

No. 728,807.

PATENTED MAY 19, 1903.

P. MURRAY.
ENGINE AND POWER TRANSMITTING MEANS THEREFOR.

APPLICATION FILED OCT. 17, 1901.

NO MODEL.

3 SHEETS—SHEET 1.

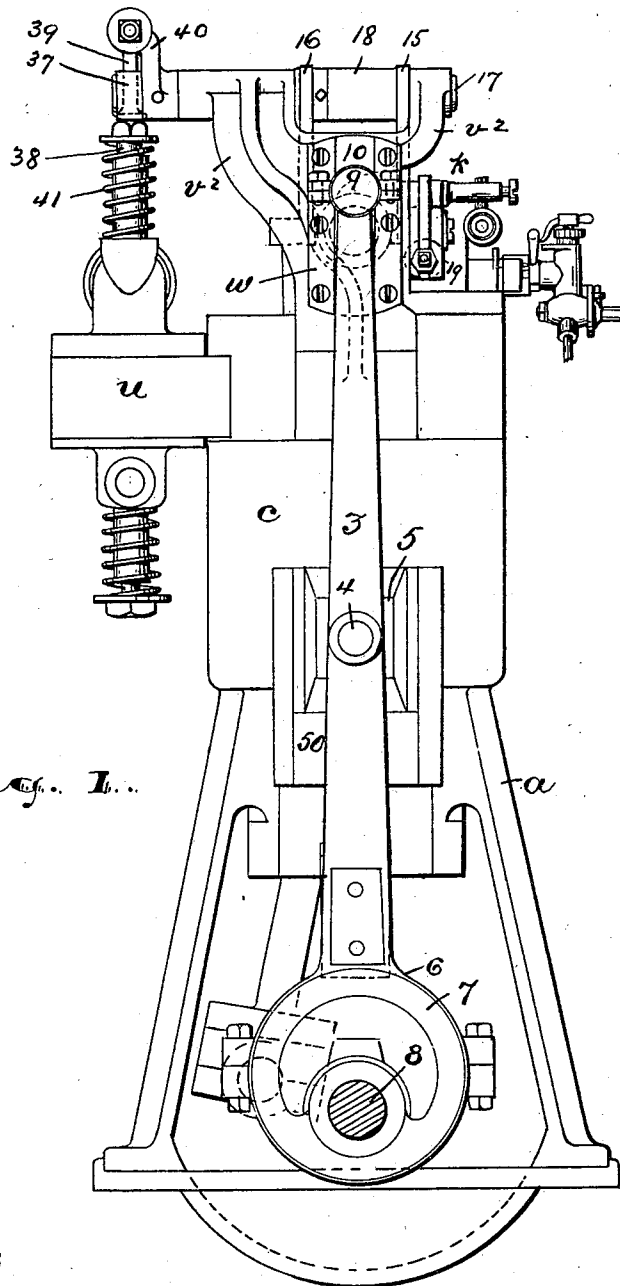


Fig. 1.

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Henry King
Russell M. Everett

INVENTOR:

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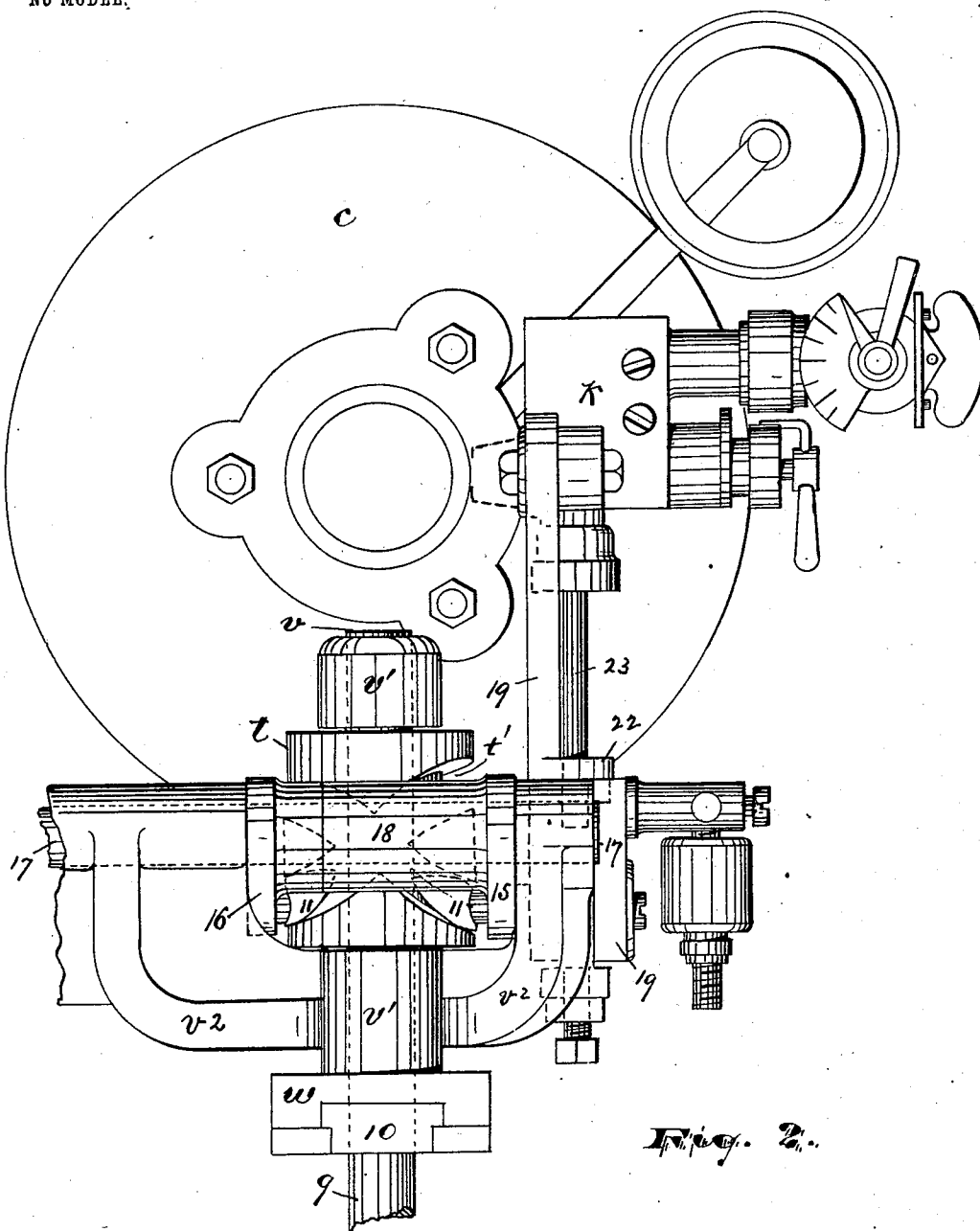


Fig. 2.

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3 SHEETS—SHEET 3.

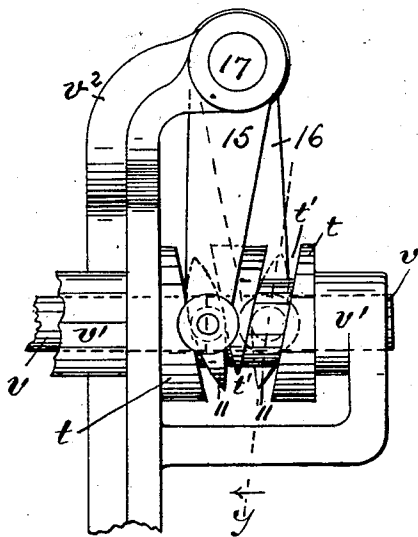


Fig. 3.

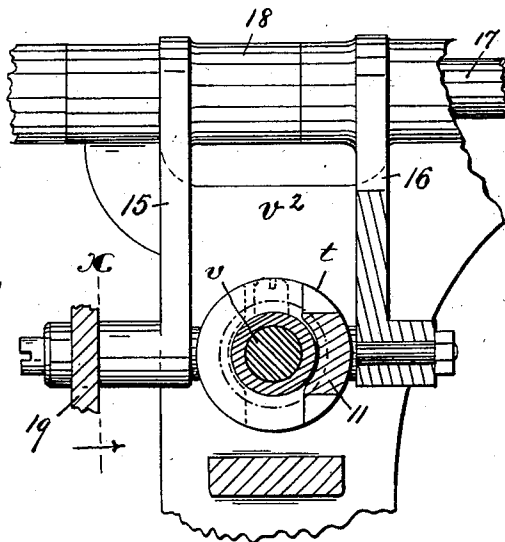


Fig. 4.

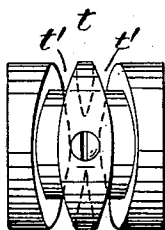


Fig. 5.

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UNITED STATES PATENT OFFICE.

PETER MURRAY, OF JERSEY CITY, NEW JERSEY, ASSIGNOR OF ONE-HALF TO
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ENGINE AND POWER-TRANSMITTING MEANS THEREFOR.

SPECIFICATION forming part of Letters Patent No. 728,807, dated May 19, 1903.

Application filed October 17, 1901. Serial No. 78,934. (No model.)

To all whom it may concern:

Be it known that I, PETER MURRAY, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Engines and Power-Transmitting Means Therefor; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

The objects of this invention are to secure a transmission of rotary movement in opposite directions with greater uniformity and positiveness of movement and simplicity of construction and when applied to a pump in an explosive-engine to provide means for more effectively controlling the supply of hydrocarbon fuel to the explosion-chamber of such engine and to secure other advantages and results, some of which may be referred to hereinafter in connection with the description of the working parts.

The invention consists in the improved engine and power-transmitting means therefor and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth, and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like characters of reference indicate corresponding parts in each of the several figures, Figure 1 is a rear elevation of an engine to which my improved power-transmitting means has been applied. Fig. 2 is a plan of the upper portion of the same, on an enlarged scale. Fig. 3 is a detail side view of a bracket and parts supported thereon, showing certain of the power-transmitting means more fully, the view being taken in the direction of the arrow on line *x*, Fig. 4. Fig. 4 is a section taken on line *y* of Fig. 3, and Fig. 5 is a detail view of a certain rotary cam forming a part of the power-transmitting means.

In said drawings, *a* indicates a bed or frame upon which the operating parts of the engine have their bearings, said frame being adapted to be seated in the hull of a boat or to be

otherwise stationed or arranged. Said frame or bed is preferably cast integral with a cylinder *c*, containing a piston and means for igniting the explosive mixture by which said piston is driven, said piston and internal igniting means not being shown. Also within said cylinder is arranged an atomizer (not shown) by which the hydrocarbon fluid, preferably in liquid form and preferably in the specific forms of gasolene and kerosene-oil, is mixed with air, the liquid being evaporated or rendered vaporous or gaseous with facility and thoroughness by said vaporizer. To supply the vaporizer with the said hydrocarbon, I employ a pump *k* and coöperating regulating means, which are driven by the power-transmitting means hereinafter described, in which the present invention particularly inheres.

The hydrocarbon fuel, preferably gasolene at the initial stages of operation and kerosene-oil after the engine is fairly in operation, is fed from suitable tanks (not shown) to the pump *k*, indirectly operated by the grooved cam *t*, which cam also coöperates with other parts to open the exhaust-valve *u*. Said cam *t* is arranged on a shaft *v*, having bearings on the bracket *v*³ of the cylinder *c*. Said shaft has a crank wheel or arm *w* at one end, said wheel or arm being operated by a lever 3, fulcrumed at 4 upon a slide 5, arranged in a vertical slideway 50, formed on or attached to the cylinder *c*, said lever 3 at its lower end being attached to an eccentric-strap 6 on an eccentric 7, fixed to the main driving-shaft 8 and rotating therewith.

At its upper end the lever 3 is in immediate connection with the crank-pin 9 of a dovetailed slide 10, arranged in a correspondingly dovetailed transverse groove in the face of the crank wheel or arm *w*, whereby as the lever 3 oscillates on its fulcrum and also has a limited vertical or longitudinal reciprocating movement under the influence of the eccentric 7 said slide 10 will permit of such movements and yet acting with the lever 3 will transmit rotary movement to the crank wheel or arm *w* in a direction opposite that of the movement of the shaft 8. The dovetailed slide 10 compensates for the expansion and contraction of the cylinder under vary-

ing degrees of heat due to the combustion of gases, &c., therein. This rotary movement of the crank wheel or arm *w* is in turn transmitted to the shaft *v*, arranged in suitable bearings *v'* of the bracket *v²*, secured to the cylinder.

The cam *t* (shown clearly in Figs. 3, 4, 5) is provided with a cam-groove *t'*, which crosses its own track, as indicated more clearly in Figs. 3 and 5, so as to effect back and forth movements of shuttles 11 in a direction parallel with the axis of the cam *t*. I prefer to place two of such shuttles in said groove *t'*, disposing them on opposite sides of the cam, so that said shuttles 11 move reciprocally in opposite directions. Said shuttles are carried by arms or levers 15 16, one of which is loosely pivoted on a shaft 17, arranged on the bracket *v²*, which holds the cam-shaft *v* in position. The said loose arm 15 is held in position away from the arm or lever 16 by an interposed sleeve 18. Said arm or lever 15 is pivotally connected, as shown in Figs. 1, 4, to a fuel-feed-pump operating-rod 19, giving to said rod 19 a longitudinal reciprocating movement. Said rod 19 is provided with an arm 22, which in turn engages the piston-rod 23 of the hydrocarbon-supply pump *k* and operates said pump to effect a regular supply of fuel in any suitable manner.

By means of the grooved cam and the lever-arms 15 16, operated thereby, I secure by simple and positively-effective means a simultaneous opening of the exhaust-valve of the engine and a charging action of the pump, whereby the atomizer receives the charge positively in proper time to secure subsequently a vaporization of the charge and a mixture of the atomized hydrocarbon with air preliminary to the mixture being drawn into the explosion-chamber of the engine.

I prefer to and in practice I employ the reciprocating slide 5, upon which the lever 3 is fulcrumed, as a motor for a rod of a pump, (not shown,) by means of which a cooling liquid may be forced into a water-jacket of the cylinder *c*.

Having thus described the invention, what I claim as new is—

1. The improved power-transmitting device, comprising a suitable bed or frame, a power-shaft carrying an eccentric, a lever-oscillated by said eccentric, a movable fulcrum for said lever, and a shaft rotated by said lever, said shaft having a grooved wheel or

arm, and a slide working in the groove of said wheel or arm and having a crank-pin in connection with said lever, substantially as set forth.

2. The improved power-transmitting device, comprising a bed or frame, a power-shaft carrying an eccentric, a lever having an eccentric-strap arranged on said eccentric, a sliding fulcrum for said lever, and a rotary shaft having a crank-pin loosely carried thereon with which the lever is connected at the end thereof opposite that having the strap, substantially as set forth.

3. The improved power-transmitting device, comprising a bed or frame, a power-shaft carrying an eccentric, a lever having an eccentric-strap arranged on said eccentric, a movable fulcrum for the lever and a shaft rotated by said lever, said shaft having a grooved wheel or arm and a slide arranged across the axis of said shaft in said groove, substantially as set forth.

4. In an engine, the power-transmitting device adapted to operate two distinct portions of said engine simultaneously comprising a suitable frame or bed, a power-shaft having means for oscillating a lever, said lever fulcrumed on a sliding fulcrum, and a shaft having a cam and grooved wheel or arm, the latter having a slide provided with a crank-pin for the lever, and the cam having a crossing cam-groove in which the independently-operable parts have their connections, substantially as set forth.

5. In an engine, the power-transmitting means comprising a bed or frame, a power-shaft having an eccentric, a lever having an eccentric-strap on said eccentric, a slide disposed intermediate of the length of the lever and having a fulcrumal pin for the lever, the slide having the crank-pin 9, the grooved wheel arranged upon the end of a shaft and carrying said slide, said shaft having a grooved cam and levers supported upon a suitable bracket and having shoes or shuttles in the said grooves and operating independent parts of said engine, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of September, 1901.

PETER MURRAY.

Witnesses:

CHARLES H. PELL,
C. B. PITNEY.