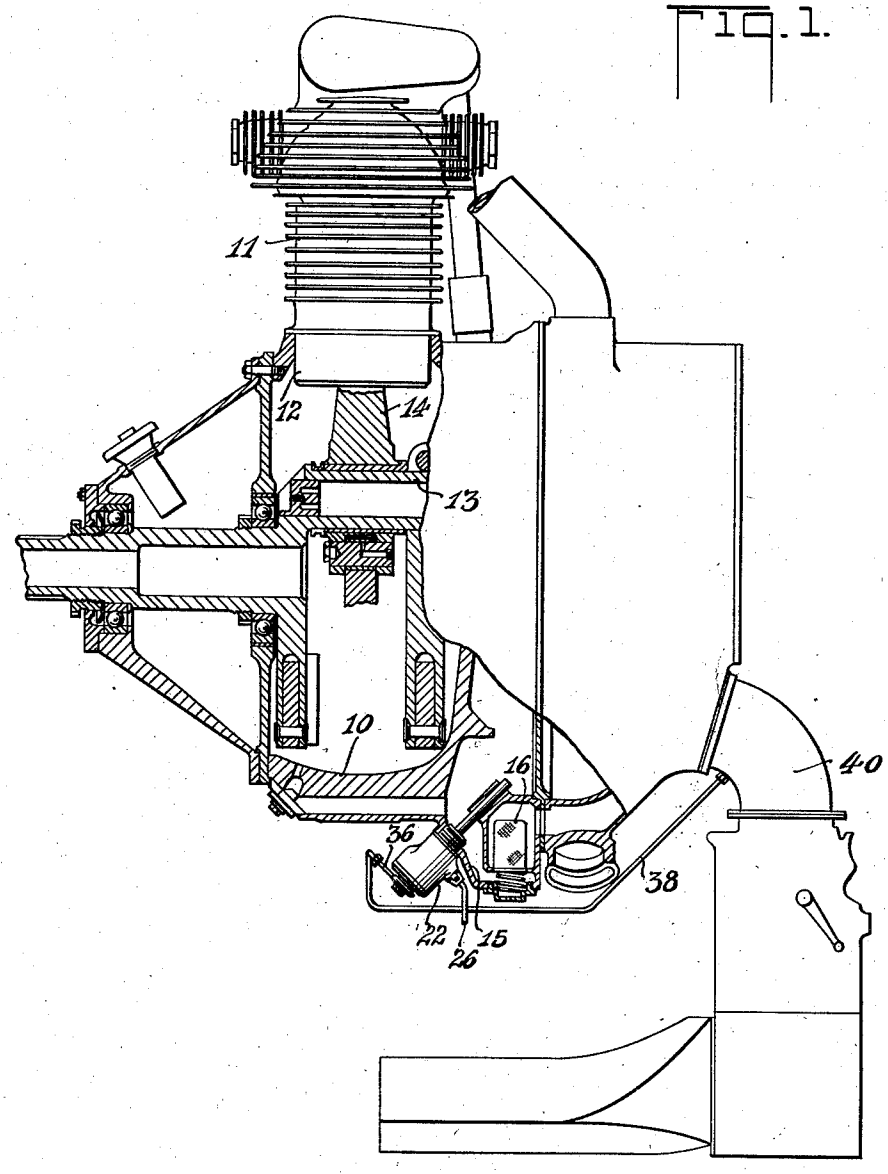
June 13, 1939. W. D. KENNEDY 2,162,259

ENGINE OIL SCAVENGING DEVICE

Filed Feb. 10, 1938 2 Sheets-Sheet 1

Fig. 1.



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Filed Feb. 10, 1938 2 Sheets-Sheet 2

FIG. 2.

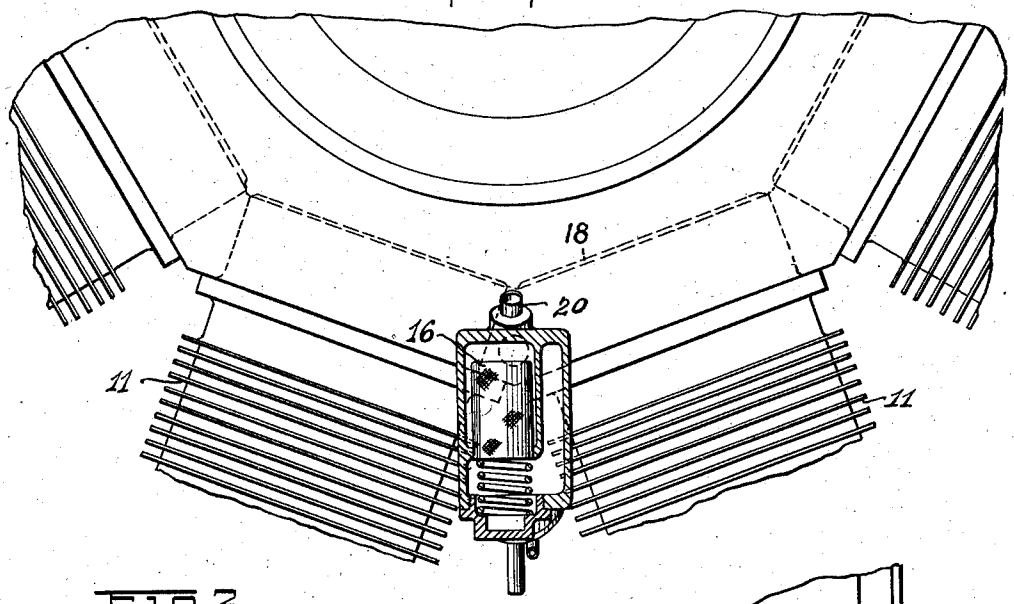
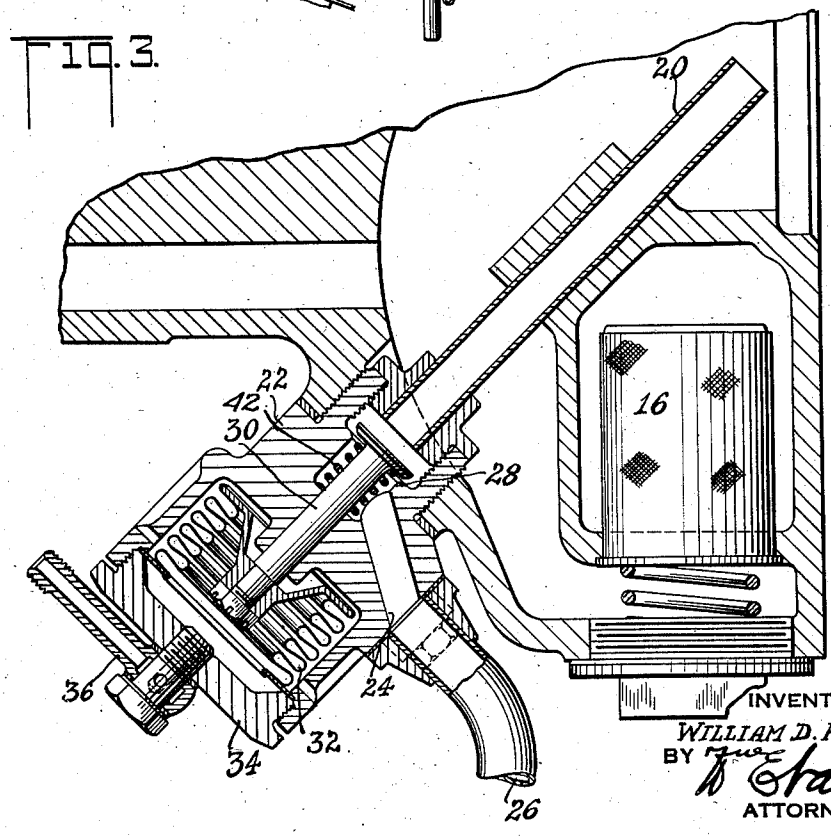


FIG. 3.



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ENGINE OIL SCAVENGING DEVICE

William D. Kennedy, West Englewood, N. J., assignor to Wright Aeronautical Corporation, a corporation of New York

Application February 10, 1938, Serial No. 189,770

6 Claims. (Cl. 123—196)

This invention relates to static radial cylinder internal combustion engines of the type in which lubricating oil for the engine is fed from an external tank, the surplus oil in the engine being scavenged therefrom and returned to the tank in normal operation. Frequently, when engines of this type are left standing, lubricating oil accumulates in the engine crankcase and may at times rise above the level of the skirts of the bottom cylinders, whereupon oil passes into the bottom cylinders. This oil may gradually seep past the pistons and accumulate in the combustion chambers of the lower cylinders, fouling the spark plugs and offering a source of potential damage to the engine if the latter be started without first removing the spark plugs and draining the oil accumulation. There have been cases where attempts have been made to start engines in which oil has accumulated in the bottom cylinders, the starting torque being sufficient to burst the cylinder heads.

It is an object of this invention to provide a device which will prevent the possibility of oil accumulation in the lower engine cylinders. A further object of the invention is to provide a crankcase drain system which is automatic in operation; that is, the drain is open when the engine is stopped, but the drain is automatically closed in response to engine starting and engine operation. By the use of this device, the possibility of dangerous oil accumulations in the bottom cylinders is prevented. It is a further object of the invention to make the drain device of this invention responsive in its operation to suction in the intake manifold.

Further objects will be obvious in reading the annexed detailed description in connection with the drawings in which;

Fig. 1 is a side elevation, partly in section, of a radial cylinder aircraft engine;

Fig. 2 is a rear elevation of a lower part of the engine showing the location of the drain device, and

Fig. 3 is an enlarged fragmentary section of the engine crankcase showing the drain device and operating means therefor, in detail.

The engine shown comprises a main crankcase 10 upon which radially projecting cylinders 11 are mounted, only one of the cylinders being shown in Fig. 1. The several cylinders are similar and each is provided with a skirt 12 projecting inwardly into the crankcase. The engine is provided with the conventional crankshaft 13 and connecting rod system 14 and, as is well-known in engines of this character, lubricating oil is fed, under pressure, during operation to the crankshaft which acts as an oil distributor. The oil is fed as usual from an external tank and surplus oil drains to the bottom of the crankcase as at 15, whence it passes through a screen 16 and is returned to the oil tank by a scavenging pump, not shown.

If the engine be standing by, liquid oil may accumulate in the bottom of the crankcase and may at times reach a level higher than the lowest point on the edges of the bottom cylinder skirts, as indicated at 18 in Fig. 2.

To prevent such an excessive accumulation, I provide a drain tube 20 having its upper ends slightly below the point 18, this tube being carried by a housing 22, mounted in the crankcase, which incorporates a drain opening 24 open to the atmosphere as at 26. The housing likewise is provided with a valve seat 28 upon which a poppet valve 30 may seat to close off the tube 20 from communication with the atmosphere. A bellows 32 is attached at one end to the stem of the valve 30 and is mounted at its other end in the housing 22, being retained thereon by means of a nut 34 having a fitting 36 communicating with a tube 38 which connects to the conventional carburetor adapter 40 forming part of the engine induction system.

During engine operation, low pressure exists in the carburetor adapter 40 which is communicated to the bellows 32, thus causing the valve 30 to rest upon its seat 28. Closure of the drain opening 24 from the crankcase is desired during engine operation since, when the engine is running, the lubricating oil in the crankcase is whipped into a turbulent mist by the rotating parts and, since normally, a pressure in excess of atmospheric exists in the crankcase during engine running, the tubes 20 and 26 would provide a pressure through which a large amount of oil would be lost due to the turbulent oil mist passing therethrough. When the engine is stopped, the pressure in the adapter 40 balances with that of the atmosphere whereupon a spring 42 raises the valve 30 from its seat, placing the tube 20 in communication with the atmosphere, so that, should oil accumulation reach the level of the top of the tube 20, the oil will flow down the tube and will drain externally from the outlet 26. Thus, any possibility of dangerous oil accumulation in the engine crankcase is prevented.

While I have described my invention in detail in its present preferred embodiment, it will be obvious to those skilled in the art, after under-

standing my invention, that various changes and modifications may be made therein without departing from the spirit or scope thereof. I aim in the appended claims to cover all such modifications and changes.

What I claim is:

1. In an engine in combination, a crankcase subject to oil accumulation when the engine is not operating, an overflow drain member in said crankcase having an opening for relieving such accumulation, an induction duct subject to low pressure in engine operation, and means responsive to low duct pressure for closing said drain opening.

2. In an engine, in combination, a crankcase subject to excessive oil accumulation when the engine is not operating, said case having an opening to relieve the crankcase of excessive oil, and means responsive to operation of the engine for closing said opening.

3. In a static radial cylinder engine including a crankcase in which an excess of oil may accumulate with a tendency to enter into the lower engine cylinders, said crankcase having a drain opening below the level of the cylinder portions within the crankcase to inhibit accumulation of said excess oil when the engine is stopped by draining of the oil therethrough, a valve operable to close said opening, and means responsive to operation of the engine for closing said valve.

4. In a static radial cylinder engine including a crankcase in which an excess of oil may accumulate with a tendency to enter into the lower engine cylinders, said crankcase having a drain opening below the level of the cylinder portions within the crankcase to inhibit accumulation of said excess oil when the engine is stopped by draining of the oil therethrough, a valve operable to close said opening, a bellows joining said valve with the case and serving, when exhausted, to close the valve, and a connection from said bellows to the engine intake system.

5. In an engine, a crankcase having a bottom opening, a valve movable to open and close said opening, means urging said valve open when the engine is not operating, and means responsive to engine operation for closing said valve.

6. In an engine, a crankcase having a bottom opening, a valve movable to open and close said opening, means urging said valve open when the engine is not operating, low pressure induction system for the engine, and means responsive to low pressure in the induction system for closing said valve.

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