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W. EBERLE

APPARATUS FOR COOLING THE OIL FOR INTERNAL COMBUSTION ENGINES

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Fig. 1.

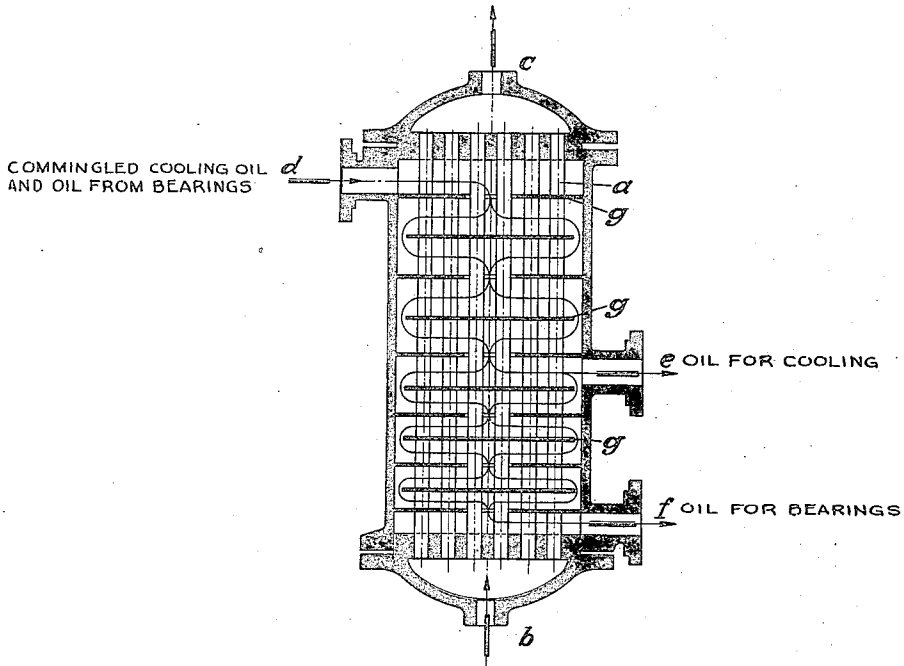
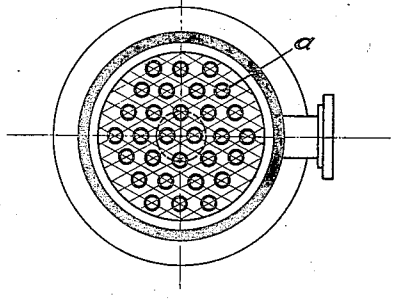


Fig. 2.



Witnesses:

Paul Drey & Herrick

Richard Lutz.

Inventor:

Wilhelm Eberle.

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UNITED STATES PATENT OFFICE.

WILHELM EBERLE, OF AUGSBURG, GERMANY, ASSIGNOR TO THE FIRM: MASCHINENFABRIK AUGSBURG-NUERNBERG, AKTIENGESELLSCHAFT, OF AUGSBURG, GERMANY, A CORPORATION OF GERMANY.

APPARATUS FOR COOLING THE OIL FOR INTERNAL-COMBUSTION ENGINES.

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To all whom it may concern:

Be it known that I, WILHELM EBERLE, a citizen of the German Republic, residing at Augsburg, Germany, have invented certain new and useful Improvements in Apparatus for Cooling the Oil for Internal-Combustion Engines, of which the following is a specification.

In internal combustion engines it has been found to be of advantage to use the same kind of oil for cooling the pistons of the working cylinders as for lubricating the working parts of the engine. The lubricating oil as also the cooling oil are hereby caused to circulate in closed circles in such a manner, that both the used lubricating and the used cooling oil are returned into the same container, whence the oil is sucked up by a pump, purified and re-cooled. After re-cooling the quantity of oil is divided, one part being used for lubrication and the other for cooling the engine pistons. The lubricating oil is forced into the bearings under pressure and has to fulfill two distinct duties, namely to lubricate and to cool the bearings. In order to keep the temperature in the bearings as low as possible it is necessary, to feed the lubricating oil in cool condition, that is to say, the oil should, if necessary, be cooled down to the temperature of the re-cooling medium. According to the practice which has been followed up to the present, the entire quantity of oil, including the cooling oil, is cooled back to the same degree of temperature. This, however, necessitates very large coolers which, especially in the case of ships' engines, has proved to be disadvantageous.

The present invention now mainly relates to a process, by which the entire quantity of oil is adapted to enter the cooler, the oil for cooling the pistons, however, being withdrawn somewhat earlier, so that only the lubricating oil is caused to circulate right through the entire cooler.

The effect is obtained in this way, that with the same size of cooler as used in the known processes, the lubricating oil discharges at a lower temperature or, which amounts to the same, that for the same discharge temperature of the lubricating oil the cooler may be constructed accordingly smaller. Experience has shown that there is no risk to keep the temperature of the cooling oil somewhat higher than that of the lubricating oil.

In the accompanying drawing a device for carrying out the cooling method according to the invention is shown.

Fig. 1 is a vertical section and

Fig. 2 a horizontal section through the improved cooler.

The cooling medium, for example water, is caused to flow through the tubes *a*, entering at *b* and leaving the device at *c*. The oil is conducted in counterflow around these tubes and enters the device at *d*. *e* is the discharge opening for the cooling oil and *f* that for the lubricating oil. Partitions and baffle plates *g* are provided to guide the stream of oil through the apparatus. It is advisable to adapt the stream sections which are formed by these partitions beyond the discharge opening for the cooling oil to the remaining smaller quantity of oil in order to keep, the speed of flow and, in consequence, the removal of the heat as high as possible. It will accordingly be seen on examination of Fig. 1 that the partitions and baffle plates are located nearer together beyond the discharge opening *e*. The purpose of this arrangement is of course to constrict the oil passage ways accordingly as a portion of the oil is withdrawn. By such an arrangement it is possible to maintain constant the velocity of the oil through the cooling device and this permits the cooling to be carried on at the maximum efficiency. It will be obvious that were the cooler to be made with more than two discharge outlets the baffle plates and partitions would be correspondingly nearer together after each successive outlet so as always to provide spaces which correspond in general to the amount of oil which is to flow through them. The purpose of such an arrangement has previously been explained.

The aforesaid method and apparatus are of course not restricted to two quantities of oil of different temperatures, but there may be as many streams of oil as desired.

What I claim is:

1. A system for cooling the oil used in cooling and lubricating Diesel engines, which comprises a cooling device, means for introducing the mingled cooling and lubricating oil from the engine thereinto, means for passing a cooling medium through the

device in heat exchange relationship with the oil, an outlet from the device for the withdrawal of a portion of the oil, and an outlet for the remaining oil, these outlets being in spaced relation, such that the oil is withdrawn in two bodies of different temperatures.

2. A system for cooling the oil used in cooling and lubricating Diesel engines, which comprises a cooling device, means for introducing the mingled cooling and lubricating oil withdrawn from the engine thereinto, means for passing a cooling medium through the device in heat exchange relationship with the oil, an outlet from the device for the withdrawal of a portion of the oil, an outlet for the remaining oil, these outlets being disposed in spaced relation, such that the oil is withdrawn in two bodies of different temperatures, and means within the device for maintaining a constant velocity of flow of the oil therethrough.

3. A system for cooling the oil used in cooling and lubricating Diesel engines, which comprises a cooling device, means for introducing the mingled cooling and lubricating oil from the engine thereinto, means for passing a cooling medium through the device in heat exchange relationship with the oil, an outlet from the device for withdrawing a portion of the oil, a second outlet for withdrawing the remaining oil, these outlets being disposed in spaced relation such that the oil leaves the device in two bodies at different temperatures, and baffle plates within the device for directing the oil through the device along tortuous paths, the said baffle plates being so arranged as to maintain the velocity of the oil constant throughout the device.

4. A system for cooling the oil used in cooling and lubricating Diesel engines, which comprises a cooling device, means for introducing the mingled cooling and lubricating oil from the engine thereinto, a plurality of tubes in the device for the passage of a cooling medium in heat exchange relationship with the oil, an outlet from the device for withdrawing a portion of the oil, a second outlet for the remainder of the oil, these outlets being placed at different distances from the inlet to cause the oil to issue from them at different temperatures, and a plurality of baffle plates and partitions in the device for directing the oil from the inlet to the outlets along tortuous paths, these partitions and baffle plates being spaced more closely between the outlets than in the rest of the device to maintain the flow of oil through the device at a constant velocity.

5. The process of cooling oil for internal combustion engines which consists in subjecting the oil while in motion to heat exchange with a cooling medium, withdrawing portions of the oil at different stages in the cooling, and maintaining the velocity of the oil constant throughout the heat exchange.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

WILHELM EBERLE.

Witnesses:
PAUL DREY,
RICHARD LUTZ.