

Sept. 20, 1949.

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2,482,226

CRANKCASE VENTILATOR

Filed May 25, 1945

2 Sheets-Sheet 1

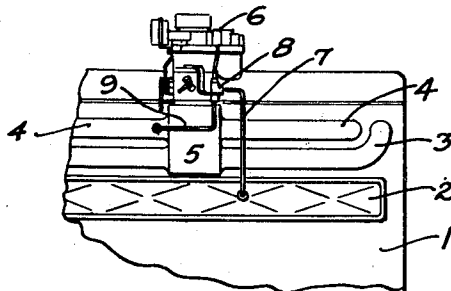


FIG. 1.

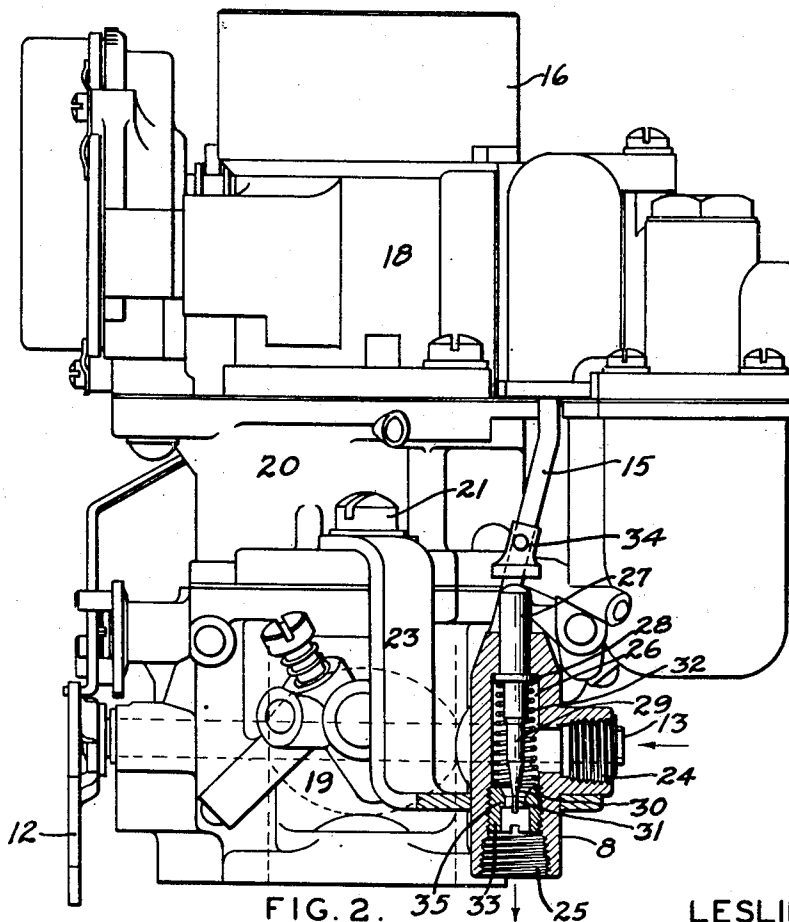


FIG. 2.

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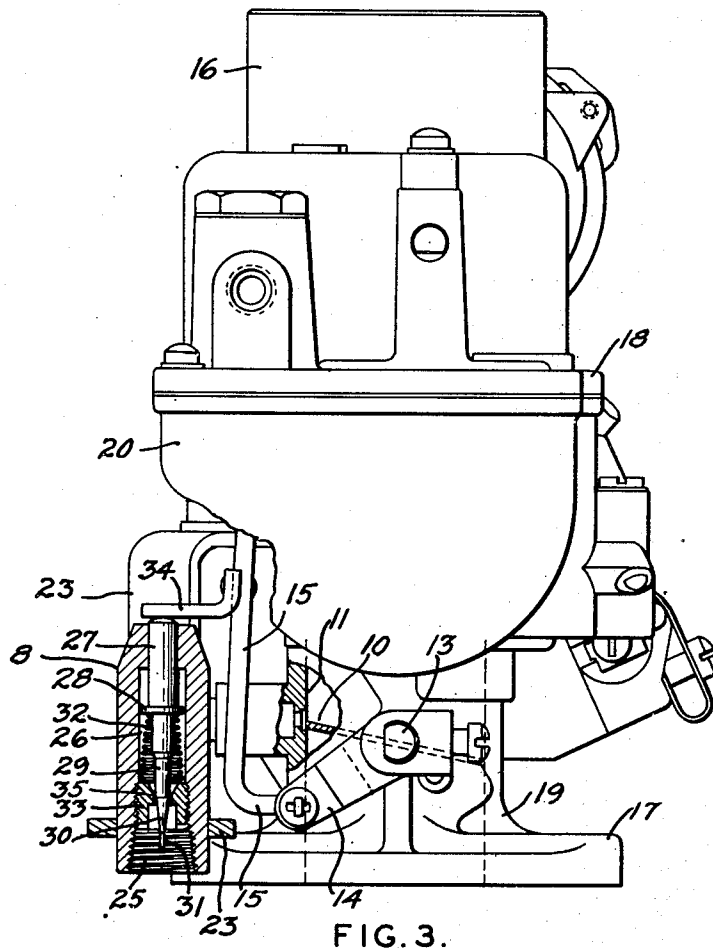


FIG. 3.

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2,482,226

CRANKCASE VENTILATOR

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Application May 25, 1945, Serial No. 595,694

6 Claims. (Cl. 123-119)

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This invention relates to crankcase ventilators and particularly to an improved device for regulating the flow of air from the crankcase to the intake manifold of the engine so that the maximum rate of flow will be obtained when the engine is being operated at high speed with wide open throttle and a minimum when the engine is idling. Devices for this general purpose have previously been designed, but they were not entirely satisfactory in that it was not possible to obtain sufficient flow during the normal medium load operation of the engine without obtaining excessive flow either at idling or at maximum speed. The invention will be better understood upon reference to the following specification and accompanying drawings, referring to which

Figure 1 is a diagrammatic view of my device as applied to an engine.

Figure 2 is a view showing the application of my improved control valve to the carburetor.

Figure 3 is a side elevation of the carburetor and control device shown in Figure 2.

The reference numeral 1 indicates an internal combustion engine having a valve cover 2, exhaust manifold 3, intake manifold 4, hot spot 5, and carburetor 6. The valve compartment to which the cover 2 is applied forms an outlet for the crankcase from which exhaust and other vapors may be withdrawn, and for this purpose, I have provided the conduit 7 leading to the control valve generally indicated at 8, the outlet of which is connected to the intake manifold 4 by means of the conduit 9. The engine carburetor may be of conventional construction and the details are not shown, but the carburetor is preferably constructed according to the Coffey Patent No. 2,085,351.

The carburetor includes a throttle valve 10 which controls the flow of mixture to the engine through the mixing conduit 11. The throttle is operated manually by means of the lever 12 which is mounted on one end of the throttle shaft 13, the other end of which is provided with a lever 14 which is used to operate the accelerating pump (not shown) by means of the link 15. It will be understood that the carburetor has a conventional air inlet, such as indicated at 16, and a mixture outlet discharging into the intake manifold to which the carburetor is secured by means of the flange 17.

The carburetor comprises three sections including the air horn casting 18, the flange casting 19, and the body casting 20. The body casting is attached to the flange casting by means of bolts as at 21. In order to control the flow of air from

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the crankcase into the intake manifold, I provide a valve body member 8 which is supported by the bolt 21 by means of bracket 23. The body member comprises an inlet 24 and an outlet 25, each provided with suitable screw threads for connection to the conduits 7 and 9, respectively. The body member 8 contains a bore 26 which is reduced at its upper end to receive a plunger 27 which carries a shoulder 28 to seat against the upper end of the bore 26, and a metering valve extension comprising straight portion 29, tapered portion 30, and a smaller cylindrical portion 31. The valve is normally held in the position shown in Figure 2 by a spring 32 which acts between the shoulder 28 and the valve member 33 which is threaded into the lower end of the bore 26.

The pump link 15 is provided with a lug or projection 34 which is movable downward to the position shown in Figure 3 when the throttle valve 10 is moved to its substantially closed or idling position as shown in that figure. When the throttle is moved beyond its half way open position, the projection 34 moves upwardly out of the path of the plunger 27, permitting the spring 26 to hold the valve in its widest open position in which the cylindrical portion 31 of the metering valve is held within the restricted passage 35 of the valve.

In operation, when the throttle valve is in closed position, the largest portion of the metering valve nearly fills or highly restricts the metering passage 35, preventing the high suction in the intake manifold from drawing so much air through the passages 7 and 9 as to upset the idling mixture supplied to the engine. As the throttle is moved towards open position, the tapered part 30 is brought into the opening 35 reducing the restriction and permitting the introduction of more air as the rate of air flow to the engine is increased. When the throttle is moved to more than half way open position or to a predetermined position between half way and wide open position, the cylindrical portion 31 of the metering valve is moved into the passage 35, so that the minimum restriction is provided, and this same degree of restriction is present regardless of the exact position of the throttle in the latter stages of its opening movement. I find that this arrangement has advantages with respect to maintaining desirable fuel mixtures, as the lower manifold suction which exists when the engine is laboring draws less diluting air from the crank case and thus helps to maintain a powerful and rich mixture, while the increase of suction, when the engine is lightly loaded and is run-

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ning faster with respect to a particular throttle opening, leans out the mixture and gives improved economy.

I claim:

1. In an internal combustion engine having a crankcase and an intake passage, a fuel mixture supply device connected to said intake passage, a throttle valve, a vapor passage leading from said crankcase to the intake passage, a valve in said vapor passage, and means connected to said throttle for adjusting said valve to provide minimum crankcase ventilation when said throttle is in idling position and so as to fully open said valve when said throttle is in the last half of its opening movement and substantially before it is fully opened.

2. In an internal combustion engine having a valve chamber and an intake manifold, a charge forming device connected to said intake manifold, a throttle for said charge forming device, a vapor passage connected to said valve chamber and to said intake manifold, a valve in said vapor passage, said valve comprising a restricted passageway and a metering rod extending into said passageway, said metering rod comprising a pair of cylindrical portions connected by a tapered portion, one of said cylindrical portions being substantially larger than the other, means connected to the throttle for moving the larger portion into the restricted passageway when the throttle is moved to its substantially closed position, and means for moving the smaller cylindrical portion into said restricted passageway when the throttle is moved to open position.

3. In an internal combustion engine having a valve chamber and an intake manifold, a charge forming device connected to said intake manifold, a throttle for said charge forming device, a vapor passage connected to said valve chamber and to said intake manifold, a valve in said vapor passage, said valve comprising a restricted passageway and a metering rod extending into said passageway, said metering rod comprising a pair of cylindrical portions connected by a tapered portion, one of said cylindrical portions being substantially larger than the other, means connected to the throttle for moving the larger portion into the restricted passageway when the

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throttle is moved to its substantially closed position, and means for moving the smaller cylindrical portion into the said restricted passageway when the throttle is moved to open position, said smaller portion being moved into the said restricted passageway when the throttle is substantially half-way open.

4. In an internal combustion engine, a carburetor having a body member and a flange member secured together by a bolt, a bracket carried by said bolt, a valve member carried by said bracket, a throttle shaft carried by said flange member, a link connected to said throttle shaft, and means carried by said link for operating said valve.

5. In a device of the class described, a flange member having a throttle shaft, a body member secured to said flange member, a bracket secured to said body member, a valve member carried by said bracket, a link member operated by said throttle shaft, and means carried by said link member for operating said valve.

6. The method of ventilating the crankcase of an internal combustion engine which comprises utilizing the engine suction to withdraw vapors from the crankcase, variably restricting without completely cutting off the flow of gases from the crankcase to the manifold when the engine throttle is more than half way closed, and applying a fixed restriction to such flow when the throttle is more than half way open.

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