

[54] CARBURETOR

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261/99; 55/259

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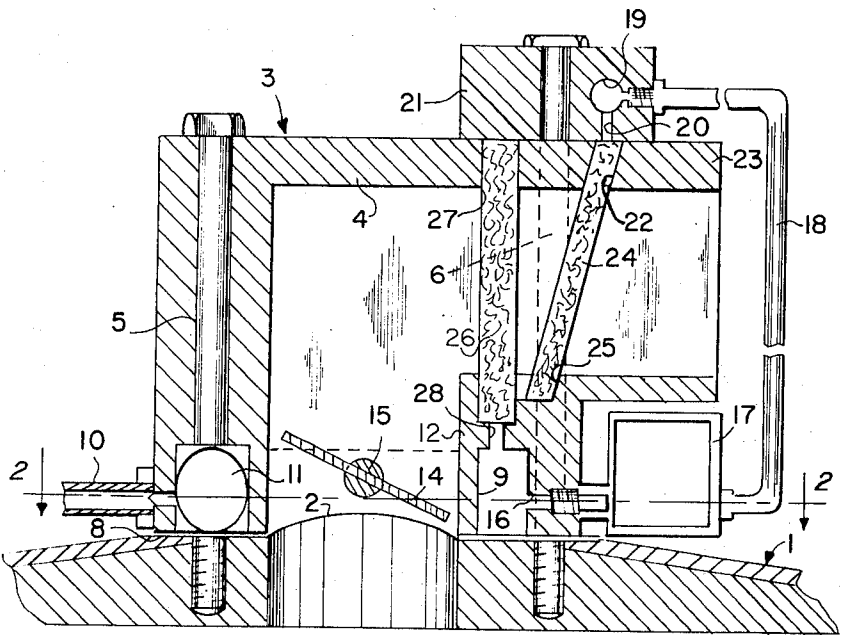
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[57] ABSTRACT

A simplified carburetor employing one or more porous fuel-absorbing filter elements to dispense fuel into the air drawn therethrough on its way to the engine manifold. In a simple and efficient way the fuel-air ratio supplied is essentially constant at all normal operating speeds. Pollution is reduced to a minimum.

5 Claims, 4 Drawing Figures



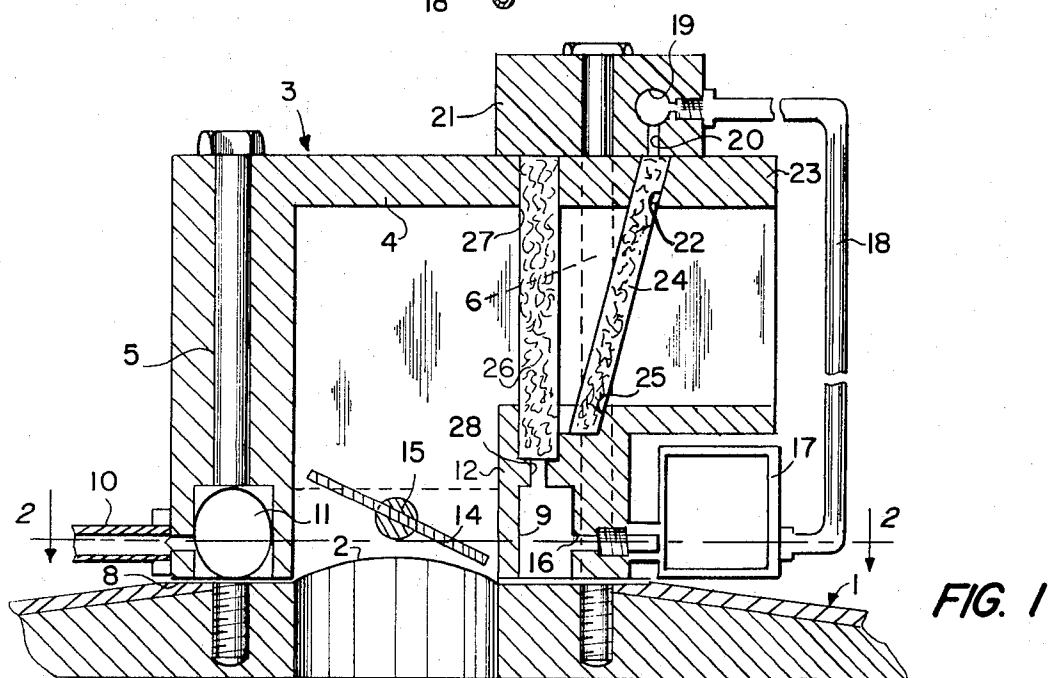
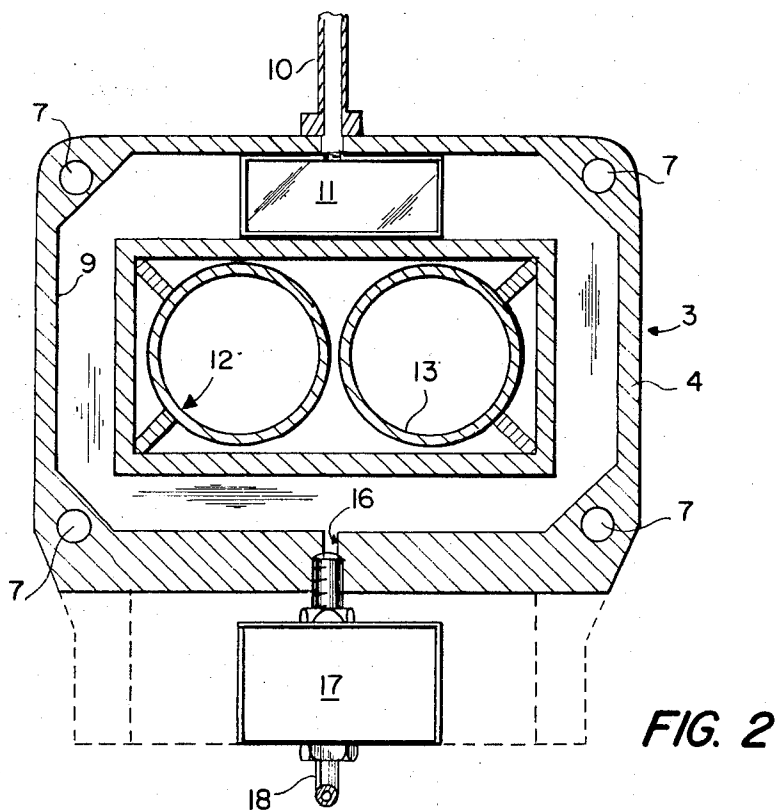


FIG. 4

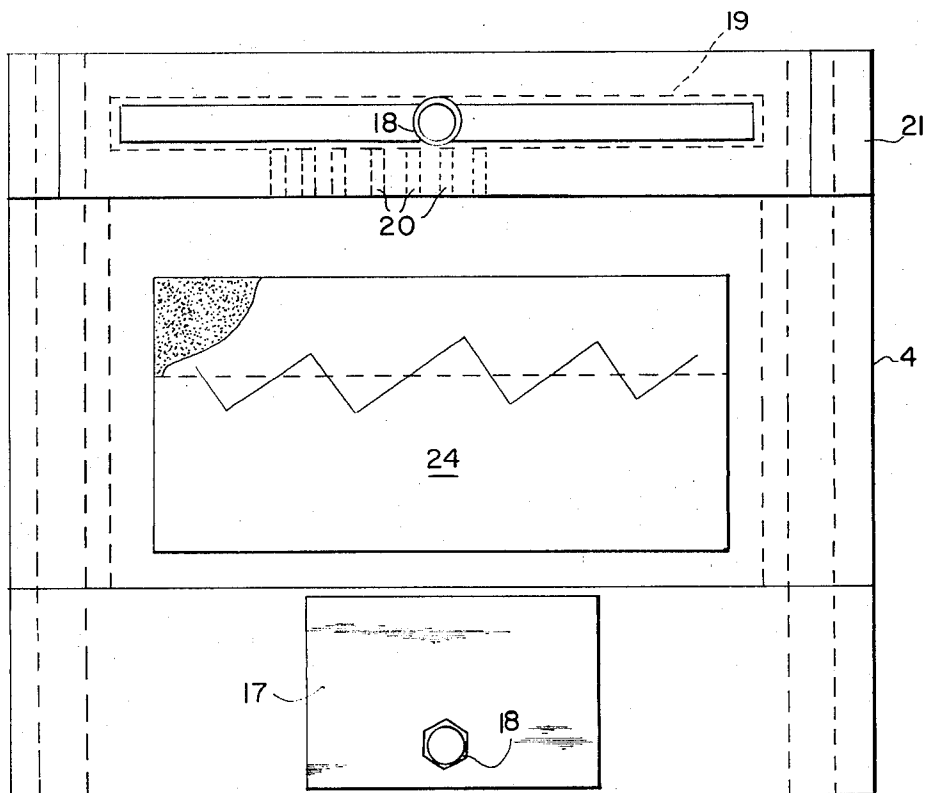
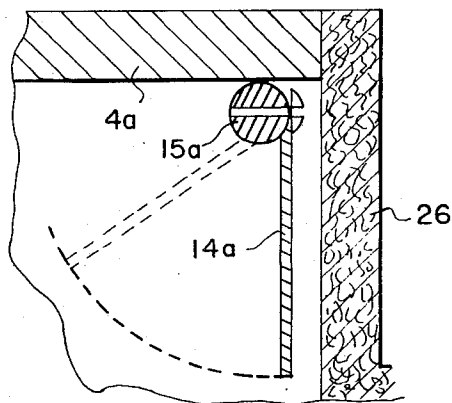


FIG. 3

CARBURETOR

BACKGROUND OF THE INVENTION

This invention relates to carburetors and more particularly to devices of that type which are an improvement over existing carburetors in the employment of porous absorbent plate-like filter elements to disperse fuel vapor into the engine intake air impelled there-through.

Carburetors as presently constructed and applied to internal combustion engines, especially those used with automotive vehicles, have become extremely complicated, expensive and difficult to service and adjust for the multitude of various operating conditions under which vehicles are required to operate. Further, the present and contemplated attachments for reducing carbon monoxide content and other pollutants in exhaust gases, add more complications which require frequent servicing by skilled mechanics. So vast have these complications become that the servicing, adjustment and repair of existing carburetors is a distinct discrete area or field of mechanical and scientific skill which relatively few mechanics have mastered. As a result reliable servicing of carburetors has become difficult to locate and expensive when obtainable.

It is the purpose and object of this invention to provide a carburetor which is relatively inexpensive to construct, requires a minimum of adjustment, is simple to service and recondition, long-lived and reliable in operation and efficient over a wide range of operating conditions.

Other objects and advantages will become apparent to those skilled in the art, after a study of the following detailed description, in connection with the accompanying drawing wherein is depicted a preferred form of the invention.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a schematic vertical section through a carburetor constructed in accordance with the invention;

FIG. 2 is a section taken in a plane about as identified by line 2 — 2, FIG. 1;

FIG. 3 is a front elevation as seen from the right of FIG. 1; and

FIG. 4 shows a modified construction of throttle valve for a carburetor otherwise as shown upon FIGS. 1 through 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring in detail to the drawing, 1 indicates generally the intake manifold of an internal combustion engine of known existing type, having an opening 2 through which vaporized fuel is drawn by manifold suction or subatmospheric pressure.

The carburetor generally identified at 3 may consist of a housing 4 secured by suitable means such as cap screws, two of which are indicated at 5 and 6, FIG. 1, to the manifold. As shown by through-bores 7, FIG. 2, there will preferably be four of these screws attaching the carburetor housing to the manifold with interposition of a gasket 8.

As best shown upon FIG. 2, the lower portion of housing 4 is constructed to form a horizontally-disposed continuous reservoir, channel or fuel sump 9 into which fuel is fed from the main gas line 10, under control of float valve 11 of conventional construction

and function, namely, to maintain essentially constant the fuel level in the sump. Continuing reference to FIG. 2, shows that the carburetor housing may include two circular throats 12 and 13 which act jointly to supply vaporized fuel to manifold 1. As indicated at FIG. 1 for throat 12, each is equipped with a butterfly or throttle valve such as 14, fixed to a common shaft 15 which in a conventional construction is connected for rotation by and in response to operation of a throttle such as the gas treadle, not shown, of an automotive vehicle.

As shown at FIG. 1, at the side diametrically opposite to float valve 11, a passage 16 leads from reservoir 9 to a fuel pump 17 which may be electrically driven and of essentially constant flow rate. The outlet or discharge conduit 18 extends to and is in communication with a cavity or bore 19 formed in a block 21 removably fixed atop the housing 4. As depicted upon FIG. 3, the cavity is elongated in a horizontal direction and generally cylindrical in form.

From cavity 19 a series of parallel laterally-spaced jet forming orifices 20 in block 21 extend downwardly and open into a slot 22 formed in the air-intake portion 23 of housing 4. The top edge of a first porous and absorbent filter element 24 extends into and fills the slot so that fuel passing downwardly from the orifices 20 is absorbed by and wets the filter element. As shown, element 24 is generally plate-like or planar in form and slopes downwardly across air intake 23 to obturate it so that all air entering the carburetor throat must first pass through the filter on its way to the intake manifold. The lower edge of the filter fits within a transverse groove or channel 25 formed in the air intake portion of housing 4. The channel is sufficiently wide to accommodate the lower edge of a second filter element 26 shown as essentially vertically disposed across intake 23, downstream of element 24.

The top edge of second filter element 26 fits within and fills a slot 27 formed in the top wall of the carburetor housing, in spaced parallel relation with slot 22. From channel 25 one or more passageways, one of which is identified at 28, extend downwardly into communication with sump or reservoir 9, whereby any excess fuel supplied by pump 17 is returned for recirculation thereby. Filters 24 and 26 may be essentially alike in shape and form, of the same porous, absorbent, felt-like material.

As an example, the filter elements may be about 4-1/2 inches long, 2 3/4 inches wide and 3/8 inch in thickness. Filter 24 may be constructed of porous fiber encased in one-fourth inch hardware cloth. Filter 26 may be of metal fibers similarly encased as with filter 24. By the construction described, filter 26 is made essentially free of danger from burning as the result of backfire. Also this filter catches and absorbs any raw fuel escaping through filter 24 and vaporizes it and/or releases it for return to sump 9. Filter 24 is preferably inclined to the vertical as shown, so that it does not release raw fuel as readily as it otherwise might do.

Jet orifices 20 may be three in number and about one thirty-second inch in diameter, but the foregoing parameters are by way of example only and may be varied as to size, spacing and relation in dependence upon the size or horsepower of the engine and its operating characteristics such as normal speed and power output.

Operation with the engine of which manifold 1 forms a part, in operation and fuel pump 17 energized, air is drawn into intake opening 23 and impelled through filter elements 24 and 26 in succession. Since element 24 at least, is saturated with fuel passing down through calibrated orifices 20, it vaporizes and picks up fuel to form an explosive mixture which then passes valve or valves 14 on its way to the engine's cylinders, for production of power in the usual way. Any excess or surplus of fuel over the rate instantaneously required by the engine, descends through orifice or orifices 28 to sump 9 from whence it may be withdrawn by pump 17 for recirculation.

Since filter 24 at least is continuously saturated with fuel the rate of evaporation thereof is essentially directly proportional to the rate of flow of intake air therethrough so that the fuel/air ratio afforded by the carburetor remains nearly constant for all rates and efficient operation of the engine is attained for all power outputs from idle to full load. Since filter 26 is supplied with fuel only from any excess seeping into channel 25 from filter 24, it acts to make homogenous and uniform the explosive vapor emanating from filter 24. Further, since channel 25 is subject to a degree of suction, or subatmospheric pressure, by reason of its communication with intake of pump 17 which operates at a constant rate, the flow of fuel to the filters is essentially uniform, while the surplus or excess fuel will flow back into sump 9 at a rate reversely proportionally to the power output of the engine. That is to say, while there will at all times be a certain small amount of fuel recirculated, the rate will be less the greater the power output of the engine.

In a conventional carburetor the rate of flow of fuel from the one or more jets or nozzles thereof, varies as the pressure differential between ambient air and the carburetor chamber just upstream from the throttle or control valve. With the engine idling or operating at low speed the pressure differential drops and approaches zero so that the fuel/air ratio which at best is critical, lessens and may pass below the value required for explosion, resulting in stalling or rough idling. At high speed or heavy load on the other hand, the pressure differential rises rapidly so that the fuel/air ratio increases to an extent which may result in inefficient operation, excessive fuel consumption and overheating.

Those drawbacks are avoided by my invention because the fuel/air ratio is essentially independent of the subatmospheric pressure differential between the air entering intake 23 and the downstream side of the filters, upstream of valve 14. I believe that any given quantum of air traversing the filters, picks up the same amount of fuel vapor therefrom no matter what the ve-

locity of the air may be under all normal operating conditions.

A further advantage is the remarkable ease of servicing. Block 21 for instance can be removed readily and when so removed exposes both filters 24 and 26 which can then simply be lifted out of their slots for cleaning and/or replacement.

I claim:

1. In a carburetor, a housing defining a through passageway including an inlet for ambient air at a first end, and an outlet for explosive fuel vapor at a second end, first means for attaching said outlet end to the intake manifold of an internal combustion engine, in pressure-tight relation therewith, there being a first slot in and through said housing opening into said passageway at the top thereof and adjacent said first end, a first porous absorbent filter element disposed in said passageway between said ends thereof and obturating the same, and having a first edge fitting and essentially filling said first slot, second means including a conduit opening at its discharge end into communication with said first slot, there also being a channel in said housing opening into said passageway, opposite to and below said slot, said first element having a second edge extending into said channel, and a second porous absorbent filter element obturating said passageway adjacent and downstream of said first filter element, said second element having a lower edge extending into said channel and with its opposite edge sealed in a second slot in and through said housing, adjacent said first slot.

2. The carburetor of claim 1, said elements being essentially planar and plate-like, said second element being disposed essentially vertically, said first element being disposed sloping downwardly, toward said second element.

3. The carburetor of claim 1, said second means also including a solid block removably fixed to said housing, containing a cavity and obturating said second slot, said block when removed exposing said filter elements for removal and replacement.

4. The carburetor of claim 3, a fuel sump in said housing below the level of said channel, an orifice draining fuel from said channel into said sump, a fuel pump, an intake connection from the sump to said pump, a discharge connection from said pump to the cavity in said block, and a main fuel line including a float valve connected to said sump to supply liquid fuel thereto.

5. The carburetor of claim 3, said cavity being a bore generally parallel with and over said first slot, and a plurality of spaced metering orifices in said block and placing the bore in communication with said slot and the first filter element.

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