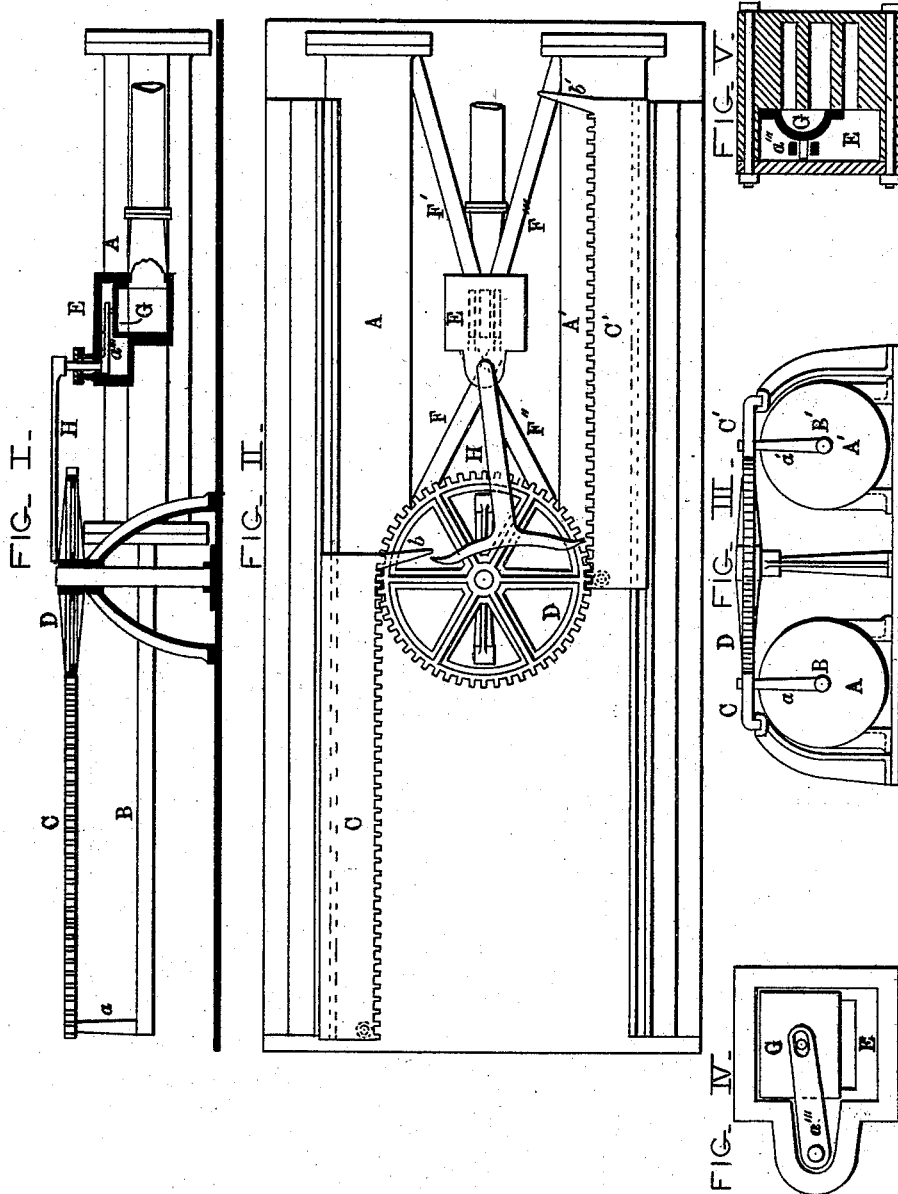


D. GOUGH.
Steam-Engines.

No. 214,646.

Patented April 22, 1879.



—WITNESSES—

G. R. Brooks.
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—INVENTOR—

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UNITED STATES PATENT OFFICE.

DIXON GOUGH, OF CARROLLTON, MARYLAND.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **214,646**, dated April 22, 1879; application filed October 11, 1878.

To all whom it may concern:

Be it known that I, DIXON GOUGH, of Carrollton, in the county of Baltimore and State of Maryland, have invented certain Improvements in Steam-Engines, of which the following is a specification; and I do hereby declare that in the same is contained a full, clear, and exact description of my said invention, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to certain improvements in a duplex or two-cylinder engine, *e*, adapted for a variety of purposes where a reciprocating movement is required; and it consists in certain details of construction of the engine with the view of effecting a proper introduction and discharge of steam to and from the cylinders during the reciprocating movement before alluded to.

In the description of the invention which follows, reference is made to the accompanying drawings, forming a part hereof, and in which—

Figures 1 and 2 are, respectively, an exterior side view and a plan of the improved duplex engine. Fig. 3 is an end view of the invention. Figs. 4 and 5 are views of parts of the improvements on an enlarged scale.

Similar letters of reference indicate similar parts of the invention in all the views.

A A' are the cylinders of the engine, and B B' the piston-rods, extending from the pistons, which pistons, having no novel features, are not shown in the drawings. The outer ends of the piston-rods B B' are provided with the pins *a a'*, which connect them to racks C C', suitably supported and guided, and adapted to have a longitudinal movement parallel with the said rods.

The movements of the piston-rods are combined or transmitted to each other; but their motions are in opposite directions.

The means for coupling the racks consist of a toothed wheel, D, located between and engaged with the racks C C'; consequently the forward movement of one piston and its attachments assists in the backward movement of the other, and vice versa.

The two cylinders are provided with a single steam-chest, E, situated between them, with steam and exhaust pipes F F' F'' F''', connecting it with the ends of the cylinders. The steam-chest is fitted with a valve-seat and a valve, G, which is slid backward and forward upon the seat to control the direction of the steam-currents.

The valve-moving mechanism consists of a vibrating arm, *a'''*, located within the steam-chest and connected to the valve, and is actuated from the exterior of the said chest by a T-shaped arm, H, and tappets *b b'*, projecting from the racks.

Other tappets may be used in connection with the ones described to give to the T-shaped arm a supplemental movement, and thereby increase the opening of the steam-ports in the steam-chest during the stroke, if desired; but in most cases the arrangement shown is sufficient to effect the proper working of the engine.

The operation of the engine is extremely simple, the direction of movement of the piston being governed entirely by the position of the T-shaped arm, which is actuated by the tappets *b b'*.

I do not claim reciprocating racks and a gear-wheel having concentric therewith an arm with branches, operated on by pins on the racks to work separate valves alternately; but,

Having thus described my invention, what I claim as new, and wish to secure by Letters Patent of the United States, is—

In combination with the valve G and cylinders A A', having pistons provided with racks C C', and tappets *b b'* projecting from their faces, the intermediate gear, D, and T-shaped arm H, adapted to be vibrated by the said tappets, and thereby change the direction of the steam-currents through the agency of a single valve, substantially as specified.

DIXON GOUGH.

Witnesses:

WM. T. HOWARD,
WM. C. NICHOLLS.