Aug. 16, 1938. J. TOTH, JR 2,127,192

OIL COOLING SYSTEM

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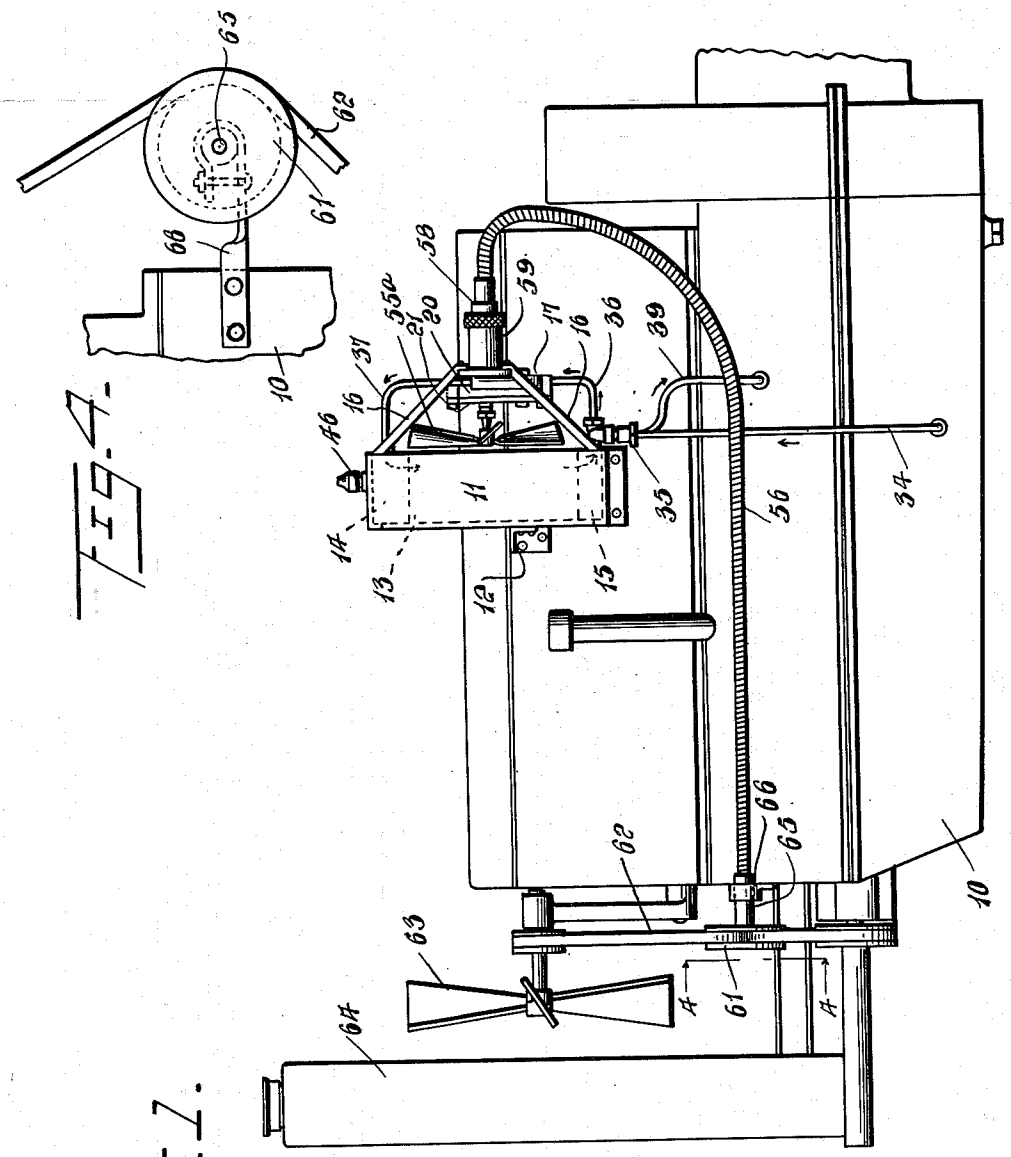


FIG. 4.

FIG. 1.

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Fig. 2.

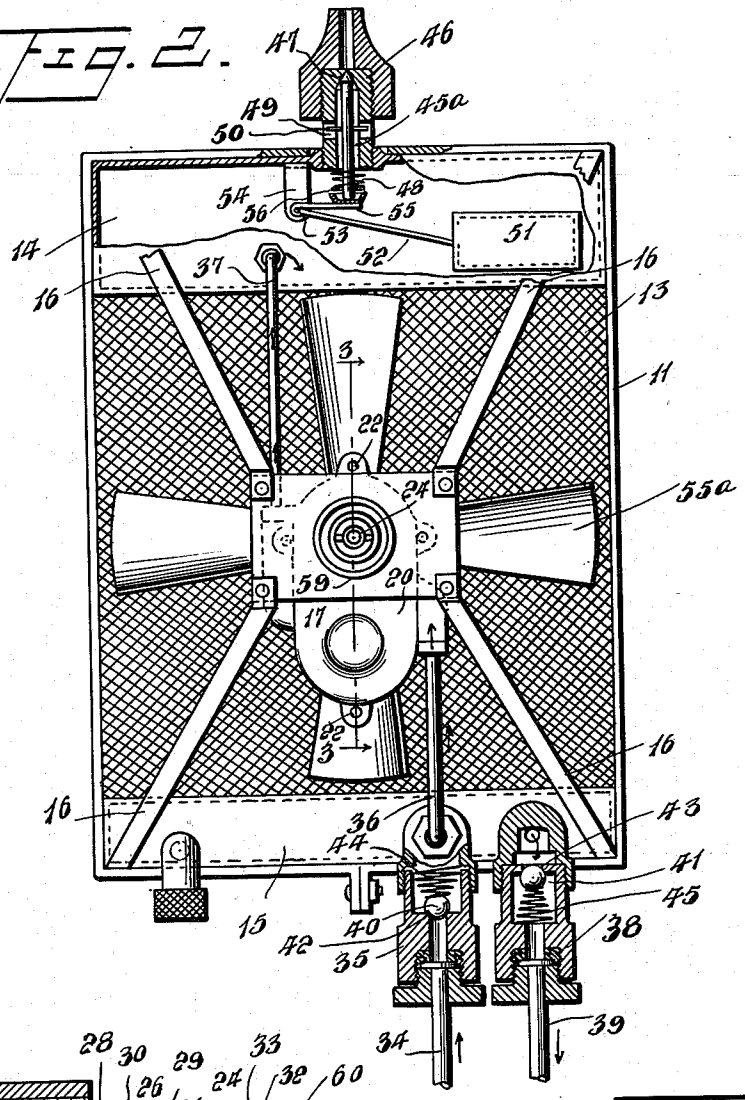
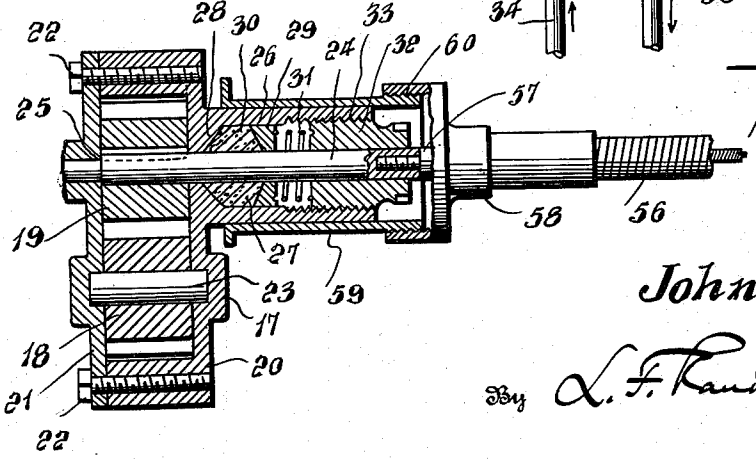


Fig. 3.



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OIL COOLING SYSTEM

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1 Claim. (Cl. 184—104)

This invention relates to a mechanism or system for cooling the lubricating oil employed in crankcases or the equivalent, in connection with all types of internal combustion engines, and Diesel engines, and whether stationary or mobile.

It is particularly aimed to provide a construction adapted to be mounted on the cylinder block or equivalent of the engine, at the coolest location and to be operated through the motion of the engine.

A further object is to provide a novel structure of a unitary nature, wherein the oil is elevated by a gear pump and permitted to descend through a radiator, cooled by an air circulating mechanism operated by the unit.

It is also aimed to provide a novel means for packing the operating shaft for the gear pump to prevent danger of leakage.

Another object is to provide a novel structure wherein the radiator has a tank at the upper end thereof into which the oil is discharged for cooling, and which tank is normally out of communication with the atmosphere but adapted to be placed in communication therewith through the medium of a valve controlled by a float in said tank or chamber.

The more specific objects and advantages will become apparent from a consideration of the description following taken in connection with accompanying drawings illustrating an operative embodiment.

In said drawings:—

Figure 1 is a view in side elevation of an engine equipped with my improvements;

Figure 2 is a rear elevation, partly in section, of my improvements;

Figure 3 is a detail section taken on the line 3—3 of Figure 2, and

Figure 4 is a detail section taken on the line 4—4 of Figure 1.

Referring specifically to the drawings wherein like reference characters designate like or similar parts, the engine illustrated in Figures 1 and 4 at 10 is to be taken as diagrammatic, it specifically being an automobile propelling engine. It may however be any type of internal combustion engine, a Diesel engine and be either stationary or mobile.

My improvements embody a shell 11 adapted to be attached, preferably at the side of and to the engine 10 as by bracket means at 12, at the coolest location. Within the shell 11 is a radiator 13 whose spaces or passages communicate with a tank or header 14 at the upper end thereof and with a tank or header 15 at the lower end thereof.

Rearwardly of the shell and radiator and supported by bracket or brace arms 16 connected thereto, is a casing 17, of any specific structure, preferably separable, of a gear pump. Such pump having internal rotors 18 and 19 coacting to pump oil through the casing. This casing has a main section 20 and a detachable section or plate 21 secured thereto by bolts 22. Rotor 18 is carried by a stub shaft 23 while the rotor 19, which drives the rotor 18, is keyed to a driving shaft 24 having a shoulder at 25 in thrust engagement with the plate 21.

Extending from the section 20 is an integral tubular projection 26 in which flexible packing is disposed at 27 about the shaft 24 and the inclined portion 28 of the tube adjacent the section 20.

A follower 29 is slidably disposed within the sleeve 26, having an angular face at 30 in contact with said packing and the follower is constantly urged into engagement with the packing to take up wear and maintain it compressed through the agency of a coil spring 31. The spring is engaged by a nut 32, in which the shaft 24 is also journaled, and which nut has adjustable screw threaded engagement at 33 with the interior of the cup 26.

Said gear pump is adapted to draw oil from the crankcase 10 through a pipe 34 and suitable fitting 35 connected to the shell and from the same through a pipe 36 into the casing 17 and discharge the same through a pipe 37 leading from the casing to the header 14. The oil from the header 14 is adapted to trickle or circulate through the various minute passages of the radiator 13, collecting in the header 15. From the header 15, the oil completes its circulation or return through a fitting 38 connected to the shell and a pipe or conduit 39 in communication with the crankcase or location from whence the oil was removed. It will be noted that the fittings 35 and 38 include check valves 40 and 41 respectively, opening in opposite directions and urged into contact with seats 42 and 43, respectively, by expansive coil springs 44 and 45, respectively.

In the header 14 a needle valve 45a is mounted in a fitting 46, and normally engaged with a seat 47 thereof cutting off communication with the atmosphere. The valve is urged downwardly or to open position by an expansive coil spring 48 surrounding the same and such movement is limited through the coaction of a pin 49 in a slot 50 of the fitting. A float 51 engages the oil in the

header 14, having an arm 52 pivoted at 53 to a bracket or support 54 within the header the arm 52 having an extension 55, engageable with the lower end of the valve 45a, by means of a cup 56 carried by the arm or extension 55.

The shaft 24 is extended forwardly of the casing 17 and between the casing and the radiator 13, has a fan 55a fastened thereon. This fan draws air from front to rear through the various air passages of the radiator 13 serving to cool the walls of the oil passages and the oil therein, so that when the oil returns to the header 15 it will be in a cool condition and in that condition transferred through the pipe 39 back to the crankcase or the equivalent.

Said shaft 24 may be operated in any suitable manner as through the medium of a flexible shaft 56 having screw connections as at 57 at one end, to the shaft 24, the flexible shaft passing through an end cap 58 fastened to a supplemental sleeve 59, by screw threads at 60, the supplemental sleeve being connected to the sleeve 26. Said flexible shaft 56 may be driven in any suitable manner and for instance may have a pulley 61 keyed thereto and engaged with a belt 62, which may be the fan belt driven by the engine 10 in the conventional way, to operate an air circulating fan 63 for the water cooling system of the engine and specifically the radiator 64 thereof. The pulley 61 may have a short shaft 65, journaled as at 66 to a bracket fastened to or in any suitable manner provided on the engine.

When the engine is started, the air release valve 47 is opened, permitting escape of all air pressure in the header 14 and enabling the oil to fill the radiator as it is pumped up into it by the gear pump, through the conduit 34, fitting 35, conduit 36, the oil pump and the conduit 37. After such radiator is filled, the air release valve 45a will be closed through the raising of the float 51 and associated mechanism and the pressure of the oil opens check valve 41, forcing the oil or permitting the oil to flow back into the crankcase through the fitting 38 and pipe 39, giving a complete circulation of oil, with cooling thereof through the action of the fan 55a incidental to passage of the oil through the radiator 13. When the motor is stopped, the check valves 40 and 41 close the oil lines or pipes to keep the oil from running back into the crankcase.

Because of the provision of the flexible shaft 56 it is apparent that the bracket 12 supporting shell 11 may be located, as shown in the drawings, on the engine 10 or any other position, as for instance on the base frame of the engine, in the coolest location available.

I claim as my invention:—

A cooling mechanism of the class described having a radiator provided with upper and lower headers in communication with the passages thereof, a pump, having a shaft, means supporting the pump in unitary relation with the radiator, conduit means of communication between the pump and the upper header, conduit means through which the pump may elevate oil through the pump to the conduit means first mentioned, a fan operable by the said shaft located between the pump and the radiator, a return pipe means for oil leading from the lower header, oppositely movable check valves disposed in the last two mentioned means, a valve in said upper header adapted to cut-off communication with the atmosphere, means urging the valve to open position, and float controlled means in said header operable to close the last mentioned valve.

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