

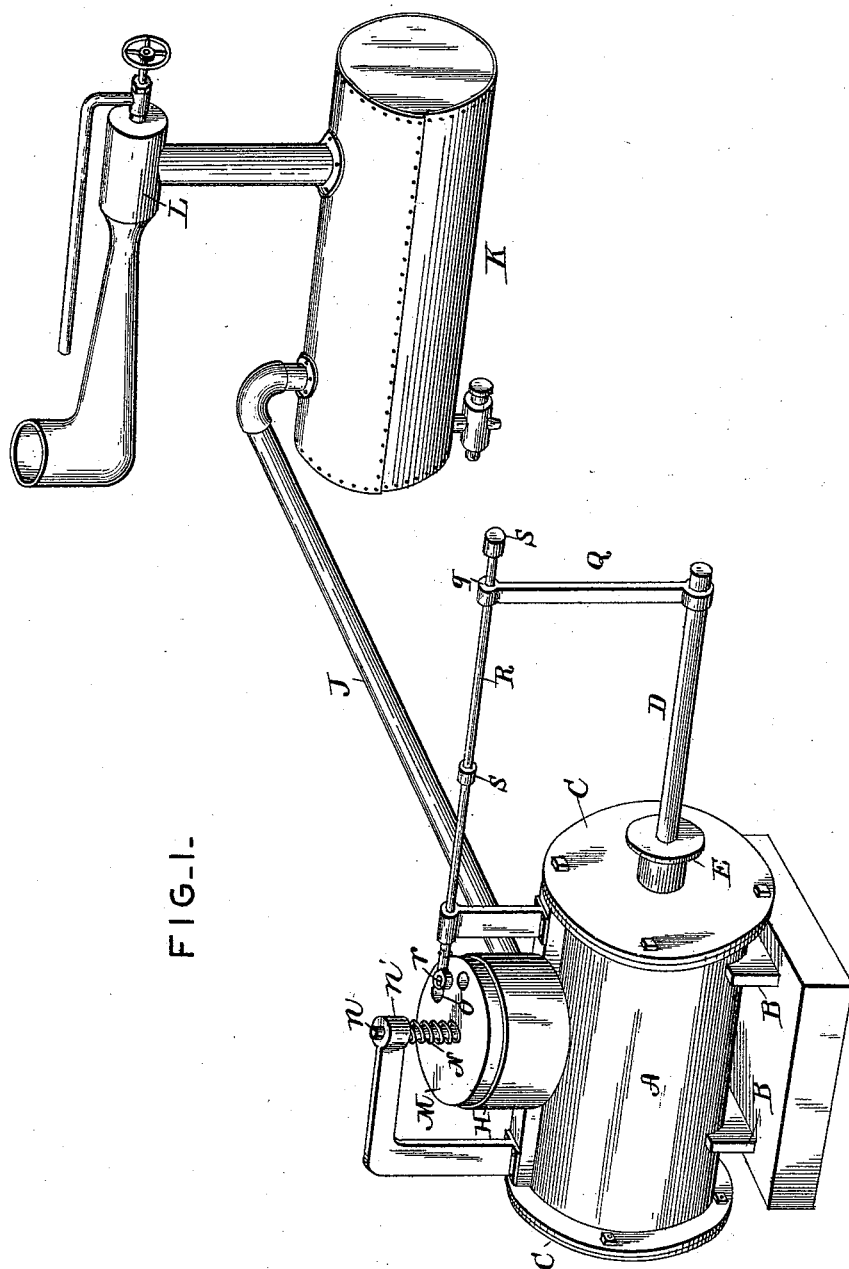
(No Model.)

2 Sheets—Sheet 1.

J. KNAPPER & S. B. MARTON.
ENGINE.

No. 490,662.

Patented Jan. 31, 1893.



Witnesses

Jas. H. McCutcheon
D. P. McLaughlin

Inventors

By their Attorneys, *J. Knapper*
Steward B. Marton
C. Snow & Co.

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FIG. 2.

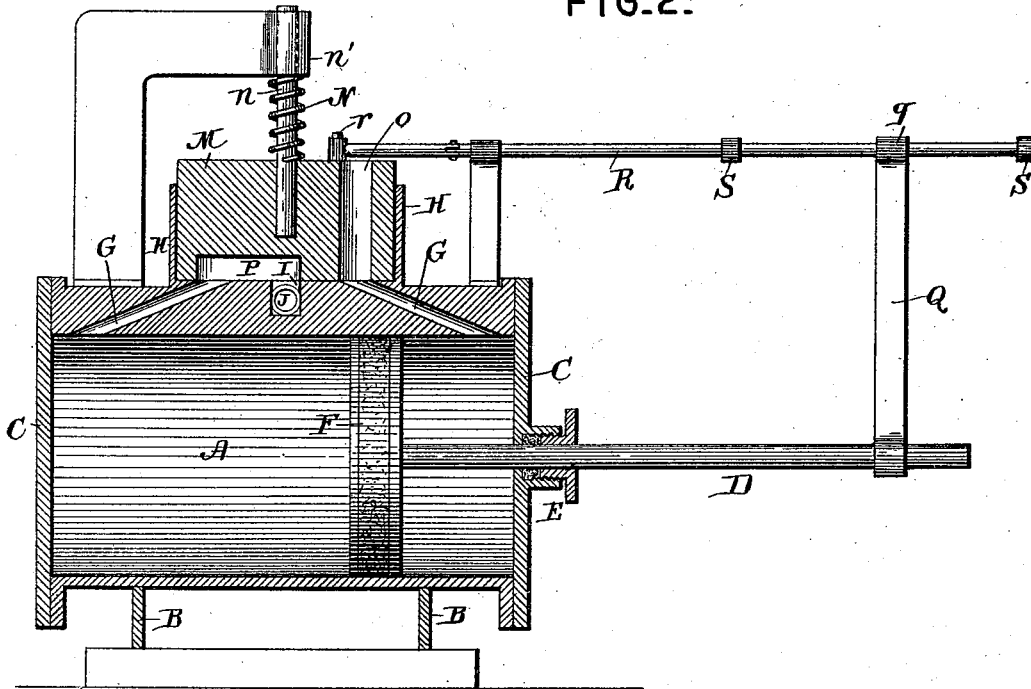
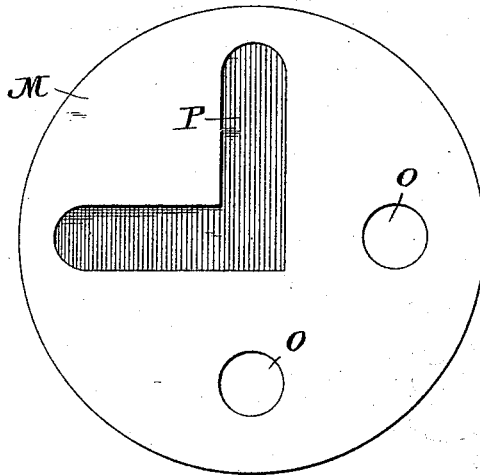


FIG. 3.



Witnesses

Jas. H. McLathran
D. P. Walchamper

Inventors

By their Attorneys,

J. Knapper
Stuard B. Marton

CA Snow & Co.

UNITED STATES PATENT OFFICE.

JOSEPH KNAPPER AND STUARD B. MARTON, OF CONNELLSVILLE,
PENNSYLVANIA.

ENGINE.

SPECIFICATION forming part of Letters Patent No. 490,662, dated January 31, 1893.

Application filed January 20, 1892. Serial No. 418,692. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH KNAPPER and STUARD B. MARTON, citizens of the United States, residing at Connellsville, in the county of Fayette and State of Pennsylvania, have invented a new and useful Engine, of which the following is a specification.

This invention relates to engines, and particularly to that type operated by atmospheric pressure and a vacuum.

It is the main object of this invention to provide an engine of this character which may not only be used in its ordinary capacity, for driving machinery, but also may be used as a pump for ventilating purposes, collecting the foul air and discharging the same.

With these and many other objects in view which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

In the accompanying drawings;—Figure 1 is a perspective view of an atmospheric-vacuum engine connected with an ordinary vacuum apparatus, as contemplated by this invention. Fig. 2 is a vertical longitudinal sectional view of the engine cylinder and valves. Fig. 3 is a bottom plan view of the oscillating valve.

Referring to the accompanying drawings;—A represents a cylinder supported upon suitable supports B, and provided with the usual opposite heads C, one of which accommodates the piston rod D working through the stuffing box and gland E in said head and carrying the solid piston F, working within said cylinder. The said steam cylinder is provided with the opposite end ports G, which open into said cylinder at opposite ends thereof and communicate with the bottom of the circular valve casing or seat H located upon the top of said cylinder. A central vacuum exhausting port I is formed on the body of the cylinder and communicates with the interior of said valve casing H between each of the opposite ports G opening therein, and is connected by suitable and ordinary piping J with a vacuum chamber or vessel K, in which a continual vacuum is maintained by an ordinary steam ejector L connected therewith,

but any suitable means for creating a vacuum and maintaining the same within a suitable vessel connected with the vacuum port I, may be employed.

Snugly seated within the circular valve seat or casing H, is the circular oscillating cut-off valve M which is held in its seat by atmospheric pressure, and is steadied in its movement back and forth by means of the downwardly pressing spring N, mounted on the valve stem *n* and bearing thereagainst and the bearing bracket *n'* receiving the upper end of the valve stem. The solid valve block M is provided with the opposite atmospheric ports or openings O extending vertically through the valve and adapted by the oscillation of the same to register alternately with the opposite ports G opening into each end of the cylinder A. The said circular valve block M is further provided with a right angle vacuum connecting or exhaust groove or passage P, which is designed to connect one of the cylinder ports G with the central vacuum ports I, while the opposite cylinder port registers with one of the atmosphere ports O. A reversal or quarter turn of the circular valve block changes the relation of the ports and connects the opposite end of the cylinder with the vacuum exhaust port, while the other end of the cylinder is receiving the ordinary atmospheric pressure in its turn. It will be readily seen that as the valve M is oscillated a vacuum will be immediately formed upon one side of the piston F, and the ordinary pressure of the atmosphere admitted on the other, alternately. Motion will be thus communicated to the piston and piston rod and the machine put in motion, and energy equaling about twenty-eight pounds to the square inch being attained by forming a vacuum upon one side of the piston and having the pressure of the atmosphere upon the other.

It will be noted during the operation of this engine that no heat whatever is connected with the same and that the pipes carrying the vacuum can be set long distances from the vacuum apparatus and lose no power by condensation of steam in the pipes as would be the case in ordinary steam engines, thereby accomplishing the work of ordinary light

power engines used for pumping and other purposes with better advantages.

The piston rod D is provided with an upwardly extending arm Q, provided with an upper bearing q, receiving and working over the valve rod R. The said valve rod is connected at r to the top of the oscillating valve M near one edge thereof, and is provided with the tappets S, which are engaged by the said arm Q at the end of each stroke of the piston, thereby alternately reversing said valve to acquire the operation herein described and set forth.

The construction, operation and advantages of the herein described atmospheric-vacuum engine are thought to be apparent without further description.

Having thus described our invention what we claim and desire to secure by Letters Patent is;—

In an atmospheric-vacuum engine, the combination of a cylinder having a circular valve casing entirely open at its top and inclosing the flat valve seat, opposite cylinder ports opening into said valve seat and each end of the cylinder and a central vacuum exhaust port communicating with the center of said valve seat between the ports and a vacuum

apparatus, an oscillating valve registering with said open valve casing, which forms a bearing therefor, and provided with atmosphere ports extending vertically therethrough and a right angle vacuum exhaust groove formed in the bottom face thereof and connecting one of the cylinder ports with the central vacuum port while an atmosphere port registers with the other cylinder port, a bearing bracket arranged over the valve, a valve rod or stem connected at its lower end to the center of the valve and having its upper end turning in said bearing bracket a spring arranged upon said stem over said valve to hold the same to its seat, the piston rod having an upwardly extending valve controlling arm, and a valve rod pivotally connected to the top of said valve and provided with tappets engaged alternately by said arm, substantially as set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

JOSEPH KNAPPER.
STUARD B. MARTON.

Witnesses:

SAM. R. MARTON,
WILLIS W. SHIELDS.