Nov. 15, 1938. H. G. KAMRATH 2,137,054

CRANKCASE BREATHER AND OIL FILLER PIPE ASSEMBLY

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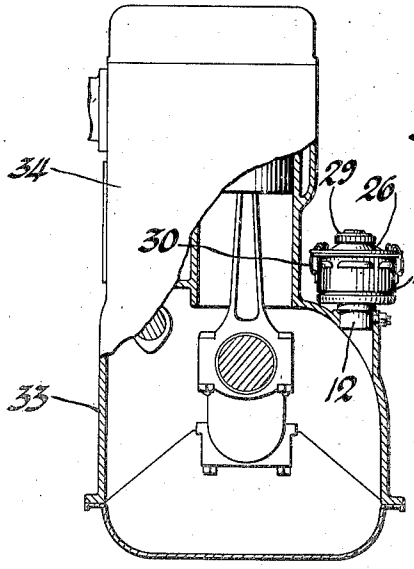


Fig. 1

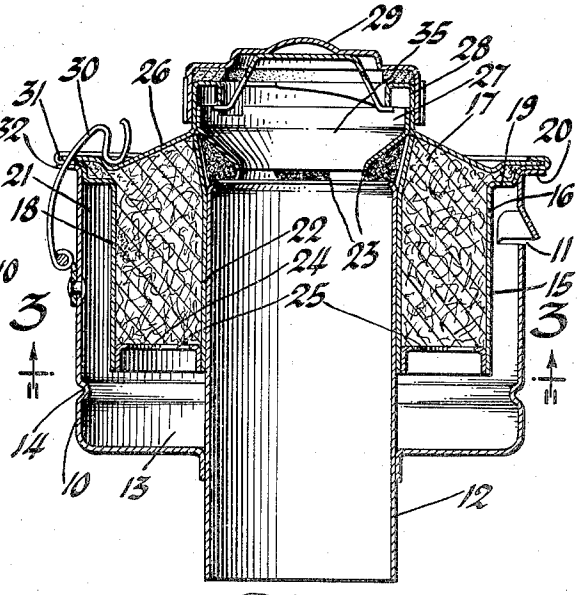


Fig. 2

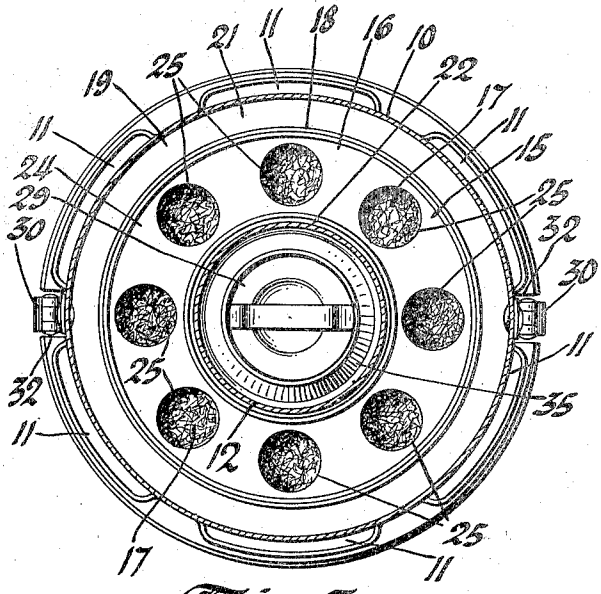


Fig. 3

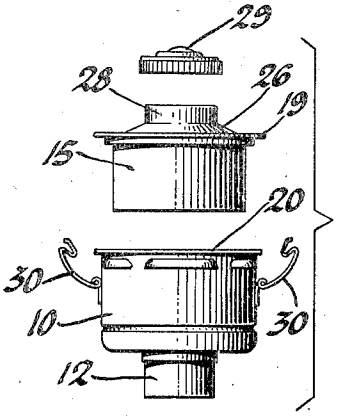


Fig. 4

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CRANKCASE BREATHER AND OIL FILLER PIPE ASSEMBLY

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6 Claims. (Cl. 121—194)

This invention has to do with internal combustion engine breather and oil filler pipe assemblies in which there are incorporated air cleaners which serve to inhibit the escape of oil vapors from and the entrance of dirt into the crankcases of the engines on which the assemblies are installed.

The principal object of the invention is to provide an assembly of the type referred to which is so constructed that the air cleaner may be easily disassembled and serviced and the filler pipe may be uncovered so that oil may be introduced into the crankcase of the engine on which the assembly is installed without disturbing or exposing the air cleaner assembly.

For a better understanding of the nature and objects of this invention, reference is made to the following specification wherein there is described the preferred embodiment of the invention which is shown in the accompanying drawing.

In the accompanying drawing:

Figure 1 shows a breather and oil filler pipe assembly in accordance with my invention installed on an internal combustion engine;

Figure 2 is an enlarged longitudinal section through the breather and oil filler pipe assembly;

Figure 3 is a section taken on the line 3—3 of Figure 2;

Figure 4 is an exploded view on a reduced scale of the breather and oil filler pipe assembly.

The breather and oil filler pipe assembly shown in the drawing includes a cup-shaped member 10 with a ring of orifices 11 in its side wall just below its upper end and a tube 12 which extends through and is secured in a central orifice in the bottom of the cup-shaped member with its upper end at a somewhat lower level than the upper end of the side wall of the cup-shaped member. As the drawing shows, the upper portion of the tube 12 defines with the cup-shaped member 10 an annular receptacle 13 which is filled with oil or some other suitable liquid to about the level of the bead 14 before the assembly is put into use.

Within the annular receptacle 13, there is disposed an annular filter element 15 which consists of a hollow annulus 16 filled with a suitable filter medium 17 such as that disclosed in the Webb application Serial No. 752,232 which was filed on November 9, 1934. On the upper end of the cylindrical outer wall 18 of the annulus 16, there is an upwardly stepped, outwardly extending supporting flange 19 whose outer step is seated on a flange 20 on the upper end of the side wall of the cup-shaped member with its riser telescoped snugly within it. The wall 18 is imperforate and is separated from the side wall of the cup-shaped member by an annular aperture 21 into whose upper end the orifices 11 open. The inner wall 22 of the annulus 16 is generally cylindrical but its upper portion is flared slightly. The cylindrical lower portion of the wall 22 is imperforate and snugly embraces the upper portion of the tube 12. The flared upper portion of the wall 22 extends above the upper end of the tube 12 and has in it a ring of orifices 23. The annular bottom wall 24 of the annulus 16 which is joined to the lower ends of the walls 18 and 22 is disposed above the liquid level in the annular receptacle 13 and has in it a ring of orifices 25. The outer edge of the top wall 26 of the annulus 16 which is generally frusto-conical in shape is joined to the upper step of the supporting flange 19 on the outer wall 18 with its inner edge resting on the upper end of the flared portion of the inner wall 22. Except for the central orifice 27, the top wall 26 of the annulus 16 is imperforate. The orifice 27 is encircled by an upwardly projecting flange 28 on whose upper end there is seated a cap 29 which is detachably connected to the flange by a bayonet-slot joint.

To hold the filter element in place in the annular receptacle 13, there are provided spring hooks 30 which engage over the top of the filter element and are connected to the cup-shaped member 10 so that they may be swung to the inoperative positions in which they are shown in Figure 4. So that the hooks 30 will also prevent rotation of the filter element with respect to the cup-shaped member and thus facilitate removal of the cap 29, there are preferably provided in the flanges 19 and 20 notches 31 and 32 through which the hooks extend when they are engaged over the top of the filter element.

The breather and oil filler pipe assembly which is shown in the drawing may be installed with the lower end of the tube 12 telescoped within the oil filler pipe of an internal combustion engine or, as Figure 1 shows, with the lower end of the tube 12 secured directly in a vertical opening in the crankcase 33 of the engine 34. When the assembly is so installed and the engine is operating, air is alternately drawn into the crankcase and discharged therefrom through the assembly. Air drawn into the crankcase passes, successively, through the orifices 11, the aperture 21, the orifices 25, the filter medium 17, the orifices 23 and the tube 12 and is freed of dirt by contact with the body of liquid in the bottom of the annular

receptacle 13 and the filter medium 17. Air discharged from the crankcase takes the same path in the reverse direction and is similarly freed of vapors and entrained oil.

As Figure 4 indicates, the filter element 15 may be lifted vertically from the annular receptacle 13 after the hooks 30 have been moved to their inoperative positions. This feature of my breather and oil filler pipe assembly, of course, facilitates renewal of the supply of liquid in the annular receptacle 13 and cleaning and recoating the filter medium 17 with liquid. However, it is not necessary to remove the filter element from the annular receptacle to replenish the supply of oil in the crankcase of the engine on which the assembly is installed. To do this, it is only necessary to remove the cap 29. To prevent any of the oil intended for the crankcase from going into the filter element 15 through the orifices 23, there is preferably provided a funnel-like element 35 whose upper end is secured within the flange 28 which encircles the orifice 27 in the top of the filter element through which oil is introduced into the tube 12 and whose lower end overlaps the orifices 23.

I claim:

1. In an assembly of the type disclosed, a generally vertically disposed tubular member whose lower end is open, a shell which encircles and is radially spaced from a portion of the tubular member so that it defines therewith an annular receptacle which constitutes a liquid reservoir, an orifice which communicates with the interior of the shell and the atmosphere, a filter element disposed within the shell, an orifice which communicates with the filter element and the interior of the tubular member, a cover for the upper end of the filter element, and a removable cover for the upper end of the tubular member.

2. In an assembly of the type disclosed, a generally vertically disposed tubular member, whose lower end is open, a shell which encircles and is radially spaced from a portion of the tubular member so that it defines therewith an annular receptacle which constitutes a liquid reservoir, an orifice in the wall of the shell near its upper end, an annular filter element removably disposed within the shell with its outer and lower walls spaced, respectively, from the outer and lower walls of the shell and supported from the upper end of the shell, a cover for the upper end of the filter element and the upper end of the tubular member, an orifice in the cover which is substantially equal in size to and disposed opposite the upper end of the tubular member when the filter element is assembled with the shell, and a removable closure for the orifice substantially equal in size thereto.

3. In an assembly of the type disclosed, a generally vertically disposed tubular member whose lower end is open, a shell which encircles and is radially spaced from a portion of the tubular member so that it defines therewith an annular receptacle which constitutes a liquid reservoir, an orifice which communicates with the interior of the shell and the atmosphere, an annular filter element disposed within the shell so that it may be removed therefrom, a cover for the upper end of the filter element and the upper end of the tubular member, an orifice in the cover disposed opposite the upper end of the tubular member when the filter element is assembled with the shell, and a removable closure for the orifice.

4. In an assembly of the type disclosed, a generally vertically disposed tubular member whose lower end is open, a shell which encircles and is radially spaced from a portion of the tubular member so that it defines therewith an annular receptacle which constitutes a liquid reservoir, an annular filter disposed within and supported from the annular receptacle so that it may be removed therefrom, an orifice in the top of the filter element which is disposed opposite the upper end of the tubular member when the filter element is disposed within the annular receptacle, a cover for the orifice which may be removed therefrom by rotating it, and means for holding the filter element in place within the annular receptacle and preventing rotation of the filter element with respect to the annular receptacle.

5. The assembly specified by claim 4 in which the last-mentioned means includes hooks which are connected to the shell and engage over the cover of and in notches in the filter element.

6. In an assembly of the type disclosed, a generally vertically disposed tubular member whose lower end is open, a shell which encircles and is radially spaced from a portion of the tubular member, means within the shell for separating foreign matter from air, an orifice which communicates with the interior of the shell and the atmosphere, an orifice which communicates with the interior of the shell and the interior of the tubular member, a cover for the upper end of the shell, and a removable cover for the upper end of the tubular member.

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