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F. M. YOUNG

MULTIPLE HEAT EXCHANGE UNIT

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INVENTOR.

FRED M. YOUNG

ATTORNEY
The present invention is an improvement over my Patent 2,237,516, April 8, 1941, and has for its object, providing means for cooling the lubricating oil as well as the jacket cooling fluid.

Another object of the present invention is to provide a unit which may be made sufficiently large to serve the larger Diesel engine installations wherein the cooling of the lubricating oil is a very important factor in the successful operation of engines of the type.

A further object of the present invention is to provide a separate oil cooling unit, which can be readily removed and replaced and position this unit in front of the fan so as to shield the fan and be cooled by the air being drawn into the fan.

A still further object of the present invention is to provide a device which is light, strong, durable and easily manufactured at low cost and occupies minimum floor space.

To these and other useful ends, my invention consists of parts, combinations of parts, or their equivalents, and mode of operation, as hereinafter set forth and claimed and shown in the accompanying drawing in which:

Fig. 1 is a front elevational view of my improved unit having a single core for cooling the lubricating oil.

Fig. 2 is a side elevational view of the device shown in Figure 1.

Figure 3 illustrates a modification.

I provide a frame or base for the device which in its entirety is designated by reference character A, comprising preferably side channels 18—10 having their flanges preferably turned outwardly, the rear ends of these members being rigidly secured together by means of preferably an inverted channel 11 (see dotted lines in Figure 2) the ends of this channel being preferably electric welded to members 10, the front ends of members 10 being rigidly secured together preferably by means of an inverted channel 12.

Member 12 is made slightly shorter than the space between members 10 and plates 13 are preferably electric welded to the ends of this channel. Members 13 are rigidly secured to members 10 by means of spaced bolts as at 14.

The jacket cooling core is preferably made in two units, each being designated in its entirety by reference character B and having vertically positioned headers, the bottom headers being secured to the upper flange of members 10, preferably similar to that shown in Patent 2,237,516 and the upper headers being secured to the bottom headers similar to that shown in this patent.

The pairs of headers are operatively connected by means of finned tubes. An inlet connection 17 is preferably provided for one of the upper headers and the other upper header is operatively connected to the adjacent lower header at 18. Various other means may be used for connecting either pair of vertical headers.

One of the lower headers is operatively connected to the coolant circulating pump as at 19. This pump in its entirety is designated by reference character C. The unused openings of the headers are provided with screw threaded plugs 20; thus provisions are made for various connections between headers. The oil cooling core in its entirety is designated by reference character D.

I provide side plates 25—25 having flanges 26 at their forward ends for stiffening these members, the rear ends being secured to the bottom headers as illustrated and the bottom edges being secured to members 10 either by bolts or by welding.

A transverse element 28 is provided which is preferably circular in cross section and welded at its ends to members 29 in the position shown in Figures 1 and 2.

I provide braces 29—29 which are secured either to member 28 as illustrated or to the bearing block and diverge outwardly, the lower ends being secured to members 29 at or near the bottoms thereof; thus to provide a braced structure for supporting the fan.

A bearing block 30 is provided which is mounted on member 28 intermediate the ends thereof and having rotatably mounted therein a shaft 31, the forward end of this shaft carrying preferably a number of V-belt sheaves 32.

Pump C is provided, with a driving shaft 33 which is rotatably mounted in a support 34, the inner ends being supplied with sheave pulleys 35. Pulleys 32 and 35 are operatively connected by means of a suitable number of V-belts 36.

Shaft 33 is driven in the direction indicated in Figure 2 by the curvilinear arrow. Shaft 31 is provided with a number of fan blades 37. A number of V-belts 38 (see Figure 1) may act to transmit power from the engine served or from some other source.

I vertically adjustably mount a bearing block 40 on the forward end of one of the members 25 havin rotatably mounted thereon a shaft 41 havin tighter sheaves 42. Block 40 is held to member 25 by means of bolts 43. Members 25 are provided with a number of apertures 44 wherein block 40 may be positioned in various vertical adjustments for tightening belts 38.
Clearly I have shown and described a unit suitable for cooling the jacket fluid of an internal combustion engine. It is very desirable to provide means for cooling the lubricating oil in engines of the class. In Figures 1 and 2 I illustrate one form of core for this purpose, the core comprising vertical headers 50—50 which are operatively connected by means of finned tubes 51. Headers 50 are secured in the position shown by means of plates 52—52. These pairs of plates may however be made in one piece as illustrated by dotted lines in Figure 2, in which event they terminate adjacent the top edges of members 25 thus the entire protecting screen above member 25 may be dispensed with. Clearly the upper half of the fan will be protected against accidental contact by this plate. The front or lower half of the fan may be protected in the usual manner by means of wire netting 54, the bottom sides being protected by members 25 and the top sides being protected by plates 52 and intervening netting or by the unitary side plates as shown by dotted lines.

The headers 50 of member D are secured to members 52. One header having inlet and outlet pipes 57 and 58 for connection to the oil line of the engine served. The other header being secured to the other plates by means of bolts or otherwise. Clearly the pairs of members 52, as illustrated in Figure 2, may be made in a single piece, as illustrated in Figure 3. Thus the upper side plates in either event, form a simple and inexpensive support for member D which member can obviously be easily removed and replaced. It will be seen that members 25, 52 or 52' and 53 form a three sided shroud for the fan.

Thus it will be seen that I have provided a device which is pleasing in appearance, easily manufactured at low cost and efficient; that the fan is protected by means of the lower, upper and top plates and the oil cooler core; that the oil cooler core may be easily removed and replaced and that in the position shown it will have abundant capacity for cooling the oil of the engine served.

Having thus shown and described my invention, I claim:

1. A multiple unit heat exchanger of the class described, comprising in combination a base frame, vertically positioned headers mounted on the rear corners of said frame have finned tubes forming operating connections therebetween and being adapted to be operatively connected to the cooling jacket of an internal combustion engine, side plates secured at their bottoms to the sides of said frame and at their rear edges to the front edges of said headers and extending from the frame to near the vertical center of the headers, a transversely positioned element secured to said plates near the upper front corners thereof, a fan rotatably mounted on said element intermediate its ends and on a horizontal line substantially midway said core, means for driving the fan, plates secured to the upper front edges of said headers and a transverse cover plate secured to the upper edges of said last plates, said last and transverse plates extending forward a distance in front of the plane of the front edges of the blades of said fan, whereby the first, second and transverse plates cooperate to form a shroud for said fan, a heat exchange core comprising vertically positioned headers having horizontally positioned finned tubes forming operating connections therebetween, the said last mentioned positioned headers being positioned in front of said fan and anchored to said second plates and being adapted to be operatively connected to the oil line of an internal combustion engine.

2. A multiple unit heat exchanger of the class described comprising in combination a base frame, vertically positioned headers mounted on the rear corners of said frame having finned tubes forming operating connections therebetween and being adapted to be operatively connected to the cooling jacket of an internal combustion engine, side plates secured at their bottoms to the sides of said frame and at their rear edges to the front edges of said headers and extending from the frame to near the vertical center of the headers, a transversely positioned element secured to said plates near the upper front corners thereof, a fan rotatably mounted on said element intermediate its ends and on a horizontal line substantially midway said core, means for driving the fan, second plates secured to the upper front edges of said headers and a transverse plate secured to the upper edges of said second plates, said second and transverse plates extending forward a distance in front of the plane of the front edges of the blades of said fan, whereby the first, second and transverse plates cooperate to form a three sided shroud for said fan, a heat exchange core adapted to be connected to the oil line of an internal combustion engine and being positioned in front of said fan and between said second plates and being anchored thereto.