Feb. 28, 1928. 1,660,599

G. R. DAVENPORT

INTERNAL COMBUSTION ENGINE

Filed Sept. 16, 1926 2 Sheets-Sheet 1

FIG-1-

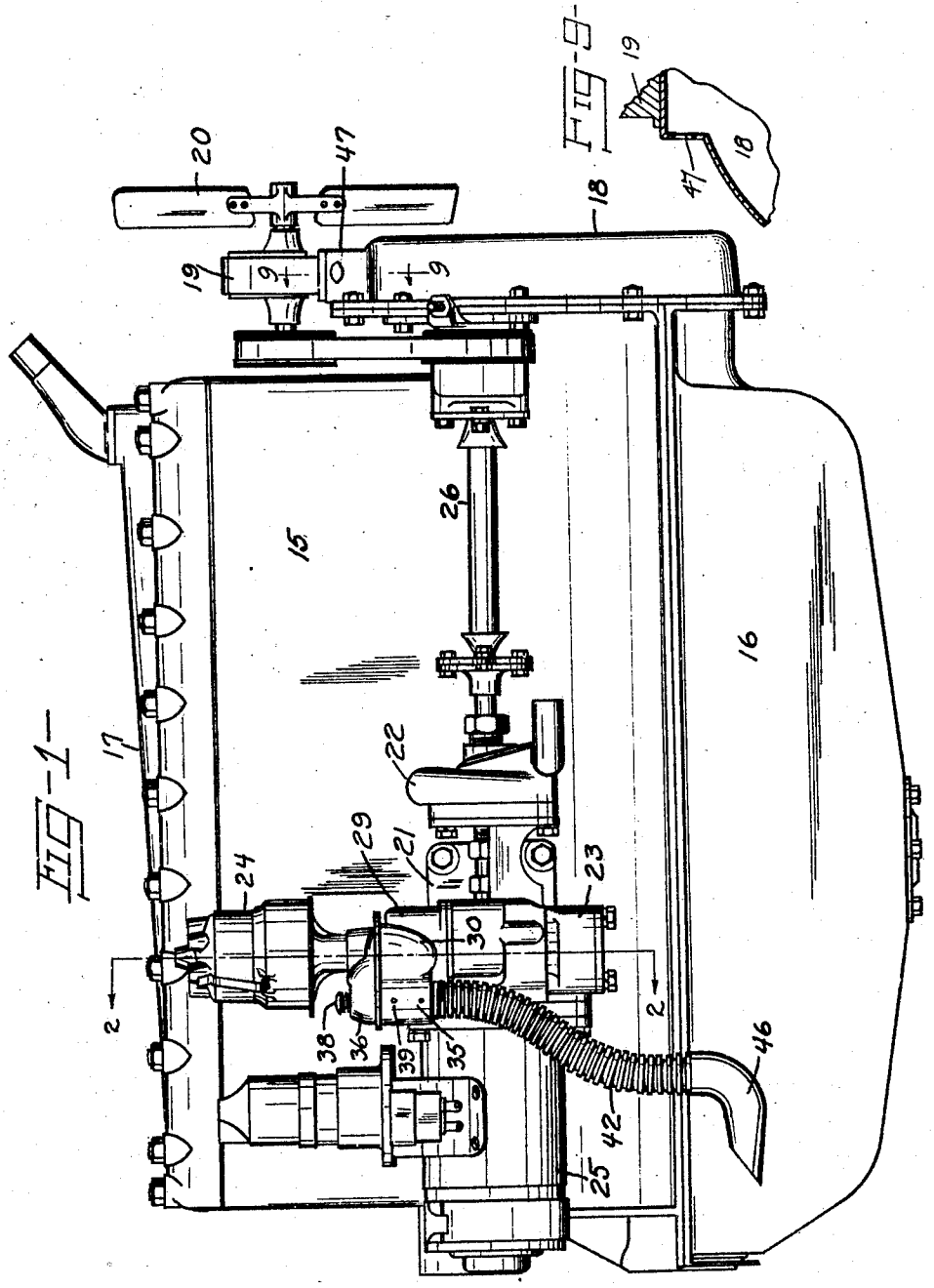


FIG-5-

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FIG-3-

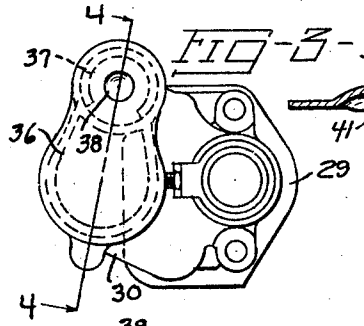


FIG-5-

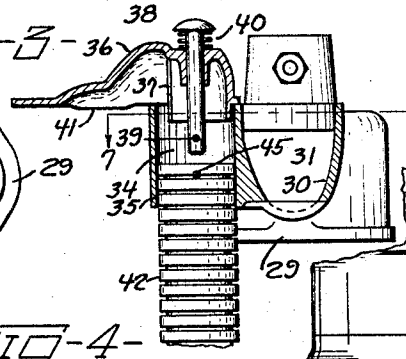


FIG-2-

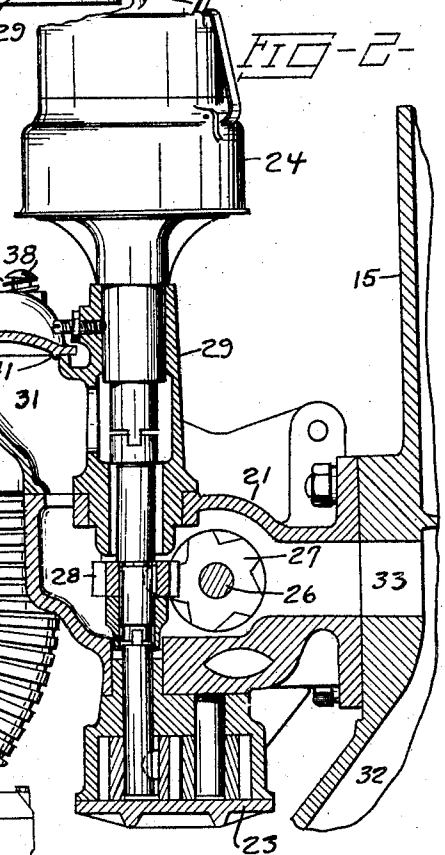


FIG-4-

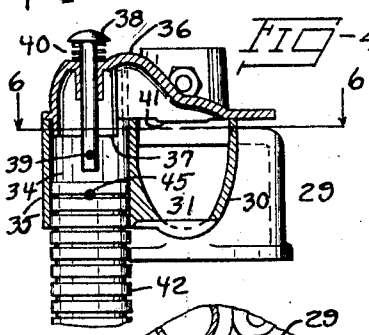


FIG-6-

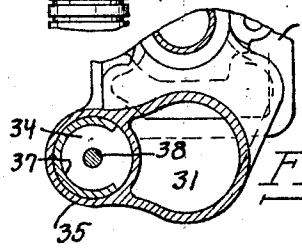


FIG-7-

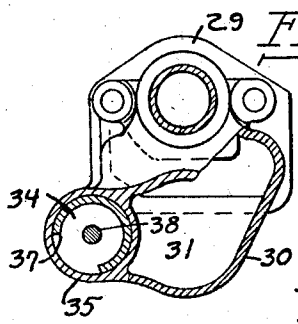
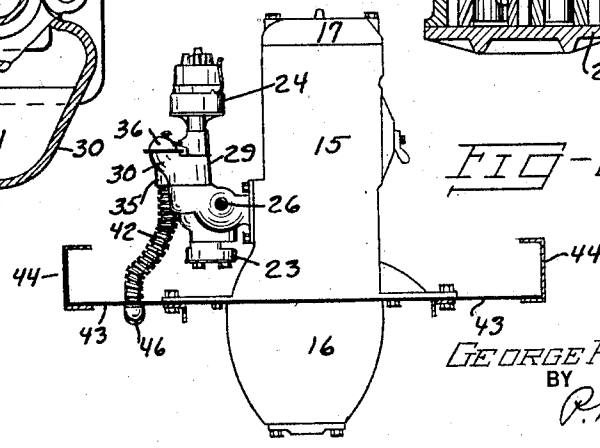


FIG-8-



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Patented Feb. 28, 1928. 1,660,599

UNITED STATES PATENT OFFICE.

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INTERNAL-COMBUSTION ENGINE.

Application filed September 16, 1926. Serial No. 135,844.

This invention relates to motor vehicles and particularly to internal combustion engines used therewith, its principal object being to provide a combined oil filler and crank-case breather of such a construction that loss of oil through the breather opening is prevented when oil is being introduced into the engine.

Another object is to provide a combined oil filler and crank-case breather in which a common passage normally connects the interior of each with the interior of the engine crank-case, the oil filler opening being provided with a closure operable when open to shut off the interior of the oil breather from communication with the interior of the engine crank-case.

Another object is to provide a combined oil filler and breather provided with an interconnected passageway, the oil filler being provided with an opening for the introduction of the oil into the crank case and having a closure therefor, the closure being provided with a baffle operable to allow open communication between the interior of the oil filler and the interior of the oil breather when the closure is in closed position, and to block the passageway when the closure is in open position.

Another object is to provide a crank-case breather for an internal combustion engine in which a passageway connects the interior of the crank-case with an exhausting nozzle positioned exteriorly of the engine compartment, and providing an air inlet in said crank-case at a point remote from said passageway whereby a current of air will be caused to pass through said crank-case.

A still further object is to provide, in connection with the engine of a motor vehicle, a nozzle positioned exteriorly of the engine compartment and in a position to be affected by the passage of air thereby due to the movement of the vehicle whereby a suction will be set up within the nozzle, the interior of said nozzle being in communication with the interior of the crank-case of the engine which is provided with an air inlet at a point remote from the point of connection of the nozzle with the crank-case, whereby air will be caused to circulate through the crank-case and will remove vapors and gases therefrom upon being discharged through the nozzle.

The above being among the objects of the present invention, the same consists in certain features of construction and combinations of parts to be hereinafter described with reference to the accompanying drawings, and then claimed having the above and other objects in view.

In the accompanying drawings, which illustrate a suitable embodiment of the present invention, and in which like numerals refer to like parts throughout the several different views,

Figure 1 is a side view of an internal combustion engine for a motor vehicle showing an embodiment of the present invention incorporated therewith.

Figure 2 is an enlarged, fragmentary, partially sectioned view taken transversely of the engine on the line 2—2 of Figure 1, showing the relative positions of the various parts and the passageway connecting the interior of the crank-case with the oil-filler and breather.

Figure 3 is a plan view of the crank-case breather and oil filler member with the co-operating closure, the ignition distributor not being shown to better illustrate the present invention.

Figure 4 is a sectional view taken on the line 4—4 of Figure 3 with the oil filler closure in closed position.

Figure 5 is a sectional view taken on a line corresponding to 4—4 of Figure 3 with the oil filler closure in open position.

Figure 6 is a sectional view taken on the line 6—6 of Figure 4 showing the relation of the parts when the closure is in closed position.

Figure 7 is a sectional view taken on the line 7—7 of Figure 5, showing the relation of the parts when the closure is in open position.

Figure 8 is a more or less diagrammatic view of the engine and the parts constituting the present invention shown mounted in a vehicle chassis frame, the view being taken as a transverse section through the engine and frame rearwardly of the engine water pump.

Figure 9 is a section taken on the line 9—9 of Figure 1.

The engine shown in the accompanying drawing, with the exception of the parts constituting the present invention, is of a conventional construction and comprises, in general, a cylinder block 15 the lower por-

tion of which serves as the upper half of the crank-case, an oil pan 16 which serves as the lower half of the crank-case, a cylinder head 17, chain-housing 18, fan support 19 and fan 20. A bracket 21 is secured to a suitable face on the side of the cylinder block 15 and supports a water pump 22, an oil pump 23, a distributor 24 and a generator 25, all of which are driven from the accessory shaft 26 which is itself suitably driven from within the chain-housing 18 and extends rearwardly through suitable joints through the bracket 21 where it drives the various aforementioned accessories either directly or through suitable gears such as 27 and 28 which are suitably mounted within the hollow interior of the bracket 21. A hollow cast member 29 secured to the upper face of the bracket 21 serves as a supporting member for the distributor 24 and is provided with an outwardly and upwardly extending wall portion 30, the hollow interior of which forms a passageway 31 in communication with the interior of the hollow bracket 21, which terminates in an upwardly exposed opening which serves as an oil filler for the engine, the oil introduced into such opening flowing down through the passageway 31 into the hollow interior of the bracket 21 where it lubricates the gears 27 and 28, and then passes into the interior 32 of the engine crank-case (see Figure 2) through the passageway 33 which connects the same with the hollow interior of the bracket 21.

A second passageway 34 which serves as a crank-case breather, is formed adjacent the upper end of the passageway 31, its wall 35 being common to the wall 30 of the passageway 31 over a portion of its surface and terminates in an upwardly exposed opening in the same plane as the oil filler opening. A common closure 36 is provided for both openings, it being somewhat crowned in shape whereby when it is in position to cover both openings, as shown in Figure 4, its interior forms a passageway connecting the passageways 31 and 34. The closure 36 is provided with a skirt portion 37 depending from its under surface in the shape of a hollow cylinder which projects into the upper end of the passageway 34 and acts as a guide for the closure 36 therein, a section beng cut out of its wall in proper position to effect a continuous passage between the passageways 31 and 34 when the closure is in position to cover both. The closure 36 is adapted to swing or turn about a vertical line coincident with the center line of the passageway 34, the lower end of the skirt portion 37 guiding it in this position. The closure 36 is held in position by a pin 38 which slidably passes down through its axis and is held in such position by a cross-pin 39 which projects through both the lower end of the pin 38 and the walls 35 of the passageway 34. A coil spring such as 40 compressed between the head of the pin 38 and the upper surface of the closure 36 resiliently holds the closure 36 in the position shown. Small lips such as 41 formed on the under side of the closure 36 engage the inner walls of the walls 30 when the closure is in position to cover the oil filler opening, to prevent accidental displacement of the closure, the spring 40 giving sufficiently to allow the closure 36 to tilt sufficiently for the lips 41 to pass over the upper edge of the walls 30 when the closure is rotated to open position. When the closure is rotated to uncover the passageway 31, as indicated in Figure 5, to expose the open upper end thereof so that oil may be introduced thereinto, the skirt portion 37 is rotated with the closure 36 and the cut out portion is rotated away from the passageway 31 so that the skirt portion 37 completely cuts off any communication between the passageways 31 and 34. This feature overcomes the previous disadvantages of constructions in which the oil filler and oil breather are intercommunicated and which heretofore have been such that should oil be poured too rapidly into the oil filler opening, part of the oil would overflow into the breather opening and be discharged to the ground and lost.

A flexible tube 42 secured to the lower portion of the breather walls 35 extends downwardly and projects through one of the side section dust pans 43 which extend between the cylinder block 15 and the adjacent chassis frame side rail 44 to prevent dust and other foreign matter from the road beneath the engine from reaching the engine. This tube 42, which is secured to the walls 35 by a pin 45 passing through both, serves to extend the breather passage 34 to a point below the pan 43, and any oil vapor or other objectionable gases discharged by the crank-case therethrough is thus discharged at a point below the floor of the vehicle and at the place where the possibility of its reaching the occupants of the vehicle is exceedingly remote, and at the same time it prevents the oil carried by such vapor from being deposited in the engine compartment where its presence would serve to catch dust and to cause an unsightly appearance of the engine and other parts.

In order to take advantage of the nature of the construction shown to scavenge the interior 32 of the crank-case and thereby reduce dilution of the lubricating oil by gasoline and to remove the water vapor therein, I provide the end of the tube 42 below the dust pan 43 with a nozzle 46 whose open end is pointed toward the rear of the car and of such a shape that the air passing thereby due to the forward movement of the vehicle in which the engine is incorporated will cause a suction within the nozzle which will

be transmitted to the interior 32 of the crank-case. A small opening, 47 (see Figure 1) in the upper end of the chain-housing 18, the interior of which is in open communication with the interior 32 of the crank-case, is provided at a point remote from the passage 33 which leads out of the crank-case and by various previously mentioned passageways communicates with the nozzle 46, to allow fresh air to enter the interior 32 of the crank-case. The suction on the nozzle 46 causes air to be drawn into the crank-case through the opening 47 and to be eventually exhausted through the nozzle 46, the air in passing through the crank-case absorbing a certain amount of the gasoline and water vapor present therein and thereby removing the same therefrom when discharged through the nozzle 46. This tends to keep the viscosity of the oil at a relatively constant value, disregarding temperature, and in removing the water vapor prevents emulsifying of the oil with water. The size of the opening 47 may be varied as best suits conditions which may vary with the type and size of engine upon which the construction is used.

Formal changes may be made in the specific embodiment of the invention described without departing from the spirit and substance of the broad invention, the scope of which is commensurate with the appended claims.

What I claim is:

1. In combination with an internal combustion engine, a passageway communicating with the interior of the crank-case thereof and provided with an opening, a second passageway adjacent the first-mentioned passageway provided with an opening normally in communication with said first opening, a closure common to both of said openings, and means for closing said second opening to said first opening when said closure is moved to uncover the first-mentioned opening.

2. In an internal combustion engine, an oil filler opening having communication with the interior of the engine crank-case, a passageway adapted to communicate with said opening to thereby form a crank-case breather, a closure for said opening forming means for connecting said passageway with said opening when said closure is in closed position, and a baffle on said closure cutting off said communication between said opening and said passageway when said closure is in open position.

3. In combination with the crank-case of an internal combustion engine, an oil filler opening communicating with the interior of the engine crank-case, a passageway extending from adjacent said opening to a point outside of the engine compartment, a closure for said opening forming means for connecting said passageway with said opening when said closure is in closed position whereby said passageway will serve as a crank-case breather, and a baffle movable with said closure for closing said communication between said opening and said passageway when said closure is moved to uncover said opening.

4. In combination with an internal combustion engine, an oil filler passage and a breather passage provided with a single closure, means for connecting said breather passage with said oil filler passage when said closure is in position to cover said oil filler passage, and means cutting off said connection when said closure is moved to uncover said filler passage.

5. In combination with an internal combustion engine, a passageway extending from a point within the crank-case of said engine to a point exterior thereto and terminating in an opening, a second passageway entirely exterior to said crank-case and terminating at one end in an opening adjacent the first-mentioned opening, and a closure for said openings providing means for connecting the interiors of said passageways, said closure being movable to uncover said first-mentioned opening.

6. In combination with an internal combustion engine, a passageway extending from within the crank-case to a point exterior thereto and terminating in an opening, a second passageway entirely exterior to said crank-case provided with an opening adjacent the first-mentioned opening, a pivoted closure common to both of said openings and provided with an interior passage connecting both of said openings when in position to cover said first-mentioned opening, said closure at all times covering the second-mentioned opening and provided with a baffle for cutting off communication between said passageway when said closure is moved to expose the first-mentioned opening.

7. In combination with a motor vehicle, an engine provided with a passageway connecting the interior of the crank-case with an opening exterior thereto, a second passageway exterior to said crank-case leading from a point below the engine compartment to an opening adjacent the first-mentioned opening, a common closure for both of said openings provided with a passageway connecting said openings, and an opening in said crank-case remote from the point of connection of the first-mentioned passageway therewith, the end of said second-mentioned passageway exterior to said engine compartment being shaped to effect a suction upon forward movement of said vehicle whereby air will draw through the third-mentioned opening into said crank-case and finally be discharged exterior to said engine compartment.

8. In an internal combustion engine, an oil filler passage therefor, a second passage connecting with said oil filler passage to form a breather for the crank-case of said engine, a closure for said oil filler, and means for closing said second passage to said oil filler when said closure is moved to uncover said oil filler passage.

9. In an internal combustion engine, an oil filler, a passage forming with said oil filler a breather for the crank-case of said engine, said oil filler and passage having adjacent openings, a closure for said openings providing a passage common to both of said openings when said closure is in the closed position, and means for closing said passage to said oil filler when said closure is moved to uncover said filler opening.

10. In a motor vehicle, an engine provided with a crank-case, an oil filler exterior to said crank-case having a passageway leading thereto, a crank-case breather duct leading from said passageway and terminating exterior to the engine compartment, one end of said duct being positioned to effect a suction within the same upon forward movement of said vehicle, an opening in said crank-case separate from said passageway for allowing air to enter said crank-case, and means for closing the opening of said duct into said passageway when lubricant is poured into said oil filler.

11. In a motor vehicle, an engine provided with a crank-case, a passageway leading from the interior of said crank-case terminating in a rearwardly disposed opening in the path of the flow of oil relative to said vehicle upon forward movement thereof to create a suction within said crank-case, an opening in said crank-case separate from said passageway for introducing air into said crank-case, an oil filler opening in said passageway exterior of said crank-case, and means for closing said passageway between said rearwardly disposed opening and an oil filler opening when lubricant is poured into said oil filler.

Signed by me at Detroit, Michigan, U. S. A., this 10th day of September, 1926.

GEORGE R. DAVENPORT.