F. N. ISHAM.

INTERNAL COMBUSTION ENGINE.

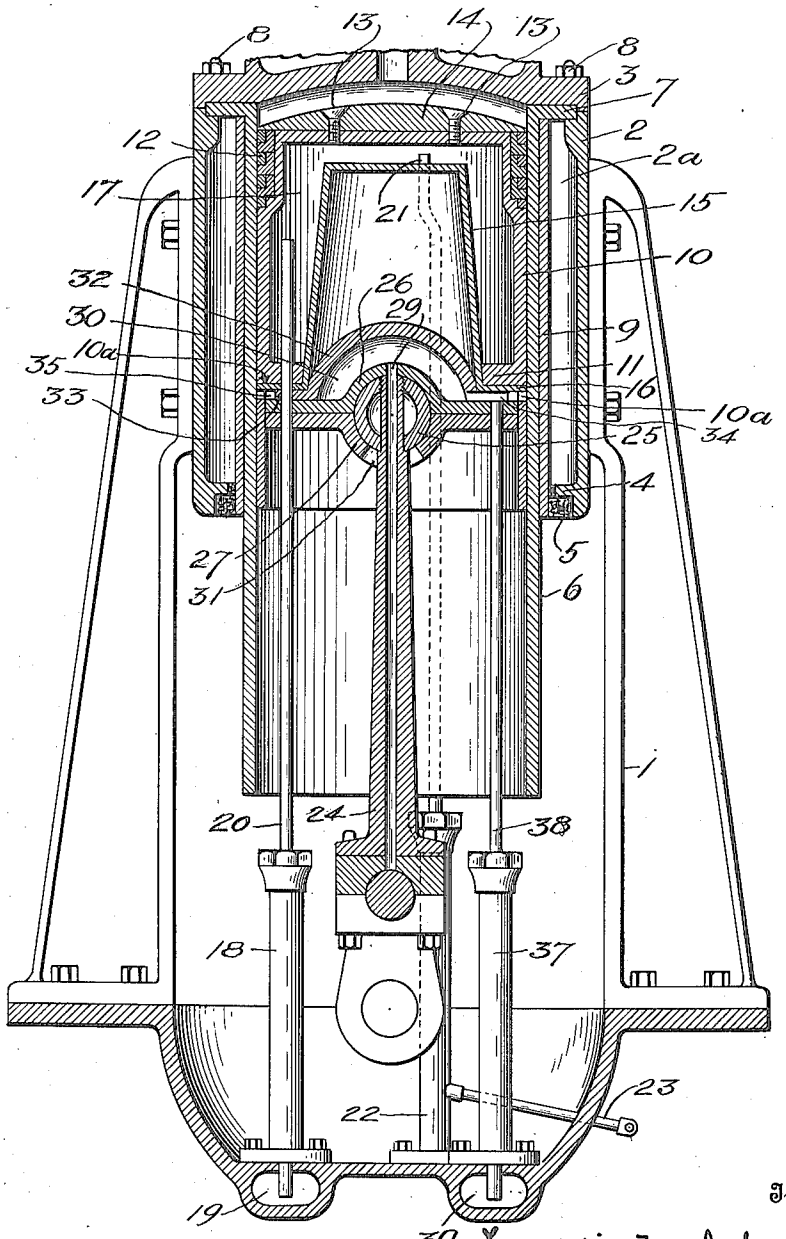
APPLICATION FILED APR. 25, 1913.

1,187,737.

Patented June 20, 1916.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

Jos Gregory

L. N. Gillis

Inventor

Franklin N. Isham

By David B. Mead

Attorney

F. N. ISHAM.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED APR. 25, 1913.

1,187,737.

Patented June 20, 1916.

2 SHEETS—SHEET 2.

Fig. 2.

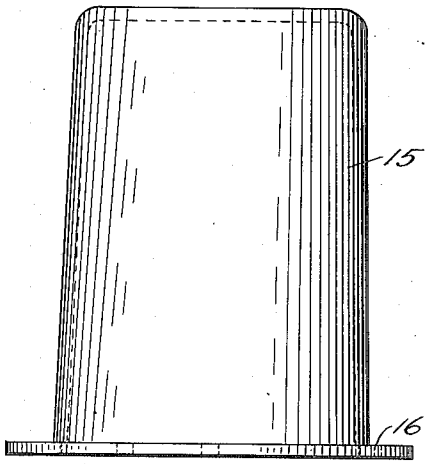


Fig. 3.

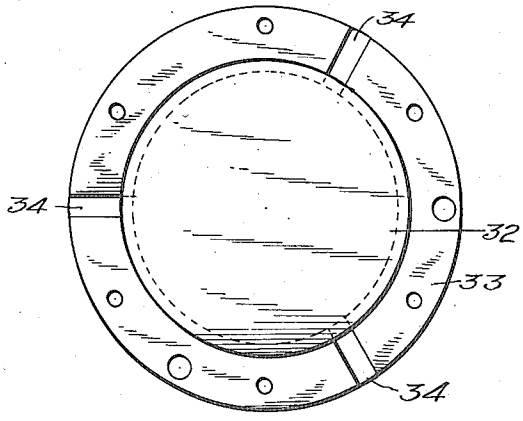


Fig. 4.

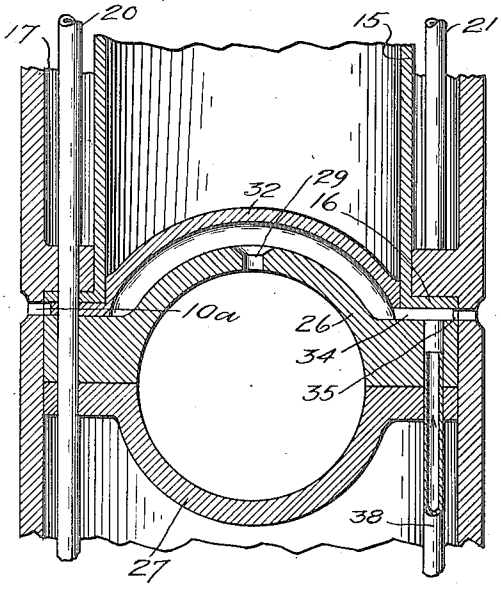
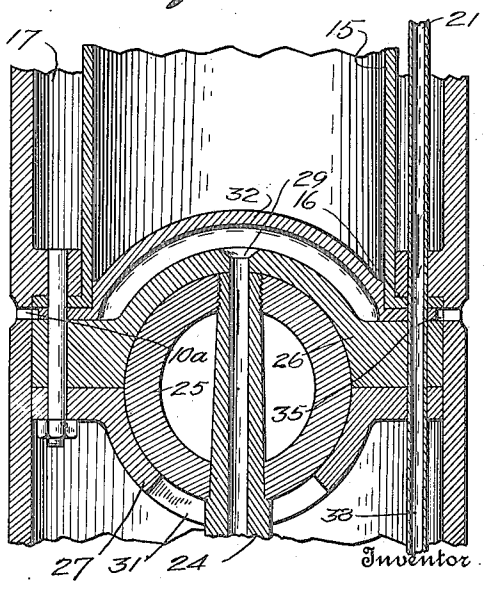


Fig. 5.



Witnesses

Jas. Gregory

L. N. Willis

Inventor

Franklin N. Isham

By David H. Mead

Attorney

UNITED STATES PATENT OFFICE.

FRANKLIN N. ISHAM, OF NEW LONDON, CONNECTICUT, ASSIGNOR OF ONE-SIXTH TO FRANK A. DAYTON AND ONE-SIXTH TO EDWARD W. BARLOW, BOTH OF NEW YORK, N. Y.

INTERNAL-COMBUSTION ENGINE.

1,187,737. Specification of Letters Patent. Patented June 20, 1916.

Application filed April 25, 1913. Serial No. 763,681.

To all whom it may concern:

Be it known that I, FRANKLIN N. ISHAM, a citizen of the United States, residing at New London, in the county of New London and State of Connecticut, 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, and it relates particularly to means for cooling the operative parts of the engine.

The object which I have in view is to provide an engine wherein the operative parts shall be uniformly cooling thus preventing distortion and consequent injury by reason of unequal expansion and contraction.

With these objects in view the invention consists of an internal combustion engine having the generic and specific features of construction and arrangement of the parts substantially as hereinafter described and claimed.

The invention is illustrated in the accompanying drawings in which;

Figure 1 is a vertical sectional view of an engine embodying my improvements; Fig. 2 is a side view of a portion of the piston; Fig. 3 is an inverted plan view of a part forming a portion of the oil reservoir; Fig. 4 is an enlarged sectional view particularly showing the means for admitting oil to the inner face of the cylinder from the oil reservoir; and Fig. 5 is an enlarged sectional view showing the means of securing to the piston a ball forming part of the connection between the piston and the connecting rod.

In these drawings 1 represents the frame of the engine, the construction of which is immaterial as to details. In the present form the frame has bolted to it a cylindrical shell 2 to which is attached the head 3 which forms the upper end of the cylinder. The shell 2 has projecting inward therefrom near its lower end a flange 4, and below such flange is arranged a packing 5 interposed between the shell and a portion of the cylinder.

The cylinder employed is composed principally of a tube 6 having formed therewith at one end a flange 7 which rests in an annular groove in the upper end of the shell 2 and is thereby retained in position. In the construction herein shown the head 3 rests upon the flange 7 of the tube and is secured by bolts 8 to the shell 2, the cylinder being held in place by clamping between the head and the shell without introducing bolts through the flange 7, thereby allowing such flange to expand and contract without injury. An annular chamber 2^a is formed between the shell and the cylinder for the reception of a liquid for cooling the exterior of the cylinder. Preferably though not necessarily there is introduced around the upper end of the tube 6 a strengthening jacket 9 by which the upper part of the tube is reinforced.

The principal portion of the piston consists of a tube 10 having formed on the inner face thereof a flange 11 and having the upper end reduced forming a space between such reduced end and the inner face of the cylinder for the reception of packing rings 12. Attached to the upper end of the tube 10, in any suitable way, as by bolts 13 is a strengthening head 14. Extending through the tube 10 below the flange 11 are a series of holes 10^a which form part of the communication between an oil reservoir to be described hereinafter, formed in the piston, and the inner face of the tube 6 of the cylinder.

Arranged within the tube 10 is a shell 15 substantially in the form of a truncated cone which has formed with it at its lower end an annular flange 16 the diameter of which flange is the same as that of the interior diameter of the tube 6. The flange of the shell 15 rests below and in contact with the flange 11 of the lower portion of the tube 10 permitting the ready introduction and removal of the shell. The arrangement of the shell 15 which is of a length to leave a space between its upper end and the upper inner face of the tube 10 and is of less diameter than that of the tube, is such as to leave between such shell and the tube a space 17 for the reception of a cooling fluid. The means herein shown for introducing the cooking fluid consists of a pump 18 mounted in the lower portion of the frame 1 of the engine and having its lower end communicating with a supply passage 19. The hollow piston 20 of the pump is attached to the flange of the tube 10 and shell 15 in a manner to reciprocate therewith, and thus

in the up and down movement of the piston water or other fluid is intermittently injected into the space 17. An outlet pipe 21 communicates with the upper portion of the space 17 at a point removed from the point of introduction of the water or the like and serves to conduct from the engine the liquid injected by the pipe 18 after circulating in the space 17. The lower end of the pipe 21 preferably telescopes with a base 22 from which leads an outlet pipe 23 through which the liquid is discharged from the engine.

The connecting rod 24 has attached to the upper end thereof a sphere 25 which is mounted in a spherical socket formed by enlargements in the middle of the meeting faces of two disks 26 and 27, each of which is of a diameter corresponding to the inner diameter of the lower portion 28 of the piston. The connecting rod 24 is hollow, and the upper disk 26 has in it an opening 29 which permits the entrance of oil to the hollow rod from an oil reservoir 30. The lower disk has the enlarged semi-cylindrical part thereof cut away to form an opening 31 to permit of the reciprocating movement of the connecting rod in the operation of the engine.

The oil reservoir 30 is forced by attaching to the upper disk 26 a plate 32 having in the central portion thereof a hollow dome-shaped portion and provided around its edge with a flange 33 having therein on its lower face the grooves 34. The exterior diameter of the flange 33 is somewhat less than that of the inner diameter of the tube 10 and therefore when the parts are assembled there is left between the edge of such flange and the inner face of the tube an annular passage 35 which communicates with the reservoir 30 through the passages formed by the grooves in the lower face of the flange 33, and with the inner face of the cylinder through the holes 10^a.

The parts of the bearing for the sphere 25, composed of the disks 26 and 27, the plate 32 and the shell 15 are all secured to the flange 11 of the tube 10 by means of bolts 36, the heads of which are preferably toward the lower open end of the cylinder, permitting their ready removal to allow of the separation and removal of any of the parts.

Oil is injected into the reservoir 20 by means of a pump 37 the hollow piston rod 38 of which is secured to the disks 26 and 27, in a position to have its upper end flush with the upper face of the disk 26. The end of the hollow piston rod is arranged below the flange 33 and communicates with one of the grooves 34 in such flange. The lower end of the pump communicates with a reservoir 39 which contains oil or is in communication with an oil supply.

The described arrangement provides an easily assembled and compact structure whereby a supply of cooling liquid may constantly be injected into and allowed to escape from the interior of the piston, insuring its uniform cooling. It also provides for the means whereby oil under pressure is introduced into the reservoir, and from thence if forced between the cylinder and piston, into the bearing of the spherical end of the connecting rod and through the connecting rod to the crank pin. An excess of oil will be discharged from the lower end of the cylinder and around the crank pin, and may be caught in a reservoir formed in the lower portion of the frame of the engine, and reused.

I claim;

1. An internal combustion engine having a piston comprising a hollow body, a shell of a smaller size than the body arranged therein forming a chamber between the shell and the inner face of the hollow body, a pump having a reciprocating hollow piston connected to the piston and communicating with the chamber, and a telescoping discharge pipe connected with the chamber.

2. An internal combustion engine having a piston comprising a hollow body having an inwardly extending flange, a shell of a smaller size than the body arranged therein forming a chamber between the shell and the inner face of the hollow body, the shell being provided at its lower end with a flange bearing against the inwardly extending flange of the hollow body, a pump having a hollow piston extending through the flange and communicating with the chamber, and a telescoping outlet pipe connected with the chamber.

3. An internal combustion engine having a piston comprising a hollow body, having an inwardly extending flange, a shell of smaller size than the body arranged therein forming a cooling chamber between the shell and the inner face of the hollow body, the shell being provided at its lower end with a flange arranged to bear against the lower face of the flange of the hollow body and secured thereto, a pump having a hollow piston extending through the flanges and communicating with the cooling chamber, and a telescoping discharge pipe connected with the chamber.

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

FRANKLIN N. ISHAM.

Witnesses:

A. G. Du Bois,

Philip F. Larner.