

[54] COMBINATION ENGINE BREATHER CAP
AND CAN PIERCER

[76] Inventor: Ronald R. Elder, Eugene, Oreg.

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[58] Field of Search..... 141/98, 330, 338,
141/329, 19, 106; 184/1.5, 105 R; 220/86 R

[56] References Cited

UNITED STATES PATENTS

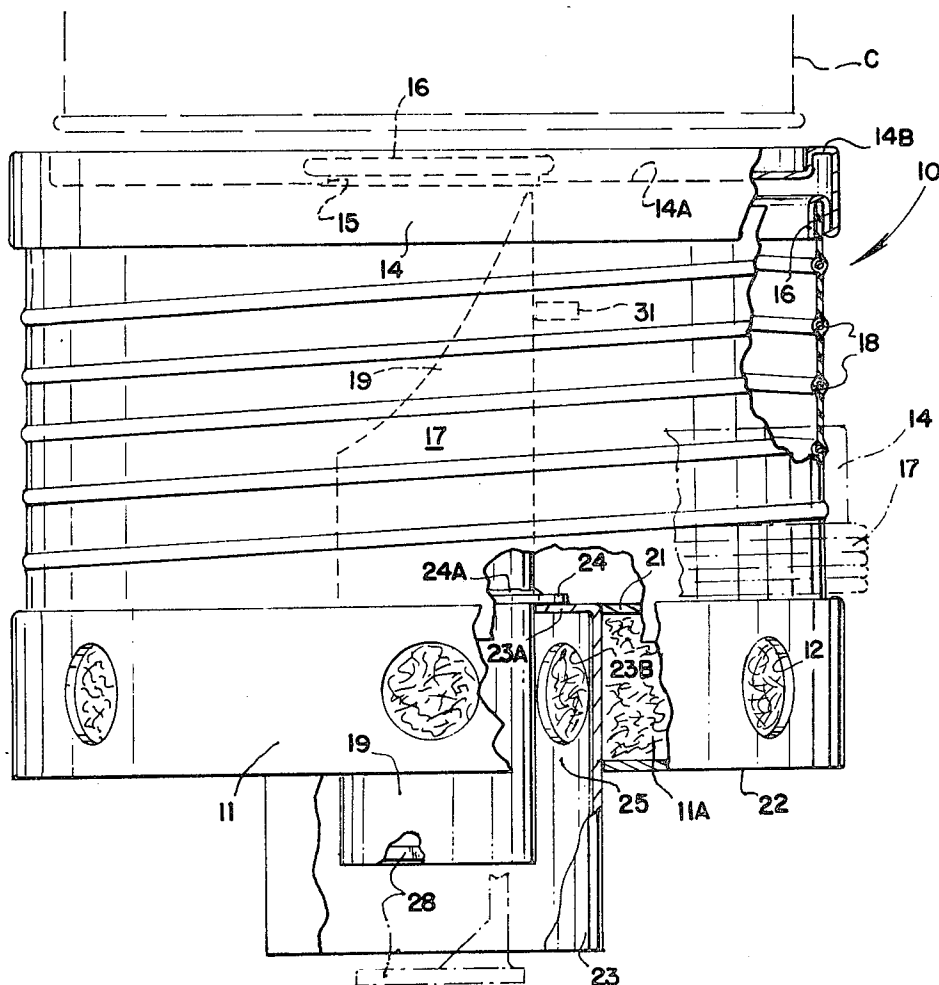
2,130,085	9/1938	Harks.....	184/105 R
2,130,634	9/1938	Wiswell.....	184/105 R
2,693,249	11/1954	Baumbach	184/105 R

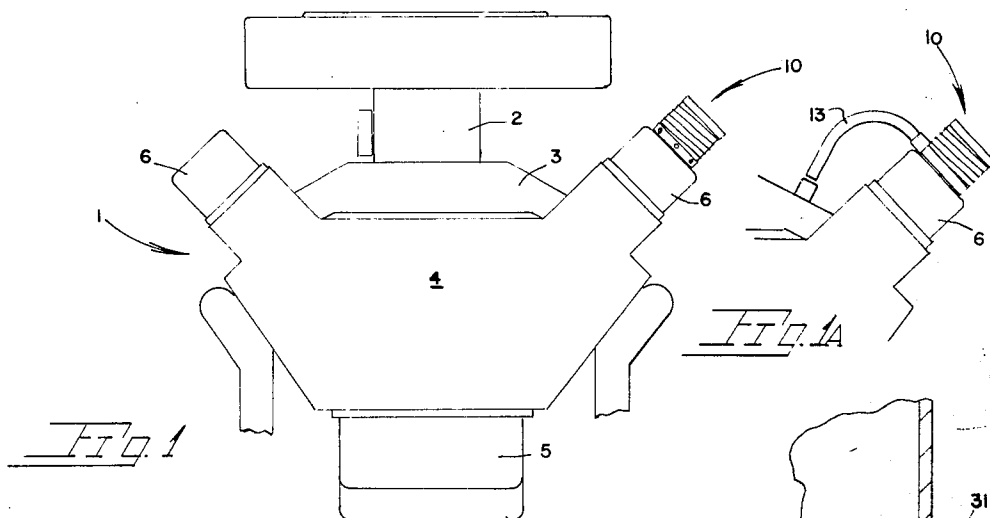
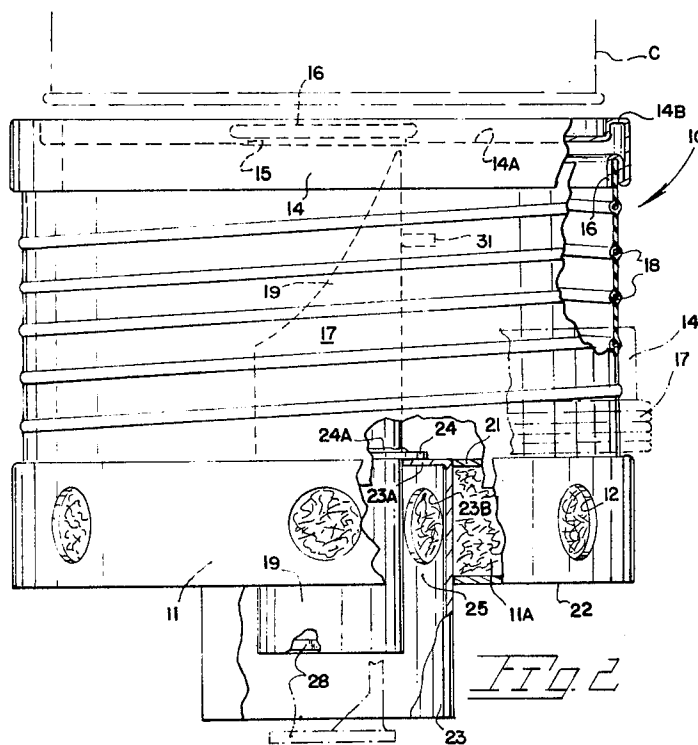
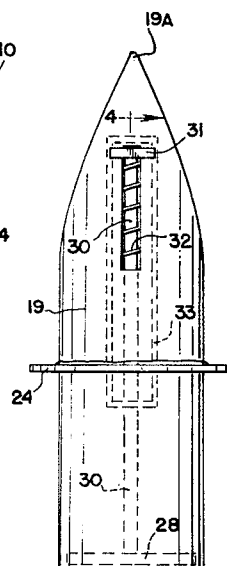
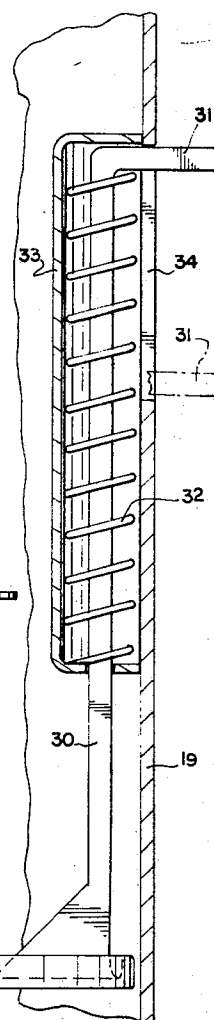
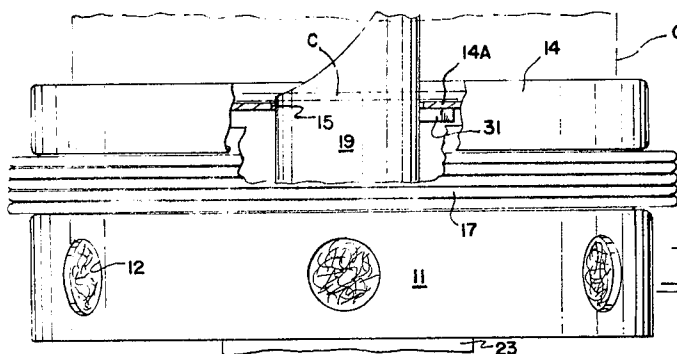
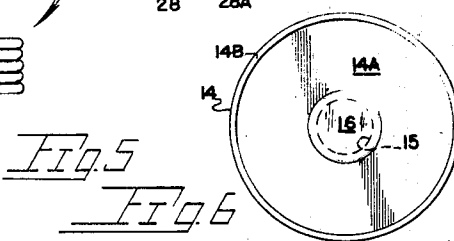
Primary Examiner—Edward L. Roberts
Attorney—James D. Givnan, Jr.

[57] ABSTRACT

A combination breather cap and oil can piercer device for use on automotive engines for replacement of existing breather caps. A collapsible sleeve and plate attached thereto guide a manually held oil can into opening contact with a stationary piercer element normally shrouded by the extended sleeve. Closure means normally seals the lower end of the tubular piercer element to prevent engine entry of foreign objects while a removable cap closes off the internal sleeve area to prevent the deposit of dirt particles on the can piercing element. Normal breather cap functions are provided for which may include directing crankcase vapors into the fuel-air intake system.

6 Claims, 7 Drawing Figures





COMBINATION ENGINE BREATHER CAP AND CAN PIERCER

BACKGROUND OF THE INVENTION

The present invention relates generally to automotive engines and more particularly to an improved breather cap device for ventilation of the engine crankcase.

Present automotive engines utilize breather caps with filter means therein to provide filtered communication of the crankcase with the atmosphere and more recently, for emission control purposes, with the fuel-air intake system in those engines having a crankcase ventilation system. In either case the cap has as its primary function the passage of oil diluting or contaminating fumes from the crankcase. Commonly, the breather cap is used in conjunction with a breather pipe in direct communication with the engine crankcase or alternatively the cap may be in indirect communication via an engine valve cover. Further, cap removal is necessary each time oil is added to the engine.

In the adding of oil from can containers to an engine a combination can piercer and spout device is most commonly used which requires forceful insertion into the oil can followed by rapid inversion of the can to empty the oil contents. The inverting of the can and directing of the spout into the breather cap opening, if not done with a degree of precision and care, may result in the spilling of oil. Further, the task of adding oil to the engine in the case of an engine oil change is further complicated by repeated insertion and removal of the piercer-spout device with each quart can of oil added.

Efforts to remedy the problem by providing a stationary can piercer in combination with a breather cap have not been widely acceptable for one reason or another with one likely reason perhaps being the complexity of such devices while another being the restricted clearance for such a device below the engine compartment hood.

Examples of the prior art may be seen in the following U.S. PAT. Nos.: Wiswell, 2,130,634; Pittman, 2,134,004; Lang, 2,644,430; Baumbach, 2,693,249; Gaudet, 3,331,405. Briefly, the prior art devices show the combination of a piercing element and holder means therefor combined with the upper end segment of a breather pipe to permit the addition of canned oil to the engine. For the most part the prior art devices are of a complex nature not readily adaptable to existing engine components and require the removal of a cap prior to piercing of an oil can.

SUMMARY OF THE INVENTION

The present invention is embodied within an engine mounted device for serving the dual functions of a crankcase ventilation component and an oil can piercer and conduit.

The present device includes a collapsible sleeve member which during use of the device retracts to expose a centrally disposed can piercing element. Removal of a drained oil can results in the collapsible sleeve member extending to conceal said element sealing off the surrounding area against dirt particles. Additionally important is positionable closure means movable to the open position in response to a downwardly urged oil can which safeguards the engine against the entry of foreign objects or dirt particles. Additionally the present device may receive conduit means for pass-

ing crankcase fumes to the intake manifold of the engine.

It is an important object of the present invention to provide a permanently mounted combination breather cap and can piercer which permits the convenient and safe addition of oil to an automotive engine. The present device permits the adding of oil to be done quickly and without risk of spillage by the service station attendant. The locating of the well known combination piercer-spout tool is avoided.

Means are provided within the tubular segment of the piercer element for closing the lower end of same at all times other than when oil is being added to the engine. Importantly, foreign objects are prevented from entering the engine as the same are trapped in place permitting removal prior to adding of the oil. Further the tubular segment is sealed from under the hood air thus assuring, at all times, a clean spout or conduit for the added oil.

BRIEF DESCRIPTION OF THE DRAWING

In the accompanying drawing:

FIG. 1 is a front elevational, schematic of an automotive engine with the present device affixed to a valve cover thereof,

FIG. 1A is a view similar to FIG. 1 showing a modified form of the invention,

FIG. 2 is an elevational view of the device removed from the engine with fragments broken away for illustrative purposes,

FIG. 3 is an elevational view of the piercer assembly removed from the present device and rotated clockwise through ninety degrees from its position in FIG. 2,

FIG. 4 is a sectional view taken along line 4-4 of FIG. 3 showing details of closure means for the piercer assembly,

FIG. 5 is a view similar to FIG. 2 with the device collapsed during an oil adding operation, and

FIG. 6 is a plan view of the device on a reduced scale.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With continuing reference to the accompanying drawing wherein applied reference numerals indicate parts similarly identified in the following specification, the reference numeral 1 indicates generally a typical automotive engine having a carburetor 2, an intake manifold 3, an engine block 4 and an oil pan 5. Indicated at 6 are a pair of valve covers housing the rocker arm mechanisms of the V-type engine shown which, of course, in the case of an in-line engine such would be singular.

Indicated generally at 10 is the present combination breather cap and can piercer device shown mounted in place on valve cover 6. As earlier noted, the present device is equally applicable to those automotive engines having crankcase breather pipes which receive a breather cap. For purposes of reducing engine emissions later model automobile engines include a positive crankcase ventilation system wherein a negative pressure is applied to the breather cap device to insure a uni-directional airflow through the crankcase. The instant invention is equally applicable to those engines with and those without positive crankcase ventilating systems.

The instant device comprises a circular base 11 having a closed annular chamber 11A for the reception of

a filtering medium. Openings 12 vent the chamber 11A to the atmosphere or alternatively, as shown in FIG. 1A, a single opening may be provided in the base 11 to receive one end of a conduit 13 for venting chamber 11A with the engine intake manifold 3.

Additionally the device includes an upper plate member at 14 having a circular recessed area 14A defined by a rim 14B formed therein to provide means for positioning and retention of the lower end of an oil can indicated at C. Centrally formed within upper plate member 14 is an aperture 15 normally receiving an insertable cap 16. Aperture 15 is desirably only slightly larger than the diameter of the piercer 19. The lower periphery of the plate member 14 is of rolled configuration as at 16 to permanently engage and retain the upper peripheral edge of a flexible, contractable sleeve 17. In a similar manner the upper periphery of base 11 is of rolled configuration to secure the lower edge of sleeve 17.

Sleeve 17 is of neoprene rubber or equivalent material having a coiled spring element 18 which may be formed integral therewith or, alternatively, provided interiorly and separate of the sleeve. The upper plate member 14, under the downwardly biasing influence of a hand held oil can will collapse the sleeve 17 to the position of FIG. 5.

A tubular can piercer at 19 is axially disposed centrally below upper plate 14 with the opening 15 in the latter being of a size to permit downward passage of plate 14 closely past the can piercer with the latter acting as a plate guide during downward movement of the plate.

With attention again to the base 11, top and bottom walls at 21 and 22 centrally receive mounting means for the device in the form of a collar 23 engageable, in a secure manner, with an opening in the valve cover or breather pipe end. A horizontally directed rim 23A of the collar supports a flange 24 to distribute downward loads imparted to the piercer during can penetration. Flange 24 may be secured as by an annular weld 24A to the tubular can piercer. The collar diameter is such as to provide annular spacing 25 between the collar 23 and the outer wall surface of the lower portion of can piercer 19. An airflow accordingly may pass through said annular space and through a series of openings 23B formed within the upper portion of the collar.

With attention to FIGS. 2-4 wherein details of the tubular can piercer 19 are shown, a valve is indicated at 28 normally disposed in a raised position closing the lower end of the piercer. Said valve includes a stem 30 extending upwardly within the piercer and terminating exteriorly of same in a valve actuator arm 31. Biasing the valve body upwardly to a closed position is a compression spring 32 circumposed about the valve stem and enclosed within a spring housing 33 affixed interiorly along the tubular piercer 19. An elongate opening at 34 in the tubular piercer permits limited vertical movement of arm 31 under the downward influence of upper plate member 14 and oppositely under the upward influence of spring 32. At all times other than when upper plate 14 is in its lowermost position (FIG. 5) the valve 28 closes the lower end of piercer element 19 to prevent accidental entry of foreign objects into the engine. For this reason valve 28 is desirably formed with an annular barrier at 28A to retain any object falling thereon. Further valve 28 prevents the deposit of contaminants within the tubular piercer resulting from

circulating engine vapors. The removable closure 16 in plate 14 additionally seals the interior area of sleeve 17 against entry of dirt particles to thus close off the upper pointed end 19A of the piercing element.

In use the present device remains in place on the engine except for cleanings at infrequent intervals. The closure 16, which may be of a flexible plastic material for snap engagement with opening 15 in upper plate 14, is removed prior to placement of a quart size oil can onto recessed area 14A. Manual downward biasing of the oil can initiated with a light impacting of the hand on the upper end of the can will cause the pointed can piercer end to penetrate the bottom wall of the can with continued manual pressure ultimately causing the full penetration of the tubular can piercer as seen in FIG. 5. During downward movement of plate 14 the sidewall of the piercer acts as a guide to retain the plate 14 against lateral displacement. Further, plate 14 in its downward passage contacts actuator arm 31 depressing same to cause opening of valve 28.

While I have shown but a few embodiments of the invention it will be apparent to those skilled in the art that the invention may be embodied still otherwise without departing from the spirit and scope of the invention.

Having thus described the invention what is desired to be secured under a Letters Patent is:

1. A combination breather cap and oil can piercer device for use on an automotive engine, said device comprising,
 - a base including mounting means removably engageable with an engine component, said base adapted to permit passage of engine produced vapors,
 - a plate outwardly spaced from said base and including means for positioning an oil can thereon, said plate apertured at its center,
 - a collapsible sleeve interposed between said base and said plate including means biasing said plate away from the base,
 - a tubular can piercing element centrally mounted on said base and normally concealed within said sleeve when the latter is in its extended position,
 - closure means for said piercing element adapted for opening movement during the collapsing of said sleeve permitting the passage of oil therepast while at other times serving to close off the lower end of said tubular piercing element, and
 - said device permitting the opening and addition of canned oil to an engine upon placement of the can on said plate with subsequently exerted downward force causing said sleeve to collapse with resultant can piercing contact of the piercing element and opening of said closure means.
2. A combination breather cap and oil can piercer device as claimed in claim 1 wherein said closure means comprises a valve, a valve stem terminating upwardly in an arm for contact by said plate during downward movement of same.
3. A combination breather cap and oil can piercer device as claimed in claim 2 wherein said valve is provided with an annular barrier for retention of foreign objects accidentally entering said can piercing element.
4. A combination breather cap and oil can piercer device as claimed in claim 1 wherein the aperture within said plate is registerable with said tubular piercing element during downward movement of the plate

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with said tubular element additionally functioning as a guide for the downwardly moving plate.

5. A combination breather cap and oil can piercer device as claimed in claim 4 wherein said plate additionally includes an upwardly projecting rim to define a recessed plate area for reception of the lower end of an oil can, said rim retaining the oil can end on the plate during downward movement of the plate and can.

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6. A combination breather cap and oil can piercer device as claimed in claim 1 additionally including a cap removably mounted within the plate aperture sealing the internal sleeve area to prevent entry of dirt particles and their resultant deposit on the can piercing element.

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