Jan. 16, 1940. W. L. CARLSON 2,187,264

CRANKCASE BREATHER

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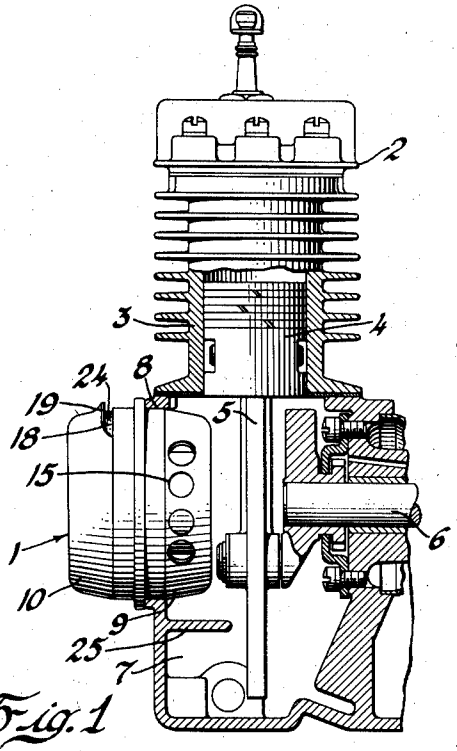


Fig. 1

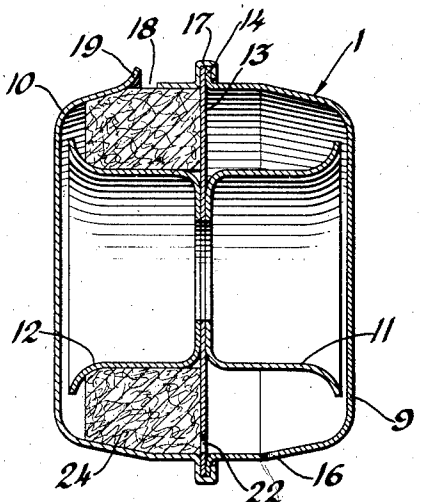


Fig. 2

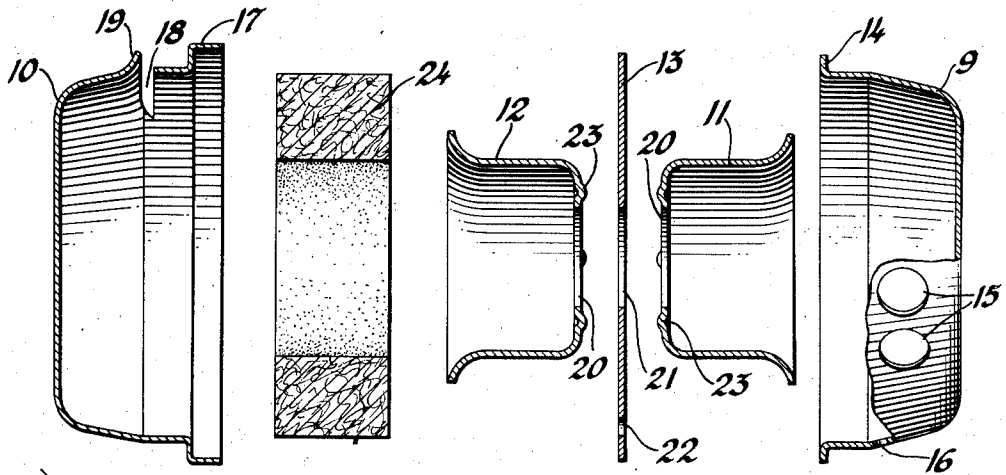


Fig. 3

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CRANKCASE BREATHER

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7 Claims. (Cl. 121—194)

This invention relates to a new and improved crankcase breather for internal combustion engines which is adapted to relieve the compression in the crankcase and prevent the escape of oil therefrom.

It is an object of the invention to provide a breather construction which will vent the crankcase to the atmosphere, prevent dirt, dust or other foreign matter from entering the crankcase, and also separate any oil from the crankcase gases passing through the breather and return this oil to the crankcase.

It is a further object to provide a breather which is simple in construction and efficient in operation, and other objects and advantages of this invention will appear from the following description taken in connection with the accompanying drawing showing one embodiment thereof.

In the drawing:

Figure 1 is a fragmental vertical section of an internal combustion engine with the breather of the present invention.

Figure 2 is a vertical section of the breather assembly.

Figure 3 is a vertical section, partly in elevation, of the several elements of the breather assembly shown in spaced relation.

Referring first to Figure 1, the breather, indicated generally at 1, is shown in connection with an air cooled engine 2 of the general type used in small electric generating plants, although it will be understood that this breather may be used with any internal combustion engine of conventional form. In the present showing, the engine 2 has the usual cylinder 3, piston 4, connecting rod 5, crankshaft 6, and crankcase 7, and the crankcase 7 is provided with an opening 8 to receive the breather 1.

Except for the filter element, the breather 1 is constituted entirely by sheet metal parts which may be readily formed and assembled with the filter element as a complete unit as is clearly shown in Figures 2 and 3 and as will now be described. These metal parts consist of the two casing members 9 and 10, the similarly formed baffle members 11 and 12, and the baffle plate 13.

The casing member 9, which as shown in Figure 1 is adapted to extend into the crankcase 7 when the breather unit is associated with the engine, is generally cup-shaped with an outwardly extending flange 14 at its open end, and is provided with a series of openings 15 in its peripheral wall and also with a relatively small hole 16 for a function to be hereafter described.

The casing member 10, which is outside of the crankcase when the breather unit is associated with the engine as shown in Figure 1, is also generally cup-shaped and is initially formed with an offset flange 17 at its open end as shown in Figure 3 which is adapted to be crimped or spun over the flange 14 of the casing member 9 as shown in Figure 2 during assembly of the breather unit. This casing member 10 is provided with a peripheral slot 18 which is formed with the outwardly curved wall portion 19 in the nature of a louver.

The similarly formed baffle members 11 and 12 are each generally bell-shaped and each flared outwardly at its open end and provided with a central opening 20 in its closed end. The baffle plate 13 is a flat circular plate with a central opening 21 of the same size as the openings 20 in members 11 and 12, and a relatively small hole 22 is provided in the plate 13 adjacent its edge for a purpose to be later set forth.

The baffle members 11 and 12 are preferably each formed initially with several spaced projections 23 around the central opening 20 as shown in Figure 3 whereby these members may be readily welded to opposite sides of the plate 13. The filter element, which may consist of a generally cylindrical mass of copper mesh or other suitable pervious material 24, is adapted to be located around the outside of the baffle member 12, and the entire unit may be then assembled by placing the circular edge of the plate 13 within the offset flange 17 on the casing member 10 and clamping the flange 14 of the casing member 9 in engagement with the opposite side of the plate 13 by crimping or spinning the edge of the flange 17 over this flange 14 to thereby complete the breather assembly as shown in Figure 2.

Before describing the operation of the breather it should be noted that the parts are so positioned when assembled in the above manner that the slot 18 may be placed at the upper side of the unit when mounted in the opening 8 in the engine crankcase and the small holes 16 and 22 will be then located at the bottom of the unit. It should also be noted that the relative size of the several parts is preferably such that the flared open ends of the baffle members 11 and 12 are spaced only a slight distance from the closed ends of the casing members 9 and 10, respectively.

In the present application of the invention, the crank pin bearing and crankshaft bearing are adapted to be lubricated by a splash system and the hollow connecting rod 5 is provided with an extension to splash the oil in the crankcase and also to feed some of this oil through the connect-

ing rod to the piston pin bearing, and it is preferable to provide a horizontal baffle plate or wall 25 in the crankcase below the opening 8 for the breather unit to prevent the direct splashing of oil into the openings 15 in the breather casing member 9 which extends into the crankcase.

With the above described construction it will now be apparent that the crankcase gases and vapors may first enter the breather casing member 9 through the openings 15 and pass into the baffle member 11 through the narrow space between the flared end of this member and the closed end of the casing member 9, then pass through the baffle members 11 and 12 and into the casing member 10 through the narrow space between the flared end of the baffle member 12 and the closed end of the casing member 10, and finally reach the atmosphere by passing through the filter material 24 and out through the slot 18.

During this movement of the crankcase gases and vapors to the atmosphere it will also be apparent that the relatively small amount of oil which may be present in these vapors will either condense on or in the baffle members 11 and 12 and drop off of the flared open ends thereof or be separated from the vapors by the filter material 24. Any oil which may then collect in the bottom of the casing member 10 may pass through the hole 22 in the baffle wall 13 into the bottom of the casing member 9 and together with any oil which has collected therein, drain back into the crankcase through the hole 16.

It will also be evident that any air which enters the crankcase through the breather will have to pass through the filter material 24 which may be moistened to some extent by the oil in the crankcase vapors and which will prevent dirt, dust or other foreign matter from entering the crankcase.

Only a single, specific embodiment of the invention has been herein shown and described, but it will be understood that the invention is not to be strictly limited thereto and various changes and modifications may be made within the scope of the invention as set forth in the appended claims.

I claim:

1. In an internal combustion engine provided with a crankcase, a breather unit adapted to be mounted directly within an opening in the crankcase, including a casing having a substantially cylindrical portion extending into the crankcase with peripheral openings in said portion to place the interior of said casing in communication with said crankcase, and having a portion extending outside of said crankcase with an opening to the atmosphere, and means within said casing to baffle and filter the crankcase vapors passing through said casing from said crankcase to the atmosphere.

2. In a crankcase breather, a substantially cylindrical casing provided with closed end walls and peripheral openings adjacent opposite ends thereof adapted to communicate, respectively, with a crankcase and the atmosphere, and a bell-shaped baffle member in said casing having a flared opening closely adjacent one of said closed end walls and a central opening for the passage of crankcase vapors from the crankcase to the atmosphere.

3. In a crankcase breather, a substantially cylindrical casing provided with closed end walls and peripheral openings adjacent opposite ends thereof adapted to communicate, respectively, with a crankcase and the atmosphere, a baffle wall intermediate the ends of said casing, a bell-shaped baffle member on each side of said baffle wall with the open end of each baffle member adjacent an end wall of said casing, and said baffle wall and members being provided with aligned central openings to permit the passage of crankcase vapors from the crankcase to the atmosphere.

4. The elements set forth in claim 3 in which said baffle wall is provided with a further opening adjacent the bottom of said casing and said casing is provided with a bottom drain hole adjacent the end thereof which communicates with the crankcase to permit the return of oil to the crankcase.

5. The elements set forth in claim 3, with filter material in the casing around one of said bell-shaped baffle members.

6. In an internal combustion engine provided with a crankcase, a breather unit adapted to be mounted directly within an opening in the crankcase and having a portion extending into the crankcase and provided with an opening communicating therewith, and a horizontally arranged baffle wall in said crankcase beneath the opening in said breather unit to prevent the splashing of oil into said breather unit.

7. In a crankcase breather, a substantially cylindrical casing provided with end walls and adapted to communicate with a crankcase adjacent one end of said casing and with the atmosphere adjacent the other end of said casing, and a baffle member in said casing with an opening therethrough and extending closely adjacent to one of the end walls of said casing to form therewith a relatively restricted passage for the crankcase vapors through said casing.

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