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INTERNAL COMBUSTION ENGINE

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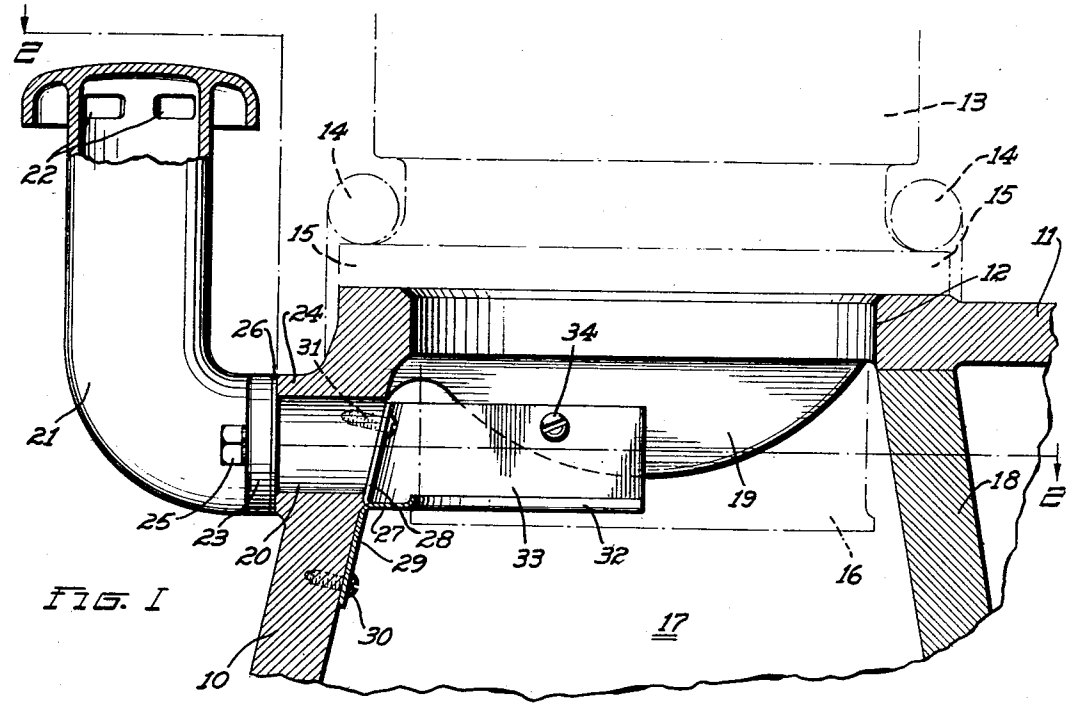


FIG. I

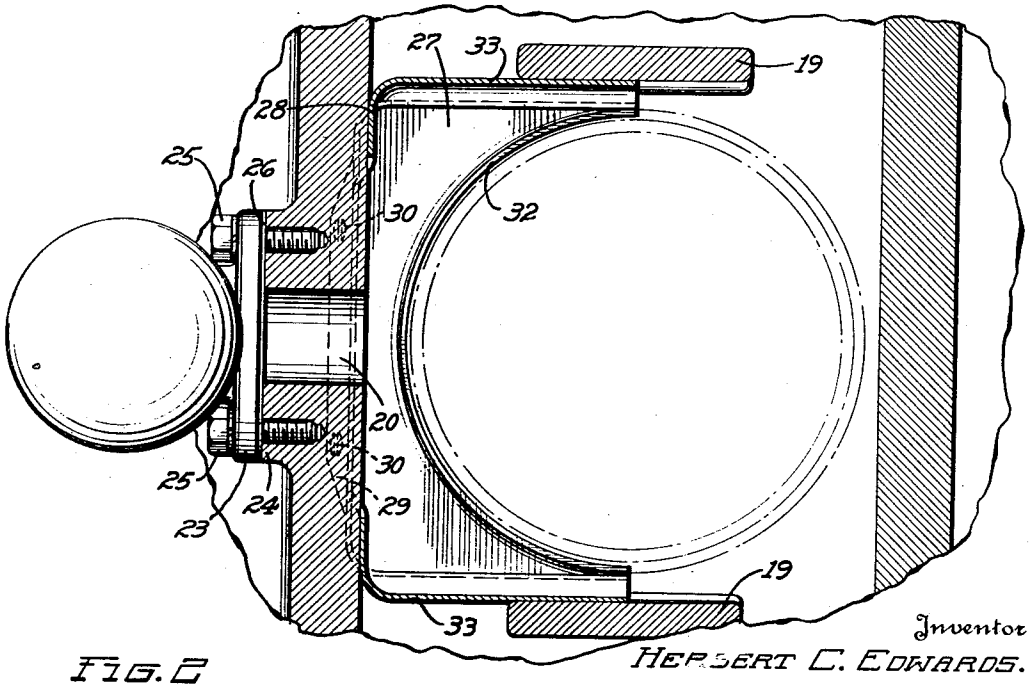


FIG. 2

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INTERNAL COMBUSTION ENGINE

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6 Claims. (Cl. 121—194)

This invention relates to internal combustion engines and more particularly to crank case breather means.

An object of the invention is to provide an internal combustion engine in which baffle means is arranged internally of the crank case so that oil therein will be prevented from flowing outwardly through the breather opening.

Another object of the invention is to provide an internal combustion engine with a detachable shield which is arranged in the crank case between the breather opening and the body of oil contained therein.

A further object of the invention is to prevent the escape of lubricating oil through the breather in liquid form.

Other objects of the invention will appear from the following description taken in connection with the drawing, which forms a part of this specification, and in which:

Fig. 1 is a vertical sectional view through a fragment of a radial type of internal combustion engine, showing my invention associated therewith;

Fig. 2 is a sectional view of the same taken on line 2—2 of Fig. 1.

Referring now to the drawing by characters of reference, I have shown my invention associated with a radial type of internal combustion engine having a unitary barrel-type crank case. Such crank case includes a front wall 10 and a peripheral wall 11 having openings 12 therein through which a plurality of cylinders 13 extend in a radial relation. Securing bands 14 surround the crank case and engage flanges 15 projecting from the cylinders for holding them on the crank case.

The skirt portions 16 of the cylinders project interiorly of a chamber 17 which is formed by the front wall 10 and a removable interior wall 18, such chamber constituting the housing for the usual connecting rod assembly and crank shaft (not shown) employed with engines of this type. Rib members 19 extend inwardly from the peripheral wall of the crank case and intermediate the cylinder skirts, such rib members serving as reinforcing means for the crank case.

A breather opening 20 is formed in the upper portion of the front wall 10 of the crank case intermediate the top rib members and adjacent the uppermost cylinder. A breather tube 21 is formed with openings 22 extending through its upper end and with a flange 23 which is secured to a boss 24 formed on the front wall 10 of the crank case by means of bolts 25, and a gasket 26 is arranged between the flanged end of the breather and the outer end of the boss 24 through which the breather opening extends.

The chamber 17 is partially filled with a body of lubricating oil so that when the engine is in operation the usual splash system of distribution to the interior cylinder walls takes place, such system being so well known that it is not deemed necessary to illustrate or describe the same herein. I have found, however, that with this arrangement of breather and this form of lubricating system some of the body of oil moves through the breather opening 20 and is carried out through the breather tube openings 22 along with the gases which usually escape through the breather. This is particularly true when the engine is employed as the power plant of an aeroplane wherein the engine is often tilted in various directions, and the main purpose of this invention is to provide a shield within the crank case so that the body of oil in the crank case cannot escape through the breather.

To this end I provide a shield or baffle member which is preferably detachable and arranged within the crank case in a relation between the opening and the body of oil. The shield is preferably formed of sheet metal and comprises a base portion 27 which is of a design to extend between the two upper rib members 19 and from the front wall 10 endwise of the crank case to a point substantially halfway across the chamber 17. This base portion is arranged in a plane beneath the opening 20 and is provided with an upstanding flanged front end 28 which lies adjacent the interior wall surface of the front crank case wall. The portion 29 of this flanged front portion of the shield, which would normally overlie the opening 20, is bent downwardly and secured below the base portion to the wall 10 by a screw 30, the flange 28 being secured to the wall 10 by screws 31. The inner portion of the base is formed with an upwardly extending flange 32 which closely surrounds the cylinder skirt adjacent the opening, and the outer sides 33 of the shield member are flanged upwardly to a point adjacent the peripheral wall of the crank case and are secured to the ribs 19 by screws 34.

It will be seen that the shield extends beneath the breather opening 20 and prevents splashing of the body of oil so that it can be carried out through the breather. This shield member is detachable so that it can be readily applied or removed from the crank case. It will be seen that any gas escaping from the crank case must travel over the upper end of the flanged walls 33 at the forward

end of the crank case or over the inner end of the shield which slides intermediate the upper ribs 19 and the upper cylinder, and thus the engine can be tilted at an extreme angle without danger of the body of lubricating oil contained in the crank case flowing or splashing into the breather.

While I have herein described in some detail a specific embodiment of my invention, which I deem to be new and advantageous and may specifically claim, I do not desire it to be understood that my invention is limited to the exact details of the construction, as it will be apparent that changes may be made therein without departing from the spirit or scope of my invention.

What I claim is:

1. In an internal combustion engine, a crank case having a breather opening in the upper portion of its wall, a cylinder extending into the crank case in spaced relation from the opening, and baffle means forming an imperforate wall extending across the space between the crank case wall and the cylinder beneath the opening.

2. In an internal combustion engine, a crank case having a breather opening in the upper portion thereof and adapted to contain a body of oil, a cylinder extending within the crank case adjacent the opening, reinforcing internal rib members for the crank case extending adjacent the cylinder, and a shield secured to the crank case and to the rib members, said shield being arranged intermediate the breather opening and the body of oil in the crank case and closely surrounding a portion of the cylinder.

3. In a radial internal combustion engine, a barrel-type crank case adapted to contain a body of oil, cylinders extending into the crank case, interior radial rib members in the crank case extending between the cylinders, one of the end walls of said crank case having a breather opening through the upper portion thereof adjacent the upper cylinder and intermediate a pair of said ribs, and a shield in said crank case extending across the portion of the crank case between the end wall, the upper cylinder and the adjacent ribs and in a plane beneath the breather opening.

4. In an internal combustion engine, a crank case having a breather opening in the upper portion thereof and adapted to contain a body of oil, a cylinder extending into the crank case, rib members extending from the top of the crank case adjacent opposite sides of the cylinder, a shield member extending partly across the crank case in a plane beneath the breather opening, said shield member having upstanding flanges adjacent the rib members and the crank case wall through which the opening extends, and means for securing said flanges to the crank case wall and the ribs.

5. In an internal combustion engine, a crank case having a breather opening in the upper portion thereof and adapted to contain a body of oil, cylinders extending into the crank case, baffle means within the crank case in a relation to shield the opening from the body of oil, and detachable means securing the baffle to the crank case, said baffle means secured to a crank case wall and extending to closely engage a portion of a cylinder.

6. In an internal combustion engine, a crank case having a breather opening in the upper portion of its wall, a cylinder extending into the crank case in spaced relation from the opening, and a baffle plate forming an imperforate wall extending across the space between the crank case wall and the cylinder beneath the opening, said baffle plate having upturned edge portions engaging the cylinder and the crank case wall.

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