June 28, 1932. H. E. LEMMERMAN 1,864,604

BREATHER CAP

Filed June 14, 1930

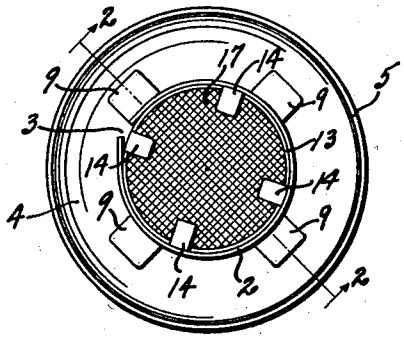


Fig. 1

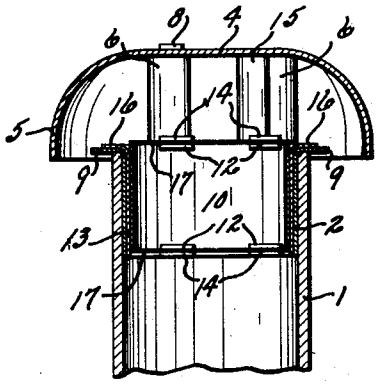


Fig. 2

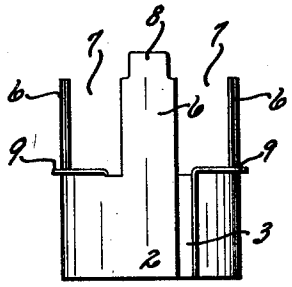


Fig. 3

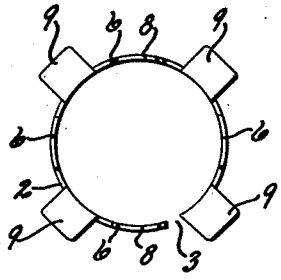


Fig. 4

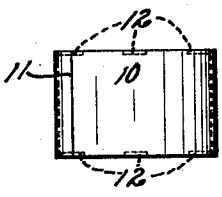


Fig. 5

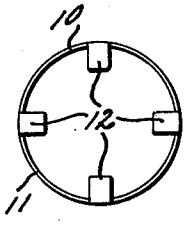


Fig. 6

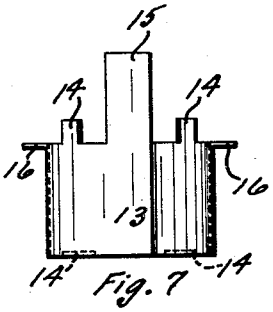


Fig. 7

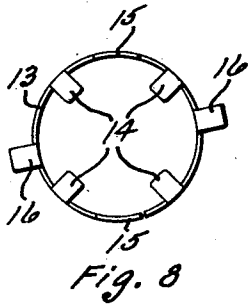


Fig. 8

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UNITED STATES PATENT OFFICE

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BREATHER CAP

Application filed June 14, 1930. Serial No. 461,211.

This invention relates to caps or closures, and more particularly to breather caps for the breather tubes or vents on motor vehicles. The object of the invention is to provide a simple and improved cap which is very easily made and assembled, which can be sold at low cost, which supplies ample venting or breathing area, and which at the same time prevents escape of oil or oil vapors to the atmosphere.

A further object of the invention is to provide simple and improved means for mounting and supporting filter screens in such a breather cap, including a screen unit which not only can be made and sold as a separate part attachable to breather caps already in use, but which can be embodied as a part of new caps.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

In the drawing, which represents one suitable embodiment of the invention, Fig. 1 is a bottom plan view; Fig. 2 is a sectional view on the line 2—2, Fig. 1; Figs. 3 and 4 are respectively a side elevation and a top plan view of the main sleeve or body; Figs. 5 and 6 are similar views of the inner member of the screen unit; and Figs. 7 and 8 are similar views of the outer member of the screen unit.

The cap shown in the drawing is constructed and arranged for attachment to the open end of the breather pipe 1, which is a simple metal tube with a plain open end. The cap is provided with a tubular body portion or main sleeve illustrated in Figs. 3 and 4 and marked generally 2. Said main sleeve, while generally of tubular form, is slitted longitudinally, as at 3, to provide a slight longitudinal gap, its walls being more or less resilient so that by making the body sleeve with an over all outside diameter slightly greater than the internal diameter of the breather tube, it can be collapsed to reduce the gap 3 and then inserted into the breather tube, where it will be firmly held by the inherent tendency of the resilient walls to expand. Attached to the sleeve body is a cover 4 of any suitable inverted saucer or umbrella shape, its over all diameter being greater than that of the body sleeve so that its skirt 5 is spaced from the walls of the sleeve. This cover forms the shield or guard to prevent foreign material from entering the breather pipe.

The body sleeve 2 and cap 4 may be secured together in any suitable manner. In the arrangement shown, the sleeve is provided with a plurality, four being shown, of extended arms 6 separated by open spaces 7. Two or more of said arms (two in the form shown) are narrowed at their ends to provide ears 8, which are passed through simple slots in the cover 4 and bent down on the outside thereof to secure the sleeve and cap together. The remaining shorter arms 6 merely abut the inner surface of the cover and assist in supporting the sleeve and cap against relative movement. The open spaces 7 between adjacent arms form vent openings from the interior of the sleeve to the open atmosphere underneath the skirt of the cover and in said open spaces the sleeve is provided with small ears or lugs 9 bent outwardly into a transverse plane, which lugs serve as stops to engage the end of the tube 1 for limiting introduction of the cap sleeve thereinto.

Within the main sleeve is located a suitable screen supporting unit which, briefly described, consists of telescoping inner and outer sleeve members designed to support in parallel relation two screen members and also provided with means for supporting the screen unit within the cap.

The inner member of the screen unit is shown in Figs. 5 and 6. It is a simple tubular member 10 made either from a section of tubing or by rolling or bending a strip into tubular form with its edges abutting, or nearly so, at 11, the two end edges of the tubular member being each provided with a plurality, four being shown, of ears or lugs 12 bent inwardly. The outer member of the screen unit is a similar tubular member 13 provided at its opposite ends with similar lugs or ears 14 and at one end being provided with endwise projecting arms 15 and an extra pair of lugs 16 bent outwardly.

In assembly of the screen unit, the inner member 10 is formed as shown in full lines,

Fig. 5, its lugs 12, four at each end, being bent inwardly. The outer member 13 is formed as shown in full lines, Fig. 7, with its lugs 14 at one end and bent inwardly but with its lugs 14 at the other end extending longitudinally, and with its lugs 16 bent outwardly. A circular screen member 17, usually made of woven wire, is pushed into the outer member 13 and laid upon its inwardly bent lugs 14. The inner member 10 is then telescoped into the outer member 13 and pushed down until its lugs 12 at one end rest upon the screen unit 17. Another screen unit 17 is then laid upon the other end of the inner member 10, being supported by the lugs 12 thereof. Thereupon the endwise extending lugs 14 on member 13 are bent downwardly and inwardly, which permanently connects or locks together the inner and outer members of the screen unit, the two screens, one at each end thereof, lying in parallel transverse planes and each of said screens being permanently held between a set of inwardly extending lugs 12 of the inner member and a set of inwardly extending lugs 14 of the outer member.

The endwise extending arms 15 on the outer member of the screen unit are of substantially the same length as the arms 6 of the main sleeve or body. The assembled screen unit is now inserted or telescoped into the main sleeve or body with its arms 15 opposite or substantially registering with the arms 6. Its outwardly extending arms 16 rest upon the stop lugs 9 of the main sleeve. The cover 4 is now attached to the assembled screen and main sleeve unit by passing the lugs 8 through the cover and bending them down as described. In the finished cap the ends of the arms 15 abut or nearly abut the shell or cover 4, so that endwise movement of the screen unit within the main sleeve is prevented in one direction by the engagement of the lugs 16 with the lugs 9 and in the other direction by the engagement of the ends of arms 15 with the shell or cover.

When the completed cap is inserted into the breather tube, the only outlet or vent from the tube is through the two screen members 17 and thence outwardly through the gaps or openings 7 to the space beneath the skirt of the outer cover and thence to the open air. Air can therefore pass freely into and out of the breather tube. On the other hand, oil or oily vapors do not escape from the tube, but any vapors or any oil that is splashed upwardly from within the tube is caught by the screens and drains back into the tube without liability of escaping and running down over the ends or other parts.

Some breather caps are made with shells or covers and sleeve members generally of the form of the members 2 and 4 shown in the drawing, and in such caps there is a free escape for oil or oily vapors. To improve such caps and baffle oil escape, the screen unit of my invention may be made and sold as a separate part for attachment to such caps. In such cases the screen unit will be made as before described in substantially the form shown in the drawing, with its inner and outer members 10 and 13 assembled with a pair of screen members 17. The screen unit, however, will be so formed that it can be pushed or telescoped into the open end of the main sleeve 2 and then fastened in place to prevent escape. Any suitable fastening means, such as a spring latch, may be employed, but for convenience the ears 16 may be employed for this purpose. In such separate screen units the ears 16 may be extended longitudinally so that the screen unit can be pushed into the outer sleeve of the cap to its home position, whereupon the ears 16 may be bent outwardly with a screw driver or pair of pliers so as to permanently fasten the parts together. Other arrangements are suitable for the purpose.

What I claim is:

1. A breather cap structure, comprising a tubular body member provided adjacent one of its ends with lateral vent openings, a cover for said body member secured to said aforementioned end thereof, and a screen unit of tubular form mounted within said body member and provided with supporting ears projecting outwardly into the vent openings of said body member, whereby said screen unit is positively connected to and supported by said body member.

2. A breather cap structure, comprising a tubular body member provided adjacent one of its ends with lateral vent openings and being also provided adjacent said openings with outwardly projecting ears, a cover for said body member secured to said aforementioned end thereof, and a screen unit of tubular form mounted within said body member and provided with supporting ears projecting outwardly through the vent openings of said body member and lying above and engaging the ears of said body member, whereby said screen unit is positively connected to and supported by said body member.

3. A breather cap structure, comprising a tubular body member provided adjacent one of its ends with lateral vent openings, a cover for said body member secured to said aforementioned end thereof, and a screen unit mounted within said body member and including an outer sleeve and an inner sleeve, said inner sleeve being supported at its lower end by the lower end of said outer sleeve and said outer sleeve being provided at its upper end with supporting ears projecting outwardly through the vent openings of said body member, whereby said screen unit is positively connected to and supported by said body member.

4. A breather cap structure, comprising a tubular body member provided adjacent one

of its ends with lateral vent openings, a cover for said body member secured to said aforementioned end thereof, and a screen unit mounted within said body member and including an outer sleeve and an inner sleeve, said inner sleeve being supported at its lower end by inwardly extending lugs carried by the lower end of said outer sleeve and said outer sleeve being provided at its upper end with supporting ears projecting outwardly through the vent openings of said body member, whereby said screen unit is positively connected to and supported by said body member.

5. A breather cap structure, comprising a tubular body member provided adjacent one of its ends with lateral vent openings, a cover for said body member secured to said aforementioned end thereof, and a screen unit mounted within said body member and including an outer sleeve and an inner sleeve, said inner sleeve being supported at its lower end by inwardly extending lugs carried by the lower end of said outer sleeve and said outer sleeve being provided at its upper end with supporting ears projecting outwardly through the vent openings of said body member, whereby said screen unit is positively connected to and supported by said body member, said screen unit also including a transversely disposed screen member arranged between the lower end of said sleeve and the inwardly extending lugs carried by the lower end of the outer sleeve and also including a transversely disposed screen member arranged between the upper end of the inner sleeve and inwardly extending lugs carried by the upper end of the outer sleeve.

6. A breather cap structure, comprising a tubular body member provided adjacent one of its ends with lateral vent openings, a cover for said body member secured to said aforementioned end thereof, and a screen unit of tubular form mounted within said body member and provided with supporting ears projecting outwardly into the vent openings of said body member, whereby said screen unit is positively connected to and supported by said body member, said screen unit being also provided with means adapted for engagement with said cover for limiting upward movement of said screen unit relative to said tubular body member.

7. A breather cap structure, comprising a tubular body member provided adjacent one of its ends with lateral vent openings, a cover for said body member secured to said aforementioned end thereof, and a screen unit of tubular form mounted within said body member and provided with supporting ears projecting outwardly into the vent openings of said body member, whereby said screen unit is positively connected to and supported by said body member, said screen unit being also provided between its outwardly projecting ears with two upwardly extending and substantially opposed arms for engagement with said cover, whereby upward movement of said screen unit relative to said tubular body member is limited.

In testimony whereof I hereby affix my signature.

HOWARD E. LEMMERMAN.