William T. Chamberlain's Improvement in Steam Engines.

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PATENTED

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Fig. 1.

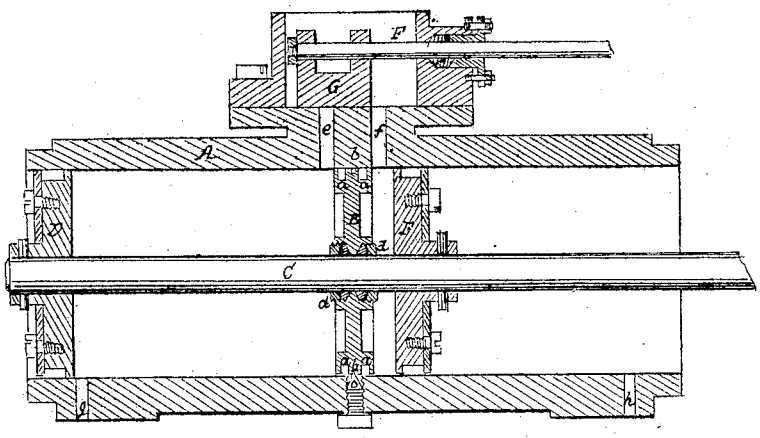


Fig. 2.

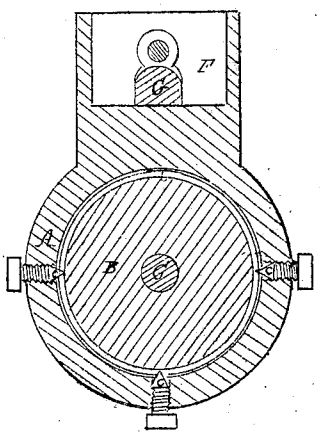
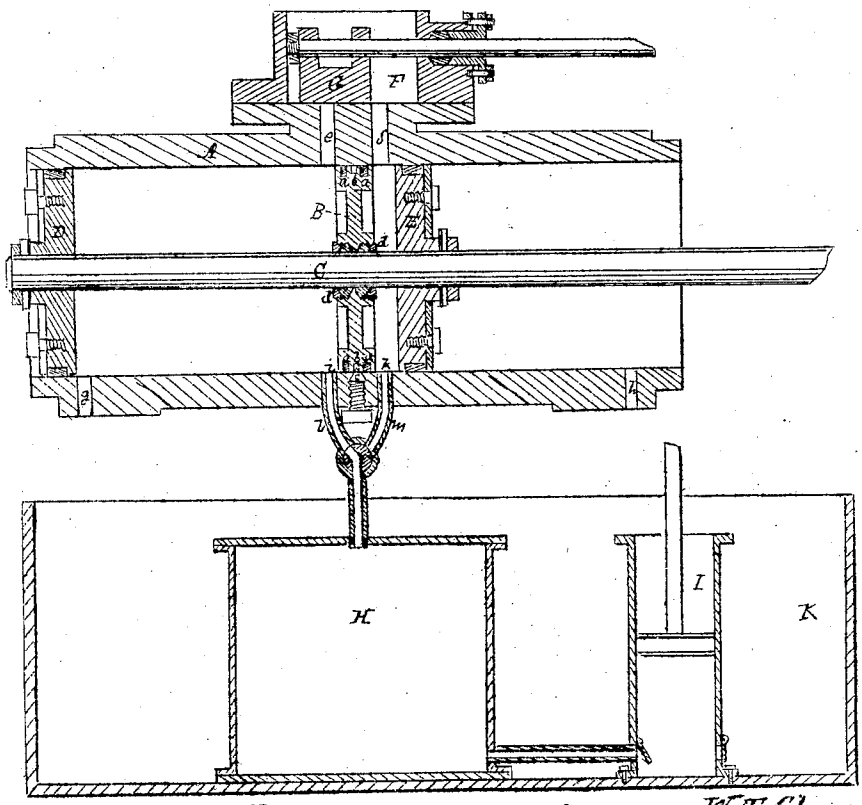


Fig. 3.



Witnesses

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WILLIAM T. CHAMBERLAIN, OF NORWICH, CONNECTICUT, ASSIGNOR TO HIMSELF AND JAMES W. CHAMBERLAIN, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 74,046, *dated February* 4, 1868.

IMPROVEMENT IN STEAM-ENGINES.

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

TO ALL PERSONS TO WHOM THESE PRESENTS MAY COME:

Be it known that I, WILLIAM T. CHAMBERLAIN, of Norwich, in the county of New London, and State of Connecticut, have invented a new and useful Improvement in Steam-Engines; and I do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 denotes a vertical and longitudinal section, and

Figure 2 a transverse section of an engine constructed with my improvements.

It has one long straight cylinder A, open at each end, and provided at its middle with a movable circular partition, whose circumference is grooved to contain packing *a a*. It also has a groove, *b*, extending in and around such circumference, such groove being to receive the pointed ends of two or more clamp-screws *c c*, screwed into the cylinder and against the circumference of the movable partition B, the same being as shown in fig. 2. These screws serve, with the groove *b*, to hold the partition in place within the cylinder. By having a movable partition made and applied to the cylinder, in manner as set forth, a single cylinder may be used, it being easier to bore a single cylinder to one uniform diameter, and with a straight axis, than to bore two separate cylinders to one diameter of bore. Furthermore, the single cylinder having no joint at its middle, like a compound cylinder composed of two cylinders united at their ends by flanges and screws, is not liable, like the compound cylinder, to leak steam at its middle. A piston-rod, C, extending through the partition B, and working in stuffings or stuffing-rings *d d*, properly applied thereto, carries two heads or pistons D E, one of which is arranged on one side, and the other on the other side of the partition B. Induction-passages or ports *e f*, lead from a steam-chest, F, into the interior or bore of the cylinder, or other parts of it which are on opposite sides of the partition B, a valve, G, being employed to alternately open and close such ports. Furthermore, eduction-passages or ports, *g h*, lead out of the lower part of the cylinder. Each of these eduction-ports should be so arranged that when its piston is at its terminus of outward motion the port will be closed to and uncovered by the piston, which during its outward movement passes across and beyond the port, the same being in order to permit steam employed in propelling the piston to escape through the port.

The operation of the engine so constructed will be as follows: If we suppose the parts to be in position, shown in fig. 1, steam will be flowing through the induction-port *f*, and by its action against the piston E, it will propel such piston along in the cylinder, or away from the partition B, and the piston D will be driven toward the said partition. As soon as the piston E may have passed beyond the eduction-port *h*, steam employed in propelling such piston will escape through the said port. At this moment the valve G should close the port *f*, and open the port *e*. Steam will then enter the cylinder through such port and act against the piston D, and propel it away from the partition B, until it may pass by the eduction-port *g*. This port then being open, and between the piston D and the partition B, steam used in so propelling the piston D will rush from the cylinder and escape through such port. Next, the steam should be made to propel the piston E, as before. Thus, a reciprocating rectilinear motion will be imparted to the piston-rod. During each retreat or return-movement of each piston, provided a vacuum or partial vacuum between it and the partition B may have been produced in those parts of the cylinder by the escape of steam therefrom, the pressure of the atmosphere on the piston will operate to aid the steam in propelling the other piston, such aid depending on the excess of atmospheric pressure over the pressure of the steam which may remain between the retreating piston and the partition.

In order to attain the advantages of an atmospheric-engine combined with those of a high-pressure steam-engine, there may be combined with the improved engine exhibited in fig. 1, and above described, a condenser or condensing-apparatus, and a pump for extracting the condensed steam from such apparatus. In Figure 3, I have shown such a combination. In such figure, *i* and *k* are ports leading out of the cylinder A, on opposite sides of the partition B, and by pipes *l m* to a cock, *o*, connecting with a condenser, H, arranged in a tank, K, containing water, there being a pump, I, applied to such condenser for extracting from it the water or condensed steam contained therein. The cock *o* is to alternately put the ports *i k* in communication with the condenser, one of them being out of communication, while the other is in communication therewith. By such means, it is believed, a vacuum may be produced in the cylinder, so as to cause the pressure of the atmosphere on the retreating piston to aid in accelerating or effecting the advance of the other piston.

Having thus described my engine, what I claim as my invention, is as follows:

I claim the improved engine, as described, viz, as made with the cylinder A, the partition B, the two pistons D E, the rod C, the induction-ports *e f*, and eduction-ports *g h*, arranged in manner substantially as specified.

I also claim the combination of the movable partition B, its packing and clamp-screws, or the equivalents of the latter, with the cylinder A, provided with induction and eduction-ports, and two pistons D E, arranged so as to operate as described.

WM. T. CHAMBERLAIN.

Witnesses:

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