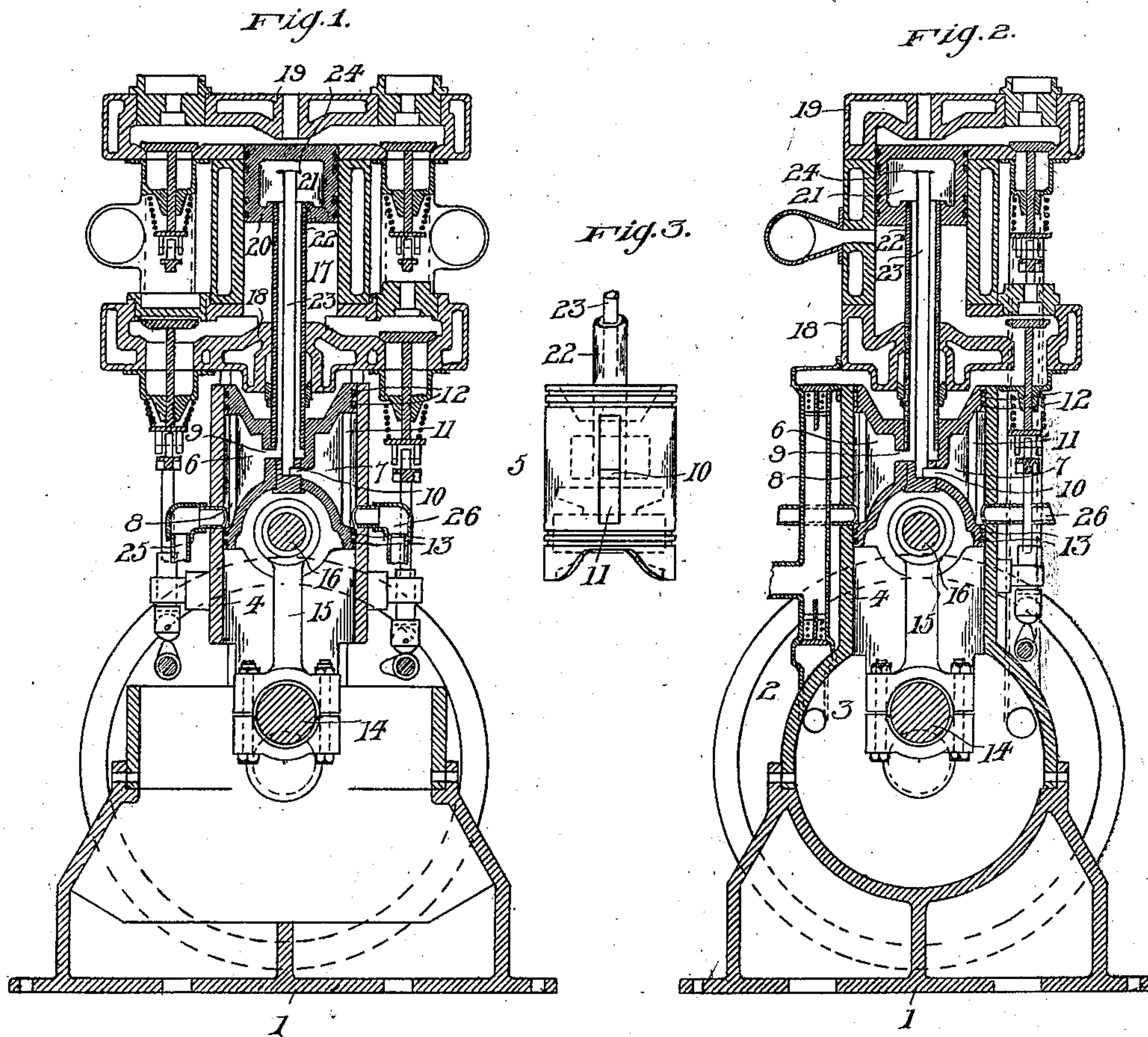


T. TURNBULL, JR.
INTERNAL COMBUSTION ENGINE.
APPLICATION FILED MAY 11, 1909.

983,583.

Patented Feb. 7, 1911.



Witnesses:

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UNITED STATES PATENT OFFICE.

THOMAS TURNBULL, JR., OF PITTSBURG, PENNSYLVANIA.

INTERNAL-COMBUSTION ENGINE.

983,583.

Specification of Letters Patent.

Patented Feb. 7, 1911.

Application filed May 11, 1909. Serial No. 495,280.

To all whom it may concern:

Be it known that I, THOMAS TURNBULL, Jr., of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

My invention relates to improvements in internal combustion engines, and more particularly to improvements in double acting internal engines of either the two or four cycle type.

An object of the present invention is to provide new and improved means for cooling, by means of a fluid, the piston and piston-rod of engines of this class.

A further object of the present invention is to provide a new and improved cross-head construction.

In the accompanying drawing, which illustrates applications of my invention, Figure 1, is a central vertical sectional view of a double acting four cycle engine embodying my invention; Fig. 2, a similar view of a double acting two cycle engine embodying my invention; and Fig. 3, an elevational view of the cross-head.

As illustrated and as preferred both types of engines comprise a base 1, on which is mounted a casting 2. Casting 2 comprises a crank-case 3 and a cross-head slide 4. Cross-head slide 4 is in the form of an open ended cylinder and is designed to contain a cylindrical and ported cross-head 5.

Cross-head 5 constitutes an important and characteristic feature of my invention and as illustrated comprises a fluid-receiving-chamber 6 and a fluid-discharge chamber 7. Chamber 6 is in open communication with an inlet port 8 through which a cooling fluid enters the chamber and it is also in communication with an outlet port 9. Fluid-discharge-chamber 7 is in communication with an inlet port 10 and with a discharge port 11. The inlet port of chamber 7 is of the same size as the outlet port 9 of chamber 6 and the outlet port of chamber 7 corresponds in size and shape with the inlet port of chamber 6.

The cross-head is formed at its upper end with annular recesses to receive packing-rings 12 and at its lower end with similar recesses for packing-rings 13. Cross-head 5 is connected with crank 14 by means of connecting-rod 15 and a pin 16. Pin 16 is passed through openings formed in the wall

of the cross-head and after the pin is in position the packing-rings 13 partly cover said openings and aid in maintaining the pin 16 in the desired position.

17 designates the cylinder of the engine which is designed to be water cooled as well as its heads 18 and 19.

Within the cylinder is a piston or piston-head 20 formed with a chamber 21 and said piston is connected with the cross-head by means of a hollow piston-rod 22. Located within the piston-rod 22 and extending upwardly from the cross-head to the piston and projecting into the chamber 21 thereof I employ a tube or pipe 23, the latter being preferably provided at its upper end with a flange 24.

The lower end of piston-rod 22 is in communication with the fluid-receiving-chamber of the cross-head by means of port 9 thereby permitting a fluid to be passed from the receiving-chamber 6 up the rod and into the chamber 21 of the piston-head.

Inner tube 23 is in communication with the fluid-discharge-chamber of the cross-head by means of port 10, thus allowing the cooling fluid to pass from chamber 21 of the piston-head into chamber 7 of the cross-head.

The fluid for cooling the parts is supplied through a pipe 25 which registers with the inlet port 8 of the cylindrical cross-head and the cooling fluid is discharged from the chamber 7 by way of a pipe 26.

By the means described I provide a simple and efficient cooling system for the piston and piston-rod of engines of the classes described.

In the construction of a two cycle double acting engine as shown by Fig. 2, I utilize the cylindrical cross-head for compressing on both ends of the cross-head as will be readily understood.

What I claim is:

1. In an internal combustion engine, a cylindrical cross-head slide, a cylindrical cross-head formed with a fluid receiving-chamber on one side, having an inlet and an outlet passage, a fluid supply-pipe in constant communication with the receiving-chamber, a fluid discharge chamber on the opposite side of the cross-head, having an inlet and an outlet passage, a fluid discharge-pipe in constant communication with the discharge chamber, means cooperating with the fluid supply-pipe and the fluid dis-

charge-pipe for effecting a continuous flow of
a cooling fluid from the fluid receiving
chamber to the fluid discharge-chamber
through the piston and piston-rod, compris-
5 ing a chambered piston, a hollow piston rod
connecting the receiving chamber of the
cross-head and the chamber of the piston,
and a tube connecting the chambered piston
and the discharge chamber of the cross-head.
10 2. In an internal combustion engine, a
cylindrical cross-head slide, a cylindrical
cross-head formed with a fluid receiving
chamber on one side, having an inlet port
and an outlet port, a fluid discharge cham-
15 ber on the opposite side of the cross-head,
having an inlet and an outlet port, a pipe in
constant communication with the inlet port
of the receiving-chamber, a pipe in constant
communication with the outlet port of the

discharge-chamber, means coöperating with 20
said pipes for effecting a continuous flow of a
cooling fluid from the fluid receiving cham-
ber to the fluid discharge chamber through
the piston and piston-rod, comprising a
chambered piston, a hollow piston rod con- 25
necting the receiving-chamber of the cross-
head and the chamber of the piston, a tube
connecting the chamber of the piston and
the discharge chamber of the cross-head,
and annular packing rings carried by the 30
cylindrical cross-head.

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

THOMAS TURNBULL, JR.

Witnesses:

A. C. WAY,

W. G. DOOLITTLE.