P. T. HOUSTON.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED DEC. 7, 1918.

1,339,760.

Patented May 11, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

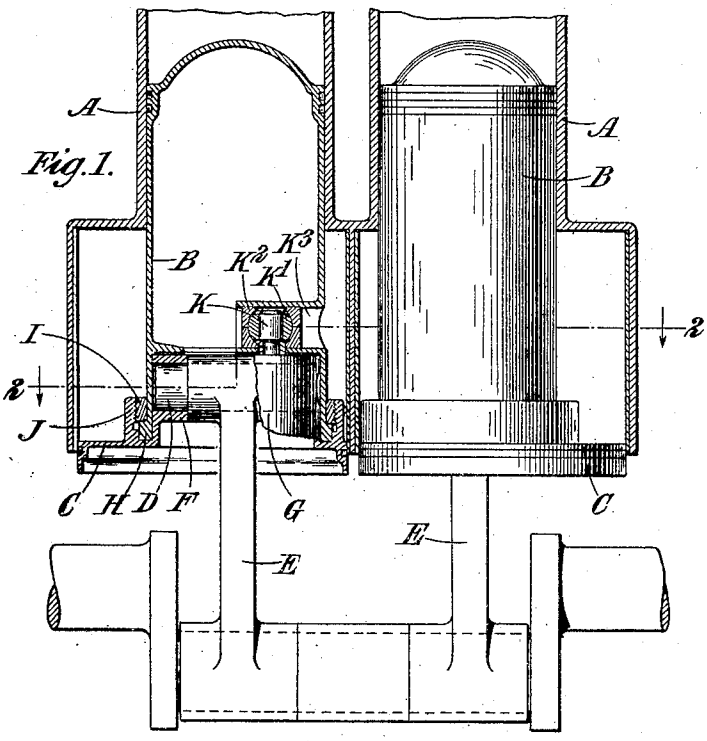
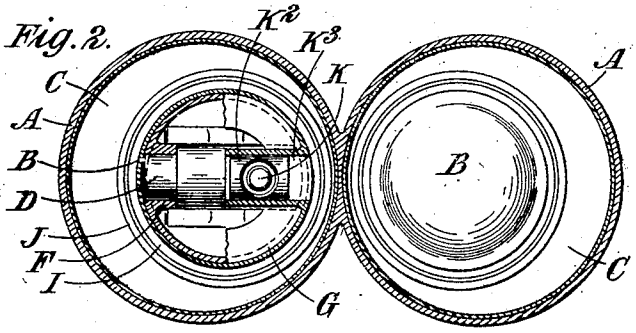


Fig. 2.



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2 SHEETS—SHEET 2.

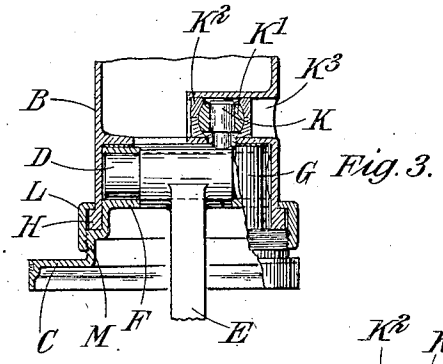


Fig. 3.

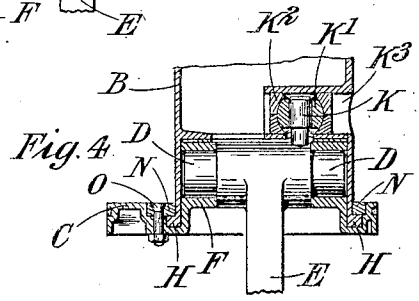


Fig. 4.

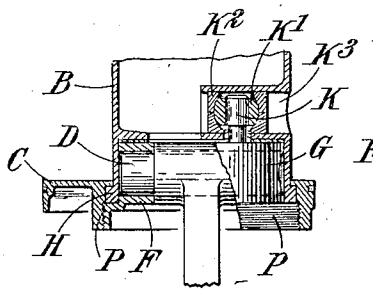


Fig. 5.

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UNITED STATES PATENT OFFICE.

PERCIVAL TURNER HOUSTON, OF LONDON, ENGLAND, ASSIGNOR TO ALPHAERO ENGINES (FOREIGN PATENTS) LIMITED, OF LONDON, ENGLAND.

INTERNAL-COMBUSTION ENGINE.

1,339,760. Specification of Letters Patent. Patented May 11, 1920.

Application filed December 7, 1918. Serial No. 265,757.

To all whom it may concern:

Be it known that I, PERCIVAL TURNER HOUSTON, a subject of the King of England, residing in London, England, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

This invention relates to improvements in two-stroke-cycle internal combustion engines of the kind described in British Specification No. 3135 of 1917, in which engines the piston uncovers ports in the cylinder by both a turning and a reciprocating movement. According to the said prior specification the engagement between the gudgeon-pin for the small end of the connecting-rod and the piston is characterized by the bearings for the ends of the gudgeon-pin being so mounted in the piston that although they reciprocate as one with it the piston can turn relatively to the said bearings; an extension being provided on the small end of the connecting-rod to operatively connect with the piston and effect the turning movement of the latter. The piston hereinbefore referred to is the working piston, and an annular pump piston was described as connected rigidly to the lower end of the skirt of the working piston.

According to the present invention the annular pump piston is rigidly connected to the gudgeon-pin bearings, so that while both the working piston and the pump piston reciprocate together, only the working piston is given a turning movement. The pump piston can be mounted eccentrically of the working piston, whereby it is possible to bring the centers of the cylinders closer together in two cylinder engines.

In the accompanying drawing which illustrates four methods of carrying out the invention as applied to a two cylinder engine with eccentrically disposed working pistons and pump pistons,

Figure 1 is a longitudinal section through the cylinders;

Fig. 2 is a section on the line 2, 2 in Fig. 1, and

Figs. 3, 4 and 5 are longitudinal sections through a portion of a cylinder, and show three methods of connecting the working piston to the pump piston, so that the former can revolve relatively to the latter.

Throughout the drawings like reference letters indicate like parts.

Referring to Figs. 1 and 2, A are cylinders, B are working pistons, and C are pump pistons. The gudgeon-pin D for the connecting rod E is carried in bearings F which are formed on a ring G solid with the pump piston C and raised on the face thereof. The working piston B is mounted so as to be free to rotate on the ring G, and has a flange H formed on the end of its skirt. An externally screwed nut I surrounds the working piston above the flange H and is adapted to be screwed into a ring J formed solid with the face of the pump piston C. The nut I is not screwed hard down upon the flange H and thus the working piston can turn relatively to the pump piston. As described in the prior specification hereinbefore referred to, the connecting rod E can be provided with an extension K operatively connected with the working piston B for imparting a turning movement thereto. In one of the constructions described in the prior specification, the extension K projects along a line parallel to the connecting rod E but to one side thereof. This extension is cylindrical and fits a correspondingly shaped orifice in a block which comprises a ball K^1 rotatably mounted in a split sliding bearing K^2. The sliding bearing K^2 is carried in a pocket K^3 formed on the inner wall of the working piston. Thus the block has sliding and turning engagement with the extension, and also has in the transverse direction sliding and turning engagement in the pocket. It will be obvious that according to the present invention, the pump piston C, while reciprocating with the working piston B, does not turn with the latter, as the pump piston is rigidly connected to the gudgeon-pin bearings F.

In the modification shown in Fig. 3, a union nut L surrounds the working piston above the flange H and is adapted to screw on to a circular boss M raised on the face of the pump piston, and thus connects the two pistons.

In the construction shown in Fig. 4, the flange H is recessed below the face of the pump piston, and a ring N surrounding the working piston above the flange is connected to the pump piston by bolts O.

According to the construction shown in Fig. 5, the pump piston C is bored to allow the working piston B to be passed upwardly through it so that the upper surface of the

flange H engages the under surface of the pump piston. The ring G is not (as in the constructions hereinbefore described) solid with the pump piston, but it is provided with a screw-threaded flange P at its lower end which is adapted to screw into the pump piston up against a shoulder in the same and thus secure the flange of the working piston in position while leaving it free to rotate.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In an internal combustion engine in which the working piston uncovers ports in the cylinder by both a turning and a reciprocating movement of the whole piston, the combination of a gudgeon pin; bearings for said pin, the working piston being axially rotatable on said bearings but reciprocatory therewith; a connecting rod on said pin, said rod having an extension; a block which has sliding and turning engagement with the extension, and also has in the transverse direction sliding and turning engagement in a pocket in the working piston for effecting the turning movement of the latter; and a pump piston rigidly connected to the gudgeon pin bearings.

2. In an internal combustion engine in which the working piston uncovers ports in the cylinder by both a turning and a reciprocating movement of the whole piston, the combination of a gudgeon pin; bearings for said pin; a pump piston rigidly connected to said bearings; a flange on the working piston and adapted to enter a seating in the pump piston; and a ring to connect the flange rotatably to the pump piston so that both pistons reciprocate together.

3. In an internal combustion engine in which the working piston uncovers ports in the cylinder by both a turning and a reciprocating movement of the whole piston; the combination of a gudgeon pin; bearings for said pin, the working piston being axially rotatable on said bearings but reciprocatory therewith; an external flange on the working piston; a pump piston adapted to encircle the working piston and having a seating for the said flange; and a ring to connect the flange rotatably to the pump piston so that both pistons reciprocate together, said ring engaging the pump piston by screw-threaded means.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PERCIVAL TURNER HOUSTON.

Witnesses:
N. Roy Becker,
Edmund Walter Church.