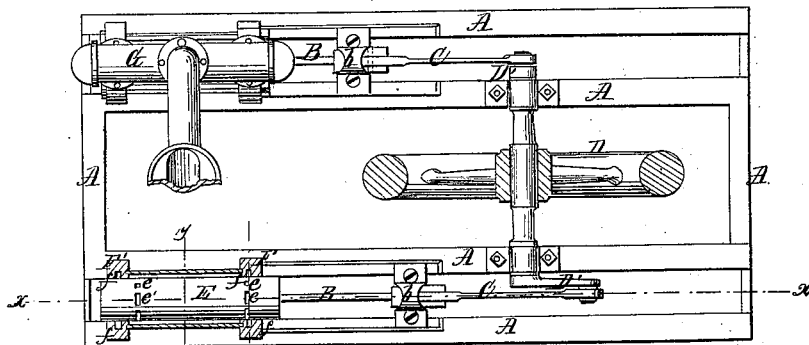
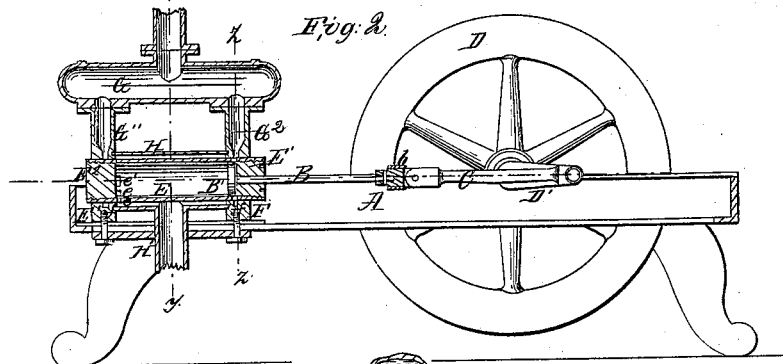


*D. H. Paullins,*  
*Steam Pump.*  
*No 46,582.      Patented Feb. 28, 1865.*

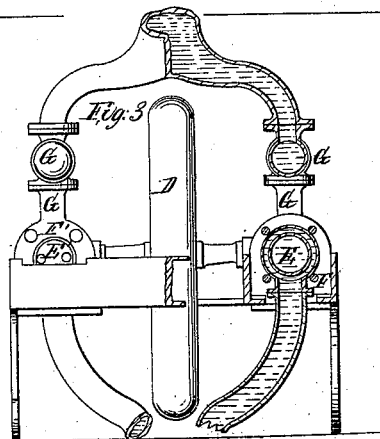
*Fig. 1*



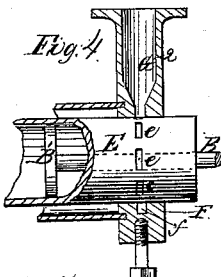
*Fig. 2*



*Fig. 3*

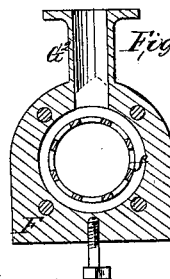


*Fig. 4*



*Witnesses:*  
*C. D. Smith*  
*James H. Moley*

*Fig. 5*



*Inventor:*

*D. H. Paullins*  
*by Messrs*  
*Atty*

# UNITED STATES PATENT OFFICE.

DANIEL H. PAULLINS, OF LOUDONVILLE, OHIO.

## IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 46,582, dated February 23, 1865.

### *To all whom it may concern:*

Be it known that I, DANIEL H. PAULLINS, of Loudonville, in the county of Ashland and State of Ohio, have invented a new and useful Improvement in Reciprocating Engines; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of an engine, partly in section, illustrating my invention. Fig. 2 is a vertical longitudinal section or the same, the line *x x* indicating the plane of section. Fig. 3 is a sectional end elevation, the line *y y* showing the point of section. Fig. 4 is a detached sectional view of one of the sliding cylinders and stationary supply-pipes hereinafter more particularly referred to. Fig. 5 is a detached view of one of the cylinders and supply-pipes, the lines *z z* indicating the point at which the section is taken.

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

This invention relates to an engine in which the pistons are each fitted within a movable interior cylinder, which is so constructed and sustains such relation with ingress-ports, an egress-port, and an external inclosing-cylinder that said movable cylinder is itself adapted to effect the object for which the supply and exhaust valves of piston-cylinders have been commonly employed—namely, to permit the steam or other driving medium to enter the cylinder at one end, drive the piston to the extremity of its stroke, and then escape to allow the piston to be acted upon from the end to which it is first driven.

In order that others skilled in the art to which my invention appertains may be enabled to fully understand and use the same, I will proceed to describe its construction and operation.

In the accompanying drawings, A may represent the several parts of a supporting-frame, at the respective sides of which work piston-rods B B, the sides of the frame constituting ways for the guides *b b*. C C are pitman-rods connecting the piston-rods B with the cranks D' D' of the fly-wheel D in customary manner. Each piston-head B' is fitted to move within a cylinder, E, which rests in circular valve-seats F F'. The cylinders E E are adapted respectively by being moved to communicate at either end with the chests G G

through pipes G' G<sup>2</sup>, in the manner to be described, said chests containing a quantity of the steam, air, gas, or cold water by which it is desired to move the pistons. Each cylinder E is so arranged that it may receive a limited movement in the direction in which its piston B' is driven, and this movement is produced by the said piston coming in contact with the end of the cylinder just before its stroke terminates. Near both ends the cylinder E has formed in it a series of apertures, those at one at one end being indicated by *e* and those at the other end by *e'*. The valve-seats F F' have each a groove, *f*, communicating at all times with the pipes G' G<sup>2</sup>, and in which the steam or other driving medium from the corresponding chest G constantly circulated completely around the cylinder, so that said steam or its substitute is always ready to pass rapidly into the cylinder E when the apertures *e* or *e'* are brought into contraposition with the grooves *f*.

In Fig. 2 the piston is represented as having reached the extremity of its stroke, in doing which the cylinder E has been moved and the apertures *e* thereby thrown into communication with the groove *f*, and consequently with the pipe G<sup>2</sup>. Now, after the piston and cylinder assume the positions represented in Fig. 2, the driving medium passes through the orifices *e* and between the piston-head B' and the adjacent end E' of the cylinder E. The piston is then advanced toward the inlet-pipe G' and the cylinder remains stationary a proper length of time to insure the entrance into the cylinder of the requisite amount of steam to drive the piston, but when the piston B' strikes the end E<sup>2</sup> of the cylinder, and the latter is carried with the piston until its stroke is completed, any suitable means being employed to arrest the motion of the cylinder at this point. This movement of the cylinder E carries the apertures *e* out of contraposition with the groove *f*, which communicates with the pipe G<sup>2</sup>, and therefore no steam or other matter can pass into the cylinder at the end where these apertures *e* are located. Said movement of the cylinder also carries the apertures *e'* to a point where they will communicate with the inlet-pipe G', and steam or its equivalent is then allowed to pass into the cylinder between the piston B' and the cylinder-head E<sup>2</sup>, the consequence of which is the return of the piston and cylinder to the positions represented in

Fig. 2, the steam between the head E' and piston B' having escaped in a manner that will be understood from the following. In moving toward the inlet-pipe G' the apertures *e* go beyond the valve-seat F, and being then uncovered by the latter, said apertures allow the steam or other matter which drives the piston to pass into the space between the cylinder E and a stationary external cylinder, H, provided with an escape-pipe, H'. The apertures *e'* also communicate with the space between the cylinders E and H, when the cylinder E is moved by the piston to the position shown in Fig. 2, and thus the apertures *e e'* may be said to constitute both ingress and egress ports or valves.

The above-described engine may be driven by steam, air, gas, or cold water, operating by gravity or expansion, and may be employed with good effect as a substitute for water-wheels.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent.

1. I claim the movable cylinder E, provided with apertures *e e'* to permit the steam to enter and escape from said cylinder alternately at the respective ends thereof when the said cylinder is moved by the action of its own piston-head, substantially as and for the purpose explained.

2. In combination with the above, the arrangement of the chest G, inlet-pipes G' G<sup>2</sup>, and grooved valve seats F F', when employed in connection with the movable cylinder E.

3. In combination with the cylinder E, actuated by its own cylinder-head, as specified, the stationary external cylinder, H, and escape-pipe H', employed in combination with the movable cylinder E, for the purpose of receiving and carrying off the steam after acting upon the piston as stated.

DANIEL H. PAULLINS.

Witnesses:

R. HILL,

ABEL R. WYMAN.