C. M. BOOTH.

RECIPROCATING ENGINE.

APPLICATION FILED JULY 3, 1916.

1,222,923.

Patented Apr. 17, 1917.

Fig. 1.

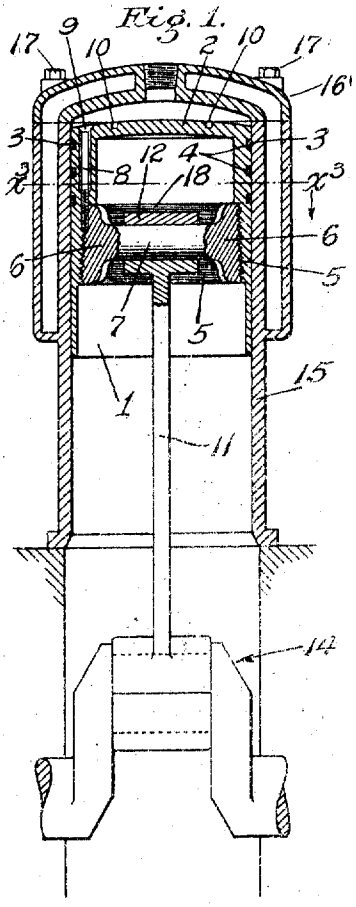


Fig. 3.

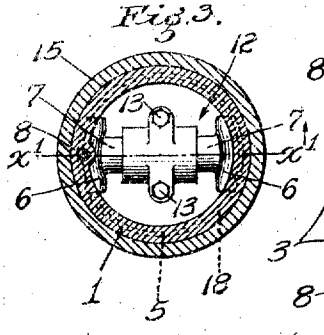
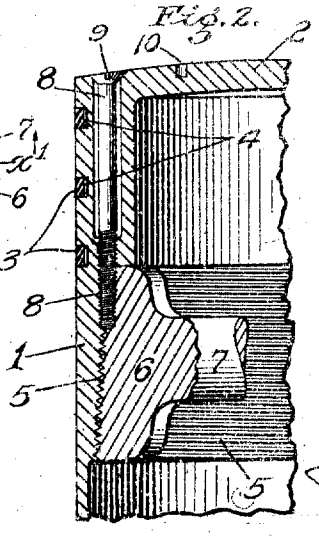


Fig. 2.



Witness,
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UNITED STATES PATENT OFFICE.

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RECIPROCATING ENGINE.

1,222,923. Specification of Letters Patent. Patented Apr. 17, 1917.

Application filed July 3, 1916. Serial No. 107 475.

To all whom it may concern:

Be it known that I, CHARLES M. BOOTH, a citizen of the United States, residing at Halleck, in the county of San Bernardino and State of California, have invented a new and useful Improvement in Reciprocating Engines, of which the following is a specification.

This improvement is designed more particularly to overcome certain difficulties in connection with internal combustion engines, and particularly engines of the automobile type. In such engines the cylinders are vertical, and in case of piston trouble it is necessary to practically dismantle the engine in order to get at the piston.

In the present type of engines in general use it is necessary in order to get at the piston rings or the wrist-pin that the oil in the lower part of the crank case be drained off; the lower part of the crank case removed; the connecting rod detached from the crank, and the head of the cylinder detached from the cylinder. Then the connecting rod is pushed up, thus pushing the piston out of the cylinder.

This is a laborious and tedious operation. The present invention is believed to offer a combination whereby the wrist-pin and piston shell are easily separable by access from the top, thus enabling changes in the piston rings and wrist-pin to be made by simply removing the cylinder head; or more broadly considered, to so construct and combine the piston, wrist-pin and connecting rod that the piston head may be removed so as to give access to the wrist-pin and connecting rod from the top of the cylinder.

An object of this invention is to accomplish this without any material change in standard engine construction.

An object of the invention is to produce a one-piece piston of light construction.

An object is to provide a piston having the foregoing advantages, and also being smooth throughout the pressure receiving surface so as to minimize carbon accumulations.

An object of the invention is to produce a piston which will hold the wrist-pin rigidly in place and prevent lateral movement.

An object of the invention is to produce a piston which will supply a protecting wall between the wrist-pin and the wall of the cylinder and yet allow easy access to the wrist-pin.

An object of the invention is to produce a piston, the rough form of which may be produced by any one of a number of mechanical processes.

Other objects, advantages and features of novelty may appear from the accompanying drawings, the subjoined description and appended claims.

The accompanying drawings illustrate the invention.

Figure 1 is a fragmental sectional elevation of parts of an internal combustion engine constructed in accordance with this invention, in one of its forms. Section is taken on line x^1, Fig. 2.

Fig. 2 is an enlarged fragmental axial section of the form shown in Fig. 1.

Fig. 3 is a transverse section on line x^3, Fig. 1.

The piston consists in a hollow shell comprising a cylindrical wall 1, a closed head 2 integral therewith, and piston rings 3 seated in grooves 4 in the wall in the usual manner. The wall 1 is threaded as at 5 on its interior surface to engage the wrist-pin mounting 6 which consists of enlarged ends of the wrist-pin 7 that is upset to form said mounting. Said enlarged ends are threaded exteriorly to engage the interior threads 5 of the piston. The piston and wrist-pin mounting are secured from unscrewing from each other by a threaded pin 8 inserted from the top of the piston as shown and screwed into one member of the mounting 6.

The head 9 of the pin 8 is counter-sunk in the piston head 2 and is slotted to receive a screw-driver by which it may be seated and unseated. Said head 2 is also provided with seats 10 for a spanner wrench and is otherwise smooth throughout so as to minimize carbon accumulations.

The upset portions or members at 6 are spaced apart and the intermediate portion or wrist-pin 7 is cylindrical and the connecting rod 11 is connected to said pin 7 in the ordinary way by the separable bearing 12, parts of which are held together by bolts 13. Said connecting rod is connected with a crank 14 in the usual manner.

The engine cylinder is of standard construction comprising a main body 15, and a cylinder head 16 connected thereto by suitable means as the bolts or cap screws 17.

With this form, all that is necessary in order to get at the rings or wrist-pin is simply to remove the cylinder head 16, then

remove the locking pin 8, and then unscrew the piston from the wrist-pin mounting 6. As this is done, the piston rises in the cylinder, and when finally unscrewed from the wrist-pin mounting, can be readily withdrawn.

The piston is provided with an internal shoulder 18 between the threaded portion 5 and the head 2, so that when the piston is screwed home, the wrist-pin mounting 6 will engage the shoulder 18 and position the wrist-pin 7 at a required distance from the head 2, thus making the relation of the wrist-pin and the head conform to the present standard construction. By removing the bolts 13 from the separable bearing 12 the wrist-pin can be gotten at. To reassemble the parts the separable bearing 12 will be replaced and secured by the bolts 13, then the piston may be inserted into the cylinder and screwed home on the mounting 6.

The method of assembling and disassembling the engine piston will be readily understood from the foregoing. The various forms shown may be respectively adapted by the constructor according to convenience and facility of construction and are practically assembled and disassembled with equal facility.

In Fig. 1 the shell prevents lateral movement of the wrist-pin, but is so constructed as to be readily removed therefrom.

I claim:

1. In an engine, a piston comprising a hollow circular shell closed at the upper end and internally screw-threaded from the lower end, and a wrist-pin screw-threaded to fit diametrically in the screw-threaded portion of the shell.

2. In an engine, a piston comprising a hollow circular shell closed at the upper end and internally screw-threaded from the lower end, and a wrist-pin having integral enlarged ends screw-threaded to fit the screw-threaded portion of the shell to mount the wrist-pin diametrically.

3. In an engine, a piston comprising a hollow circular shell closed at the upper end and internally screw-threaded from the lower end up to a shoulder, a wrist-pin having integral enlarged ends screw-threaded to fit the screw-threaded portion of the shell against the shoulder, and a locking pin removable from the top.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 24th day of June, 1916.

CHARLES M. BOOTH.

Witness:

JAMES R. TOWNSEND.