Sept. 13, 1932. H. L. ELFES 1,876,648

OIL COOLING DEVICE

Filed Sept. 22, 1930 2 Sheets-Sheet 1

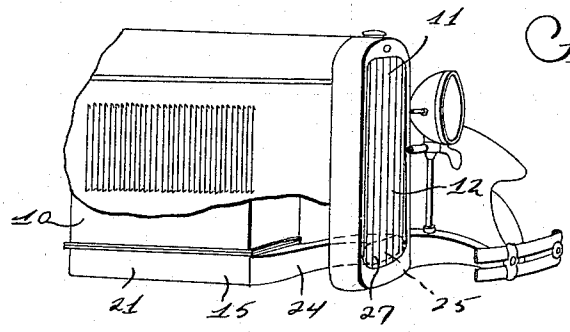


Fig. 1.

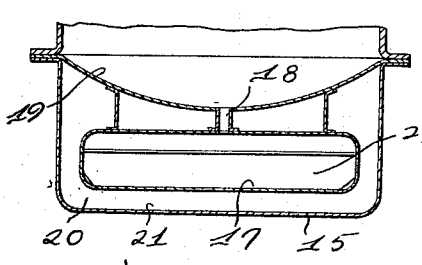


Fig. 3.

Fig. 2.

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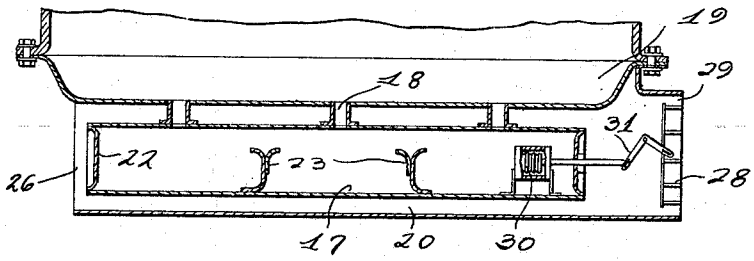
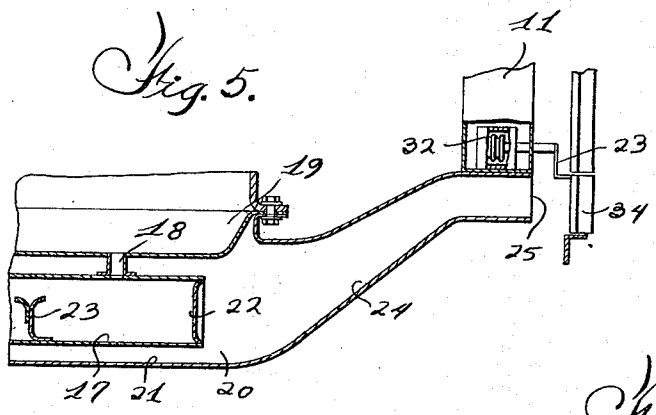


Fig. 4.

Fig. 5.



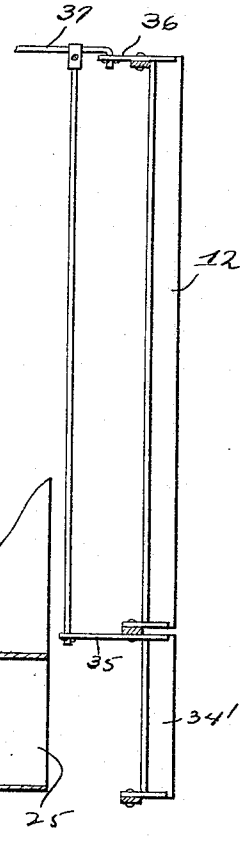


Fig. 6.

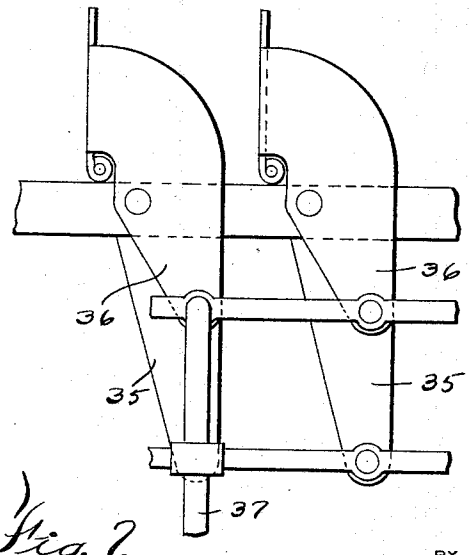
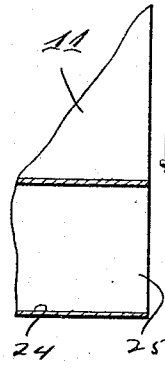


Fig. 7.



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UNITED STATES PATENT OFFICE

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OIL COOLING DEVICE

Application filed September 22, 1930. Serial No. 483,720.

This invention relates to an oil cooling device particularly designed for use in connection with the engines of motor vehicles and the like.

One of the important objects of this invention is to provide an air cooled oil cooling device in which the flow of air is controlled.

Another object of this invention is to provide controlling means for the cooling air acting in dependence upon the temperature of the oil or the temperature of the water of the circulatory cooling system.

Still another object of this invention is to provide a cooling device of this nature which is compact and simple both in construction and operation and one which may be manufactured economically and easily installed.

The several objects, advantages and novel details of construction of the invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein

Figure 1 is a fragmentary perspective view of a portion of a motor vehicle with my improved oil cooling device associated therewith;

Figure 2 is an enlarged semi-diagrammatic sectional elevational view of a motor vehicle engine, radiator and shutter structure having associated therewith my improved oil cooling device;

Figure 3 is a sectional view taken substantially on the plane indicated by line 3—3 in Figure 2;

Figure 4 is a fragmentary sectional view through the cooling device showing a modified form of construction;

Figure 5 is a fragmentary sectional view showing another modified form of construction including separate thermostatic means for controlling a separate set of shutters for the air inlet end of the device;

Figure 6 is a semi-diagrammatic vertical sectional elevational view showing still another modified form of control mechanism wherein the shutters for controlling the air to the oil cooling device are operated from the thermostat for controlling the radiator shutters but are moved differentially with respect thereto through the medium of suitably arranged levers, and

Figure 7 is a semi-diagrammatic plan view of the structure illustrated in Figure 6.

Referring now particularly to the drawings wherein like reference characters indicate like parts, it will be noted that there is fragmentarily illustrated an internal combustion engine or the like 10 together with a conventional form of radiator 11, the latter forming a part of the circulating water cooling system, the radiator being controlled by shutters 12 of any conventional type. The reference character 13 indicates a thermostat so associated with the circulatory system as to respond to the temperature changes therein, this thermostat acting through a link 14 to open and close the shutters 12 in the customary manner.

The reference character 15 indicates generally my improved oil cooling device which is secured to the lower side of the engine block in any suitable manner as, for instance, by bolts 16.

The oil cooling device consists essentially of an elongated rectangular receptacle 17 communicating by means of a plurality of conduits 18 with the bottom of a pan-like member 19 which is bolted to the bottom of the engine block and takes the place of the customary crank case. A lower wall of the sump-pan 19 forms a top wall of an air chamber or passageway 20 which surrounds the receptacle 17, the side and bottom walls of this air passageway or conduit being formed by means of a substantially U-shaped member 21. Both ends 22 of the elongated rectangular receptacle 17 are closed as illustrated clearly in Figure 2 and interiorly of the receptacle 17 there may be and preferably is provided one or more baffle members 23 which act to eliminate to a great extent the splashing of the oil therein.

The forward end of the air pasageway 20 is connected by means of a conduit 24 to a point preferably immediately under the radiator 11 and inasmuch as the oil cooling device is located in a plane below the lower end of the radiator the conduit 14 extends rearwardly and downwardly from beneath the bottom

of the radiator as most clearly illustrated in Figure 2. The rear end of the air passageway 20 is open so that air may pass into the inlet end 25 of the air conduit or passageway and flow rearwardly through the air passageway around the oil receptacle 17 and then pass out through the rear open end 26.

This will effect a cooling of the oil as will be apparent, it being understood that the oil collects in the sump-pan 19 and flows through conduits 18 into the receptacle 19 where it is taken by a pump (not shown) and again forced through the oil circulating system.

While the system will operate without any control for the cooling air, I have found it desirable in some instances to provide a control for the air passing through the air conduit 20. This is particularly effective in cold weather when it is desired to promptly raise the temperature of the oil to the point where it will flow properly through the circulating system. One form of construction for accomplishing this object is shown in Figures 1 and 2 wherein the shutters 12 for the water radiator 11 are shown as extended below the bottom of this radiator as indicated at 27. Thus the extending portions 27 of the shutters 12 are disposed in front of the open end 25 of the air conduit for the oil cooler so that when the engine is cold and as a consequence the oil is cold, the shutters 27, which are operated in dependence upon the temperature of the water in the circulatory system, will remain closed. When, however, the temperature has risen sufficiently to cause the thermostat 13 to open the shutters 12, the shutter portions 27 will also be moved to open position to permit the free passage of cool air into the conduit 24 to flow through the air passageway 20.

In Figure 4 a slightly modified form of construction is illustrated. In this form of construction the conduit 24 is eliminated and shutters 28 are arranged adjacent the inlet end 29 of the air conduit 20. The reference character 30 indicates a thermostat arranged in the receptacle 17, this thermostat being connected by means of a link 31 to the shutters 28 so as to open and close upon the same in dependence upon the temperature of the oil itself.

In Figure 5 still another modification is illustrated in which a thermostat 32 is located, for instance, in association with the bottom of the radiator 11, this thermostat being connected by means of suitable linkage 33 with separate shutters 34 arranged to control the inlet end 25 of the air conduit 24. Thus the shutters 34 would be opened and closed independently of the shutters 12 to control the air employed for cooling the oil.

In Figures 6 and 7 still another modified form of construction is illustrated. In this form of construction it is proposed to utilize the conventional thermostat 13 which ordinarily controls the shutters 12 but to provide a separate set of shutters 34′ for controlling the air inlet 25 and to actuate this set of shutters 34′, through the medium of suitable levers, so that they will be differentially opened and closed with respect to the shutters 12. As seen most clearly from Figure 7, which diagrammatically illustrates the principle involved, the shutters 34′ will be actuated through longer links 35 than the links 36 to which the actuating rod 37 for the shutters 12 is connected. Thus the same thermostat 13, whose action is imparted to the shutters 34′ by means of link 37, will, upon being actuated differentially move the shutters 34′ with respect to the shutters 12 and obviously the relation of the linkage may be such that the shutters 34′ will open to a greater or lesser extent or prior to or subsequent to the shutters 12 as found desirable or expedient.

Various modifications will suggest themselves to those skilled in this art and to this end reservation is made to make such changes as may come within the purview of the accompanying claims.

What I claim as my invention is:

1. An oil cooling attachment for engines comprising means constituting a closure for the lower side of the engine crank case, said means including a receptacle for the engine lubricant and means providing an air circulatory passage surrounding said receptacle.

2. An oil cooling attachment for engines comprising means constituting a closure for the lower side of the engine crank case, said means including a receptacle for the engine lubricant, means providing an air circulatory passage surrounding said receptacle, and means for regulating the flow of air through said passage.

3. An oil cooling attachment for engines comprising means constituting a closure for the lower side of the engine crank case, said means including a receptacle for the engine lubricant, means providing an air circulatory passage surrounding said receptacle, and means for automatically regulating the flow of air through said passage.

4. An oil cooling attachment for engines comprising means constituting a closure for the lower side of the engine crank case, said means including a receptacle for the engine lubricant, means providing an air circulatory passage surrounding said receptacle, and shutter means for regulating the flow of air through said passage.

5. The combination with an engine, of oil cooling means including a pan-like closure for the lower side of the engine crank case, a receptacle for the engine lubricant arranged therebeneath and communicating therewith, and means cooperating with said receptacle

to provide a surrounding air passageway through which air may be circulated in contact with said receptacle.

6. An oil cooling unitary attachment for engines including a closure for the lower side of the engine crank case, an oil receptacle spaced below said closure and communicating through said closure with the interior of the crank case, and a substantially U-shaped member secured to said closure and extending around said receptacle in spaced relation thereto to provide a circulatory air passageway open at opposite ends through which air may be circulated in contact with said receptacle.

7. An oil cooling unitary attachment for engines including a closure for the lower side of the engine crank case, an oil receptacle spaced below said closure and communicating through said closure with the interior of the crank case, and a substantially U-shaped member secured to said closure and extending around said receptacle in spaced relation thereto to provide a circulatory air passageway open at opposite ends through which air may be circulated in contact with said receptacle, and means for controlling the passage of air through said passage.

8. An oil cooling unitary attachment for engines including a closure for the lower side of the engine crank case, an oil receptacle spaced below said closure and communicating through said closure with the interior of the crank case, and a substantially U-shaped member secured to said closure and extending around said receptacle in spaced relation thereto to provide a circulatory air passageway open at opposite ends through which air may be circulated in contact with said receptacle, and temperature controlled shutters for controlling the flow of air through said passage.

9. An oil cooling unitary attachment for engines including a closure for the lower side of the engine crank case, an oil receptacle spaced below said closure and communicating through said closure with the interior of the crank case, and a substantially U-shaped member secured to said closure and extending around said receptacle in spaced relation thereto to provide a circulatory air passageway open at opposite ends through which air may be circulated in contact with said receptacle, and thermostatically controlled shutters for regulating the flow of air through said passageway.

10. The combination with an engine and a cooling radiator therefor, of oil cooling means associated with the bottom of the engine crank case, said means including an oil receptacle, means providing a surrounding air passageway, and means for conducting air from a point adjacent said radiator to said air passageway.

11. The combination with an engine, a cooling radiator and shutters therefor, of oil cooling means associated with the bottom of the engine crank case, said means including an oil receptacle, means providing a surrounding air passageway, and means for conducting air from a point adjacent said radiator and behind said shutters to said air passageway.

12. The combination with an engine, a cooling radiator and shutters therefor, of oil cooling means associated with the bottom of the engine crank case, said means including an oil receptacle, means providing a surrounding air passageway, means for conducting air from a point adjacent said radiator to said air passageway, and means for controlling said air.

13. The combination with an engine, a water circulatory and cooling system therefor, and thermoresponsive means for controlling the cooling of the water in said system, of oil cooling means including an oil receptacle, and means responsive to the actuation of said thermoresponsive means for controlling the flow of cooling air in contact with said receptacle.

14. The combination with an engine, of oil cooling means including a receptacle, means providing an air circulatory passage in conjunction with said receptacle, and means responsive to the temperature of the oil in said receptacle for controlling the flow of air through said passage.

15. The combination with an engine, a water circulatory and cooling system for said engine, and shutters for controlling the cooling of the water in said system, of an oil receptacle, means providing an air circulatory passageway in conjunction with said receptacle, shutters for controlling the flow of air through said passageway, a thermoresponsive member, and differential connections between said thermoresponsive member and the shutters controlling the cooling of the water in the said water circulatory system, and the shutters controlling the flow of air through said air circulatory passage for differentially actuating said shutters upon actuation of said thermoresponsive member.

In testimony whereof I affix my signature.

HAROLD L. ELFES.