T. L. Jones,

Steam Slide Valve.

No. 76,776. Patented Apr. 14, 1868.

Fig. 1.

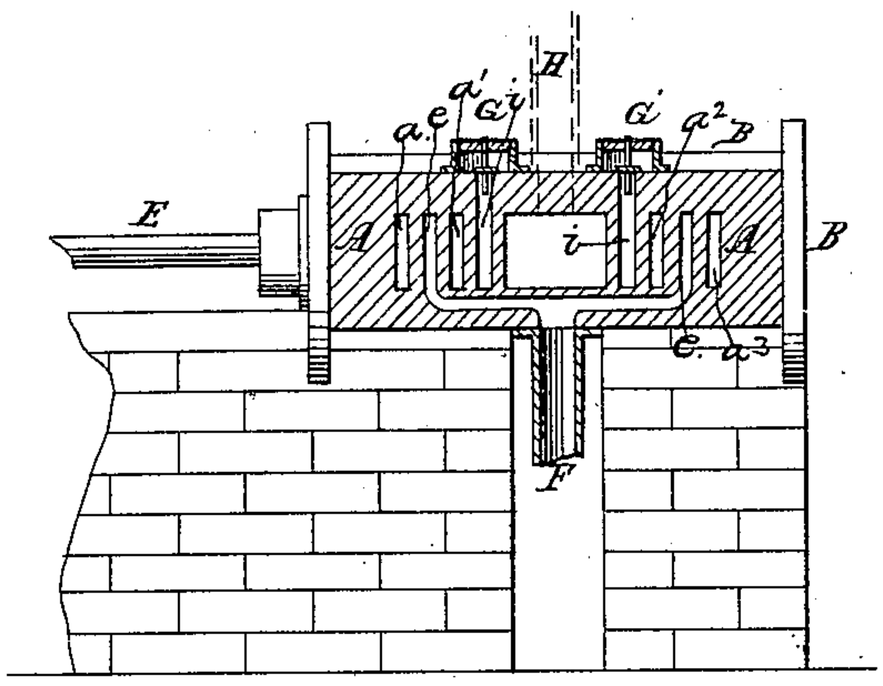
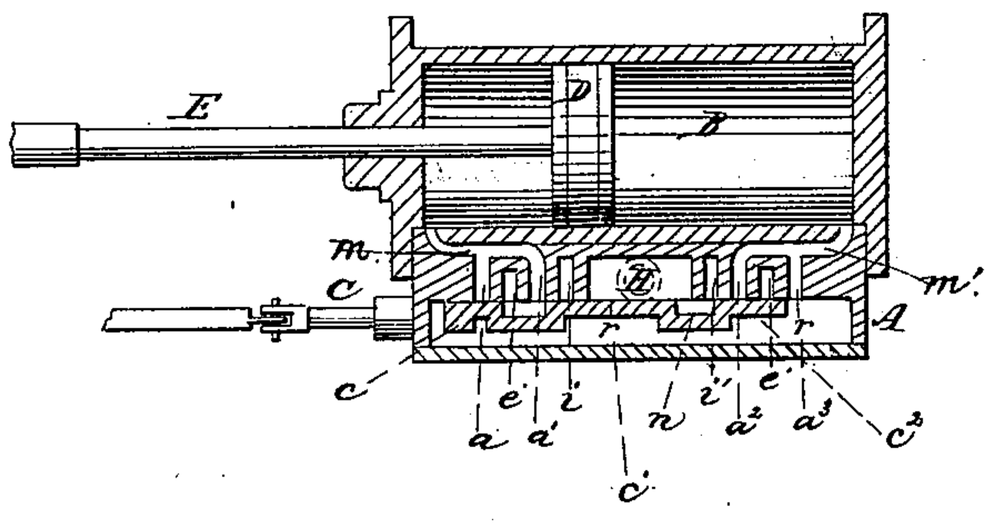


Fig. 2.



Witnesses
Solon C Kemon
Charles A Pettit

Inventor:
Thomas L. Jones
By Munn & Co
Attorneys

United States Patent Office.

THOMAS L. JONES, OF NATCHEZ, MISSISSIPPI.

Letters Patent No. 76,776, *dated April* 14, 1868.

IMPROVEMENT IN SLIDE-VALVES OF COMBINED HIGH AND LOW-PRESSURE ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, THOMAS L. JONES, of Natchez, in the county of Adams, and State of Mississippi, have invented a new and improved Combined High and Low-Pressure Engine; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a longitudinal vertical section through the steam-chest, and

Figure 2 is a horizontal section through both the steam-chest and cylinder.

This invention relates to that class of engines in which the steam, at each stroke of the piston, is first exhausted to the open air until the steam-pressure at that end of the cylinder equals the pressure of the air, after which it exhausts to the condenser.

The improvements consist in a new arrangement of valves and ports, which greatly simplifies the engine, and renders it the most economical working engine hitherto constructed.

In the drawings, A represents the steam-chest; B, the cylinder; C, the valve-rod; D, the piston; E, the piston-rod; F, the pipe, leading to the condenser; and G G′, exhausts, leading to the open air, and provided with air-tight valves, *g g′*, seating downwards. *m* is the upper, and *m′* the lower steam-port, the former branching into two ports, *a* a^1, and the latter into two more, a^2 a^3, all which enter the steam-chest. *e e′* are the condenser-ports, and *i i′* are the exhaust-ports. The steam is supplied from the boiler to the steam-chest through a pipe, H, which may be connected with any cut-off apparatus that it may be thought desirable to use.

Of the steam-ports, two, *a* a^1, are arranged above, and two, a^2 a^3, below the middle of the steam-chest. The condenser-port, *e*, is between the upper steam-ports, *a* a^1, and the lower condenser-port, *e′*, is between the lower steam-ports, a^2 a^3. One exhaust, *i*, is above and near the middle of the steam-chest, and the other, *i′*, is in a corresponding position below.

The valve is a sliding valve, having a chamber or recess, *n*, in its front side, which connects or disconnects the ports *e*, a^1, and *i*, and a similar recess, *n′*, which connects or disconnects the ports *e′*, a^2, and *i′*. The upper end of the valve, at *c*, opens or closes the steam-port *a*, and its lower end, at c^2, opens or closes the steam-port a^3. *r* is the steam-space, which is constantly full of live steam, admitted through the pipe H.

Having thus described the arrangement of the different parts of my engine, I will now explain its operation.

In order to make such explanation clearer, let us suppose the piston and valves to be in the position shown in fig. 2, the piston moving upward, or to the left, as seen in the drawings. In this position the live steam will feed through port a^3 to the cylinder below the piston, and the steam in the cylinder above the piston will be exhausting through port a^1, recess *n*, and condenser-port *e*. Ports *a*, *i*, a^3, and *e′* will be closed, and the communication will be so cut off that no steam can get to port *i′* to escape through it.

Now, as the piston moves to the left, the valve is moving to the right, and when the piston reaches the end of its stroke, the recesses *n* and *n′* will have changed so far to the right that the condenser-port *e* will be closed, but the steam-port *a* will still be closed, so that no live steam can escape through port a^1, recess *n*, and exhaust *i*, which will be in connection. At the same moment, in the lower end of the steam-chest, port a^3 will be closed, and port a^2 will be put in communication with exhaust *i′* through the recess *n′*, and in an instant the live steam in the lower end of the cylinder will force the valve *g′* up and exhaust to the open air until the steam within the cylinder and the air without are balanced, or, in other words, until the steam in the lower end of the cylinder is reduced to a pressure of fifteen pounds to the inch, when the valve *g′* will close by its own weight. The next instant, the valve still moving to the right, opens port *a* and lets live steam into the cylinder above the piston, which begins its down stroke. As the valve opens port *a*, it closes port a^1, and severs all communication from the upper end of the cylinder to the condenser-port *e* or the exhaust *i*; but, at the same time, it opens a communication from the lower end of the cylinder to the condenser through port a^2, recess *n′*, and condenser-port *e′*, and the steam in the lower end of the cylinder, which had an instant before been reduced to a pressure of fifteen pounds, is now condensed to a vacuum, when the piston passes down to the end of its stroke in the

same manner as I have described its passing to the upper end of the previous stroke from the position in which we first beheld it. The piston having arrived at the lower end of its down stroke, the same movement of the parts takes place that I have described as taking place when the piston reached the upper end of its stroke, but in an inverse manner, the movement of the lower ports, i, a^2, a^1, and a^3, corresponding to the former movement of the upper ports, a, e, a^1, and i', and *vice versa*.

The operation of this mechanism is exceedingly perfect, meeting all the conditions required in a working steam-engine to give it great power, speed, and uniform equable action. It will be observed that the exhaust end of the cylinder is in connection with the open-air exhaust only during a small portion of the stroke, and during all the remainder of the stroke the open-air exhaust is shut off and the communication is open from the cylinder to the condenser. It is only necessary to have the open-air exhaust in connection with the cylinder for a very brief time, as the inner steam-ports and the open-air exhaust-ports are large and close together, and the passage through the exhaust-pipe may be made perfectly straight, affording a free escape to the steam when in connection, and the more steam there is to be thus exhausted, the greater will be its expansive pressure, and the more rapidly will it escape.

The valves, I would so arrange that the condenser shall not be put in connection with the cylinder when the crank is passing the dead-point, but a moment after, when it has passed twenty or thirty degrees beyond that part of its revolution. The additional power then imparted to the piston by the formation of the vacuum in the cylinder, will be thrown upon the crank at a favorable moment to utilize it to the utmost extent, and not to waste it upon the dead-point, as would be the case otherwise. At the same time care should be taken that the crank should not pass too far beyond the dead-point before the condensation takes place, since the sooner the increased power is applied to it, the longer will such power have an opportunity to exert itself upon the piston.

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

The arrangement of the steam-ports a a^1 a^2 a^3, condenser-ports e e', exhausts i i', valves g g', and valve c c^1 c^2, when the parts referred to are constructed so as to operate substantially as and for the purposes set forth.

THOS. L. JONES.

Witnesses:

CHAS. A. PETTIT,

SOLON C. KEMON.