

S. J. JONES.
Reciprocating-Engines.

No. 143,827.

Patented Oct. 21, 1873.

Fig. 1.

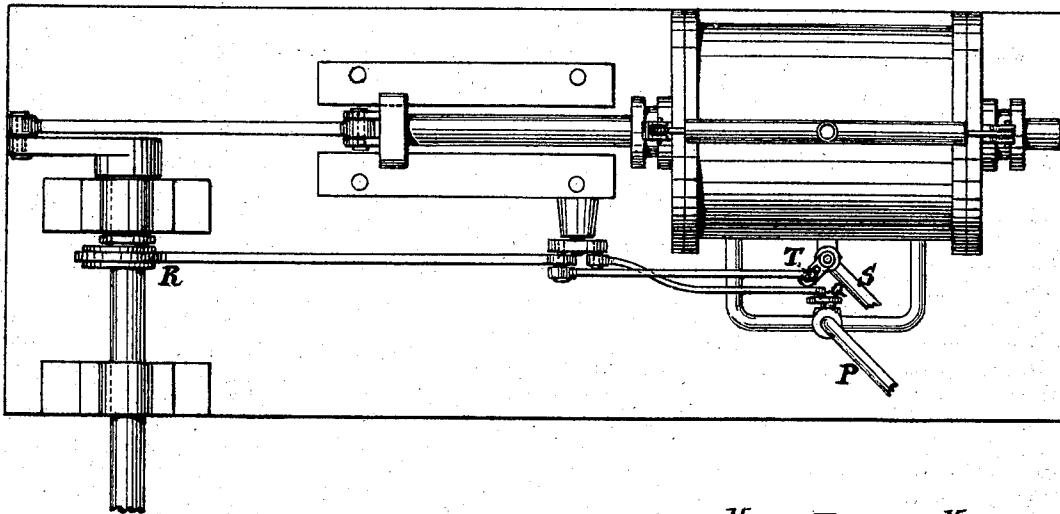


Fig. 2.

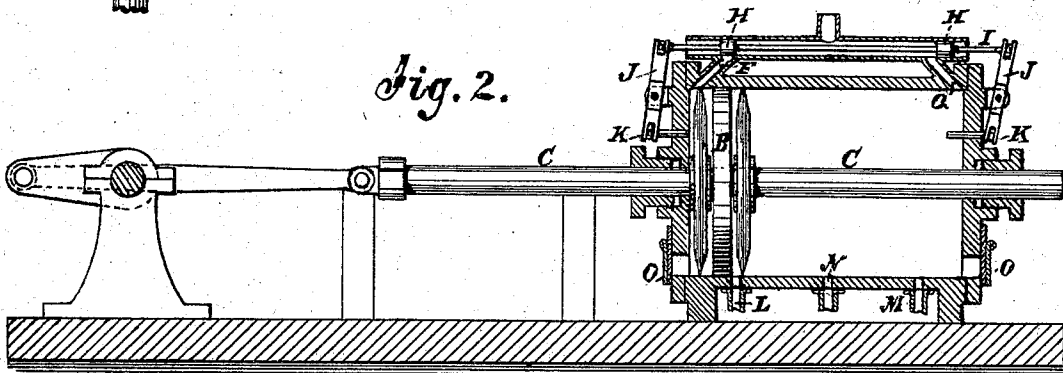
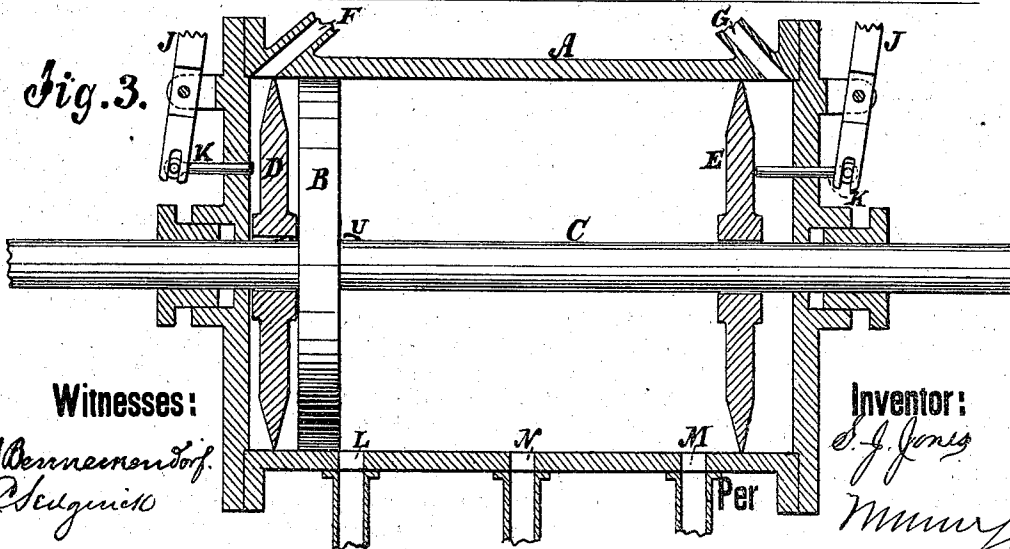


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE

SAMUEL J. JONES, OF HELENA, MONTANA TERRITORY.

IMPROVEMENT IN RECIPROCATING ENGINES.

Specification forming part of Letters Patent No. **143,827**, dated October 21, 1873; application filed May 31, 1873.

To all whom it may concern:

Be it known that I, SAMUEL J. JONES, of Helena, in the county of Lewis and Clarke and Territory of Montana, have invented a new and Improved Reciprocating Engine, of which the following is a specification:

My invention consists of an engine arranged to use steam to create a vacuum only, and shift the valves for the admission of air behind the piston, to drive it into the vacuum created by the steam, and thus develop power, which, in this way, I expect to obtain with less cost of fuel than the present way of using steam demands.

Figure 1 is a plan view of my improved engine. Fig. 2 is a longitudinal section of the engine, showing the position of the parts at the completion of the movement of the piston in one direction, and ready for the admission of the steam for creating the vacuum and shifting the air-valves to admit the air for effecting the next movement of the piston. Fig. 3 is a sectional elevation, showing the positions after the steam has been admitted to create the vacuum, but before the valves have been shifted.

Similar letters of reference indicate corresponding parts.

A represents the cylinder, B the piston, and C the piston-rod, which extends through both cylinder-heads. D and E represent what I call shuttles, the same being disks fitting on the piston-rod, one each side of the piston, and working air-tight in the cylinder. F and G are induction-ports for the air; H, the valves for opening and closing them; I, the valve-rod; J and K, rods by which the levers are thrown to work the valves by means of the shuttles, which strike the rods when forced against the cylinder-heads. L and M are steam-ports, and N is an injecting-port for water, to condense the steam after having thrown the shuttle to expel the air through the check-valves O, and shift the valves H. P is the pipe connecting the steam-ports with the boiler, and containing a valve or cock, Q, for letting on and shutting off the steam at the proper time, the said valve being worked by an eccentric, R. S is the water-pipe connecting with the port N, and having a cock, T, for opening and closing it at the times required;

it is also worked by the eccentric R. Other arrangements of valve-gear can be employed, both for these valves and the valves H. U represents slight spring-clutches on the piston-rod, intended to keep the shuttles close against the piston and prevent any rebound, both from the piston and the cylinder-heads after each movement. Supposing the engine to be standing in the position represented in Fig. 2, and the valve Q shifted to admit steam at port L, the shuttle E will thereby be driven to the other end of the cylinder, expelling the air at O, and just before arriving at the piston-head it will strike the pin K at that end, and close the right-hand air-port G, and open the left-hand port F; at the same time, if port N be opened by the shuttle, or any other means, and water admitted, the steam will be condensed and a vacuum formed, so that the air admitted at the port F will drive the piston and the shuttle D over to the right, with all the force due to the difference of the pressures on the two sides of the piston, which, in practice, will probably be about twelve or thirteen pounds to the square inch. At the same time, the port N should be closed to shut off the water; then, if port M be opened and steam admitted between shuttle F and the piston, it will be driven back to the left, expelling the air and water at that end, and taking their place to form a vacuum again by being condensed by water admitted at N, so that, as soon as shuttle F arrives at the end of its movement and strikes rod K, the air would be admitted through port G behind the piston, and drive it back to the place of beginning, and so on.

Instead of condensing the steam in the cylinder, I may use a separate condenser, into which the steam may be conducted from the cylinder of the engine; and I reserve to myself the right, if I choose, to use it.

Vapors of other non-elastic fluids, whose boiling-points are much below that of water, might be used instead of steam for creating the vacuum, the condensing injection being cool jets of whatever fluid was used to obtain the vapor; and I do not, therefore, limit myself to the use of steam.

The engine cannot be started without extraneous aid to move the piston-head to its

initial working-point, which is at either end of the cylinder. For this reason, and, possibly, for others, it would prove desirable, in many cases, to work it with a companion steam-engine, constructed with suitable exhaust-ports. A portion of the exhaust steam would suffice for the atmospheric engine.

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

1. The cylinder C, constructed with steam-inlet ports L M, water-port N, and air-ports F G', combined with a reciprocating piston, B, and disks D E, to allow the piston to be op-

erated by steam, air, and water, in the manner described.

2. The disks D E, arranged loosely on rod C, and on each side of piston B, combined with the pins K, for the purpose of operating the valve mechanism, as set forth.

3. The springs U V, arranged one on each side of piston B, and both upon the rod C, to take up the shock from the impact of piston upon the disks, as specified.

SAML. J. JONES.

Witnesses:

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MICHAEL GANNON.