

A. J. WEST.
INTERNAL COMBUSTION ENGINE.
APPLICATION FILED NOV. 7, 1906.

939,459.

Patented Nov. 9, 1909.
2 SHEETS—SHEET 1.

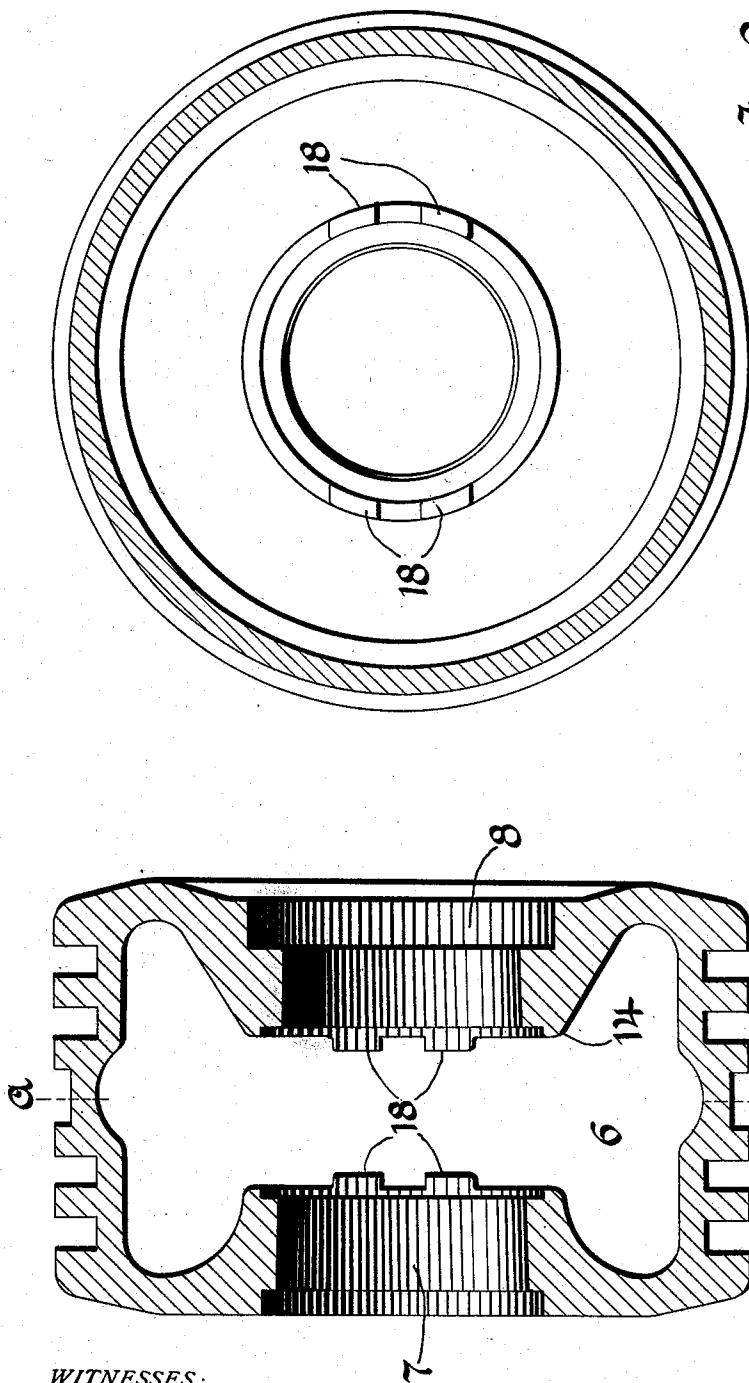


Fig. 2.

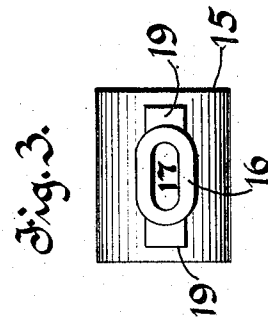


Fig. 3.

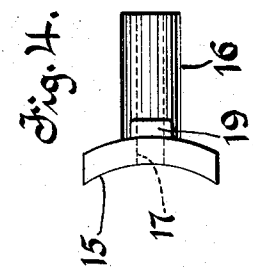


Fig. 4.

WITNESSES:

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E. W. McCallister

INVENTOR.

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A. J. West.
James S. Green
his ATTORNEY.
in fact.

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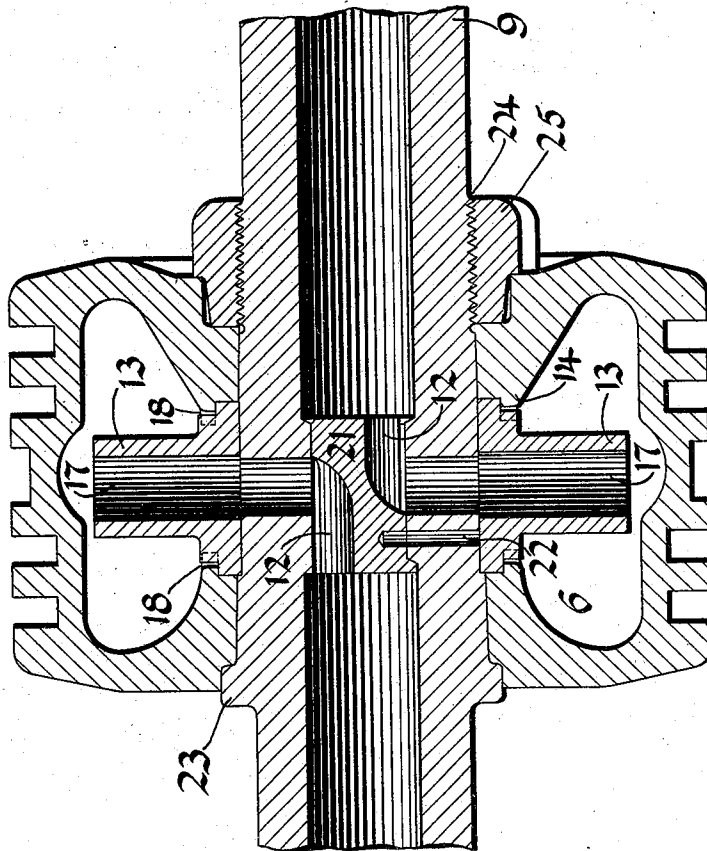


Fig. 5.

WITNESSES:

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UNITED STATES PATENT OFFICE.

ARTHUR J. WEST, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE MACHINE COMPANY, A CORPORATION OF PENNSYLVANIA.

INTERNAL-COMBUSTION ENGINE.

939,459.

Specification of Letters Patent.

Patented Nov. 9, 1909.

Application filed November 7, 1906. Serial No. 342,415.

To all whom it may concern:

Be it known that I, ARTHUR J. WEST, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have made a new and useful Invention in Internal-Combustion Engines, of which the following is a specification.

This invention relates to internal combustion engines and more particularly to pistons for such engines.

An object of this invention is the production of a piston in which simple and effective means are utilized for introducing into the piston a cooling liquid and causing it to circulate therethrough. This and other objects I attain in a piston embodying the features herein described and illustrated.

In the drawings accompanying this application and forming a part thereof, Figure 1 is a longitudinal sectional elevation of a piston embodying my invention; Fig. 2 is an end view of the piston shown in Fig. 1; Figs. 3 and 4 are, respectively, plan and side elevations of a detail embodying my invention; and, Fig. 5 is a sectional elevation of the piston showing a portion of the piston rod and the arrangement of the cooling liquid passages.

The piston is cast with an interior chamber 6 and openings 7 and 8 arranged at either side, through which a piston rod 9 extends. The piston rod is hollow and is provided at either side with openings 12, which communicate with the interior chamber 6. Each of the openings 12 is provided with nozzle portions 13, which are located within the chamber 6 and are secured between the rod 9 and a reëntrant flange 14, formed integrally with the walls of the piston.

Each nozzle 13 comprises a base portion 15, which is constructed to fit snugly against the peripheral face of the rod, and a radially-extending portion 16 provided with a passage 17, which communicates with one of the openings 12 of the rod.

Two sets of lugs 18 are formed on the flange 14 and are located diametrically opposite each other on either side of the openings 7 and 8. The lugs 18 cooperate with lugs 19, formed on the base portion 15 at either side of the portion 16 to hold the nozzle portion circumferentially in place on the rod.

A partition or diaphragm 21 is secured in place in the passage formed through the rod 9 by a pin 22 and is so arranged that the passage through the rod is divided into two parts; one part communicates with the chamber 6 through the passage 17 of one of the nozzles 13 and the other communicates with the chamber 6 through the passage formed in the other nozzle. Under such conditions the water entering the chamber 6 first traverses a portion of the passage through the rod 9 and is delivered to the chamber 6 through the downwardly-extending nozzle 13. The water passing through the chamber divides and flows on either side of the rod and is discharged from the chamber through the upwardly-extending nozzle and communicating passage of the piston rod.

In assembling the piston and piston rod, the nozzles 13, which are of such size that they may be readily introduced into the chamber 6 through the holes 7 or 8, are set in place between the holding lugs 18 and the piston rod is then forced into place. The rod is provided at one side of the piston with an integrally-formed collar 23 and at the other side with a screw thread 24. A nut 25, screwed onto the threads 24, forces the piston in place on the rod against the collar 23 and thereby locks the nozzles 13 in place within the chamber 6. With such an arrangement the casting of the piston is greatly simplified; no complicated coring is necessary and means for an adequate circulation of the cooling liquid is also obtained.

In accordance with the provisions of the patent statutes, I have described the principles of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim is:

1. The combination of a hollow piston rod having radial openings, a hollow piston on said rod and having openings registering with those in the piston rod, a partition plug in the piston rod and provided with ports leading into and from the piston and removable nozzles in the piston, said nozzles being held in position between the walls of the piston rod and the piston.

2. The combination of a hollow piston rod

having radial ports, a ported partition plug in the piston rod and communicating with the ports in the piston rod, said plug being so positioned that fluid flowing in from one end of the piston rod will be directed through the ports in the plug and in the piston rod and whereby fluid passing through ports in the piston rod and plug may be directed out through the opposite end of the piston rod, 10 a hollow piston on the piston rod, nozzles in the piston and having base flanges removably seated in recesses in the piston, said nozzles registering with ports in the plug.
3. The combination of a hollow piston rod

having lateral openings, a partition plug in the rod having independent ports registering with those in the rod, a hollow piston on the rod and removable nozzles in the piston communicating with the ports in the plug, said nozzles being frictionally held in place. 20
In testimony whereof, I have hereunto subscribed my name this 5th day of November, 1906.

ARTHUR J. WEST.

Witnesses:

CHARLES W. MCGHEE,
E. W. MCCALLISTER.