June 6, 1939. H. E. MORTON 2,160,980

ENGINE COOLING SYSTEM

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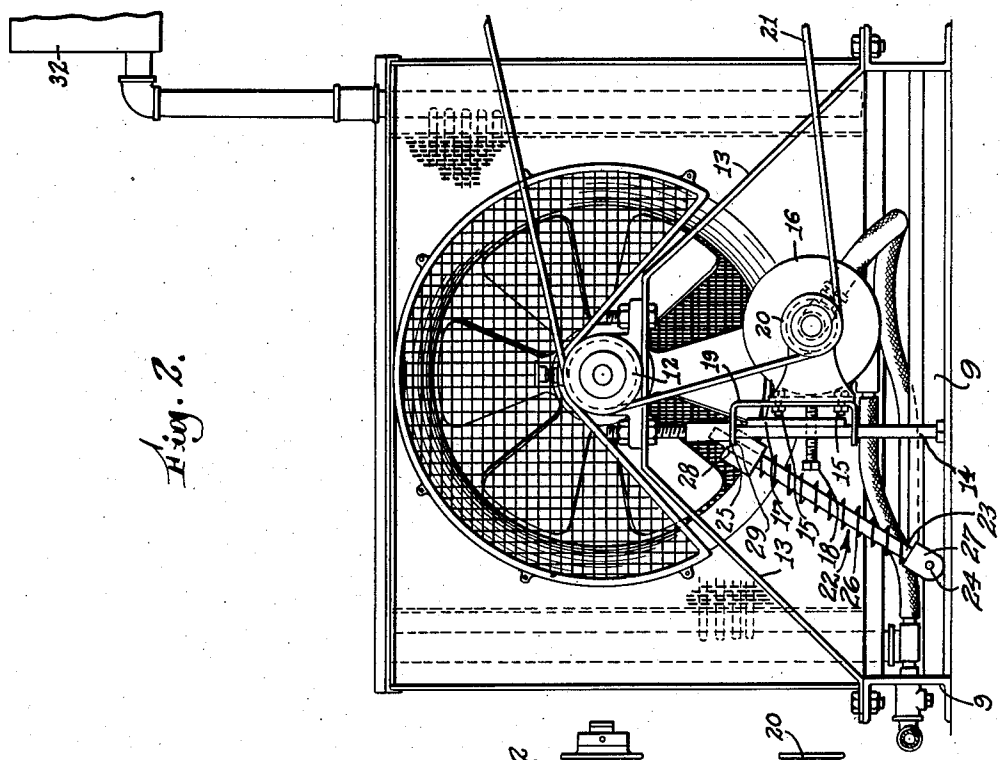


Fig. 2.

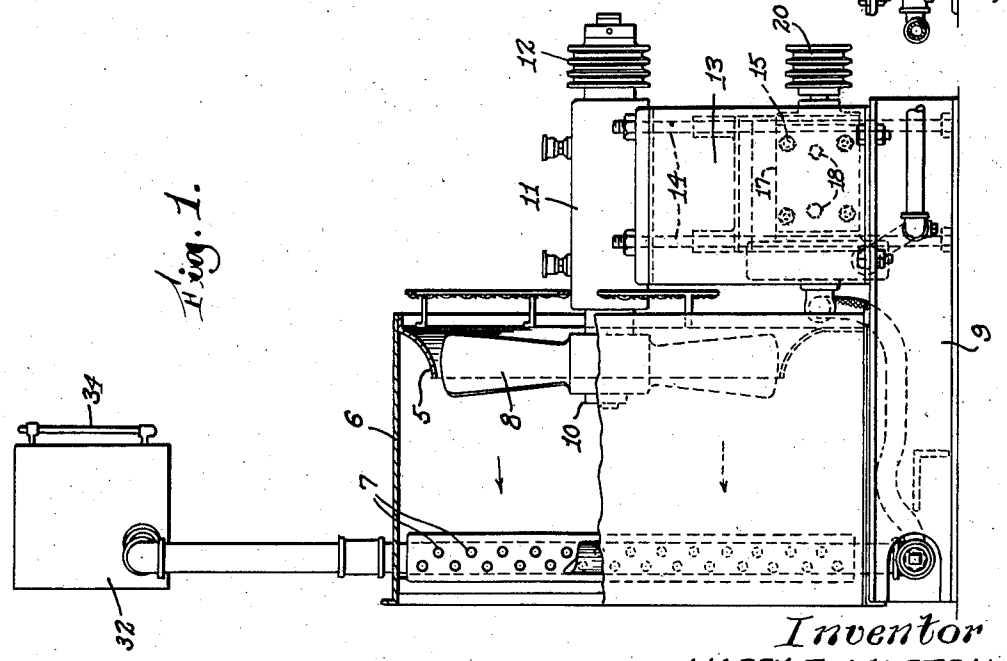


Fig. 1.

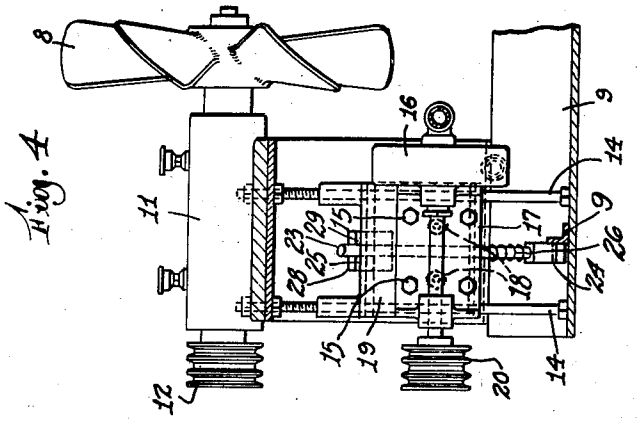
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Fig. 4



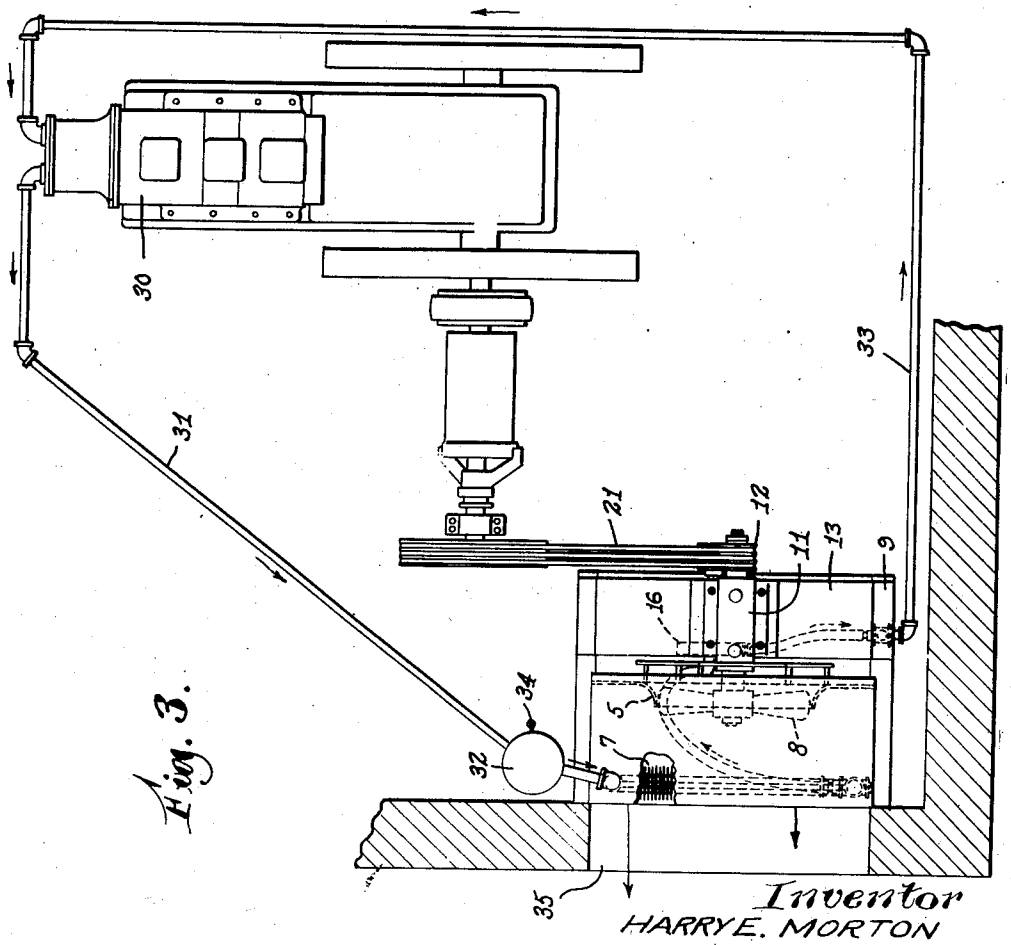


Fig. 3.

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ENGINE COOLING SYSTEM

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Application July 8, 1937, Serial No. 152,562

5 Claims. (Cl. 257—137)

This invention relates to cooling systems for stationary internal combustion engines and relates more particularly to cooling systems for gas engines used for pumping and other duties in natural oil fields.

Non-flowing oil wells are usually pumped by engines energized by natural gas from the wells. These engines operate unevenly and erratically, there being at frequent intervals, several revolutions between explosions, with the firing, over a period of time being very irregular. As a result of this irregular firing, the vibrations set up are so great that until recently, no radiator type cooling system has been considered feasible. Instead, the water from the cylinders of the engines has been pumped into open barrels or tanks where a slight amount of cooling by evaporation has taken place at the surface of the water.

The cooler according to this invention is a modification of that and in some respects an improvement over that disclosed in the co-pending application Serial No. 71,164, filed March 27, 1936 by M. S. Leonard.

According to a feature of this invention, the air is blown over the cooling coils instead of being drawn over them and in one embodiment of the invention, this feature is utilized to great advantage by having the cooler arranged to discharge through an opening in the wall of the engine room so as to discharge from the room in a ventilating arrangement, the air drawn from the room by the cooler fan.

An object of the invention is to provide a rugged efficient cooling unit for an internal combustion engine.

Another object of the invention is to provide a gas engine cooling unit which may be used to ventilate the engine room.

Other objects of the invention will be apparent from the drawings and the description which follows:

The invention will now be described with reference to the drawings of which:

Fig. 1 is a side elevation, partially in section of a cooling system for a stationary internal combustion engine according to this invention;

Fig. 2 is an end view looking at the fan end of Fig. 1;

Fig. 3 is a plan view looking downwardly upon a completé cooling system according to this invention, connected to a gas engine, and

Fig. 4 is an elevation view from the back side of Fig. 1 of the pump adjusting mechanism.

The casing 6 of sheet metal forms a housing for and supports the plurality of horizontally placed finned tubes 7 and an air outlet plate 5 for the fan 8. The casing is bolted to the structural steel frame 9.

The fan 8 is mounted on the shaft 10 which extends through the journal 11, and on one end of which is mounted the drive pulley 12. The journal 11 is supported upon the member 13 which in turn is mounted upon the frame 9 which latter is adapted to be bolted to a concrete foundation.

The bolts 14 extend between the frame 9 and the member 13 and serve to support one side of the journal 11 to the member 13 and to support the frame 19 to which the base of the pump 16 is bolted by means of the bolts 15. The plate 17 is tapped to receive the two threaded bolts 18. The ends of the bolts 18 contact when they are screwed inwardly, against one surface of the frame 19 and force it away from the bolts 14 and force the tapped plate 17 against the bolts 14 so that the frame 19 is held immovable in a desired position on the bolts 14, following adjustment of the bolts 18.

The pulley 20 of the pump 16 acts as an idler upon the belt 21 which drives the pulley 12 of the fan 8. In some sizes of cooling units, the weight of the pump 16 is permitted to rest upon the belt 21 through the intermediary of the pulley 20 in order to maintain the necessary tension in the belt 21 and to rotate the rotor of the pump. The adjusting mechanism including the frame 19, plate 17, and bolts 14 and 18 serve to hold the pump in its desired position once this has been decided upon. In some sizes of cooling units, the weight of the pump may be too great for its function of an efficient idler, and in such cases, the balancing spring indicated generally by 22 is provided. This spring assembly includes the rod 23 which is located and mounted at 24 to the frame 9. The other end of the rod 23 extends through a slot in the upper cross-member 25 of the frame 19. The spring 26 is coiled upon the rod 23 between the two cross-members 27 and 28. The upper cross-member 28 is recessed at 29 to receive the outer end of the frame member 25. With this construction, as the pump and frame 19 are moved downwardly, the spring 26 is compressed to oppose the downward movement, and thus acts to relieve a portion of the pressure of the weight of the pump upon the belt 21. It is thus seen that the pump may be slid vertically for adjustment of the belt and may be locked in any desired position. The weight of the pump serves to maintain the belt tension and when this

weight is too great, a portion of it may be counteracted by use of the spring assembly 22.

As shown diagrammatically by Fig. 3, the jacket water from the engine 30 is circulated by the pump 16 to pass from the engine through the pipe 31 to the expansion tank 32, then into the coils 7, then into the pump 16, and then through the pipe 33 to the engine. The expansion tank is located substantially above the casing 6 in the highest point of the piping and serves to maintain the piping full at all times. The tank 32 is provided with a gauge glass 34 which shows the level of the water in the tank. When any water is visible in this gauge, it is evidence that the entire system is full of water.

The fan 8 is rotated to draw air from the engine room so as to blow it over the coils 7. It is preferred that the unit be placed as shown by Fig. 3 in or adjacent the opening 35 in one of the walls of the engine room. Then, when the cooler is operating, the fan draws air from the engine room, passes it over the coils 7 and then blows it from the engine room. This insures that the air within the engine room can not be recirculated by the fan 8.

While one embodiment of the invention has been described for the purpose of illustration, it should be understood that the invention is not limited to the exact apparatus and arrangement as many departures may be suggested by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. In a heat exchange unit assembly having tubes, a pump connected with said tubes for circulating a heat exchange fluid therethrough, and a fan for moving air over the tubes, the combination of a rectangular structural base, a pair of upwardly extending leg members attached at their lower ends to said base, a substantially horizontal member attached to the upper ends of said leg members and supported thereby, a plurality of rods extending substantially vertically between said leg members, and having their lower ends attached to said base and their upper ends attached to said horizontal member, said pump having a pulley adapted to serve as an idler for the belt driving said fan, a support for said pump, and means for adjustably positioning said support along said rods.

2. In a heat exchange unit assembly having tubes, a pump connected with said tubes for circulating a heat exchange fluid therethrough, and a fan for moving air over the tubes, the combination of a rectangular structural base, a pair of upwardly extending leg members attached at their lower ends to said base, a substantially horizontal member attached to the upper ends of said leg members and supported thereby, a plurality of rods extending substantially vertically between said leg members and having their lower ends attached to said base and their upper ends attached to said horizontal member, said pump having a pulley adapted to serve as an idler for the belt driving said fan, a support for said pump, said support having a substantially vertical portion to which said pump is attached and having upper and lower substantially horizontal portions apertured to loosely receive said rods, a substantially vertical plate between said vertical portion of said support and said rods, and means for forcing said plate against said rods for positioning said pump on said rods.

3. In a heat exchange unit assembly having tubes, a pump connected with said tubes for circulating a heat exchange fluid therethrough, and a fan for moving air over the tubes, the combination of a rectangular structural base, a pair of upwardly extending leg members attached at their lower ends to said base, a substantially horizontal member attached to the upper ends of said leg members and supported thereby, a plurality of rods extending substantially vertically between said leg members and having their lower ends attached to said base and their upper ends attached to said horizontal member, said pump having a pulley adapted to serve as an idler for the belt driving said fan, a support for said pump, means for adjustably positioning said support along said rods, and means exerting a lifting force upon said pump for relieving a portion of its weight from said belt.

4. In a heat exchange unit assembly having tubes, a pump connected with said tubes for circulating a heat exchange fluid therethrough, and a fan for moving air over the tubes, the combination of a rectangular structural base, a pair of upwardly extending leg members attached at their lower ends to said base, a substantially horizontal member attached to the upper ends of said leg members and supported thereby, a plurality of rods extending substantially vertically between said leg members and having their lower ends attached to said base and their upper ends attached to said horizontal member, said pump having a pulley adapted to serve as an idler for the belt driving said fan, a support for said pump, said support having a substantially vertical portion to which said pump is attached and having upper and lower substantially horizontal portions apertured to loosely receive said rods, a substantially vertical plate between said vertical portion of said support and said rods, means for forcing said plate against said rods for positioning said pump on said rods, and means attached to said upper horizontal portion of said support and to said base for exerting a lifting force upon said pump for relieving a portion of its weight from said belt.

5. In a heat exchange unit assembly having tubes, a pump connected with said tubes for circulating a heat exchange fluid therethrough, and a fan for moving air over said coils, in combination, a bearing for said fan, a rectangular structural base for said assembly, a pair of upwardly extending leg members attached to said base, a substantially horizontal member attached to the upper ends of said leg members and forming a support for said bearing, a plurality of bolts attached to said base and extending substantially vertically between said leg members and through said horizontal member and through said bearing and serving to hold said bearing on said horizontal member, said pump having a pulley serving as an idler for the belt driving said fan, a support for said pump having apertures through which said bolts extend, and means for clamping said support against said bolts.

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