C. L. VAN SCHOICK.

COOLER FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED APR. 24, 1909.

984,982.

Patented Feb. 21, 1911.

Fig. 1.

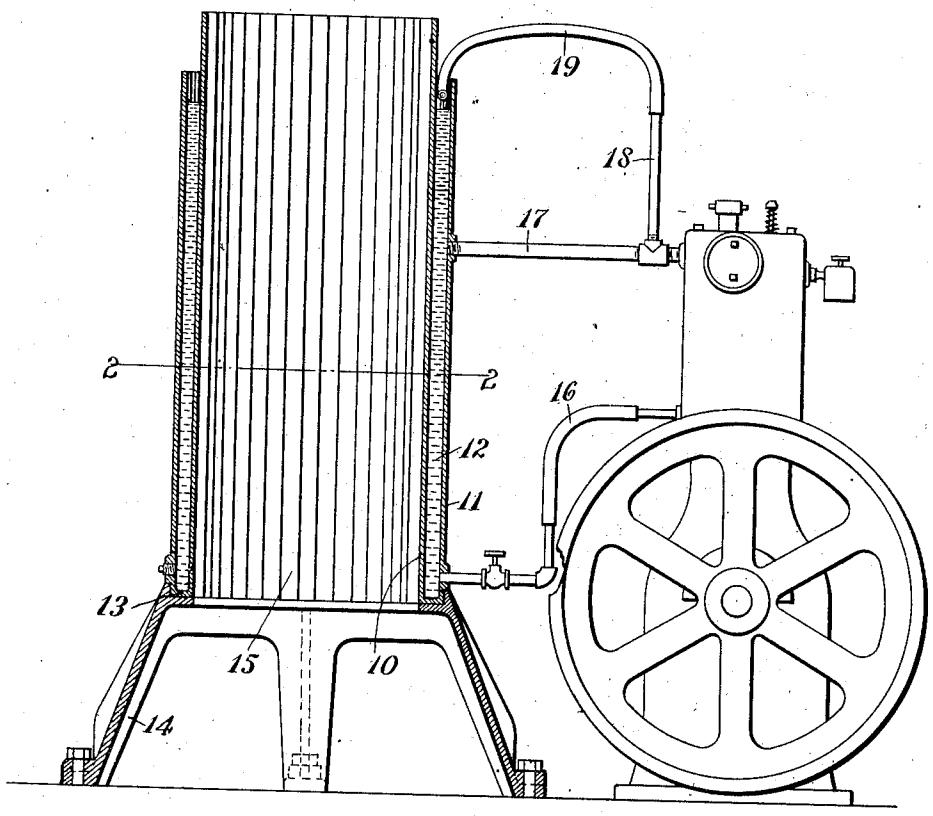


Fig. 2.

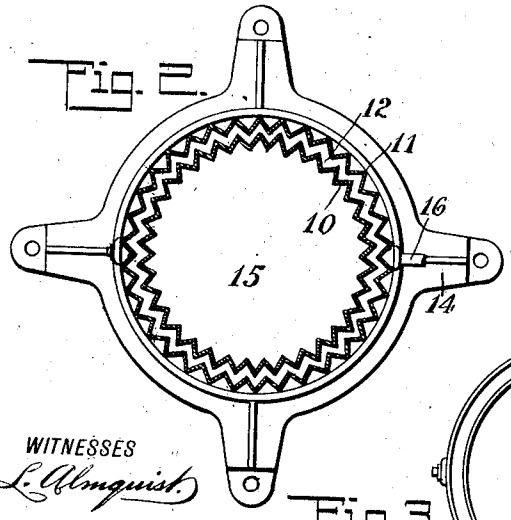


Fig. 4.

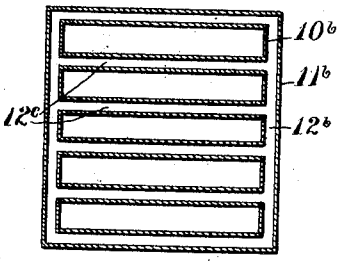
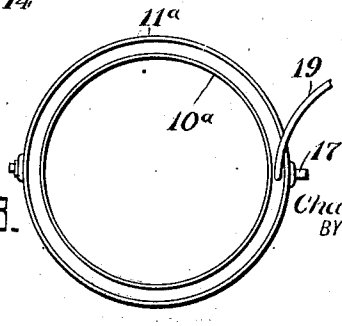


Fig. 3.



WITNESSES

L. Almquist.

C. W. Fairbank

INVENTOR

Charles L. Van Schoick

BY

Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES LABUREN VAN SCHOICK, OF MILWAUKEE, OREGON, ASSIGNOR OF ONE-THIRD TO HAROLD R. SPENCER AND ONE-THIRD TO MANLIUS F. SPENCER, OF PORTLAND, OREGON.

COOLER FOR INTERNAL-COMBUSTION ENGINES.

984,982. Specification of Letters Patent. Patented Feb. 21, 1911.

Application filed April 24, 1909. Serial No. 491,947.

To all whom it may concern:

Be it known that I, CHARLES L. VAN SCHOICK, a citizen of the United States, and a resident of Milwaukee, in the county of Clackamas and State of Oregon, have invented a new and Improved Cooler for Internal-Combustion Engines, of which the following is a full, clear, and exact description.

This invention relates to certain improvements in cooling means for internal combustion engines, and more particularly to an improved tank adapted to be connected to the jacket of an internal combustion engine and operating automatically to withdraw the heated water from the jacket, cool it, and return the water to the jacket.

The object of my invention is to so construct the tank that there will be an automatic circulation of the air over the walls of the tank to cool the water, and so position the tank that the cooling of the water will bring about the automatic circulation of the latter.

My improved tank is in the form of a jacket or shell, which is itself formed of two concentric walls between which the water is held, the inner wall encircling a large central passage open at the top and bottom and through which air may circulate.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, and in which—

Figure 1 is a vertical section through a tank constructed in accordance with my invention and operatively connected to the jacket of an engine; Fig. 2 is a transverse section through the tank; Fig. 3 is a top plan view of a simplified form of tank in which the walls are smooth rather than being corrugated; and Fig. 4 is a horizontal section through a tank in which the central open space is subdivided by partitions through which the water may circulate.

The specific form of tank illustrated in Figs. 1 and 2 is formed of two concentric walls 10 and 11, spaced apart to leave a comparatively thin annular water jacket 12 therebetween. The two walls are connected together at their lower ends by an annular bottom wall 13, and may, if desired, be connected together at their upper ends. Preferably, there is no top or cover to the tank, so that the water in the annular chamber may evaporate to aid in the cooling effect. The tank is supported by suitable legs 14, constituting a standard, so that the bottom of the tank is at a considerable distance above the floor or support for the engine. The passage or chamber 15 encircled by the inner wall 10, is entirely open and unobstructed at its lower end and also at its upper end, so that air may freely flow through this passage. The lower end of the tank is connected to the lower portion of the jacket of the engine by a suitable conduit 16, and the upper portion of the jacket of the engine is connected to the upper portion of the tank by a suitable conduit 17. The conduit 17 is preferably provided with an upwardly extending branch 18, adjacent the engine, and a hose 19 leads from the upper end of this branch to the open top of the tank above the water level in the latter. It often happens that the water in the jacket becomes heated to the boiling point, so that steam will pass out from the jacket along with the water. The escape of this steam through the conduit 17 into the water would tend to render the flow intermittent were it not for the branch 18. The steam or air bubbles escape up this branch, while the water flows along the conduit 17 uninterruptedly. Any water which may be carried up the branch by the steam will be returned to the tank through the hose 19.

The inner and outer walls of the tank may be corrugated so that the surface area of the tank will be greatly increased in proportion to the volume of the tank. Furthermore, the corrugations present sharp angles from which the heat may be more readily dissipated. In Fig. 3 I have illustrated a somewhat simpler form in which the walls 10^a and 11^a are smooth and devoid of corrugations.

The tank need not necessarily be cylindrical in cross section, as it is evident that substantially the same results might be obtained by forming the tank rectangular in cross section, as indicated in Fig. 4. In this figure I have shown in horizontal section, a tank having an outer rectangular wall 11^b, and a plurality of tubes or conduits 10^b disposed therein and spaced from the walls 11^b of the tank, and spaced from each other to leave a peripheral water chamber 12^b and a plurality of transverse water

chambers 12ᵉ. The adjacent sides of the inner tubes or conduits form partitions across the tank, and the lower end of each of the tubes or conduits is open so that air may freely flow therethrough.

The hot water coming from the engine jacket is delivered through the conduit 17 to the upper portion of the jacket, and the air within the passage 15 and in contact with the outer surface of the tank is heated by radiation from this hot water. The heating of the air causes it to rise and draw in fresh cool air at the lower portion of the passage 15 and draw fresh cool air into contact with the lower portion of the outer surface of the tank. The heat of the water thus creates an automatic air circulation, and as the water becomes cooler it descends to the lower portion of the tank and rises through the conduit 16 to displace the hot water in the engine cylinder. The water automatically circulates due to the difference in temperature of the tank and the engine cylinder, and the air automatically circulates due to the difference in temperature of the water at the upper and lower ends of the tank.

No fan or other suction device need be employed for creating any forced draft of the air and no pump need be employed for circulating the water. The entire system operates automatically and efficiently to maintain the engine cylinder at the proper temperature.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A cooler for water-jacketed internal combustion engines having two concentric vertically-disposed walls spaced apart to form a water chamber therebetween, the inner wall forming a central air passage open to the atmosphere at its upper and lower ends, means for supporting said cooler at an elevation to permit the free admission of air to the lower end of the central air passage, means for delivering water from the lower portion of the cooler to the water jacket of an engine, and a conduit for delivering water from said jacket to the upper portion of the cooler, said conduit having a branch leading from the upper side thereof and delivering to said water chamber and serving for the escape of steam from the engine jacket and said conduit, said water chamber having the top thereof open to facilitate the evaporation of the water.

2. A cooler for water-jacketed internal combustion engines, including an open top water chamber, means for delivering water from the lower portion of the chamber to the water jacket of an engine, a conduit for delivering water from the upper portion of the jacket to the upper portion of the cooler but below the normal water level therein, and a branch conduit leading from the upper side of said conduit and delivering to the water chamber above the normal water level in the latter, and serving for the escape of steam from the jacket and conduit.

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

CHARLES LABUREN VAN SCHOICK.

Witnesses:
H. C. MUNGER,
J. T. WALLACE.