

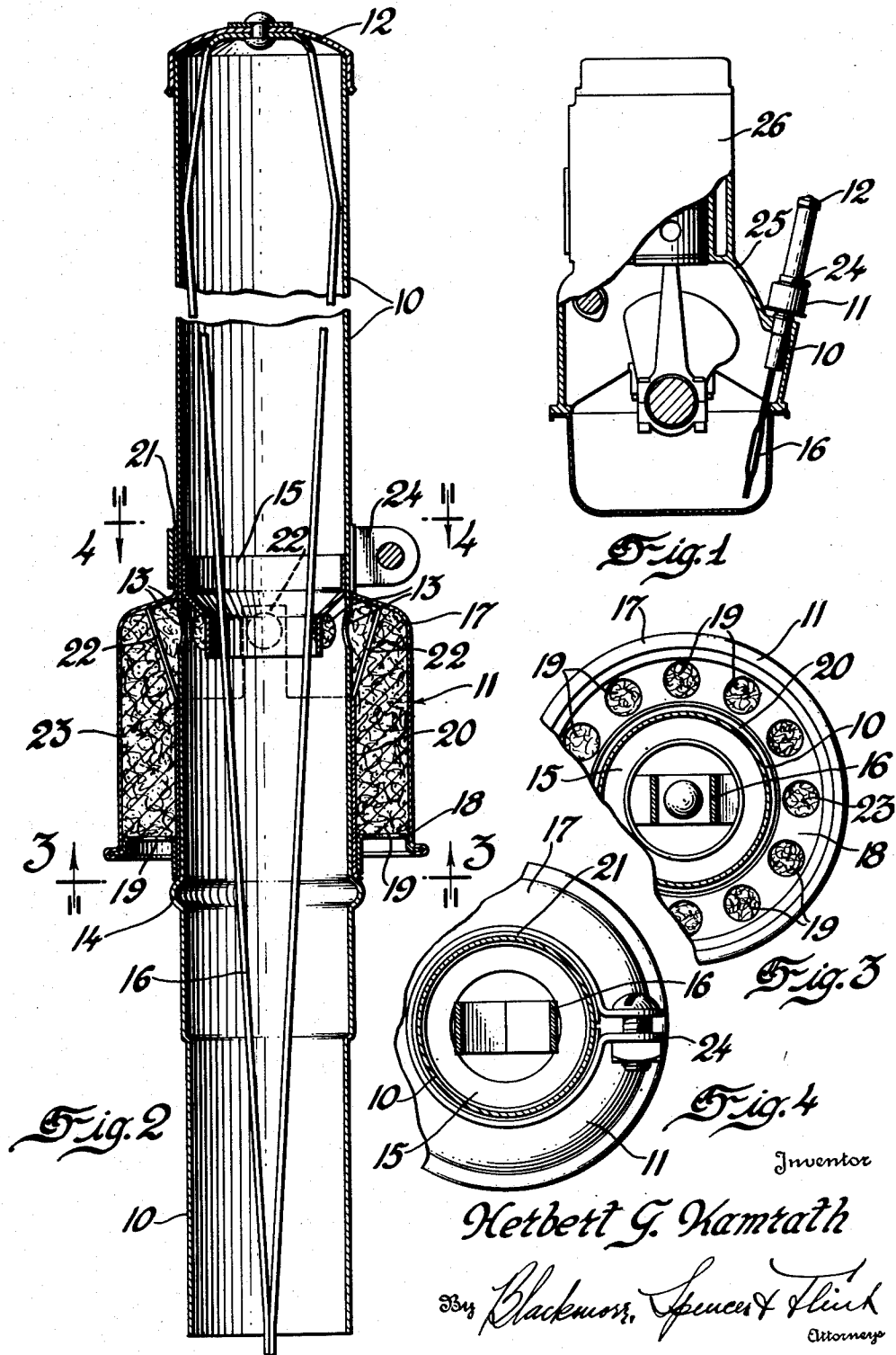
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CRANKCASE BREATHER AND OIL FILLER PIPE ASSEMBLY

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CRANKCASE BREATHER AND OIL FILLER
PIPE ASSEMBLY

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10 Claims. (Cl. 121—194)

This invention has to do with internal combustion engine crankcase breather and oil filler pipe assemblies in which there are incorporated air cleaners.

5 The principal object of the invention is to provide an assembly of the type referred to which is so constructed that the escape of oily vapors therethrough from the crankcase of the engine on which it is installed is minimized and that servicing the air cleaner is facilitated.

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

15 In the accompanying drawing:

Figure 1 shows a crankcase 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 crankcase breather and oil filler pipe assembly;

Figure 3 is a fragmentary view taken as indicated by the line 3—3 of Figure 2;

25 Figure 4 is a fragmentary view taken as indicated by the line 4—4 of Figure 2.

The crankcase breather and oil filler pipe assembly which is shown in the drawing includes a tube 10, an annular filter element 11 which encircles an intermediate portion of the tube, and a removable cap 12 for the upper end of the tube.

30 Through the tube 10, about midway between its ends, there extend a ring of orifices 13. At a distance below the orifices 13, there is formed in the tube an annular bead 14. In the tube above the orifices 13, there is secured the larger end of a funnel-like element 15 with its smaller end extending below the orifices. To the cap 12, there is secured the upper end of an oil gage rod 16 whose lower end projects beyond the lower end of the tube 10.

45 The filter element 11 consists of a member 17 which is shaped generally like an inverted cup with an annular head 18 in which there are a ring of orifices 19 secured over its open end and a tube 20 whose diameter is such that it will fit snugly around the tube 10 between the orifices 13 and the bead 14 secured in the central orifice in the head 18 and extending into the member 17. In the end wall of the member 17, there is a central orifice which is encircled by an upstanding split flange 21 whose diameter is equal to that of the tube 20. The tube 20 terminates short of the end wall of the member 17 but there extend from its upper end four legs 22 which are inclined toward the side wall of the member 17 and whose ends engage the end wall of the member 17. The annular space between the member 17, the head 18 and the tube 20 and the

legs 22 is filled with a suitable liquid wetted filter medium 23 such as that disclosed in the Webb application Serial No. 752,232 which was filed on November 9, 1934.

5 The filter element 11 is assembled with the tube 10 by sleeving the lower end of the tube 20 around the upper end of the tube 10 and sliding the filter element downwardly until the lower end of the tube 20 is seated on the bead 14. As the drawing shows, the location of the orifices 13 in the tube 10 and the dimensions of the filter element 11 are so correlated that when the lower end of the tube 20 is seated on the bead 14 the upper end of the tube 20 is located below and the inner edge of the end wall of the member 17 above the orifices 13. To hold the filter element in this position, there is provided a ring clamp 24 which encircles the split flange 21.

The crankcase breather and oil filler pipe assembly which is shown in the drawing may be installed on an internal combustion engine with the lower end of the tube 10 telescoped within the oil filler pipe of the engine or, as the drawing shows, with the lower end of the tube 10 secured directly in an opening in the upper wall of the crankcase 25 of the engine 26. The oil gage rod 16 is, of course, made of such length that it will extend into the body of lubricating oil in the crankcase of the engine and afford a means of determining the level of the oil therein.

30 When the assembly is installed in either of the mentioned ways and the engine on which it is installed is operating, the oily vapors generated in the crankcase of the engine, which when conventional crankcase breathers are employed escape into the atmosphere therefrom, being less dense than the air in the upper end of the tube 10, rise into and displace air from the latter. In the upper end of the tube 10 the oily vapors are cooled and condensed and then gravitate back into the crankcase. Thus my crankcase breather and oil filler pipe assembly conserves lubricating oil and obviates filming the engine and its surroundings with oil.

45 To promote condensation of the oily vapors, it is, of course, preferable to position the assembly so that the upper end of the tube 10 is located in a current of air. When the assembly is employed on an engine equipped with a cooling fan it may profitably be disposed so that the upper end of the tube 10 is located in the current of air generated by the engine cooling fan. How long the portion of the tube above the orifices 13 should be to make it sufficiently effective in condensing the oily vapors is a matter which, of course, varies with different engines and installations. For the particular engine and installation for which the assembly shown in the drawing was designed a length of about six inches was found satisfactory.

When the engine on which the assembly is installed is operating, air is, of course, alternately drawn into and discharged from the crankcase of the engine through it. The air which enters the crankcase passes, successively, through the orifices 19, the filter medium 23 and the orifices 13, between the legs 22 and through the tube 10 and is freed of dirt by the filter medium. The air which is discharged from the crankcase follows the same path in the opposite direction and is similarly freed of entrained oil and whatever oily vapors may pass with it through the orifices 13.

After the cap 12 is removed and the clamp 24 loosened, the tube 10 and the filter element 11 may be disassembled by simply sliding the latter off the upper end of the former. This capability of disassembly and the ease with which it may be effected, of course, facilitates servicing the filter element.

The supply of lubricating oil in the crankcase of an engine on which my assembly is installed may be replenished by simply removing the cap 12 and introducing oil into the upper end of the tube 10. The funnel-like element 15, of course, prevents any of this oil or any of the condensate from the oily vapors which rise into the upper of the tube 10 escaping from the tube through the orifices 13.

I claim:

1. In an internal combustion engine, a crankcase breather in which there is included a hollow structure into which vapors from the crankcase may rise, and a breather orifice in the hollow structure so disposed that there is beyond it in the direction of travel of vapors from the crankcase a chamber of such capacity that condensation of vapors from the crankcase to the extent necessary to obviate material loss thereof through the breather orifice may occur therein.

2. In an internal combustion engine, a crankcase breather in which there is included a hollow structure into which vapors from the crankcase may rise, a breather orifice in the hollow structure so disposed that there is beyond it in the direction of travel of vapors from the crankcase a chamber of such capacity that condensation of vapors from the crankcase to the extent necessary to obviate material loss thereof through the breather orifice may occur therein, and means for separating foreign matter from air interposed between the breather orifice and the atmosphere so that air which leaves or enters the breather passes through said separating means.

3. In an internal combustion engine, a crankcase breather in which there is included a hollow structure into which vapors from the crankcase may rise, a breather orifice in the hollow structure so disposed that there is beyond it in the direction of travel of vapors from the crankcase a chamber of such capacity that condensation of vapors from the crankcase to the extent necessary to obviate material loss thereof through the breather orifice may occur therein, and means for separating foreign matter from air separable from the hollow structure and interposed between the breather orifice and the atmosphere so that air which enters or leaves the breather passes through said separating means.

4. In an internal combustion engine, a crankcase breather in which there is included a tubular structure into which vapors from the crankcase

may rise, and a breather orifice in the tubular structure so disposed that there is above it several inches of the tubular structure in which vapors from the crankcase may be condensed.

5. In an assembly of the type disclosed, a tubular structure, a hollow annulus with filter material in it telescoped around an intermediate portion of the tubular structure so that its upper end is located well below the upper end of the tubular structure, an orifice in the lower wall of the hollow annulus, and an orifice in the tubular structure which opens into the upper end of the hollow annulus.

6. In an assembly of the type disclosed, a tubular structure with a closed upper end in which vapors which enter it may be condensed, an annular bead in the tubular structure well below its upper end, an open ended hollow annulus with filter material in it telescoped around an intermediate portion of the tubular structure with its lower end seated on the annular bead and its upper end well below the upper end of the tubular structure, a split flange on the upper wall of the hollow annulus which encircles a portion of the tubular structure, a ring clamp which encircles the flange and clamps it around the tubular structure, an orifice in the lower wall of the hollow annulus, and an orifice in the tubular structure which opens into the upper end of the hollow annulus.

7. In an assembly of the type disclosed, a tubular structure, an orifice in the tubular structure so disposed that there is above it several inches of the tubular structure in which vapors which enter it may be condensed, and an annular element which is disposed below the upper end and encircles a portion of the tubular structure and overlaps the orifice in said tubular structure.

8. In an assembly of the type disclosed, a tubular structure, an annular filter element which encircles a portion of the tubular structure well below its upper end, and an orifice in the tubular structure which opens into the filter element and is so disposed that there is above said orifice several inches of the tubular structure in which vapors which enter it may be condensed.

9. In an assembly of the type disclosed, a tubular structure, an annular filter element which encircles a portion of the tubular structure well below its upper end and is separable therefrom, and an orifice in the tubular structure which opens into the filter element and is so disposed that there is above said orifice several inches of the tubular structure in which vapors which enter it may be condensed.

10. In an assembly of the type disclosed, a tubular structure with a closed upper end in which vapors which enter it may be condensed, an open ended annular element which encircles an intermediate portion of the tubular structure with its upper end well below the upper end of the tubular structure and an orifice which communicates with the atmosphere in it near one end, an orifice in the tubular structure which opens into the annular element near the other end thereof, and an annular flange on the last mentioned end of the annular element which encircles and is clamped around a portion of the tubular structure beyond the mentioned orifice in it.

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CERTIFICATE OF CORRECTION.

Patent No. 2,154,072.

April 11, 1939.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 6, claim 5, after "structure" and before the comma, insert the words with a closed upper end in which vapors which enter it may be condensed; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 13th day of June, A. D. 1939.

Henry Van Arsdale

(Seal)

Acting Commissioner of Patents.