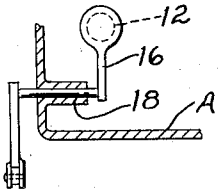
Dec. 3, 1935. A. M. NIVEN 2,022,898

INTERNAL COMBUSTION ENGINE

Filed April 5, 1930

Fig. 4.



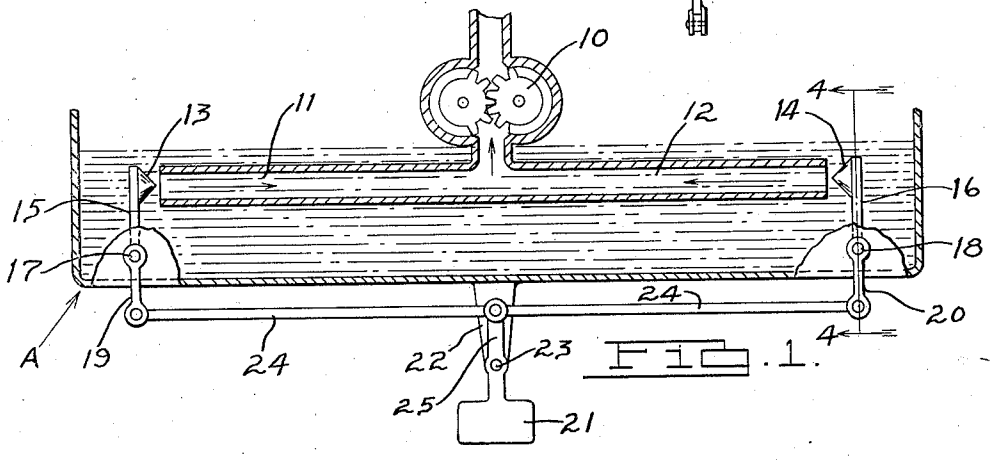


Fig. 1.

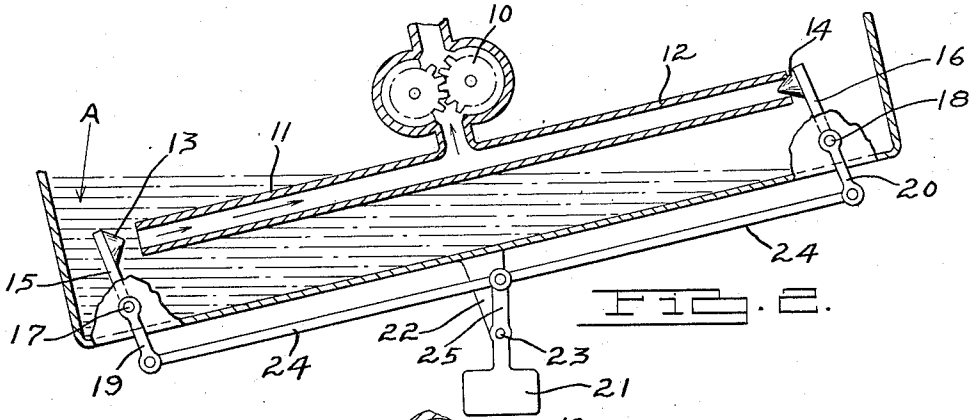


Fig. 2.

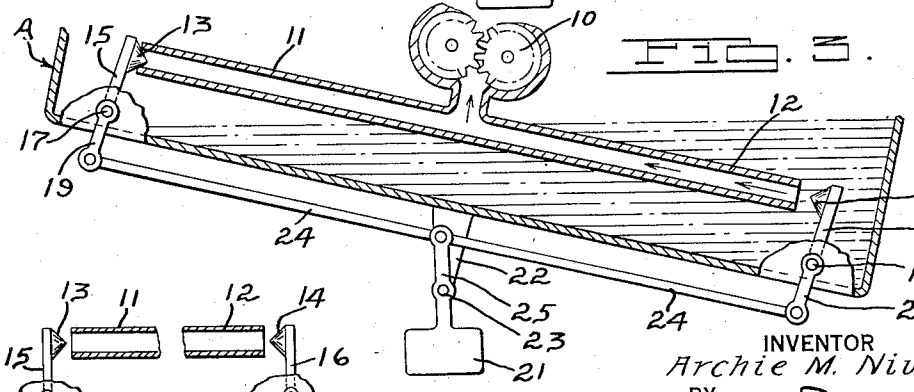


Fig. 3.

Fig. 5.

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INTERNAL COMBUSTION ENGINE

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Application April 5, 1930, Serial No. 441,763

3 Claims. (Cl. 184—6)

My invention relates to internal combustion engines and more particularly to the lubricating system for an engine adapted for use with aircraft.

At the present time airplanes often go into steep climbs or dives when in flight and as a result the lubricant or oil collected in the engine crankcase accumulates in one end or the other thereof, depending on whether the plane is diving or climbing. To insure a source of lubricant supply when employing only a single scavenging pump, a separate intake is usually provided at each end of the crankcase. Experience has shown that when one of the said intake ports is above the level of the oil in the crankcase, it is difficult to lift the oil because the pump is taking in air at the intake port which is above the oil level, thus interrupting the proper functioning of the scavenging pump.

It is the object of my invention to improve the efficiency of an internal combustion engine equipped with but one scavenging pump having a pair of intake ports by closing either one of the intake ports when the same is lifted above the level of the oil in the crankcase, thereby increasing the efficiency of the scavenging pump.

A further object of my invention is to provide a mechanism for accomplishing the result as set forth in the preceding paragraph that is responsive to gravitational forces and therefore operative when the plane goes into a relative steep climb or dive.

For a more detailed understanding of my invention, reference may be had to the accompanying drawing which illustrates one form which my invention may assume, and in which,

Fig. 1 is a longitudinal sectional view of a crankcase of an internal combustion engine, somewhat diagrammatic but illustrative of how a single scavenging pump may be operated in accordance with my invention,

Fig. 2 is a similar view but showing the crankcase tilted,

Fig. 3 is a similar view but showing the crankcase tilted in the opposite direction,

Fig. 4 is transverse sectional detail view taken substantially on the line 4—4 of Fig. 1, and

Fig. 5 is a detail diagrammatic view of a modified construction.

A, designates the crankcase of an internal combustion engine adapted for aircraft use and a scavenging pump 10 is supported thereby, the pump casing being preferably provided with a divided conduit having one portion 11 extended to the forward part of the crankcase and another portion 12 extended to the rear part of the crankcase. These conduit portions are open at the ends to provide intake ports, one at each end of the crankcase.

Each intake port is provided with a valve for closing the port. The intake ports associated with the intake conduits 11 and 12 are respectively closed by the valves 13 and 14, these valves being carried respectively by the pivoted arms 15 and 16, and preferably pivotally supported by the crankcase as shown in Fig. 4. The arms 15 and 16 are secured to relatively short shafts 17 and 18 respectively, which preferably project through the side wall of the crankcase, the arms 19 and 20 being secured respectively to the outer portion of the shafts 17 and 18. A weighted member 21 is preferably pivoted to a depending bracket 22 carried by the crankcase, as at 23, and links or other suitable connections 24 connect the arm 25 of the weighted member with the arms 19 and 20.

As the crankcase of the engine is tilted with respect to the horizontal plane, the weighted member is moved relative to the crankcase, and the valves 13 and 14 are actuated. The connections between the weight and valves are arranged to so actuate the valves as to close the intake port that is raised above the level of the oil in the crankcase as shown in Figs. 2 and 3. Preferably, these valves are so controlled as to close before the level of the oil in the crankcase falls below the intake port associated therewith, in order that no air will be drawn through the scavenging pump.

It will thus be noted that at least one intake port is immersed in the oil accumulated in the crankcase while the other intake port (not immersed in the oil) is closed. The efficiency of the scavenging pump is thereby increased, and an excessive surplus of oil is prevented from accumulating in the engine crankcase due to the constant and uninterrupted functioning of the scavenging pump.

Instead of a single weight as illustrated in Figs. 2 and 3, a construction as illustrated in Fig. 5 may be employed, in which each valve is connected with a separate weight. As shown, the valves 13 and 14 are respectively connected with the weights 26 and 27.

Although I have illustrated but one form of my invention and have described in detail but a single application thereof, it will be apparent to those skilled in the art to which my invention pertains that various modifications and changes may be made therein without departing from the spirit

of my invention or from the scope of the appended claims.

What I claim as my invention is:

1. In a lubricating system for an internal combustion engine, a crankcase containing a lubricating oil, a lubricant pump having an intake, a conduit communicating with said pump intake extending substantially longitudinally of the crankcase and having open ends adjacent opposite ends of the crankcase, valve means at each open end of said conduit and supported without the open end conduit, said valve means being operatively connected together, and a weighted member for actuating said valve means, said weighted member movable in response to gravitational forces for selectively closing the valve means when the level of the lubricant adjacent the open end of the conduit controlled by said valve means falls below the said conduit open end by reason of an abnormal longitudinal tilting of the crankcase.

2. In a lubricating system for an internal combustion engine, a crankcase in which a lubricating oil is adapted to accumulate, a pump provided with open end intake extensions terminating adjacent the ends of the crankcase, valve means for said extensions and spaced externally from the open ends thereof, a pivotally supported weighted member actuated in response to gravitational forces when the crankcase is tilted, and means connecting the valve means with said weighted member for selectively actuating the valves.

3. In a lubricating system for an internal combustion engine, a crankcase containing a lubricating oil, a pump provided with open end intake extensions terminating adjacent the ends of the crankcase, and interconnected valve means movably actuated in response to characteristic variations of a single valve actuating device, said valve means located respectively adjacent the open end of said extensions for controlling the lubricant intake extensions.

ARCHIE M. NIVEN.