

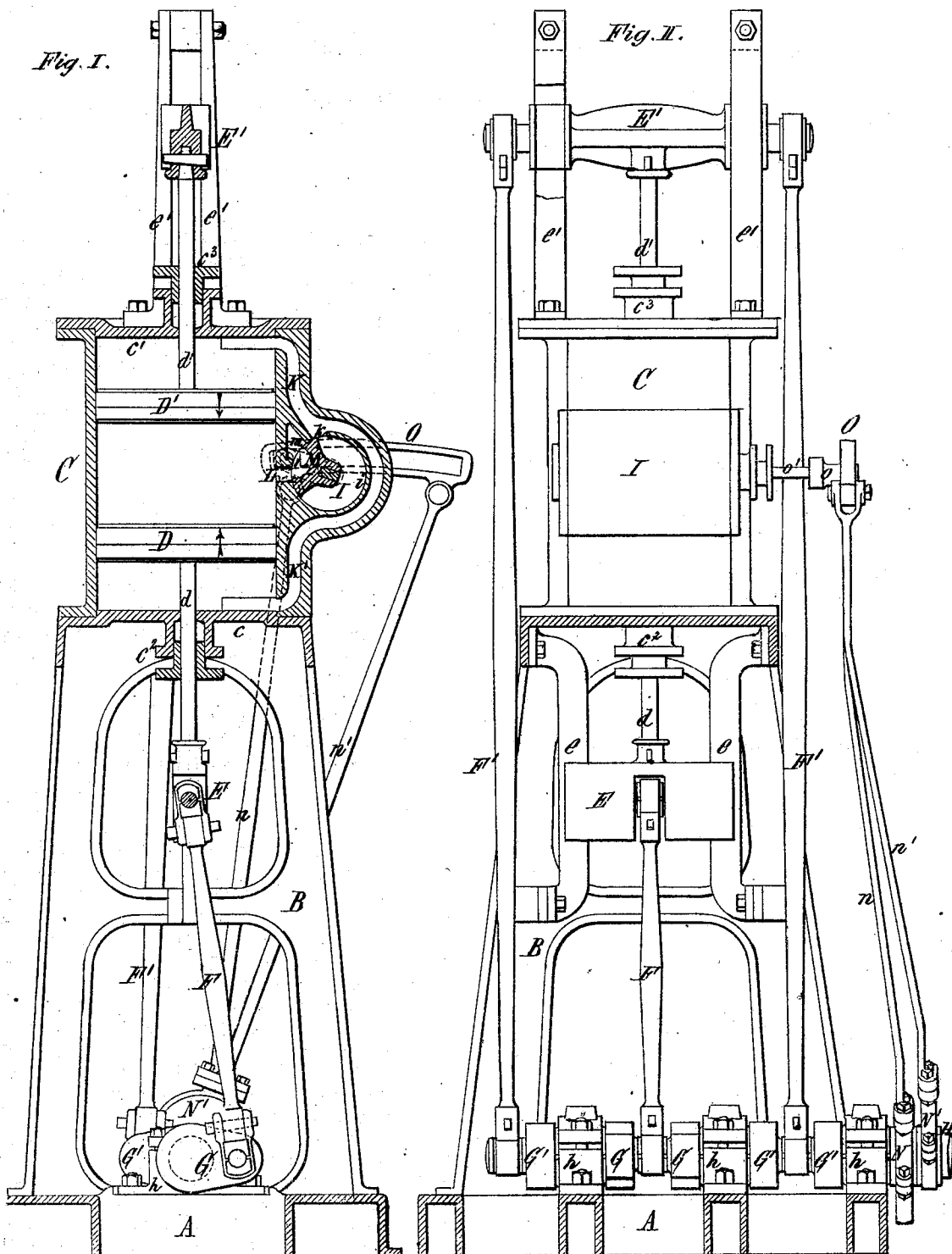
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EDWARD EVANS.

Improvement in Steam Engines.

No. 121,935.

Patented Dec. 19, 1871.



John J. Donner.
Edward Mitchell. Witness.

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by J. M. Hyatt, City.

UNITED STATES PATENT OFFICE.

EDWARD EVANS, OF NORTH TONAWANDA, NEW YORK.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 121,935, dated December 19, 1871.

To all whom it may concern:

Be it known that I, EDWARD EVANS, of North Tonawanda, in the county of Niagara and State of New York, have invented a certain Improvement in Steam-Engines, of which the following is a specification:

My invention consists in the combination, with a cylinder closed at its ends and provided with two pistons moved in opposite directions, and a central and two end ports, of the valve and partition therein, whereby steam is supplied to the three ports through a single valve, as hereinafter fully set forth.

In the accompanying drawing, Figure I is a sectional elevation of my improved steam-engine, and Fig. II an elevation at right angles to Fig. I.

Like letters designate like parts in each of the figures.

A represents the bed-plate, and B the frame of the machine. C is the steam-cylinder, and c c^1 the heads, tightly secured to its ends. D D' are two pistons, arranged in the cylinder C, and d d' their respective piston-rods. The rod d passes through a stuffing-box, c^2 , in the head c , and connects with a cross-head, E, sliding between guide-bars e . F is the connecting-rod, transmitting motion by means of the crank G to the driving-shaft H, which revolves in pillow-block bearings h . The piston D with its connecting parts forms what is commonly called a direct-acting engine. The piston-rod d' of the piston D' passes upward through a stuffing-box, c^3 , in the head c^1 , and attaches to a cross-head, E', sliding between guide-bars e' . F' F' are two connecting-rods arranged on each side of the cylinder C, and connecting the cross-head E' with two cranks, G', in the manner of a back-acting engine. The cranks G' are arranged opposite, or one hundred and eighty degrees from the crank G on the shaft H. I is the valve-chamber, preferably of cylindrical form, as represented in the drawing. K K' are two steam-ports leading from the valve-chamber to the ends of the cylinder. The port K' passes around the valve-chamber I, from which it is separated by a diaphragm, i , and joins the port K, when they communicate, by a single aperture, k , with the interior of the valve-chamber. L is a port or steam-passage leading from the

valve-chamber to the middle of the cylinder so as to form a communication between the former and the space between the pistons D and D'. m is the exhaust-passage, and M the steam-valve, of the kind ordinarily known as rocking valves. It will be observed from the drawing that the valve has to open and close only two openings, namely, the port L and the aperture k , so that any ordinary steam-valve may be used for the purpose. The admission of steam to the cylinder may also be accomplished by two valves connected so as to act simultaneously. N N' are two eccentrics, mounted on the shaft H, and n n' the rods connecting the eccentrics with the link O, which latter operates the valve M by means of an arm, o , and shaft o' .

The operation of my improved engine is as follows: When the parts are in the position shown in the drawing, the steam is admitted through the ports K and K' in the space between the pistons and the cylinder-heads, whereby the pistons are forced toward each other in the direction of the arrows, Fig. I. The steam contained in the space between the two pistons finds an outlet, through the central port L and the cavity of the valve M, into the exhaust-passage m . The admission of steam is reversed at the end of the stroke by the valve-gear in the ordinary manner, so that the steam between the pistons and the cylinder-heads is exhausted while fresh steam is admitted between the pistons, forcing the same apart.

The advantages of my improved engine are as follows: The use of two pistons shortens the stroke of each to one-half of that of the piston of an ordinary engine of the same power, thereby reducing the speed of each piston in the same measure for an equal number of revolutions, whereby the friction of the pistons in the cylinder is lessened. By the arrangement of the cranks opposite each other the forces acting upon the shaft balance each other, so that the jerks which occur in single-piston engines are prevented and a uniform movement is produced. By alternately admitting steam simultaneously at both ends of the cylinder, or in the center thereof, the strains which tend to separate the cylinder and frame of a single-piston engine are

neutralized and a quiet working of the engine is insured. In cases where speed of the shaft is an object, the number of revolutions of the same are doubled by the use of the two pistons, without the loss of power.

I claim as my invention—

The combination, with a tight cylinder, two

oppositely-moving pistons, central port L, end ports K K', of the valve M and partition i, substantially as shown and described.

EDWARD EVANS.

Witnesses:

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