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LUBRICATING SYSTEM

Filed June 7, 1932

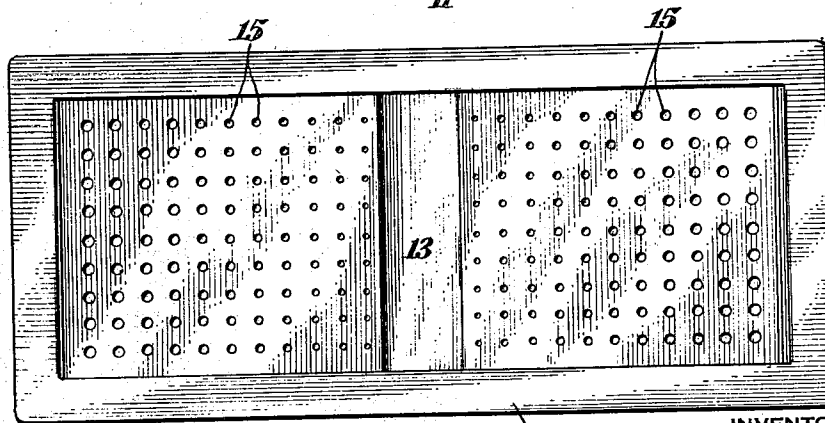
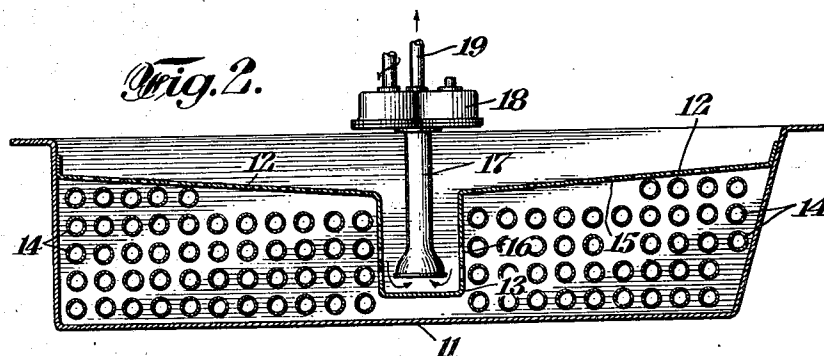
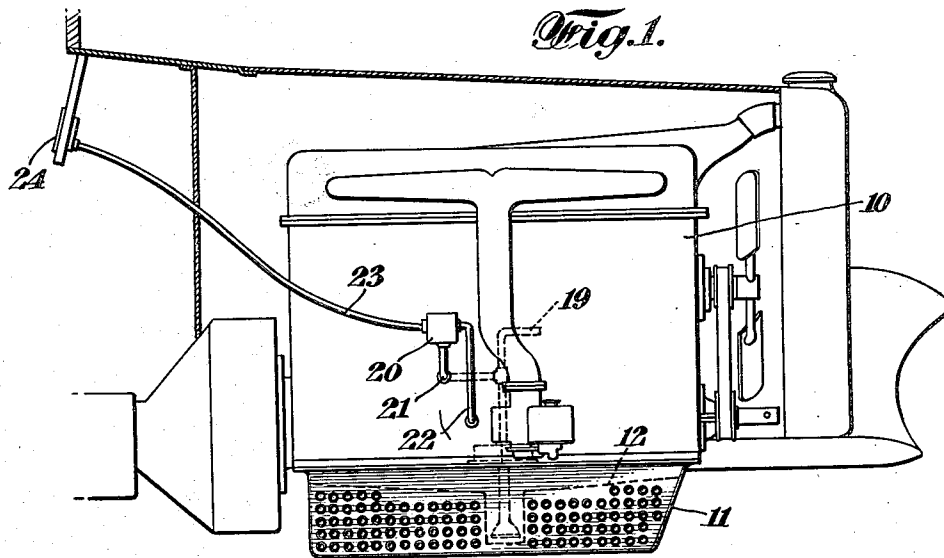


Fig. 3.

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LUBRICATING SYSTEM

Application filed June 7, 1932. Serial No. 615,818.

This invention relates to lubricating systems for automobile engines and has for an object to effect quick heating of a portion of the oil in the system to lower its viscosity with subsequent gradual heating of the remainder of the oil to reduce the viscosity of the entire body of oil and also to prevent overheating of the oil and consequent undue viscosity decrease.

10 In a lubricating system embodying this invention, the oil pan is equipped with a partition formed with sloping portions terminating in a central well. Perforations are provided in the sloping portions and also in the well portion near the bottom thereof, 15 these perforations being sufficiently small in diameter to oppose ready flow of cold lubricating oil. The oil pump for forcing oil to the bearings has its intake communicating 20 with the lower portion of the well. At the starting of the engine, the pump circulates only the oil contained in the central well and so much other oil as may seep through the perforations in the well. The oil from the 25 bearings drips on to the sloping portions and at first runs back into the well. However, as the oil becomes heated and of lower viscosity, the oil dripping from the bearings on to the sloping portions of the partition passes through the perforations in the sloping portions instead of flowing back over them to the well. The hydrostatic head outside the well is thus increased and more oil is caused to flow through the perforations into the well 30 to be supplied to the bearings. This continues until the entire body of oil is heated and eventually substantially all the oil dripping from the bearings flows through the perforations in the sloping portions and is 35 circulated through the well to the pump.

The oil pan is equipped with tubes extending therethrough for passing air into indirect heat exchange relation with the oil in the pan to prevent undue heating of the oil. 45 Preferably, the holes in the sloping portion are larger near their upper ends so that the major portion of the oil is returned to the pans near the ends thereof, thus getting the full benefit of the cooling effect from the 50 tubes.

With this apparatus, a small body of oil is quickly heated to bring it to the proper viscosity for efficient lubrication. The remainder of the oil is gradually circulated by the pump and reduced in viscosity. In this way, oil of proper viscosity is supplied to the bearings almost immediately upon starting of the engine. 55

Other objects, novel features and advantages of this invention will be apparent from the following specification and accompanying drawing, wherein: 60

Fig. 1 is a side elevation of an internal combustion engine equipped with a lubricating system embodying the invention; 65

Fig. 2 is a vertical section through the oil pan, and

Fig. 3 is a plan view thereof.

The engine 10 is provided with an oil pan 11 provided with a partition 12 having sloping portions terminating in a central well 13. Tubes 14 extend transversely through the pan below the partition 12 and serve to flow air into indirect heat exchange relation with oil contained in the pan. Preferably a scoop (not shown) is provided for directing air through these tubes upon the forward movement of the automobile. The sloping portions of the partition 12 are perforated, the perforations being of progressively larger diameter from the well to the ends of the pan. The perforations 12 are sufficiently small that oil of high viscosity will not flow through them readily. Perforations 16 are provided in the walls of the well and these are also of sufficiently small diameter that high viscosity oil will not readily flow through them. 75

A conduit 17 leads from the lower portion of the well 13 to the inlet of a pump 18. A pipe 19 leads from the pump outlet to the bearings. A viscosity meter 20 of any well-known type is connected by a pipe 21 with the pipe 19 and has an outlet pipe 22 discharging into the oil pan. The pressure developed in the viscosity meter 20 is applied through a conduit 23 to a gauge 24. 80

Assume that the engine is started with the oil in the pan at atmospheric temperature. At such temperature the viscosity of the oil is higher than required for proper lubrication. 100

The pump 18 draws oil from the well 13 and supplies the same to the bearings, thus reducing the level of oil in the well. Oil from the remainder of the pan will tend to flow into the well, but little, if any will pass through the holes 16 due to the small size thereof and the viscosity of the oil. Oil dripping from the bearings is caught by the partition 12 and until the returned oil is sufficiently heated to be reduced in viscosity, it will flow over the perforations 15 rather than passing through them. However, after a short period of operation, during which substantially only the oil in the well 13 is circulated, the circulated oil becomes sufficiently heated that its viscosity drops and the oil tends to flow through the perforations 15 rather than down into the well.

The hydrostatic head of the oil outside the well is thus increased and more oil tends to flow through the holes 16 into the well and is supplied to the bearings. This continues until the entire body of oil is heated and eventually substantially all the oil dripping from the bearings flows through the perforations 15 into that portion of the pan below the partition.

By reason of the perforations 15 being larger near the ends of the pan, the major portion of the hot oil dripping from the bearings is returned to the pan near the ends thereof. The returned hot oil circulates around the tubes 14 and is cooled, thus preventing undue heating of the oil and maintaining it at the proper temperature to render it of the desired viscosity.

In the lubricating system above described, a small body of oil is quickly heated to bring it to the proper viscosity for efficient lubrication so that oil of proper viscosity is supplied to the bearings almost immediately upon starting of the engine. The remainder of the oil is gradually circulated through the system and heated, thereby bringing all of the oil to the desired viscosity.

The temperature of the oil in the pan is regulated by cooling effect of air passing through the tubes 14. The cooling air is caused to flow through the tubes by forward movement of the automobile, thus supplying more cooling at high engine speeds than at low engine speeds. With transverse arrangement of the tubes, suitable means are provided for directing air through the tubes.

The viscosity of the oil in the system is self-controlled and no regulator or control instrument is required. The provision of the well in the partition and the arrangement of apertures causes immediate heating of a small part of the oil with gradual heating of the remainder and the regulation of the oil flow to effect cooling thereof and maintaining the proper viscosity is obtained without the use of any instrument gauge or the like.

The arrangement of tubes 14 in the oil pan

11 is not herein claimed per se as such arrangement is claimed in the co-pending application, Serial No. 630,172 of Harry T. Booth who is the inventor thereof.

It is of course understood that various modifications may be made in the device above described, without in any way departing from the spirit of the invention as defined in the appended claims.

I claim:

1. In a lubricating system, an oil pan, a partition in said pan formed with sloping portions terminating in a central well, perforations in the well portion near the bottom thereof and perforations in the sloping portions, said perforations being sufficiently small to offer high resistance to flow of cold lubricating oil, and a pump having its intake communicating with the lower portion of the well.

2. In a lubricating system, an oil pan, a partition in said pan formed with sloping portions terminating in a central well, perforations in the well portion near the bottom thereof and perforations in the sloping portions of progressively larger diameter from the well to the ends of the pan, said perforations being sufficiently small to oppose ready flow therethrough of cold lubricating oil, and a pump having its intake communicating with the lower portion of the well.

3. In a lubricating system, an oil pan, a partition in said pan formed with sloping portions terminating in a central well, perforations in the well portion near the bottom thereof and perforations in the sloping portions, said perforations being sufficiently small to offer high resistance to flow of cold lubricating oil, and a pump having its intake communicating with the lower portion of the well, and tubes extending through said pan for flowing air into indirect heat exchange relation with oil in the pan.

4. In a lubricating system, an oil pan, a partition in said pan formed with sloping portions terminating in a central well, perforations in the well portion near the bottom thereof and perforations in the sloping portions of progressively larger diameter from the well to the ends of the pan, said perforations being sufficiently small to oppose ready flow therethrough of cold lubricating oil, a pump having its intake communicating with the lower portion of the well, and tubes extending through said pan for flowing air into indirect heat exchange relation with oil in the pan.

5. In a lubricating system, an oil pan, a partition in said pan formed with sloping portions terminating in a central well, perforations in the well portion near the bottom thereof and of proper diameter to oppose ready flow therethrough of cold lubricating oil, perforations in the sloping portions of proper size to oppose ready flow therethrough

of cold lubricating oil and being of progressively increasing size from the well towards the ends of the pan, and a pump having its intake communicating with the lower portion
5 of said well.

6. In a lubricating system, an oil pan, a partition in said pan formed with sloping portions terminating in a central well, perforations in the well portion near the bottom
10 thereof and of proper diameter to oppose ready flow therethrough of cold lubricating oil, perforations in the sloping portions of proper size to oppose ready flow there-
15 through of cold lubricating oil and being of progressively increasing size from the well towards the ends of the pan, a pump having its intake communicating with the lower por-
20 tion of said well, and tubes extending through said oil pan for flowing air into in-
direct heat exchange relation with oil in said pan.

In testimony whereof, I have signed my name to this specification.

HENRY B. CLARKE.

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