March 28, 1933. C. LE R. McCUEN 1,903,005

OIL PUMP SCREEN

Filed Nov. 20, 1930

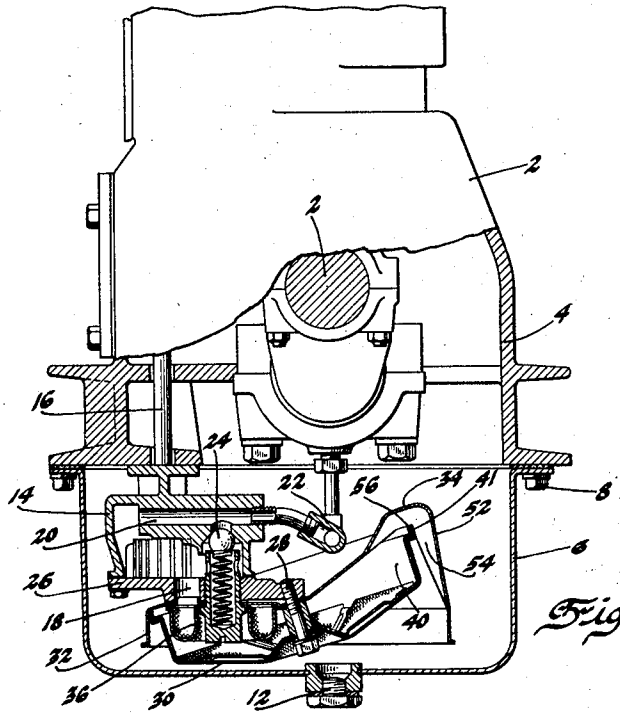

Fig. 1

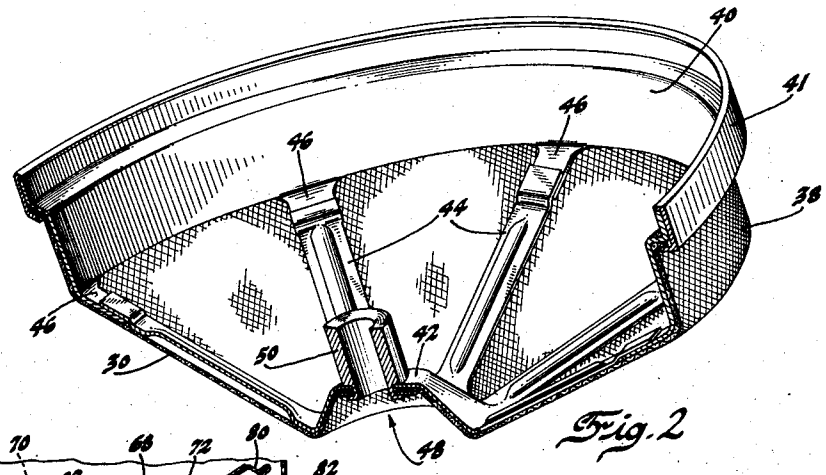

Fig. 2

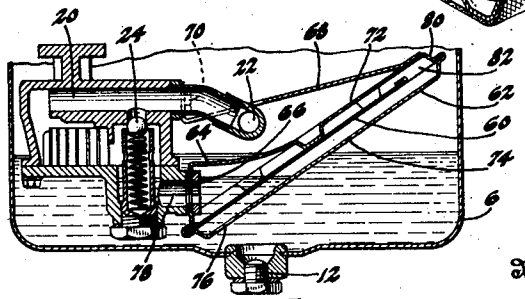

Fig. 3

Inventor

Charles LeRoy McCuen

By Blackmore, Spencer & Hicks

Attorneys

Patented Mar. 28, 1933

1,903,005

UNITED STATES PATENT OFFICE

CHARLES LE ROY McCUEN, OF LANSING, MICHIGAN, ASSIGNOR TO GENERAL MOTORS CORPORATION, OF DETROIT, MICHIGAN, A CORPORATION OF DELAWARE

OIL PUMP SCREEN

Application filed November 20, 1930. Serial No. 496,928.

This invention relates to lubricating systems and has particular reference to the screen which protects the inlet of the oil pumps of internal combustion engines used on automotive vehicles.

In the lubricating systems of engines used on automotive vehicles, it is conventional practice to place a screen between the pump inlet and the oil pan, the purpose of which is to prevent any large particles from getting into the pump and damaging the pump mechanism. It has been found that in the winter time the water which collects in the oil pan comes to the surface or becomes enmeshed in the screen and freezes to form a sheet of ice which will clog the screen and prevent the passage of oil. It is the object of the present invention to provide a means whereby the pump will be able to suck oil from the oil pan over the screen and the sheet of ice so that the engine bearings will not be starved of oil, until the lubricant is warmed and melts the ice to permit the pump and screen to function in the usual way.

The object of the invention is accomplished by using a screen of bowl shape which has a portion thereof placed at an incline so that the upper part will be well above the level of the oil or free from any possible interference by an ice sheet. The screen has a cover thereover the sides of which extend well down into the oil pan and closely adjacent the lowermost portion of the screen. The cover has a channel or passage pressed from or formed in one side thereof which forms a conduit or passage from the oil pan up over the edge of the bowl-shaped screen and to the pump inlet. If, during cold weather, the water in the oil should freeze on the screen and form an impervious sheet, the suction of the pump will pull the oil from the oil pan through the channel in the cover and through the interior of the screen bowl from where it will be passed to the engine bearings. As soon as the oil warms up the ice sheet will be melted and the pump will function in the usual way.

On the drawing:

Figure 1 shows a view of a portion of an internal combustion engine with parts shown in section to illustrate the invention.

Figure 2 is a perspective view of a portion of the screen of the invention.

Figure 3 is a sectional view corresponding to Figure 1 of a modification.

Referring to the drawing, the numeral 2 indicates an internal combustion engine having a crankshaft 2, the crankcase 4 and the oil pan 6. The oil pan is attached to the crankcase as at 8 and has the usual drain plug 12. A conventional oil pump 14 is secured to the crankcase and positioned inside the oil pan and is driven by a shaft 16 which takes its power from the camshaft or crankshaft in any desired way. The pump has the usual inlet 18 and the outlet 20. Connected to the outlet 20 is the oil manifold 22 which supplies oil to the engine bearings in the usual way. A spring-pressed one-way ball-relief-valve is shown at 24 which permits the pump to by-pass the oil to prevent excessive pressures in the manifold 22. The lower portion of the pump is closed by the cover 26 to which there is attached by means of the bolt 28 the bowl-shaped screen 30 of the invention and the cover 32. The cover 32 is open at its bottom and closed at its top and sides except for the small vent opening shown at 34. A strainer is shown at 36 and strains the oil before it enters the pump inlet 18.

The screen 30 is generally of bowl shape as shown in the perspective view in Figure 2. The screen comprises the reticulating wire member 38 mounted on a cage 40. A ring 41 at the top of the cage 40 and of the reticulated member 38, rigidly secures the two together. The bottom portion of cage 40 is open and has secured therein the spider 42, the arms 44 of which are suitably secured as by welding to the fingers 46 formed on the cage 40.

At substantially its mid portion, the reticulated member 38 and the mid portion of the spider are inwardly bent as shown at 48 and a socket or bearing 50 secured thereto. The bolt 28 passes through the stud or socket 50 and is screwthreaded into the cover 26.

The cover 34 snugly fits over the top of the

ring 41 and is ordinarily substantially incapable of passing any oil. At one portion of its periphery, the cover is formed with a pressed-out portion 52 which forms a channel 54 from the oil pan 6 up over the top of the screen as shown at 56, and into the interior of the bowl-shaped screen 38.

In case the screen 30 becomes clogged or plugged for some reason or other, such as having the water in the oil frozen therein, the suction of the pump will be insufficient to pull the oil therethrough to break the ice. During the winter months, it is therefore necessary to provide some means to allow the pump to take oil from the oil pan so that the bearings will not be starved. The channel 54 will allow the pump to draw oil from the pan up therethrough and spill it into the interior of the cage so that it may pass through the strainer 36 and into the inlet 18. The vent 34 is small and not of such size as will prevent the pump from drawing the oil from the pan when the screen 30 is clogged. Some air will of course be pulled in through the vent but the quantity will be relatively small in proportion to the oil drawn through the passage 54. The purpose of the vent is to allow the escape of air from the interior of the cover 32. If no vent were provided the air would continue to accumulate until it forced all of the oil from under the cover and prevent the pump from its normal operation.

Figure 3 shows a modification of the structure of Figure 1. In Figure 3 the screen is indicated by the numeral 60 while 62 designates the cover. The cover has a portion pressed therefrom as shown at 64, which serves as a means to attach it to the inlet stud 66 of the pump. A supporting member 68 is secured to the cover 62 and is attached as at 70 to the outlet connection of the pump. The upper and lower portions 72 and 74 of the cover form an impervious enclosure for the screen except for the inlet opening 76 and the outlet 78 and a small vent opening at 80. The pump normally draws the oil in at 76 through the screen 74 and to the inlet 78. However, if for any reason the water in the oil should freeze and clog up the screen 60 or should the screen become plugged for any other reason, the pump will pull the oil up the channel formed between the lower portion 74 of the cover and the screen up over the top of the sheet of ice and through the screen (or through the opening at 82 in case the entire screen should be clogged) and cause the oil to flow between the upper portion 72 of the cover and the screen 60 to the inlet 78. The screen 60 and cover 62 are positioned in inclined relation as shown in Figure 3 so that the top of the screen is always above the maximum oil level in the oil pan 6.

I claim:

1. In combination with an oil receptacle and an oil pump located therein, a screen between the pump inlet and the oil receptacle, said screen having a portion thereof extending above the oil level in the receptacle, and means for causing the oil to flow over said portion to the inlet when the screen becomes impervious to oil.

2. In combination with an oil receptacle and an oil pump located therein, a screen between the pump inlet and the oil receptacle, said screen having a portion thereof extending above the level of the oil in the receptacle, and the cover over the screen, said pump causing the oil to flow over the top of the screen and between the screen and cover to the inlet when the screen becomes impervious to the oil.

3. In combination with an oil receptacle and an oil pump located therein, a screen between the pump inlet and oil receptacle, and a cover over the screen, said cover provided with a vent and said pump causing the oil to flow over the screen and between the screen and cover to the inlet when the screen becomes impervious to oil.

4. In combination with an oil receptacle and an oil pump located therein, a bowl-shaped screen between the pump inlet and the oil receptacle, a cover over the screen, the side of the cover extending down to substantially the lowermost portion of the screen to close the top and sides thereof, a channel in said cover, said pump drawing the oil from the receptacle through the channel and over the top of the screen to the inlet when the screen is clogged.

In testimony whereof I affix my signature.

CHARLES L. McCUEN.