N. E. CROTHERS.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED JAN. 30, 1912.

1,040,153. Patented Oct. 1, 1912.

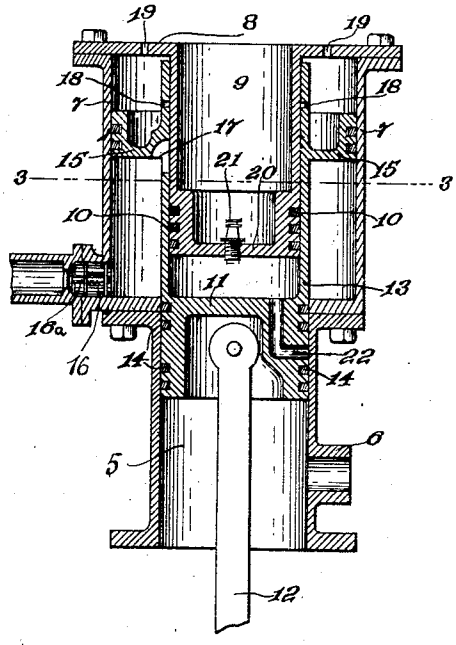

Fig. 1.

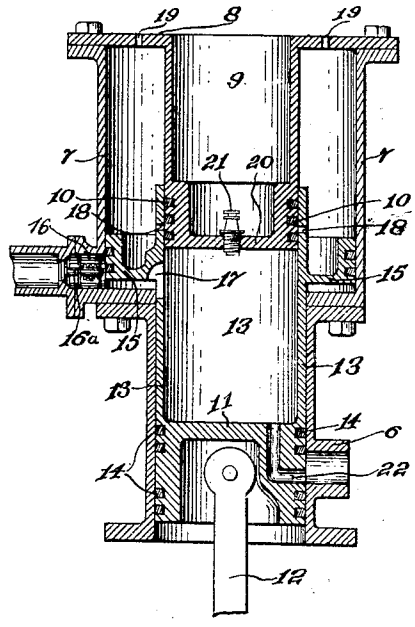

Fig. 2.

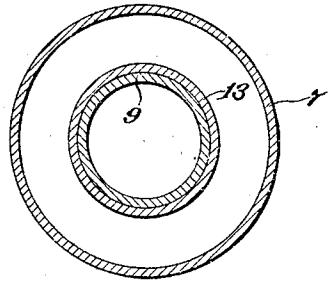

Fig. 3.

Witnesses
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UNITED STATES PATENT OFFICE.

NOBLE E. CROTHERS, OF CHICAGO, ILLINOIS.

INTERNAL-COMBUSTION ENGINE.

1,040,153. Specification of Letters Patent. Patented Oct. 1, 1912.

Application filed January 30, 1912. Serial No. 674,234.

To all whom it may concern:

Be it known that I, NOBLE E. CROTHERS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

This invention relates to internal combustion engines of the two-cycle type in which the working-cylinder is in communication with an axially alined pump-chamber, in which latter operates a plunger which is a part of the engine piston.

It is the object of the invention to provide an engine of the kind stated embodying certain novel features of construction to be hereinafter described and claimed, including an improved cylinder structure and means for lubricating the moving parts of the engine.

In order that the invention may be better understood, reference is had to the accompanying drawing forming a part of this specification in which—

Figure 1 is a central vertical section of the engine. Fig. 2 is a similar view showing the parts in another position. Fig. 3 is a cross section on the line 3—3 of Fig. 1.

Referring specifically to the drawing, 5 denotes the working cylinder of the engine, having near its crank end an exhaust port 6. On the other end of the cylinder is mounted a cylinder 7 the interior of which forms a pump and lubricant chamber. The two cylinders are in axial alinement and are fastened together in any suitable manner; or they may be cast in one piece.

The diameter of the cylinder 7 is greater than that of the cylinder 5, and the former is closed at its outer end by a head 8, its other end being open. The head 8 has a hollow, central, cylindrical extension 9 which is stationary and extends into the interior of the cylinder 7 and has its outer surface grooved to receive packing rings 10. The external diameter of the extension 9 is the same as the diameter of the bore of the cylinder 5.

In the cylinder 5 works a piston 11, the rod of which is indicated at 12. The rear end of the piston has a hollow cylindrical extension 13 which passes into the interior of the cylinder 7 in sliding contact with the outer surface of the extension 9. The piston 11 is provided with packing rings 14.

The piston extension 13 is formed intermediate its ends with a head 15 which serves as a plunger, said head working in the space between the extension 9 and the wall of the cylinder 7, said space, between the plunger and the head 8 serving as a lubricant chamber, and the space on the other side of the plunger being the pump-chamber in which the combustible mixture is compressed, said mixture entering the pump chamber through an inlet 16 containing a check-valve 16^a.

In the piston extension 13 on one side of, and adjacent to the plunger 15, is a port 17, and on the other side of the plunger, said extension has ports 18. In the head 8 are vent ports 19.

The inner end of the extension 9 is closed by a head 20 which is opposite the rear end of the piston 11 and carries an igniter 21, which later extends into the space within the piston extension 13 to the rear of the piston 11, and in the latter is a port 22 which extends from its rear end and opens through one side.

The engine operates as follows: On the inward stroke of the piston 11 and the plunger 15 a charge of fuel is drawn into the pump-chamber, and said charge is compressed on the outward stroke of the plunger and the piston. At the end of the outward stroke, the port 17 passes the inner end of the extension 9 and thus places the pump-chamber in communication with the space to the rear of the piston 11, said space being the explosion chamber. This charge therefore passes into the explosion-chamber at the end of the outward stroke of the piston and the plunger, and said charge is recompressed on the inward stroke, and ignited at the proper time. The piston now makes another outward stroke, this being the explosion stroke, and at the end thereof, the port 22 comes opposite the port 6, whereupon the spent gases are exhausted. On the explosion stroke another charge is being compressed in the pump-chamber, and said charge passes into the explosion chamber at the end of said stroke as already described. It will therefore be evident that the engine makes a power stroke for every revolution of the shaft. The lubricant-chamber behind the plunger 15 keeps the parts perfectly lubricated, the lubricant following through the ports 18 to the surface of the extension 9.

By the structure herein described an effi-

cient two-cycle internal-combustion engine is had, and also one which is devoid of complicated parts to get out of order. Inasmuch as the extension 9 is hollow, the pump-chamber will not become overheated.

The preferred embodiment of the invention has been shown, but it will be evident that various changes in the structural details may be made without a departure from the spirit and scope of the invention.

I claim:

In an internal-combustion engine, a working cylinder having an exhaust port, a pump-cylinder in axial alinement with the working-cylinder and having a fuel inlet, a plunger working in the pump-cylinder, the space on one side of the plunger being a lubricant reservoir, a closure for the outer end of the pump-cylinder, said closure having a cylindrical extension into the bore of the pump-cylinder, the diameter of said bore being greater than the bore of the working-cylinder, a piston in the working-cylinder, said piston having a hollow cylindrical extension into the pump-cylinder and fitting around the aforesaid closure extension, said cylindrical extension carrying the aforesaid plunger, and having a port which passes the closure extension at the end of the outward stroke of the piston and the plunger.

In testimony whereof I affix my signature in presence of two witnesses.

NOBLE E. CROTHERS.

Witnesses:
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