

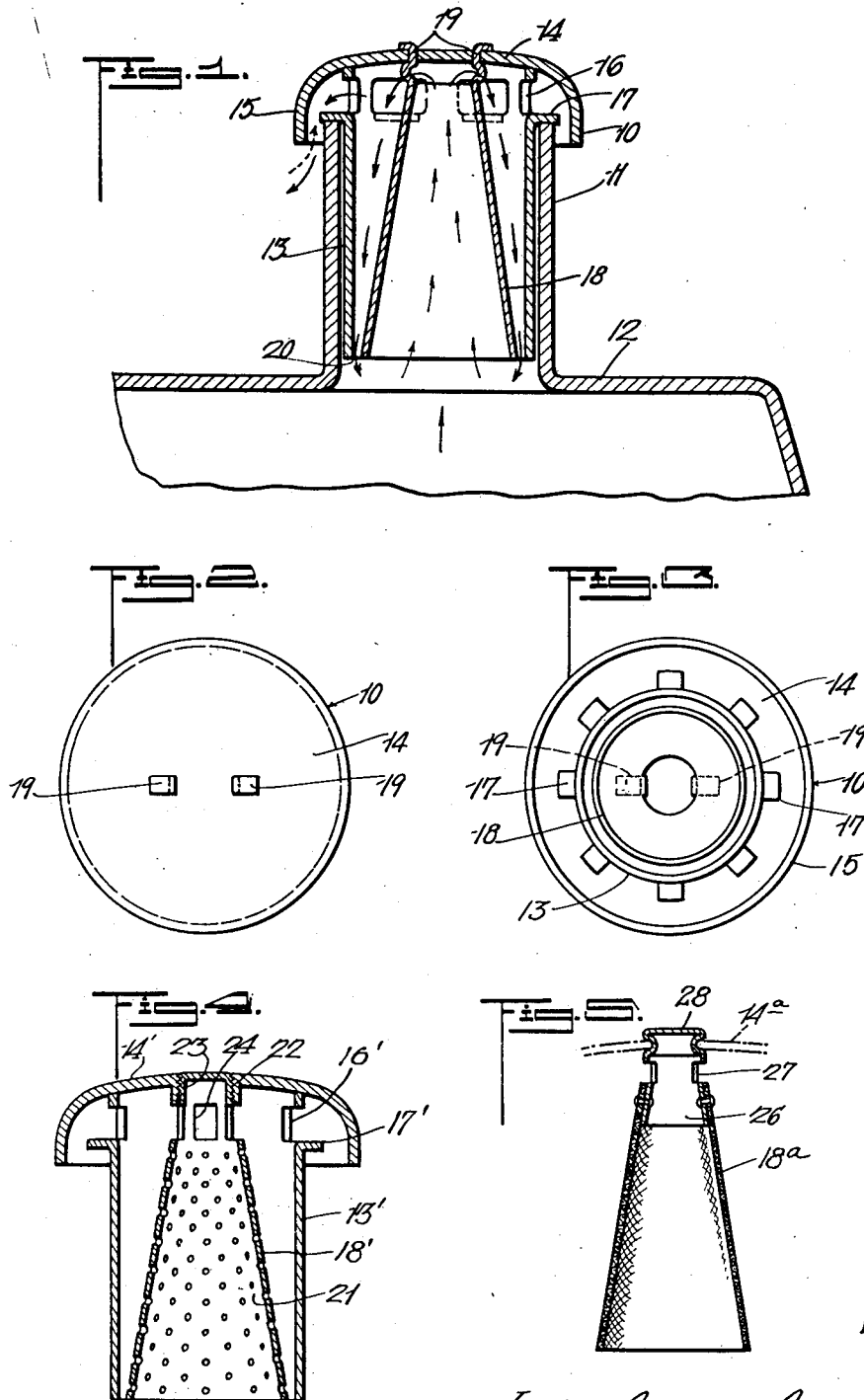
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BREATHER PIPE CAP FOR INTERNAL COMBUSTION ENGINES

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BREATHER PIPE CAP FOR INTERNAL COMBUSTION ENGINES

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This invention relates to improvements in caps for internal combustion engine crank case breather pipes, and an important object of the invention is to provide breather pipe caps which ventilate the crank case and at the same time prevent loss of oil from the breather pipe even when the engine is running at high speed.

Another important object of this invention is the provision of a breather pipe cap of the character described which is constructed and arranged to avoid the formation of obstructions therein which would clog the same, and which is easy to clean when necessary.

Other objects and advantages of this invention will be apparent from a reading of the following description in connection with the drawing wherein for purposes of illustration I have set forth preferred embodiments of my invention.

In the drawing:—

Figure 1 is a vertical sectional view through the breather pipe of an internal combustion engine crank case and through one embodiment of my invention showing it installed in the breather pipe.

Figure 2 is a top plan view of the breather pipe cap shown in Figure 1.

Figure 3 is a bottom plan view thereof.

Figure 4 is a vertical sectional view through another embodiment of my invention.

Figure 5 is a vertical sectional view through a portion of a still further embodiment of my invention.

Referring in detail to the drawing and in particular to Figures 1, 2, and 3 wherein is shown one of the embodiments of my invention, the numeral 10 generally designates this embodiment which is shown installed in the outer end of the breather pipe 11 of an internal combustion engine crank case 12. It will be understood that the type of breather pipe contemplated is that type through which the crank case oil is poured to fill the crank case, and which has also the function of passing air and gases inhaled and exhaled by the motor.

The breather cap 10 comprises the vertical cylindrical tube 13 of a diameter to frictionally telescope into the breather pipe 11 to hold the same therein and force the air and gases moving through the breather pipe to pass through the tube 13. A convex-concave hood 14 is secured to and closes the upper end of the tube 13 and extends radially outwardly therefrom so as to overhang the upper end of the breather pipe 11. The skirt portion 15 of the hood 14 normally has its

lower edge located below the upper end of the breather pipe.

Several circumferentially spaced openings 16 in the upper end portion of the tube 13 are defined by punching out tongues 17 which are bent radially outwardly at right angles to form supports for resting upon the upper end of the breather pipe and limiting the telescoping of the tube 13 into the breather pipe 11. This manner of forming the openings 16 disposes their lower edges at an elevation above the upper end of the breather pipe and above the lower edge of the skirt 15 of the hood 14, as will be evident in Figure 1. The hood 14 may be secured to the top of the tube 13 in any of several well-known ways.

Located in concentrically spaced manner within the tube 13 and having its lower end terminating substantially on a level with the lower end of the tube 13 is the open-end conical tubular imperforate baffle 18, whose upper end (see Figure 1) rises approximately to the level of the tops of the openings 16, which are arranged slightly spaced below the underside of the hood 14. A pair of diametrically opposed tongues 19 constructed on the upper end of the baffle 18 and crimped to space the upper end of the baffle 18 from the underside of the hood 14 when terminal portions of the tongues are passed through suitable openings in the hood and then bent over, support and hold the baffle 18 in place. It will be observed that while the upper part of the baffle 18 is considerably spaced from the sides of the tube 13, the lower end part of the baffle 18 very closely approaches the walls of the tube 13 to provide a restricted passage 20.

Having in common with the above-described embodiment the tube 13', having the circumferentially spaced openings 16', defined by punching out the supports 17', and the hood 14', the embodiment shown in Figure 4 differs from the above-described embodiment only in the use of a perforated baffle 18' of the same shape instead of an imperforate baffle, and in the manner of securing the perforated baffle 18' to the hood. In the Figure 4 embodiment the baffle 18' is of sheet material formed with rather widely spaced holes 21. The extreme upper part 22 of the baffle 18' is cylindrical and provided with circumferentially spaced openings 24, above which the part 22 is exteriorly screw-threaded to removably engage in the interiorly screw-threaded sleeve portion 23 carried by the hood 14'. It will be observed that the circumferentially spaced openings 24 in the closed upper part of the baffle have their lower edges arranged at a

level with the lower edges of the openings 16' of the tube 13'.

In Figure 5 is fragmentarily illustrated an arrangement of breather cap utilizing instead of the imperforate baffle 18 or the perforate baffle 18', a mesh baffle 18a carried by a tubular member 26, to the exterior of whose flaring lower part it is riveted as shown or otherwise suitably secured. Above the flaring lower part the tubular member 26 is the substantially cylindrical portion provided with circumferentially spaced openings 27 similar in form arrangement and function to the openings 24 of the embodiment shown in Figure 4. Above the openings 27 is a closed top 28 which is located in a suitable opening in the hood 14a wherein it is anchored by compressing the top until it overhangs the edges of the opening in the hood at the top and bottom sides of the hood 14a. The mesh form of baffle 18a is meant to be substituted for the baffle 18 or the baffle 18' where desired.

The functioning of all three of the forms of my invention described above is substantially the same in main particulars, a slightly different action of the oil deposited on the baffles 18, 18', and 18a necessarily taking place because of the structural differences between the imperforate, perforate, and mesh constructions. Therefore, in describing the functioning of one form of the invention I shall be describing substantially the function of all three of the forms identified herein.

Following this plan and referring particularly to Figure 1, it is pointed out that when the engine is exhaling and thereby expelling a mixture of air, gases, and particles of oil through the breather pipe 11, most of this oil particle carrying vapor will be caused to enter the wide lower end of and rise within the baffle 18. As the oil vapor strikes the inside of the baffle 18 a considerable proportion of the oil particles will adhere to the inner walls of the baffle. The air and other gases, not being as adhesive as the oil, do not thus adhere to the inner walls of the baffle, but, leaving the oil behind, pass upwardly and out of the top of the baffle 18, or out of the holes 24 and 27 in the cases of the baffles of Figures 4 and 5, respectively, then to the exterior atmosphere by way of the holes 16, 16' and 16a of the tubes 13, 13' and 13a, respectively, of the different embodiments. However then the oil laden vapors thus pass into the baffle 18, all of the oil is not deposited on the inner walls of the baffle, but some small proportion of the oil is carried upwardly against the underside of the hood 14 and adheres to the underside of the hood, and in the embodiments of Figures 4 and 5, to the underside also of the tops 22 and 28, respectively, of the baffles in these embodiments. It will be obvious that an area of the underside of the hood will be thus covered with oil which is larger than the upper end part of the baffles in the case of each embodiment and the tendency will exist for the oil thus deposited on the underside of the hood to drain radially outwardly and fall or be drawn by suction when the engine inhales, into the space between the tube 13 and the baffle for return to the breather pipe.

In the Figure 1 embodiment the upper end of the baffle 18 is elevated above the lower edges of the tube openings 16, to cause the oil laden vapors coming up through the baffle to strike the underside of the hood 14 and deposit the oil before such vapors should become diffused and pass out to the atmosphere through the holes

16 in the tube 13 before depositing their oil burden. A similar oil conserving effect is provided by the cup-shaped upper parts of the baffles 18' and 18a, into which the oil laden vapor strikes and deposits most of its oil before passing outwardly through the holes 24, 27.

It will be remarked that although most of the oil laden vapors exhaled by the engine pass upwardly through the baffle 18, some of the vapor passes upwardly through the small space between the lower end of the baffle and the tube 13 and coming into contact with the interior wall of the tube 13, deposits most of its oil burden thereon. Because of the low pressure and small volume of the oil laden vapors which pass through the said small space, the oil deposited in the interior of the tube 13 will not be forced upwardly and out through the openings 16 in the tube, but will adhere to the interior of the tube 13 until the engine inhales.

When the engine inhales, a rush of atmospheric air is sucked inwardly through the openings 16 of the tube 13 and passes downwardly through the baffle 18 and through the space between the baffle 18 and the tube 13. It will be evident that the accumulations of oil on the underside of the hood 14, on the interior of the tube 13, and on the interior of the baffle 18, which have begun to drain gravitationally into the breather pipe, will be pushed and flowed downwardly by the in-rushing air into the breather pipe to return to the crank case.

In the cases of the baffles shown in Figures 4 and 5, the perforations and openings of the mesh effect a certain amount of transfer of oil deposited thereon from one side of the baffle to the other and naturally provide a relatively greater surface for the oil to adhere to. This greater amount of exposed surface equally naturally favors cooling of the oil before it is returned to the crank case.

Although I have shown and described herein preferred embodiments of my invention it is to be definitely understood that I do not desire to limit the application of my invention thereto beyond the spirit of the invention and the scope of the subjoined claims.

I claim:—

1. A breather pipe cover for an internal combustion engine crank case, said cover comprising a tube frictionally fitted into the outer end of the breather pipe carrying lateral means near its outer end for limiting insertion into the breather pipe, a dome secured on the outer end of the tube having a depending skirt portion surrounding and radially spaced from the outer end of the breather pipe, said tube being provided with openings located between the lateral means and the outer end of the tube, and conical baffle means having opening means at its top in communication with the tube and secured to depend from the cap in concentrically spaced manner within the tube having its large end closely spaced from the tube and defining a small annular oil return space, the large lower end of the baffle being located substantially on a level with the lower end of the tube.

2. An oil saver cap for a breather pipe, said cap comprising a tubular member for telescoping loosely into the breather pipe, lateral portions on said member near and spaced from its upper end for resting upon the outer end of the breather pipe to support said member in place, a concaved hood connected to the upper end of said member and arranged to have its marginal portions over-

hang and be spaced from said upper end of the member and said outer end of the breather pipe and depend below said outer end of the breather pipe; a conical tubular baffle having openings in its side wall adjacent its upper end, opening means on the said hood with which a portion of the upper end of the baffle is engaged to support the baffle concentrically within said member with its lower and larger end located substantially on a level with the lower end of said member and spaced inwardly from the interior of said member, said member having openings above said lateral portions substantially on a level with said openings adjacent the upper end of said baffle.

3. A breather pipe cap comprising a vertically elongated tubular cylindrical member to be telescoped into the outer end of the breather pipe, said tubular member being provided near its upper end with circumferentially spaced holes, radial lugs on the exterior of said tubular member adjacent to and below said holes to rest upon the outer end of the breather pipe to support said tubular member therein, a convex concave hood secured to and closing the upper end of said tubular member and extending radially therefrom to overhang beyond the outside of the upper end of the breather pipe, opening means in the hood, a tubular conical baffle having upper end portions engageable with said opening means to suspend said conical baffle in concentrically spaced manner within said tubular member and with its lower end located substantially on a level with the lower end of said tubular member and closely spaced therefrom to define a small annular passage, said baffle being provided at its upper end with openings permitting passage of air and vapor out of and into the upper end of said baffle.

4. A cover for an internal combustion engine crank case breather pipe, said cover comprising a tube frictionally fitted into the outer end of the breather pipe carrying lateral means near its outer end for limiting insertion into the breather pipe, a dome secured on the outer end of the tube having a depending skirt portion surrounding and radially spaced from the outer end of the breather pipe, said tube being provided with openings located between the lateral means and the outer end of the tube, and conical baffle means having opening means at its top in communication with the tube and secured to depend from the cap in concentrically spaced manner within the tube having its large end closely spaced from the tube and defining a small annular oil return space, the large lower end of the baffle being located substantially on a level with the lower end of the tube, said baffle means being imperforate.

5. A cover for an internal combustion engine crank case breather pipe, said cover comprising a tube frictionally fitted into the outer end of the breather pipe carrying lateral means near its outer end for limiting insertion into the breather pipe, a dome secured on the outer end of the tube having a depending skirt portion surrounding and radially spaced from the outer end of the breather pipe, said tube being provided with openings located between the lateral means and the outer end of the tube, and conical baffle means having opening means at its top in communication with the tube and secured to depend from the cap in concentrically spaced manner within the tube having its large end closely spaced from the tube and defining a small annular oil return space, the large lower end of the baffle being located substantially on a level

with the lower end of the tube, said top of the baffle means having tab means engaging slot means in said dome in a manner to suspend said baffle means.

6. A cover for an internal combustion engine crank case breather pipe, said cover comprising a tube frictionally fitted into the outer end of the breather pipe carrying lateral means near its outer end for limiting insertion into the breather pipe, a dome secured on the outer end of the tube having a depending skirt portion surrounding and radially spaced from the outer end of the breather pipe, said tube being provided with openings located between the lateral means and the outer end of the tube, and conical baffle means having opening means at its top in communication with the tube and secured to depend from the cap in concentrically spaced manner within the tube having its large end closely spaced from the tube and defining a small annular oil return space, the large lower end of the baffle being located substantially on a level with the lower end of the tube, said top of the baffle means having a threaded portion threaded into threaded opening means in said dome.

7. A cover for an internal combustion engine crank case breather pipe, said cover comprising a tube frictionally fitted into the outer end of the breather pipe carrying lateral means near its outer end for limiting insertion into the breather pipe, a dome secured on the outer end of the tube having a depending skirt portion surrounding and radially spaced from the outer end of the breather pipe, said tube being provided with openings located between the lateral means and the outer end of the tube, and conical baffle means having opening means at its top in communication with the tube and secured to depend from the cap in concentrically spaced manner within the tube having its large end closely spaced from the tube and defining a small annular oil return space, the large lower end of the baffle being located substantially on a level with the lower end of the tube, said top of the baffle means having a portion located in an opening provided in said dome and provided with flanges engaging the top and bottom sides of said dome for holding said baffle means in place.

8. A cover for an internal combustion engine crank case breather pipe, said cover comprising a tube frictionally fitted into the outer end of the breather pipe carrying lateral means near its outer end for limiting insertion into the breather pipe, a dome secured on the outer end of the tube having a depending skirt portion surrounding and radially spaced from the outer end of the breather pipe, said tube being provided with openings located between the lateral means and the outer end of the tube, and conical baffle means having opening means at its top in communication with the tube and secured to depend from the cap in concentrically spaced manner within the tube having its large end closely spaced from the tube and defining a small annular oil return space, the large lower end of the baffle being located substantially on a level with the lower end of the tube, said baffle means being formed with a multiplicity of holes in its side walls.

9. A cover for an internal combustion engine crank case breather pipe, said cover comprising a tube frictionally fitted into the outer end of the breather pipe carrying lateral means near its outer end for limiting insertion into the breather pipe, a dome secured on the outer end

of the tube having a depending skirt portion surrounding and radially spaced from the outer end of the breather pipe, said tube being provided with openings located between the lateral means 5 and the outer end of the tube, and conical baffle means having opening means at its top in communication with the tube and secured to depend from the cap in concentrically spaced manner

within the tube having its large end closely spaced from the tube and defining a small annular oil return space, the large lower end of the baffle being located substantially on a level with the lower end of the tube, the major part of said baffles being of reticulated material. 80

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