(No Model.)

T. T. PROSSER.

STEAM ENGINE.

No. 555,465. Patented Feb. 25, 1896.

Fig. 1.

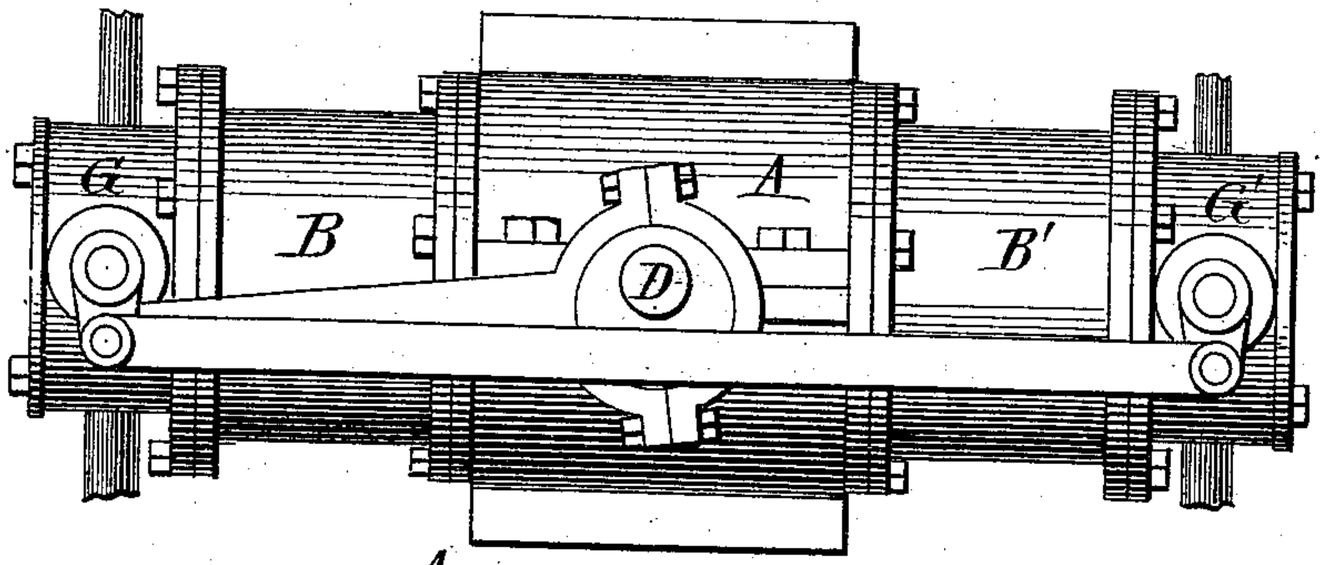


Fig. 2.

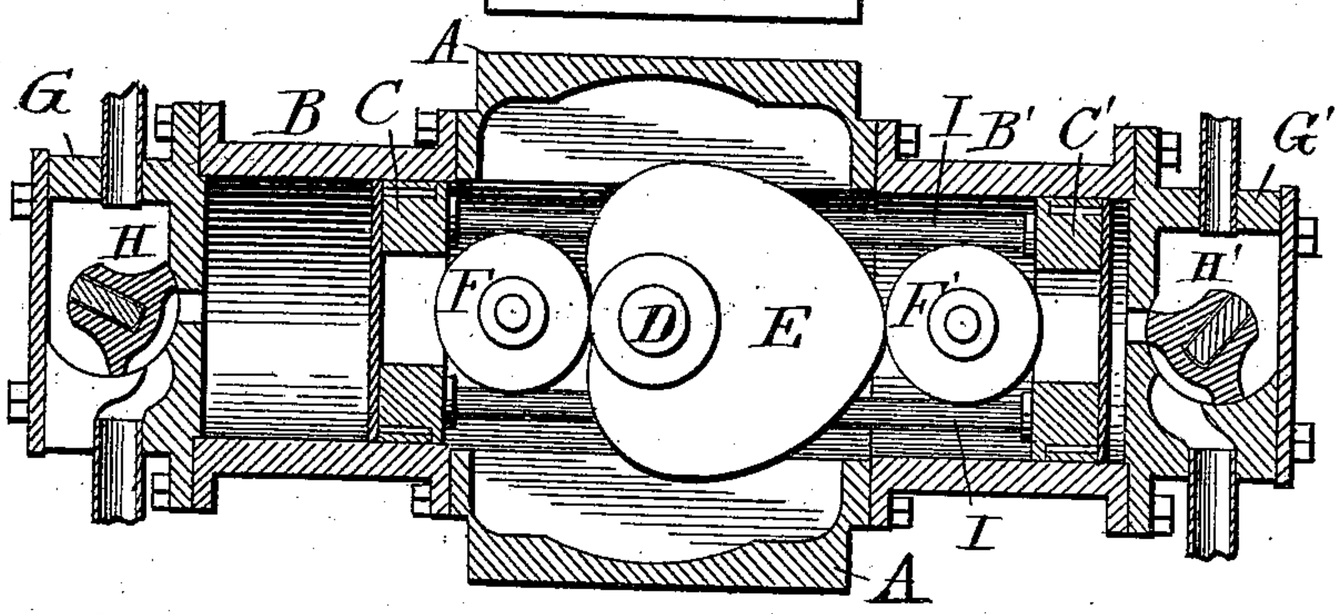
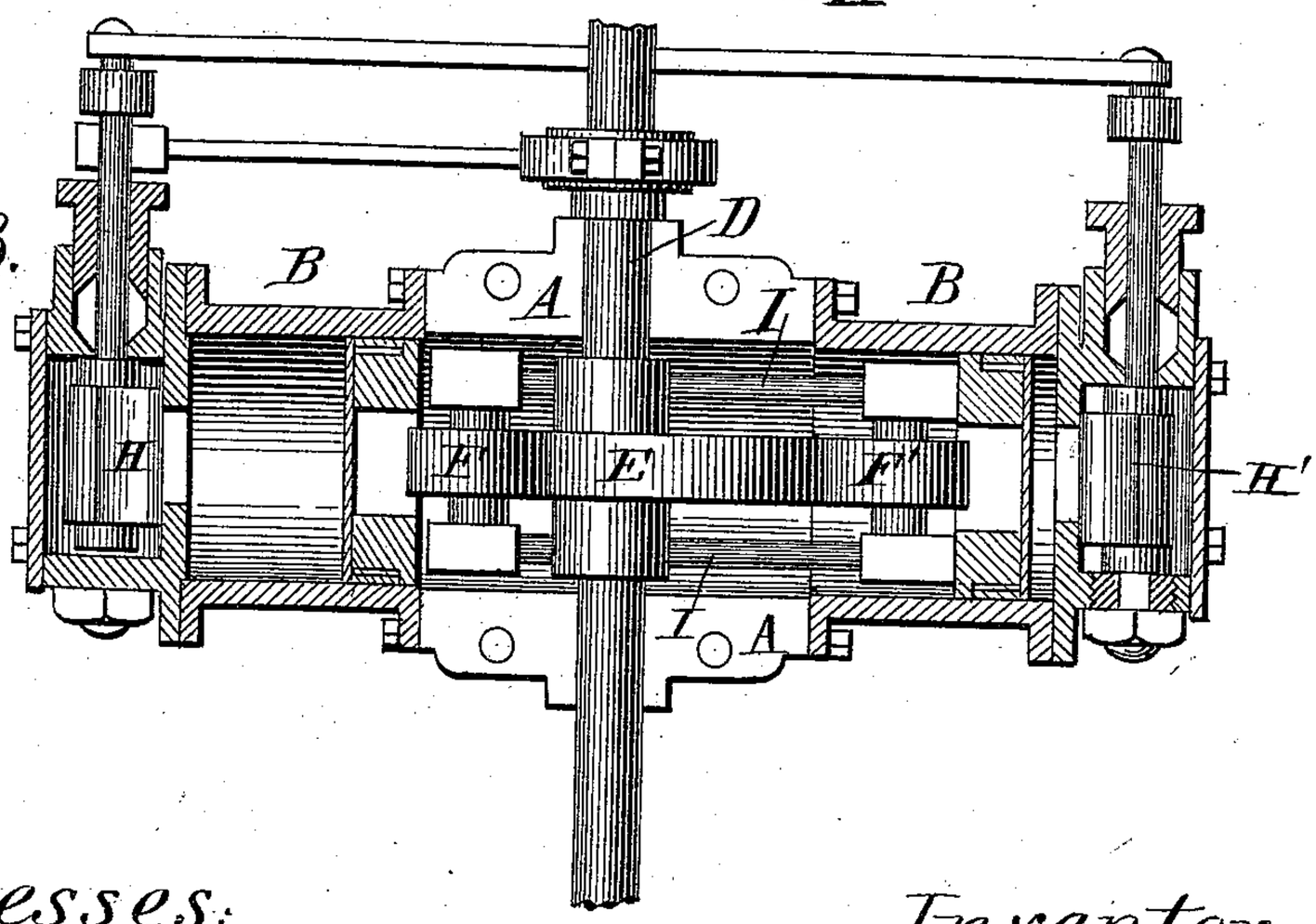


Fig. 3.



Witnesses:
R. L. Brown.
R. J. Jacker.

Inventor.
Treat T. Prosser,
By Charles Turner Brown,
Atty.

UNITED STATES PATENT OFFICE.

TREAT T. PROSSER, OF LYNN, MASSACHUSETTS.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 555,465, dated February 25, 1896.

Application filed December 7, 1892. Serial No. 454,414. (No model.)

To all whom it may concern:

Be it known that I, TREAT T. PROSSER, of Raddins Station, in the city of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Steam-Engines, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to that class of engines known and designated as "piston" or "reciprocating" engines, a class largely used on railroads, steam-vessels, and for all general purposes wherever large amounts of power are required. In this class of engines it is customary to convert the reciprocating motion of the piston into a rotary motion by the use of a crank through a series of parts connecting the crank with the piston—namely, a connecting-rod with its boxes, straps, gibs, keys, piston-rod, stuffing-box, cross-head, slides, and bolts, or through the use of an eccentric secured to the engine-shaft, so that the forward movement of the piston exerts pressure, in a line parallel with the axial line of the piston, on the periphery of the eccentric, such line of force being at all times parallel to but varying in distance from the axial line of the piston in the revolution of the shaft and eccentric, and such pressure being available for the production of rotary movement in the shaft only when the line of force is so far to one side of the axial line of the piston that a measurement from the point of contact of such line of force with the periphery of the eccentric to the center of the shaft thereof gives an angle equal, at least, to what is known in the art as the "slippage angle," and such line of force varying, as described, to one side of the axial line of the piston, a cross-head or other equivalent device is placed on the end of the piston adjacent to the eccentric to come in contact therewith. These parts being all necessary to form the connecting-link between the piston and crank are all in constant operation during the working of the engine and are subjected to all the strains incident to the speed and pressure of the steam on the piston, requiring the constant attention of the operator to prevent heating and any derangement of the different parts while in operation. By my invention these difficulties are all obviated, for all of these parts are done away with, and the loss due to their friction and wear prevented.

As engines of this character may be run at a high rate of speed, gearing in many cases can be dispensed with, and as my engine is nearly self-contained its parts are not exposed to dust or dirt, requiring less oil and attention during their practical operation to keep them in order or to clean them when not in use.

The objects of my invention are to obtain a cheaper, more powerful, durable engine for general purposes than those now in use; an engine that shall be largely self-contained and thoroughly protected from dust and dirt; an engine requiring less steam, less oil, and less attention for a given amount of work and a less time to clean when not in operation; an engine that may be safely run at a high rate of speed; one that may be used directly on a straight shaft or axle to receive and transmit the power from an alternating piston by means of wheels so arranged as to largely impart the force of action and reaction as received from the piston for propelling the shaft or axle, and thus utilize a larger proportion of the power developed by the heat and steam than the ordinary engines now in use, at the same time dispensing with the crank and a large number of working parts ordinarily used in piston-engines, as heretofore enumerated, thus saving in first cost, in oil, and attention, also in the amount of steam or heat required for a given amount of power over those now in use.

In an engine embodying my invention a drive-wheel is secured to the shaft and a transmitter-wheel on the piston, in place of the crank and connecting parts heretofore used or in place of the eccentric and connecting parts heretofore known. The drive-wheel used in the engine embodying my invention must be of such peripheral shape that the forward movement of the piston and transmitter-wheel mounted thereon will produce pressure on the drive-wheel at the point of contact of the transmitter-wheel therewith, tending to force such contact-point of the wheel to one side—that is, at right angles to the axial line (and line of movement) of the piston. By thus constructing the drive-wheel on the main shaft of the engine and the trans-

mitter-wheel on the piston, so that the forward movement of the piston will at all times force the contact-point of the drive-wheel to one side of the path of the piston, as soon as the point or apex of the drive-wheel has passed by the axial line of the piston, the forward movement of such piston is as available for the production of rotatory motion in the shaft of the engine as at any point in its forward movement; or (expressed with reference to the drive-wheel) the forward movement of the piston is as available to produce rotation of the drive-wheel when the drive-wheel is in one part or portion of its revolution as when in any other part or portion of its revolution, (it being understood that one of the transmitter-wheels on the piston acts only on one half of the drive-wheel) when the piston moves in one direction, and the other transmitter-wheel acts on the other half of the drive-wheel when the piston moves in the other direction;) and, too, I can determine what the extent of forward movement of the piston shall be to produce a given amount of rotation to the shaft of the engine. I am thus enabled to so dispose of the forward movement of the piston relative to the side-thrust thereof (through the transmitter) on the drive-wheel that the momentum of such piston is converted into rotatory force in the engine-shaft, when desired, and the movement of the piston thereby arrested. Greater efficiency, for the above and other reasons hereinafter given, is obtained in an engine embodying my invention than has heretofore been secured in engines.

To enable others skilled in the art to make and use my invention, I will describe its construction and operation, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming a part of this specification, in which—

Figure 1 is a longitudinal elevation of my engine, showing its general outside appearance; Fig. 2, a longitudinal vertical section showing all of its external parts in section and most of those on the inside either in section or elevation. Fig. 3 is a longitudinal horizontal section, part in section and part in elevation, showing more fully parts before shown only in section.

The following letters represent different parts: A, the central part between the cylinders; B and B′, the cylinders; C and C′, the pistons; D, the axle or shaft; E, the large eccentrical drive-wheel; F and F′, the small transmitter-wheels; G and G′, the steam-chests; H and H′, the valves; I, the rods connecting the pistons.

The following gives a fuller description of the parts represented by letters: A represents the central portion of the engine. It is constructed in two pieces and in such manner as to form bearings for the journal-boxes for the shaft or axle D and a cylindrical case for the axle D and the large wheel E to revolve in. The ends of A are cylindrical, are turned and counterbored to receive the steam-cylinders B and B′, one on each end. The cylinders are bolted to the flanged ends of A, and are bored and fitted for the working of the steam-pistons C and C′. One piston is in one cylinder and the other piston is in the other cylinder. Said pistons are connected together by four rods, (marked I.) These rods serve to keep the pistons in unison, so that their motions shall exactly harmonize. Two of the rods I pass over the axle and two below the axle, and two of the rods are on one side of the eccentrical wheel E and two rods on the other side of said wheel. By this arrangement the pistons are prevented from turning in their respective cylinders, but are permitted to have a free lateral motion. On the axle or shaft D, inside of the central portion of the engine A and between the pistons C and C′, is located the large eccentrical drive-wheel E, which is permanently attached to the axle or shaft D, and causes it to rotate when actuated by the small transmitter-wheels F and F′, which transfer the force of the piston to the axle through the eccentrical drive-wheel E. The small transmitter-wheels F and F′ are attached to the pistons and form the connecting-link between the pistons and the eccentrical drive-wheel E, and through which the power is transferred from the piston to the axle.

From the drawings and description it will be seen that the central portion of the engine and the cylinders are constructed in parts, which affords a ready mode of getting at any of the different parts, and it also affords a simpler mode of construction; but these parts may be all cast in one piece, and the boxes and other parts inserted, which may be a cheaper mode of construction, and as all of the working parts are so very durable it may be but a slight objection on account of ease of getting at the different parts, and may also be better, for those unskilled will not be as liable to take them to pieces as they would if it were easily done.

Having constructed the engine, as shown and described, with all parts in working order, the steam is admitted and a rapid rotation is the result, the rotation being produced by the transmitters in the longitudinal movement of the piston alternately forcing to one side and the other of the axial line of the piston the peripheral point of the drive-wheel in contact with the transmitters, respectively; but as engines of this class are very easily controlled their speed may be regulated, as desired. As this engine has a very large range of speed, it may be adjusted to suit the most of circumstances with but little difficulty.

Having described the objects of my invention and a mode of construction and operation, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a steam-engine, the combination of a central chamber or compartment having two oppositely-placed cylinders communicating

therewith, pistons located in the cylinders and connected rigidly together, a shaft or axle mounted between the pistons, an eccentrical drive-wheel secured to such shaft, transmitter-wheels rotatably mounted on the pistons and in contact with the periphery of the eccentrical drive-wheel, the periphery of such eccentrical drive-wheel shaped so that longitudinal movement of the pistons will, through the transmitters, exert force on such periphery, at right angles to such longitudinal movements of the pistons, tending to rotate such drive-wheel; substantially as described.

2. In a steam-engine, the combination of the main casing or chamber A, the oppositely-placed cylinders B having steam-chests G provided with valves H, the pistons C C′, connected by four rods I, the shaft D having secured thereto an eccentrical drive-wheel E mounted in the chamber A between the piston-rods, the transmitter-wheels F F′ carried by the pistons and arranged to act on the said eccentrical drive-wheel to rotate the shaft, by thrusting to one side of the longitudinal path of the piston the peripheral point of the eccentrical drive-wheel in contact with the periphery of the transmitter-wheels, respectively, and connections between the shaft and valve-rods, substantially as described.

3. In a motor having a longitudinally movable and reciprocatory piston-rod, pistons on the ends thereof, means for admitting motor fluid to and exhausting it from the cylinders of the pistons, and a shaft rotatably mounted between such cylinders, the combination of a wheel having an eccentrical periphery, secured on the shaft, with wheels rotatably mounted on the piston-rod and arranged to thrust to one side of the path of such wheels the point on the eccentrical periphery in contact therewith in the reciprocatory longitudinal movement of the pistons; substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 12th day of October, A. D. 1892.

TREAT T. PROSSER.

Witnesses:
C. F. DALTON,
HARVEY W. PATCH.