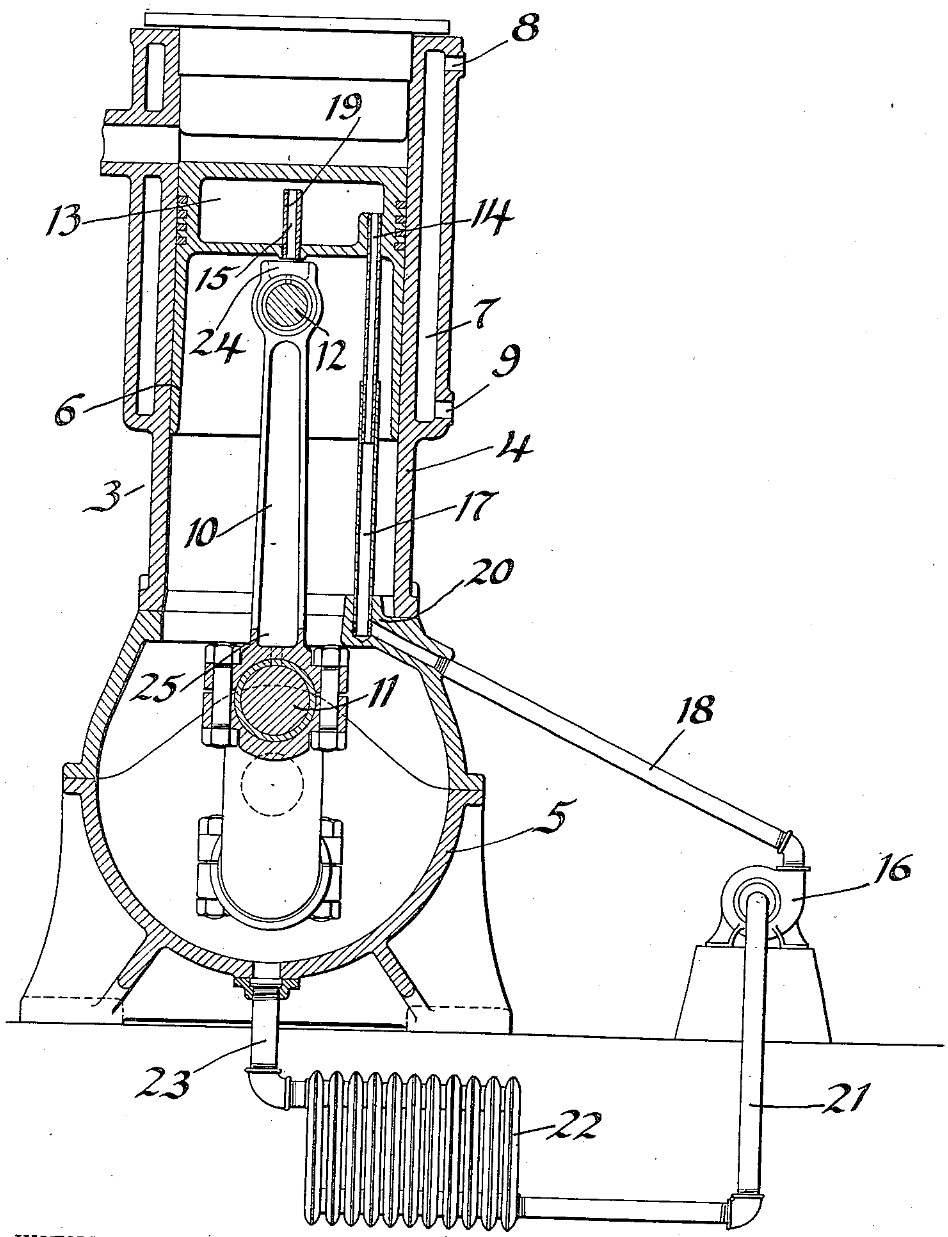
G. WESTINGHOUSE.

COOLING MEANS FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED APR. 18, 1908.

1,073,197. Patented Sept. 16, 1913.



WITNESSES:

B. C. Fero.

E. M. McCallister.

INVENTOR.

BY George Westinghouse

Jno. S. Green

his ATTORNEY IN FACT.

UNITED STATES PATENT OFFICE.

GEORGE WESTINGHOUSE, OF PITTSBURGH, PENNSYLVANIA.

COOLING MEANS FOR INTERNAL-COMBUSTION ENGINES.

1,073,197. Specification of Letters Patent. Patented Sept. 16, 1913.

Application filed April 18, 1908. Serial No. 427,932.

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have made a new and useful Invention in Cooling Means for Internal-Combustion Engines, of which the following is a specification.

This invention relates to internal combustion engines and more particularly to cooling and lubricating means for such engines.

In large sizes of internal combustion engines it is essential that the engine pistons be cooled by circulating a cooling medium through their interiors. It is customary in the vertical type of gas engines to employ an inclosed crank case which is ordinarily utilized as a reservoir for the lubricant employed in lubricating the crank connections. It is practically impossible to deliver cooling liquids to the pistons of such engines without more or less leakage, and, when water is utilized to cool the piston of a vertical type of engine, the leakage is objectionable because it forms, with the oil contained in the crank casing, a frothy emulsion which cannot be effectively utilized as a lubricant. I contemplate overcoming this difficulty by utilizing the lubricant of the engine as a cooling medium for the engine piston.

In the drawings accompanying this application and forming a part thereof; the figure is a sectional elevation of a vertical gas engine embodying my invention.

Referring to the drawings: A vertical engine 3 is provided with a single-acting cylinder 4, which is mounted on and secured to a crank case 5 and is provided with a piston 6. The cylinder is provided with a water jacket 7, which communicates through passages 8 and 9 with a source of cooling water (not shown). The crank case 5 is of the inclosed type and a portion of it is formed integrally with the bedplate of the engine. The shaft of the engine extends through the walls of the crank casing and a connecting rod 10, which is located within the casing, operates between the crank pin 11 and the wrist pin 12 which is rigidly mounted on the piston 6. The engine piston is cored out to form an internal cooling chamber 13, which is provided with an inlet port 14 and an outlet port 15. The inlet port 14 communicates with the delivery port of a centrifugal pump 16 through a telescoping pipe connection 17 and piping 18, and the outlet port 15 is provided with a vertically extending pipe 19 which extends from the port 15 into close proximity with the top of the chamber 13 and operates to raise the level of the liquid admitted to the chamber by the port 14. One portion of the telescoping pipe connection 17 connects directly with the port 14 and is screwed into a lug formed on the piston for its reception. The other portion is screwed into a bracket 20 formed on the casing 5 and communicates with the piping 18 through a passage formed within the bracket.

The inlet or suction port of the pump 16 communicates through piping 21 with a cooling apparatus 22, which in turn communicates with the interior of the crank casing 5 through piping 23 and receives lubricant therefrom. The apparatus 22 may be of any suitable kind and either air or water cooled, as desired.

The outlet port 15 of the cooling chamber 13 discharges lubricant into a cup 24 formed on the upper end of the connecting rod 10 and provided at its bottom with an oil hole which delivers lubricant to the bearing between the pin 12 and the connecting rod. A similar cup 25 is provided near the bottom of the rod 10 and is adapted to supply lubricant to the bearing between the rod and the crank pin 11.

The pump 16 operates to maintain a circulation of lubricant through the cooling apparatus 22, the chamber 13 in the piston and the crank casing. The lubricant delivered by the pump to the chamber 13 circulates through it and is effective in cooling the piston and is then discharged through the port 15 into the cup 24. The major portion of the lubricant, however, overflows the cup and falls into the crank casing 5, from which it flows by gravity into the cooling apparatus 22.

The pump 16 obviously delivers lubricant under pressure to the passage 13 and it may be employed, if desired, in connection with a force feed lubricating system. Moreover, I desire it to be understood that in engines

of more than one cylinder a single pump may be utilized in delivering lubricant to the cooling passages of all the pistons.

I do not wish to limit my invention to vertical type gas engines, as it will readily appear to one skilled in the art that it is equally well applicable to other types.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with an apparatus which represents an 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. In combination in a vertical gas engine, a lubricating system, a cooling chamber provided in the piston of said engine and included in the lubricating system, a pump for circulating lubricant through said system and means for cooling the lubricant delivered from said cooling chamber.

2. In combination in a vertical gas engine, a lubricating system, a cooling chamber provided in the piston of said engine and included in the lubricating system, a pump for circulating lubricant through said system, means for cooling the lubricant delivered from said cooling chamber, and a crank case for said engine serving as a conveyer for the lubricant from the lubricating system to said cooling means.

In testimony whereof, I have hereunto subscribed my name this fifteenth day of April, 1908.

GEO. WESTINGHOUSE.

Witnesses:
DAVID WILLIAMS,
E. W. MCCALLISTER.