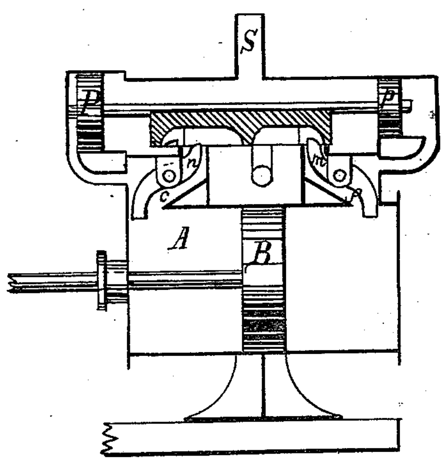
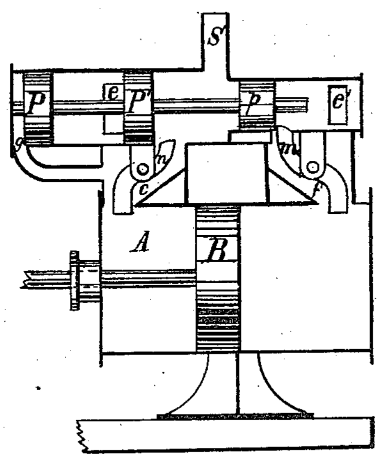


Fig. 3.



Witnesses;
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UNITED STATES PATENT OFFICE.

RUDOLPH SCHMIDT, OF YONKERS, NEW YORK.

IMPROVEMENT IN STEAM-ENGINE VALVES.

Specification forming part of Letters Patent No. **162,196**, dated April 20, 1875; application filed February 20, 1875.

To all whom it may concern:

Be it known that I, RUDOLPH SCHMIDT, of the city of Yonkers, county of Westchester and State of New York, have invented a new and improved valve for distributing the motive fluid for a reciprocating motion of an engine-piston; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification.

The invention relates to the arrangement and device of pawls or mechanical equivalents placed inside of the main ports of the engine-cylinder, by which a distributing-valve is locked in the proper position for distributing the motive fluid, until the main piston at the end of the stroke, or after a certain part of it is completed, releases the said distributing-valve from the action of the pawl, and allows it to move over into the proper position for distributing the motive fluid for the return stroke—a position in which it is kept by the action of the pawl, until the return stroke is completed, when it is released and moves back into the original position.

Figure 1 represents a vertical section of the cylinder of a steam-pump or water-pressure engine. Fig. 3 is a vertical section of the engine-cylinder, showing the valve in position for the right-hand stroke of the engine. Fig. 2 shows the arrangement as applied to the ordinary slide-valve of direct-acting steam-pumps.

Similar letters of reference indicate like parts.

A represents the main cylinder. B is the main piston, which is connected to the piston of the pump, as is usual in direct-acting steam-pumps. *c* and *f* are the supply-ports for the engine-cylinder. *e* and *e'* are outlets, which lead into the free air, or into a space of less pressure than the motive fluid. The distributing-valve consists of the three pistons on one rod, marked P, P', and *p*, and moved by the differential pressure—an arrangement for which Letters Patent have been granted to me, dated the 6th day of August, in the year of our Lord 1867. The steam enters at S, between the large piston P' and small piston *p*. The space between P and P' is always connected with the outlet *e*. The space U is connected with the port *c* on the left-hand side of the piston B by a port marked *g*.

The action of the valve is the following: The valve, as shown in Fig. 3, is in its proper position to distribute the motive fluid for the stroke toward the right. The steam enters through the port *c* on the left side of the piston B, passing at the same time into the space U. The pressure on the large pistons P and P' being equal and balanced, the valve has a tendency to move toward the right, due to the pressure of the motive fluid on the area of the small piston *p*; but the pawl *m* keeps it in position till it is released by the main piston B striking the pawl *m*. The valve now moves over into the position shown in Fig. 1, in which it is locked by the pawl *n*. A quick action of the pawls may be insured in various ways. I have deemed it the best to make the end against which the main piston strikes heavy, so as to give the pawl a tendency to enter into the valve-cylinder. The same result might be obtained by springs or even by using the impact of the exhausting motive fluid. The valve is now in position to distribute the motive fluid for the return stroke. The port *f* is connected with S, and the motive fluid enters the right-hand side of the piston, and impels the piston toward the left. The motive fluid on the left-hand side is exhausted through the port *c* and the outlet *e*, and the distributing-valve is ready to move toward the left by a pressure due to the difference of the areas of the small piston *p* and large piston P'. The motive fluid is released out of the space U by passing out through the ports *g*, *c*, and *e*. As soon as the main piston strikes pawl end *n* the valve is released and moves back into its original position, where it is kept by the pawl *m* catching it. A repetition of the action, as described above, causes the reciprocating motion of the main piston to perform the useful work for which it is intended.

I am aware that lock arrangements for locking cut-off valves by means of pawls or mechanical equivalents have been used for preventing the valve to shut off the steam until a certain part of the stroke is completed. I am also aware that such arrangements have been used for locking a distributing-valve

actuated only in one direction by a constant pressure of steam, but moved in the opposite direction by a mechanical arrangement attached to the piston-rod, as in the Nasmyth steam-hammer; but I am not aware that distributing-valves have been locked by pawls placed in the main ports of the main cylinder, and reaching with the pawl end into the valve-chest, for the purpose of locking the valve in the proper position for distributing the motive fluid, and releasing it after a part of the stroke is completed, to be moved over by the pressure of the motive fluid into the proper position for the return stroke.

What I claim as new, and desire to secure by Letters Patent, is—

The pawls placed inside the main ports of an engine-cylinder, in combination with a distributing-valve which is actuated by the pressure of a motive fluid, and is locked and released by the pawls, substantially as and for the purpose set forth.

RUDOLPH SCHMIDT.

Witnesses:
J. H. BROWN,
J. M. ALVORD.