No. 746,212. PATENTED DEC. 8, 1903.

W. C. WEATHERHOLT.

EXPLOSION ENGINE.

APPLICATION FILED JUNE 4, 1903.

NO MODEL.

Fig. 1.

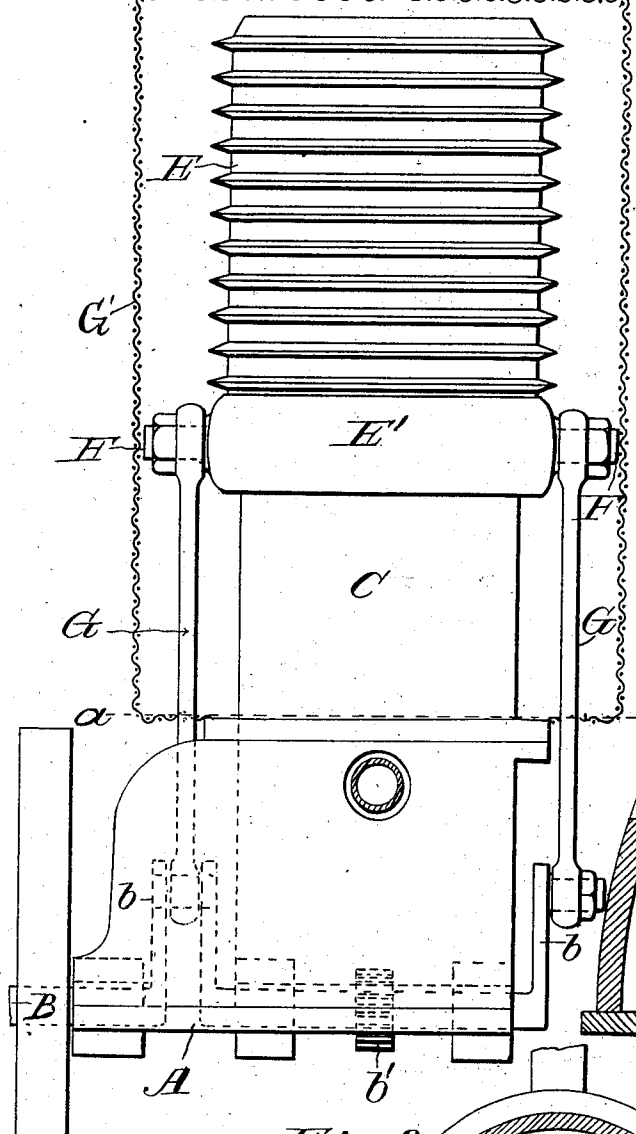


Fig. 2.

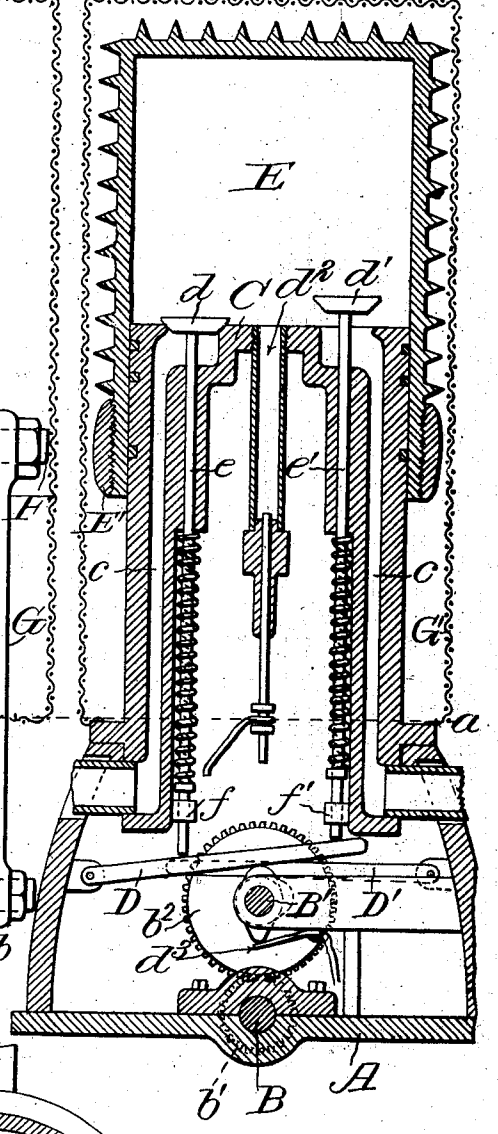
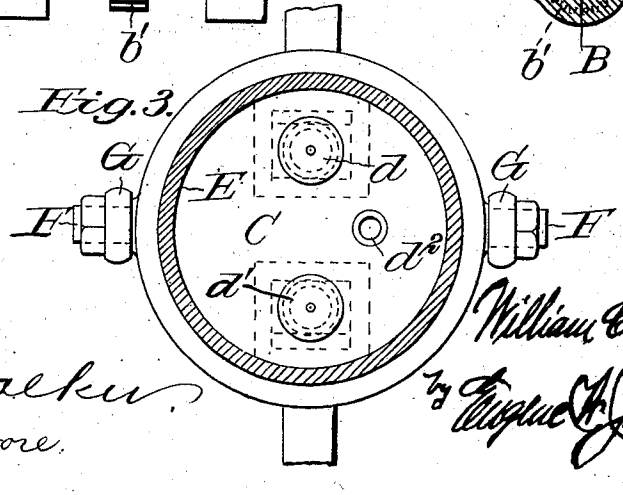


Fig. 3.



Witnesses
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 746,212. Patented December 8, 1903.

UNITED STATES PATENT OFFICE.

WILLIAM CLARK WEATHERHOLT, OF COLUMBUS, OHIO.

EXPLOSION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 746,212, dated December 8, 1903.

Application filed June 4, 1903. Serial No. 160,102. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM CLARK WEATHERHOLT, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented new and useful Improvements in Explosion-Engines, of which the following is a specification.

This invention relates to certain new and useful improvements in gas or explosion engines of the four-cycle type, the object being to provide a reciprocatory cylinder with means for adjusting the same relative to a fixed piston-head to vary the size of the compression-chambers, the cylinder being readily separable from the other parts of the engine, so that access may be had to the piston-head, the valves, and igniters, also to provide means for cooling the cylinder and to provide an explosion-motor which is simple and compact.

In the accompanying drawings, which show one form of a four-cycle engine made in accord with my invention, Figure 1 is a side elevation. Fig. 2 is a vertical section, and Fig. 3 a transverse section through the cylinder.

In the type of engine shown, A refers to a base, which in practice is fastened to a suitable foundation, such base having bearings for a crank-shaft B, having cranks $b\ b$ and a pinion b' for engagement with a gear-wheel b^2, carried by a suitably-supported lay-shaft B'. The gears $b\ b'$ are of such a size that the lay-shaft will make one turn to two turns of the crank-shaft. The dotted line $a\ a$ on the drawings indicates the limit of the movement of the cylinder toward the base of the frame, and above the dotted line $a\ a$ the frame is cylindrical, its upper end constituting a fixed or immovable piston-head C. Below the cylindrical part of the frame over which the cylinder works the frame may be of any suitable shape. In practice the frame and piston are hollow, such combined frame and piston having ways $c\ c$, which are connected to the inlet and exhaust pipes. The ways at the face of the piston-head are enlarged to provide valve-seats for the inlet and exhaust valves $d\ d'$. The piston-head has therethrough an aperture which is closed by a depending tube d^2, which carries the electrodes of the sparker or igniter. One of the electrodes is passed through a plug which is connected by a wire to a coil, and the other terminal is in electric communication with the tube and motor or engine frame, a cam or contact-point on the lay-shaft B' making and breaking the circuit as it engages or disengages a plate d^3, which is insulated from the engine-frame and connected to the battery, the circuit being made when the contact-point on the lay-shaft wipes the plate d^3. Any suitable type of igniter can be readily applied to the engine.

The frame having the fixed piston-head is hollow and in line with the center of the valve-seats has guideways for valve-stems $e\ e'$, the valves $d\ d'$ thereon being held on their seats by springs which encircle the stems and engage at one end offsets on the frame and at the other end nuts, which are adjustably attached to the stems. The ends of the stems beyond the nuts pass through and are guided by apertured lugs $f\ f'$ above arms D D', which are pivoted to the frame, and when the arms are raised by the cams on the lay-shaft the valves will be raised off of their seats. The cams and the contact-point on the lay-shaft may be carried by sleeves, so that their position may be varied when desired to change the time of ignition of the charge and the time of opening the valves.

The reciprocating cylinder E is exteriorly provided with heat-radiating ribs, and one end of the cylinder has a screw-threaded portion, with which engages an internally-threaded ring or band E', from which project wrist-pins F F, over which are placed the upper ends of connecting-rods G G, the lower ends engaging the cranks of the crank-shaft. The connecting-rods hold the cylinder-connecting band or ring in alinement with the cranks, and when the ring and cylinder are threaded the cylinder can be turned to increase or diminish the size of the explosion-chamber, or the cylinder may be entirely removed from the piston-head, so that access can be had to the valves, igniters, and packing-rings of the piston-head. In the type of engine shown the ring E' is attached to the lower end of the movable cylinder. If it is desired to provide an engine which will occupy but little space vertically, the ways $c\ c'$ and the pipes may be very near the base of the frame, and the cylindrical portion of the frame will commence near the base, the height of the frame being

shortened. When the combined piston and frame are so constructed, the cylinder may have near its upper portion a threaded boss or ring, with which the band E′ will engage, the diameter of the ring being such as to permit the cylinder being passed through the same in attaching or removing the cylinder from the piston-head. By shortening the frame and attaching the connecting-rods adjacent to the closed end of the cylinder, the ways extending the entire length of the frame and being connected to the pipes adjacent to the bed-plate, an engine of the same power will be provided, and the height from the bed-plate need be but little more than the length of the cylinder.

The invention shown may be applied to multiple-cylinder engines, and, if desired, the cylinder and piston may be incased by a fine-wire screen G′ to keep dust and foreign substances from the surface over which the cylinder moves.

The construction shown provides means whereby the speed or power of the engine or motor can be varied by changing the position of the band on the cylinder, such change of position varying the capacity of the explosion-chamber and the degree of compression of the charge. I do not limit myself to the particular construction shown for connecting the band and wrist-pins to the cylinder, for instead of screw-threads I may use bolts or other mechanical equivalents.

Having thus set forth my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an explosion-engine, a rigid or fixed piston-head, a crank-shaft, a band having wrist-pins, connecting-rods in engagement with the crank-shaft and wrist-pins and a reciprocating cylinder which is movable over the piston-head and is adjustably and removably connected to the band.

2. In an explosion-engine, the combination of a frame having a stationary piston-head, a crank-shaft, a cylinder in reciprocatory engagement with the piston-head, a band connected to the crank-shaft, and means for adjustably connecting the cylinder to the band.

3. An explosion-engine comprising a hollow engine-frame and a piston-head integral therewith, ports through the frame and piston-head, valves for the ports, valve-operating mechanism, a crank-shaft, a cylinder closed at one end and externally threaded at the other end, an internally-threaded band having wrist-pins, connecting-rods, a crank-shaft to which the connecting-rods are attached at one end, the other ends of the connecting-rods being attached to the wrist-pins, substantially as shown, so that it may be adjusted to vary the size of the compression-chamber.

4. In an explosion-engine, a fixed frame having integral therewith a piston-head, a cylinder in reciprocatory engagement with the piston-head, a crank-shaft, connecting-rods, and an internally-threaded band with which the threaded end of the cylinder engages, wrist-pins on the band, and rods connecting the wrist-pins to the cranks of a shaft, substantially as shown.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM CLARK WEATHERHOLT.

Witnesses:
J. C. SHERWOOD,
JAS. H. SCHRIVER.