

*I. Ferris,
Reciprocating Steam Engine,
Patented Apr. 3, 1866.*

Fig:1

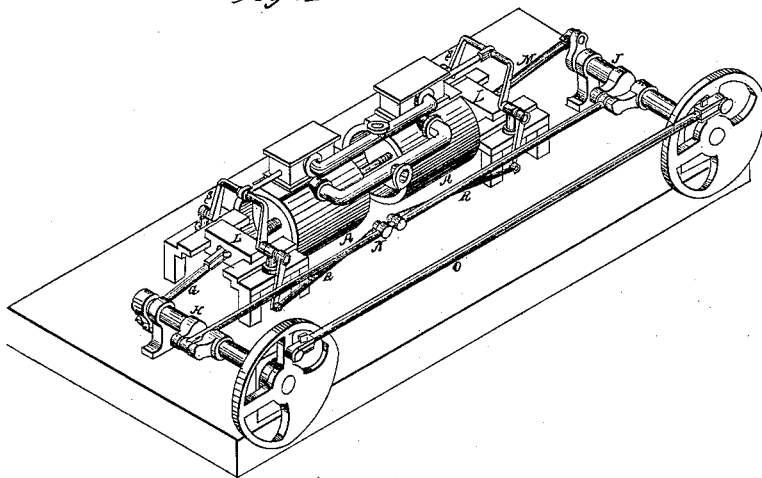
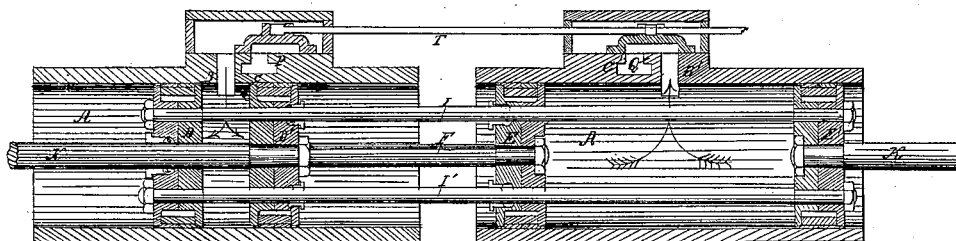


Fig: 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

ISAAC FERRIS, OF CINCINNATI, OHIO.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 53,596, dated April 3, 1866.

To all whom it may concern:

Be it known that I, ISAAC FERRIS, of Cincinnati, Hamilton county, State of Ohio, have invented certain new and useful Improvements in Motive-Powers; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

My improvements relate to the cylinders, pistons, and connections of steam or other motive-power engines; and it consist in a peculiar construction and arrangement of these parts, whereby cylinder-heads can be entirely dispensed with, the pistons and cylinders can be lubricated and packing adjusted from the outside without the removal of any of the parts of the machine, and shorter cranks and crank-connections used, and whereby the induction and eduction ports of the cylinders can be constructed so short that a great saving of power is effected over all other known devices.

In the accompanying drawings, Figure 1 is a perspective view of a steam-engine embodying my improvements. Fig. 2 is a longitudinal section of the cylinders and pistons of the same.

For convenience of lubrication and repairs I make the cylinder of the engine in two sections, A A', separated as shown; but where space is an object a continuous cylinder can be used.

The sections A A' are each provided with a pair of pistons, D D' and E E', and an induction and eduction port, B B' and C C'. Steam is admitted and discharged between each pair of pistons at the center of each cylinder, thus enabling the construction of the shortest possible steam-passages.

The pistons D' and E are rigidly connected

together by rod F, said rod passing through a packed aperture in piston D and connecting, by pitman G, with crank-shaft H. The pistons D and E are rigidly connected by the rods I I', passing through packed apertures in the pistons D' and E. The pistons D and E' connect to the crank-shaft J through rod K, cross-head L, and pitman M.

To preserve a coincident motion of the shafts H and J they are connected at right angles by parallel rods N O. Connection is made from the rod N to the valves P Q through rods R R' and rock-shafts S S', or by a single rod, R, and rock-shaft S, the valves being connected by rod T.

Power for driving purposes can be taken from either or both of the shafts H J by the ordinary attachments.

When a single cylinder is used in place of the section A A', a single piston may take the place of the pistons D' and E; but the arrangement, though it would effect a saving of space, would not present such facilities for repairs, packing, and lubrication as the one above described.

I claim herein as new and of my invention—

1. The open-ended cylinders A A' B B' C C' and pistons D D' E E', arranged, connected, and operating substantially in the manner and for the purpose set forth.

2. In this connection, the arrangement of the parts N, R R', and S S' for operating the valves P Q, substantially as described.

In testimony of which invention I hereunto set my hand.

ISAAC FERRIS.

Witnesses:

GEO. H. KNIGHT,
JAMES H. LAYMAN.