United States Patent [19]

Braden

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[54] **ANTIPOLLUTION DEVICE**

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[52] **U.S. Cl.** ..... **261/78 R**, 261/DIG. 39

[51] **Int. Cl.** **F02m 19/10**

[58] **Field of Search** ..... 261/78 R, DIG. 39

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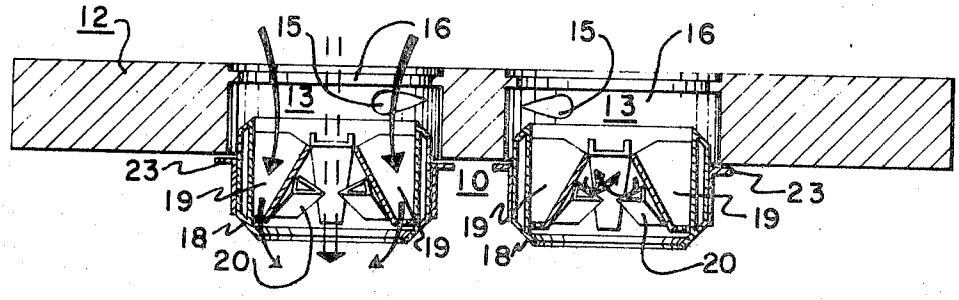
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[57] **ABSTRACT**

The antipollution device in a carburetor comprises a plate including suitable fuel ducts supplied with liquid fuel under pressure and nozzles operable to receive fuel from the ducts of the plate, the nozzles including suitable baffle veins operable to circulate and mix liquid fuel and air.

7 Claims, 5 Drawing Figures



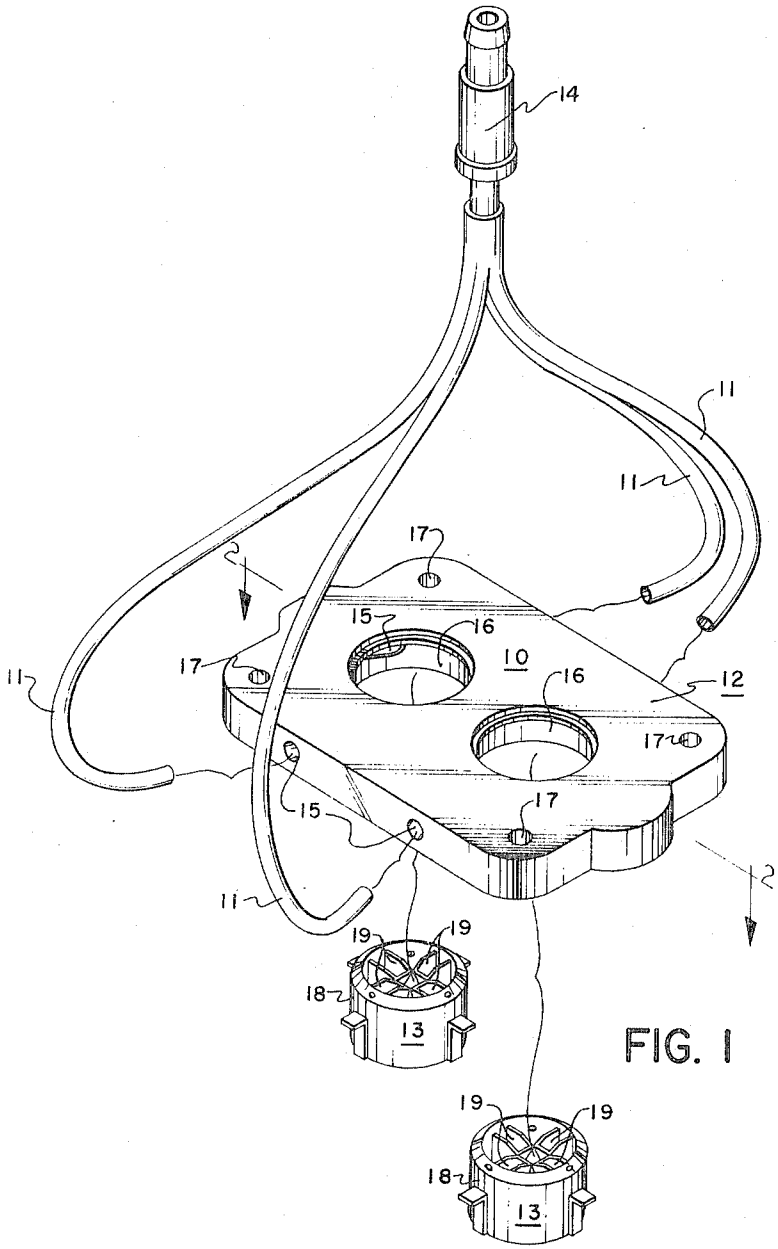


FIG. 1

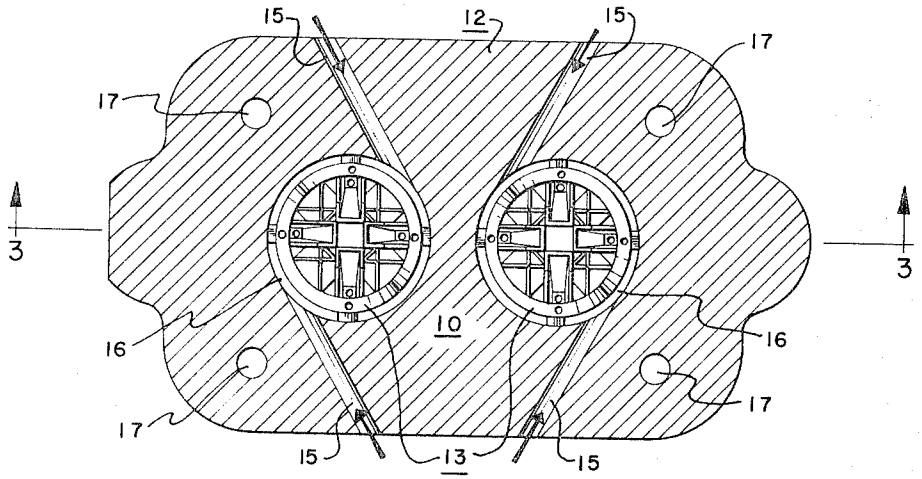


FIG. 2

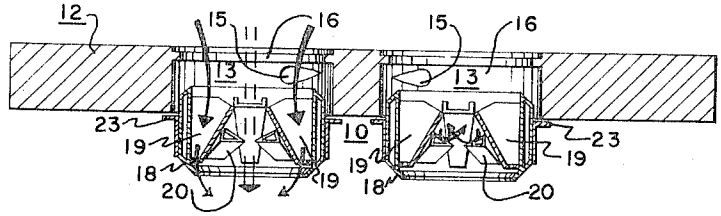


FIG. 3

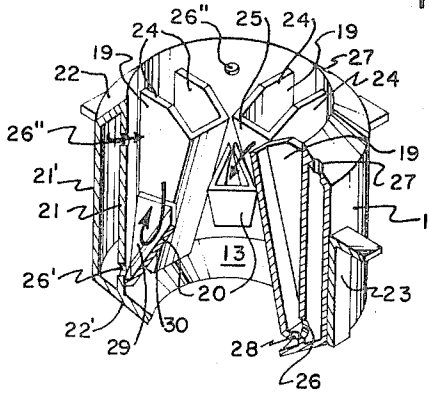


FIG. 4

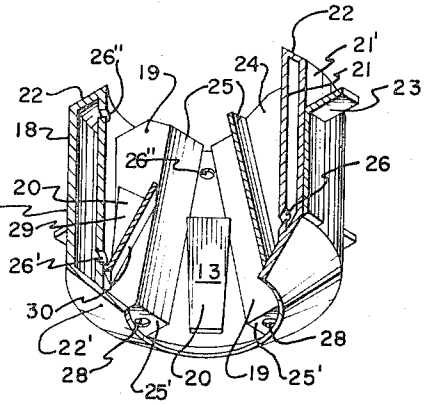


FIG. 5

ANTIPOLLUTION DEVICE

FIELD OF INVENTION

The present invention relates to carburetors and more particularly to carburetor attachments operable to reduce exhaust emissions.

DESCRIPTION OF THE PRIOR ART

It is known that an important suource of inefficiency in exhaust emissions in internal combustion engines arises from incomplete mixing of liquid fuel and air in the carburetor. Several types of apparatus have been devoloped to more optimally carburate fuel and air, including manifold preheaters, fuel injector means, superchargers, and compound carburetors. Each of these types is intended to increase the dispersion of liquid fuel in the carburetor chamber. However, each tends to add greatly to the complexity of the carburetor apparatus, and, accordingly, increases the delicacy of the carburetor. It has also been found that, at certain loads, fuel consumption and thus emission rates may be adversely affected by the presence of these attachments.

Accordingly, it is an object of the present invention to provide an antipollution device operable to more completely carburate liquid fuel and air in internal combustion engines.

It is a further object of this invention to provide the antipollution device in a substantially conventional carburetor.

It is another object of this invention to provide antipollution carburetor means which does not employ moving parts therein.

These and other objects shall become apparent from the description following, it being understood that modifications may be made without affecting the teachings of the invention here set out.

SUMMARY OF THE INVENTION

Generally, the antipollution device in a carburetor comprises a plate including suitable fuel ducts supplied with liquid fuel under pressure and nozzles operable to receive fuel from the ducts of the plate, the nozzles including suitable baffle veins operable to circulate and mix liquid fuel and air. The plate may be provided with control means for controlling the predetermined flow of liquid fuel.

A more thorough and comprehensive understanding may be had from the detailed description of the preferred embodiment when read in connection with the drawings forming a part of this specification.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top perspective view of the antipollution device of this invention shown with the fuel supply tubes, body plate and nozzles exploded away for illustrative purposes.

FIG. 2 is a cross-sectional view taken substantially along the lines 2—2 of the FIG. 1 showing a plan view of the interior configuration thereof.

FIG. 3 is a cross-sectional view taken substantially along the lines 3—3 of the FIG. 2.

FIG. 4 is a fragmentary top perspective view of a typical nozzle.

FIG. 5 is a fragmentary bottom perspective view of the apparatus of the FIG. 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT:

Referring now to the drawings and more particularly to the FIG. 1, the antipollution device of this invention is shown to advantage and generally identified by the numeral 10. It is to be understood that the device 10 is intended to be mounted on the throat of an internal combustion engine (not shown) in the manner of a carburetor. It has been found to advantage to mount the device 10 between the engine throat and a carburetor (not shown) in the manner of a compound carburetor. The device 10 comprises liquid fuel tubes 11, a body plate 12, and nozzles 13. The supply tubes 11 are intended to conduct liquid fuel under pressure from a suitable source, such as a fuel pump (not shown), through suitable means, such as a supply tube 14 to the ducts 15 in the plate 12.

Referring to the FIG. 2, the plate 12 provides fluid supply ducts 15 to the nozzles 13, carrier means 16, and plate-mounting means 17. The nozzles 13 are carried substantially centrally in suitable holes 16, shown to advantage in the FIG. 3. The ducts 15 are disposed in the plate 12 from its terminal sides to the respective nozzle carrier holes 16. It has been found to advantage to align the respective ducts 15 substantially tangent to the nozzle carrier holes 16 to facilitate circulation of liquid fuel in the nozzle 13 in the manner hereinafter described.

Referring now to the FIGS. 4 and 5, a typical nozzle 13 includes a cylindrical casing 18, fuel cups 19, and venturi cups 20. The casing 18 is formed by a pair of upstandingly, concentrically disposed cylindrical walls 21 and 21′ and a pair of end walls 22 and 22′ fastened at the upper and lower terminal ends of the walls 21 and 21′. The outermost cylindrical wall 21′ is provided with a plurality of outwardly projecting, mounting-positioning brackets 23 operable to contact the plate 12 on its lowermost terminal side about the circumference of the nozzle carrier holes 16. The end walls 22 and 22′ issue outwardly toward the respective terminal ends of the nozzle 13. The walls 21 and 21′ and 22 and 22′, thus formed, form a cylindrical chamber-like reservoir in the manner of a carburetor float chamber. As shown in the FIGS. 2 and 3, the ducts 15 are operable to supply the casing 18 with liquid fuel. The fuel cups 19 are disposed at intervals on the interior wall 21. Each fuel cup 19 is formed by a pair of side walls 24 fastened radially to the interior wall 21 and by a front wall 25 fastened to the terminal end opposite the interior wall contacting side of the side walls 24 and fastened at their lowermost terminal ends by a bottom wall 25′ to the casing 18 distally from its lowermost terminal end. As shown in the FIGS. 4 and 5, the fuel cup 19 is open to the flow of air from above. It may also be seen that the wall 25 is inclined centrally from its lowermost terminal end to its uppermost terminal end. the fuel cups 19 are operable together to form a verturi-like chamber in which a high-pressure region is formed above the fuel cup 19 and a low-pressure region is formed between and below the fuel cup 19. The interior casing wall 21 is provided with a fuel exitway 26 distally above the bottom wall 25′ and centrally disposed between the side walls 24 of the fuel cup 19, with fuel exitways 26′ disposed centrally and substantially behind the venturi cup 20, and with fuel exitways 26″ disposed distally at intervals below the uppermost termi-

nal end of the wall **21** and centrally between the fuel cups **19**, hereinafter described. Likewise, the upper end wall **22** is provided with a plurality of distally disposed entranceways **27**. Each of the fuel cups **19** is provided with a carburation exitway **28** centrally disposed in the bottom wall **25'**. In operation, air is drawn through the nozzles **13** in the direction indicated by the arrow in the FIG. **3**, and the pressure of the air tends to draw fuel in aerosol form from the exitways **26, 26', 26''** between the walls **21** and **21'** and through the nozzle **13**. It is to be understood that a portion of fuel from the ducts **15** tends to flow in a circular pattern around castings **18** as well as through the holes **27** between walls **21** and **21'**. Fuel is also drawn from the carburation exitways **28** of the fuel cups **19**. Thus, it may be seen that each nozzle **13**, having fuel cups **19**, may carburate fuel. It has been found to advantage to project the inclined end wall **22'** centrally beyond the wall **21** to create turbulence and to facilitate mixing of air-aerosol fuels.

Referring again to the FIGS. **4** and **5**, the verturi cups **20** are fastened at intervals on the interior terminal wall **21**, between and distally below the upper terminal ends of the fuel cups **19**. The venturi cups **20** are geometrically similar to the fuel cups **19** with the side walls **29** and upwardly, centrally inclined wall **30** forming a triangle at their respective uppermost terminal ends. As set out above, the venturi cup **20** may be supplied with fuel from a fuel exitway **26'** disposed in the wall **21**. The venturi cups **20** are operable to provide increased turbulence in the low-pressure region of the nozzle **13**.

In operation, a nozzle **13** is supplied with fluid from the supply tubes **11** through the plate **12**. Air flowing through the nozzle **13** tends to create a differential in which trubulence is increased by the configuration and juxtaposition of the fuel cups **19**, the venturi cups **20**, and the lowermost terminal wall **22'**. As shown in the FIGS. **1, 2** and **3**, the device **10** may include a plurality of nozzles **13**. It is also to be understood that a simple device **10** may include a single nozzle **13**.

Having thus described in detail a preferred apparatus which embodies the concepts and principles of the invention and which accomplishes the various objects, purposes and aims thereof, it is to be appreciated and will be apparent to those skilled in the art that many physical changes could be made in the apparatus without altering the inventive concepts and principles embodied therein. Hence, it is intended that the scope of the invention be limited only to the extent indicated in the appended claims.

I claim:

1. In combination with the intake throat of an internal combustion engine, an antipollution device comprising

a horizontally disposed plate including a vertically, substantially centrally disposed nozzle hole and fluid supply ducts provided with liquid fuel under pressure from a suitable source, said fluid supply ducts being disposed in said plate from its terminal side to said nozzle holes; and

a nozzle including a cylindrical casing having a pair of upstandingly, concentrically disposed walls and a pair of end walls fastened at the respective uppermost and lowermost terminal ends of said casing wall, said outermost casing wall being operable to engage said nozzle hole of said plate and being provided with means operable to connect said fuel ducts to said nozzle, fuel cups disposed at intervals on said interior casing wall, each of said fuel cups having a pair of side walls fastened radially to said interior casing wall and having a wall fastened in a centrally inclined manner from its lowermost terminal end, and exitways disposed in said interior casing wall within each of said fuel cups.

2. The apparatus of claim **1** wherein said lower end wall is provided with a centrally projecting portion operable to provide deflector means to carburated fuel.

3. The apparatus of claim **2** wherein said casing includes exitway holes in said upper end wall and exitways disposed at intervals in said interior casing wall between said fuel cups.

4. The apparatus of claim **1** including venturi cups fastened to said interior casing wall between said fuel cups, said venturi cups including a pair of radially fastened side walls and a centrally inclined wall, said wall being inclined from its lowermost terminal end to its uppermost terminal end fastened to said venturi cup side walls, and an exitway disposed in said interior casing wall within said venturi cups.

5. The apparatus of claim **1** wherein said antipollution device is provided with a plate having a plurality of nozzle holes and nozzles.

6. The apparatus of claim **1** wherein said fuel conduits are disposed in said plate substantially tangent to said nozzle hole.

7. The apparatus of claim **1** wherein said fuel ducts are provided with control means operable to predeterminely control the flow of liquid fuel to said nozzle.

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