L. CAMMEN.

APPARATUS FOR COOLING OIL.

APPLICATION FILED DEC. 18, 1917.

1,297,292.

Patented Mar. 11, 1919.

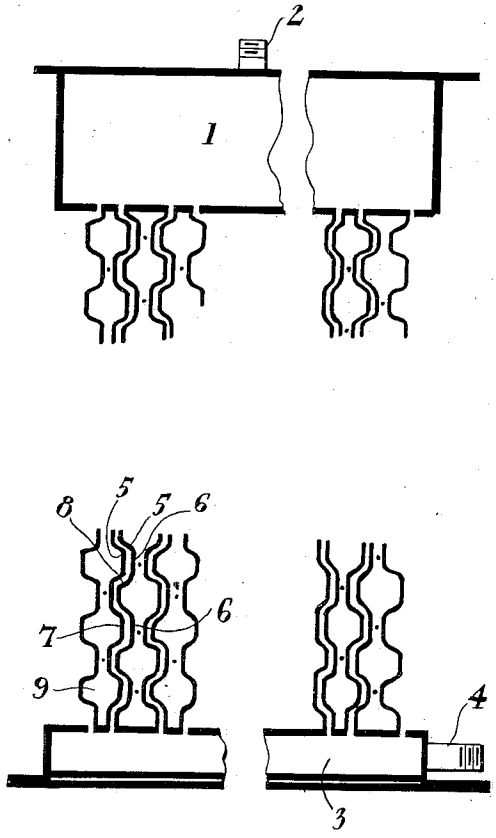


Fig. 1

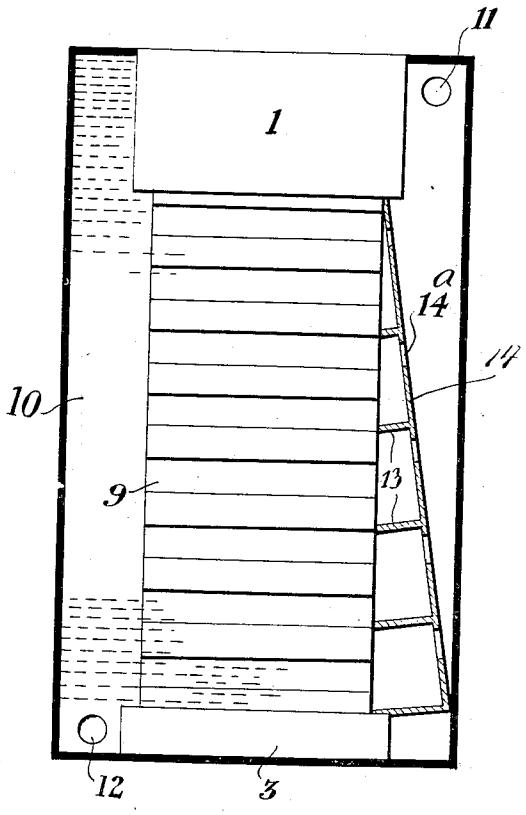


Fig. 2

WITNESS:

INVENTOR.

Leon Cammen

BY

ATTORNEY.

UNITED STATES PATENT OFFICE.

LEON CAMMEN, OF NEW YORK, N. Y.

APPARATUS FOR COOLING OIL.

1,297,292. Specification of Letters Patent. Patented Mar. 11, 1919.

Application filed December 18, 1917. Serial No. 207,750.

To all whom it may concern:

Be it known that I, LEON CAMMEN, a citizen of the United States, and resident of the borough of Manhattan, in the city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Cooling Oil, of which the following is a specification.

This invention relates to an improved apparatus for cooling lubricating oil.

The greatest difficulty in the operation of oil coolers is due to the variable consistency of the oil under temperature changes, so that a cooling device for water which would work satisfactorily, might not serve equally well to lower the temperature of heated oil, because the characteristic in oil of its rapid congealation, must be considered and guarded against.

Oil which in the lubrication of engine bearings or the like has become heated and attenuated, thus reducing its lubricating value in flowing through the cooler elements, has a tendency to adhere to the walls thereof as its viscosity increases, thereby impairing the efficiency of the cooler. Although, with cooler passages of ample size there remains a "core" of flowing hot oil, a film of dense, slowly moving oil forms between this core and the metal wall of the cooling element. This film of congealing oil, being a poor conductor of heat, necessitates the use of excessive sizes for the cooler.

In the present invention such a path is provided for the oil that: (1) the oil is many times forced to change its direction of flow in the course of its travel from inlet to outlet; and at the places where the direction of the flow is changed, there is a certain turbulence of motion which tends to wash off the film of cold oil and mix it with the flowing warm oil; (2) as the flow of oil is made quite rapid, the path provided for the oil is such that the central core, which naturally, as in all cases of rapid flow of liquids, tends to maintain its direction unaltered, washes off the cold oil deposits from alternate parts of the walls of the passage, and thus induces a better transmission of heat from the hot oil to the cold water.

Further, the present invention provides for the cooling water, wide and easily accessible passages, that can be cleaned without difficulty, which is of great practical importance. In the usual types of oil coolers the water passages are narrow and cannot be cleaned without dismantling the entire apparatus.

Other features and advantages will hereinafter appear:—

In the drawing:

Figure 1 is a front elevation of my improved oil cooling apparatus, and

Fig. 2 is a side elevation thereof.

In carrying out my improved method of cooling lubricating oil I provide an apparatus consisting of a header, as 1, having inlet 2 for the hot oil, and a hollow base, as 3, having an outlet 4 for the oil when cooled. Between the header and base are a plurality of communicating passages, each composed of parallel pairs of thin sheets of metal 5, in equal spaced relation throughout, which are provided with transverse corrugations, the convex portions 6 of one sheet of the pair entering the opposite concave portions 7 of the other sheet, and said portions having shoulders 8 which angularly direct the flowing oil.

The purpose of the angular changes in direction of the hot flowing oil is that it shall, with each such change, impinge against the shoulders and surfaces of the corrugations, and exert dislodging force upon the cooling oil which would otherwise have a tendency to congeal thereon. In this manner the passage between each pair of walls 5 is clear and permits a constant free and maximum flow of oil therethrough, the oil in passing being subjected to efficient cooling.

The cooling is effected by spacing apart succeeding pairs of walls 5 to provide intermediate channels 9 for the passage of a cooling liquid, which enters an inclosing casing 10, as at inlet 11, and passes out therefrom as through an outlet 12.

The casing 10 may contain a series of baffles 13 to direct the flow of cooling liquid in separate streams to the channels 9 in the respective horizontal planes thereof, said baffles extending from an inclined plate 14 which has a series of orifices 14ª communicating respectively with spaces between the succeeding baffles. These orifices 14 may be of progressively increased area downwardly, to compensate for the loss of head. By these means a multiple flow of the cooling liquid is provided through all the channels, enabling all to be served with a continuous flow of said cooling liquid, for exit at the common outlet 12.

Usual circulating means for passing the lubricating oil through the header, oil passages and base (not herein shown) may be employed; as also usual pumping means for creating a flow of cooling liquid through the casing 10 and channels 9.

Variations may be resorted to within the spirit and scope of my said invention and parts thereof used without others.

I claim:—

1. An apparatus for cooling oil comprising a pair of members spaced in parallelism for the passage of oil in sheet like form, said pair of members having a succession of opposite angles, and intermediary vertical courses to provide impingement steps, and accelerating guideways in the path of the oil flow, a casing inclosing said pair of members, opposite walls of said casing being respectively in opposed, spaced relation with adjacent ends of said members, and means for passing cooling liquid through said casing in contact with said members.

2. An apparatus for cooling oil comprising a plurality of pairs of members, the members of each pair spaced in parallelism for the passage of oil in sheet like form, each pair of members having a succession of angles to provide impingement steps in the path of the oil flow, and said pairs of members being separated by channels for the passage of cooling liquid, a casing having an inlet and an outlet for cooling liquid, baffles in said casing to provide a multiple flow of the cooling liquid through said channels in contact with said pairs of members, and means for directing the liquid flow to said baffles.

3. An apparatus for cooling oil comprising grouped pairs of members spaced in parallelism for the passage of oil in sheet-like form, said pairs of members each having a succession of opposite angles with intermediary vertical courses to provide impingement steps and accelerating guideways in the path of the oil flow, and said pairs of members being separated by horizontal channels, and a casing inclosing said grouped pairs of members, opposite portions of said casing being spaced from the ends of said horizontal channels, and respectively having influx and efflux means, whereby cooling fluid, flowing through said casing, is enabled to traverse said channels in contact with said pairs of members.

Signed at the borough of Manhattan in the city, county and State of New York, this 13th day of December, A. D. 1917.

LEON CAMMEN.

Witnesses:

F. W. Barker,

G. T. Carpenter.