

# United States Patent

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[15] 3,695,590

[45] Oct. 3, 1972

## [54] CARBURETER OF THE OVERFLOW TYPE

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[22] Filed: **Nov. 12, 1970**

[21] Appl. No.: **88,698**

## [30] Foreign Application Priority Data

June 8, 1970 Japan .....45/56368

[52] U.S. Cl. ....261/36 A, 261/72 R, 261/DIG. 50

[51] Int. Cl. ....F02m 37/06

[58] Field of Search .....261/DIG. 50, 36 A, 72 R

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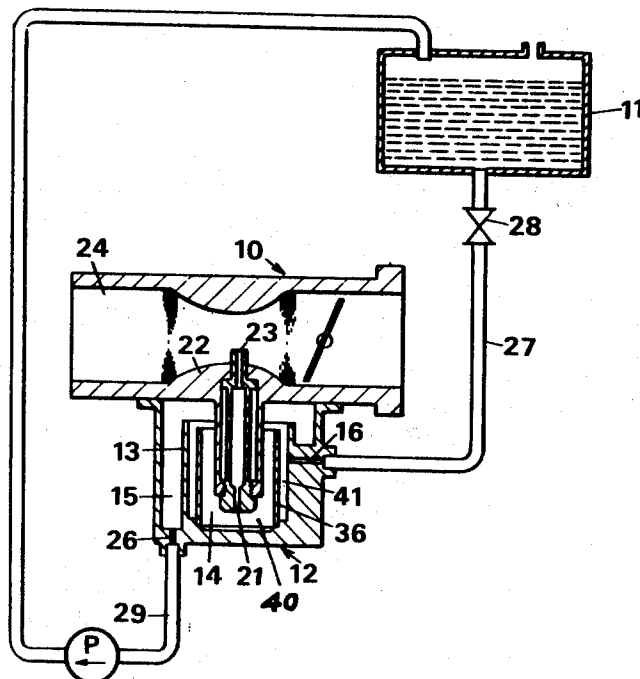
Primary Examiner—Tim R. Miles

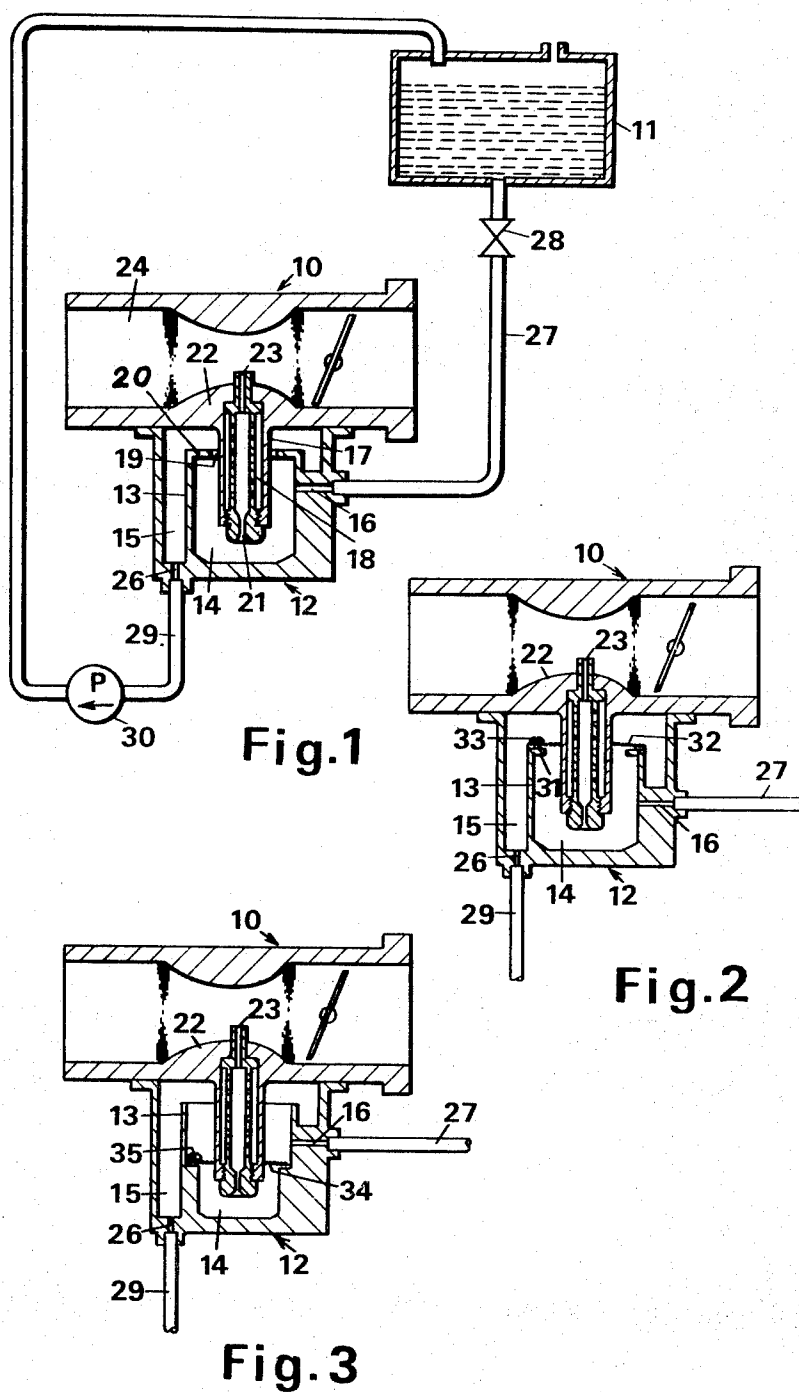
Attorney—McGlew & Toren

## [57] ABSTRACT

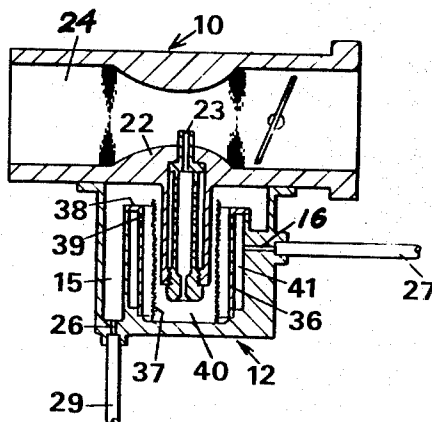
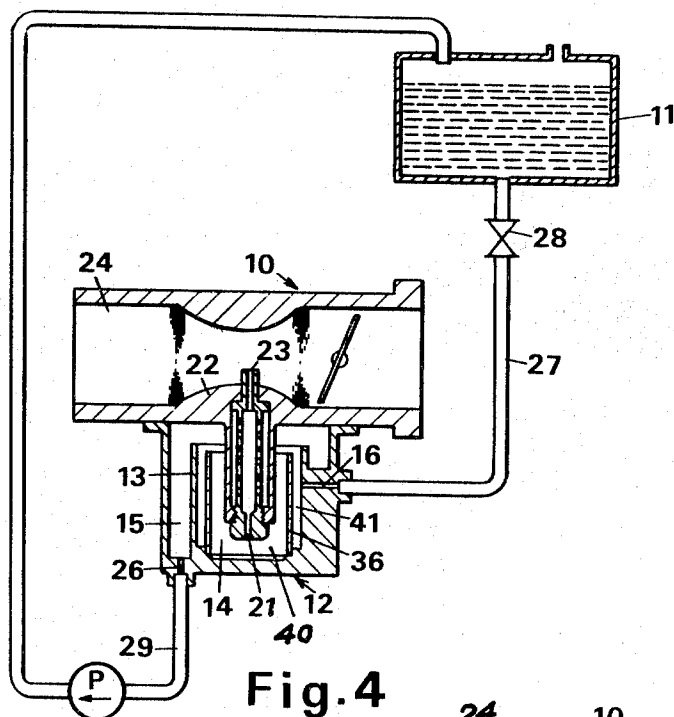
A carbureter of the overflow type which is provided with a partition wall and/or a screen in a fuel chamber of the carbureter for controlling the flow of fuel so as to stabilize a fuel layer in the vicinity of a fuel jet of the carbureter.

2 Claims, 5 Drawing Figures





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## CARBURETER OF THE OVERFLOW TYPE

### BACKGROUND OF THE INVENTION

This invention relates to carbureters of the overflow type, and more particularly it is concerned with an improvement in or relating to a carbureter fuel chamber.

Carbureters of the overflow type are generally used with motor cycles. The carbureter of this type is adapted to supply fuel to its fuel chamber by gravity when its fuel tank is disposed at a level higher than that of the fuel chamber; and when the fuel tank is disposed at a level lower than that of the fuel chamber, fuel is drawn by suction by means of a pump and the liquid level in the fuel chamber is maintained constant at all time by overflowing excess fuel.

The carbureter of this type is simple in construction. However, the designing of the carbureter of this type dictates that the orifice of a fuel inlet port must not have a large area. Because of this, the fuel newly introduced into the fuel chamber forms a current flowing at a substantial flow rate. This fuel current disturbs a fuel layer in the vicinity of a fuel jet, thereby causing fluctuations to occur in the quantity of fuel injected into a mixing passage.

### SUMMARY OF THE INVENTION

This invention has as its object the provision of a carbureter of the overflow type which is provided, in its fuel chamber, with buffer means, such as a throttling portion, cylindrical partition wall, screen, porous member or horizontal plate, either singly or in combination, for reducing the flow rate of fuel delivered to the fuel chamber, so as to thereby stabilize a fuel layer in the vicinity of a fuel jet. The invention offers the advantage of permitting to inject fuel into a mixing passage of the carbureter in a quantity which is commensurate with engine speed.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal sectional view of the carbureter of the overflow type comprising one embodiment of this invention in which a horizontal plate is mounted in an overflow wall portion in a fuel chamber of the carbureter;

FIG. 2 is a view similar to FIG. 1 but comprising another embodiment of the invention in which a screen is mounted;

FIG. 3 is a view similar to FIG. 1 but comprising still another embodiment of the invention in which a screen is mounted horizontally in a middle portion of the fuel chamber;

FIG. 4 is a view similar to FIG. 1 but comprising still another embodiment of the invention in which a cylindrical partition wall is mounted; and

FIG. 5 is a view similar to FIG. 1 but comprising the other embodiment of the invention in which a cylindrical partition wall and a cylindrical screen are mounted.

### DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

FIG. 1 shows a first embodiment of the carbureter of the overflow type according to this invention. The carbureter shown is of the type in which a fuel tank 11 is disposed at a level higher than that of a fuel chamber

12 of the carbureter 10. The fuel in the fuel tank 11 is supplied to the fuel chamber 12 as it flows by gravity when a fuel cock 28 in a fuel supply line 27 is opened.

The fuel chamber 12 is divided into a fuel well 14 and an overflow chamber 15 by a wall 13. An inlet port 16 communicating with the fuel supply line 27 is formed in the fuel well 14. A cylindrical member 17 enclosing an emulsion tube 18 extends from a lower portion of the carbureter body into a central portion of the fuel well 14. A horizontal portion 20 extends inwardly from an upper end of the wall 13 toward the cylindrical member 17 and spaced therefrom by a small gap or a throttle portion 19. A main jet 21 is formed at a lower end of the emulsion tube 18, and a main nozzle 23 is provided at an upper end thereof to open into a Venturi portion 22 of the carbureter 10.

The fuel delivered by passing through the fuel inlet port 16 is passed through the main jet 21 and injected into a mixing passage 24 through the main nozzle 23. The quantity of fuel injected into the mixing passage varies depending on engine speed. The quantity of injected fuel is reduced when the engine speed is low or the engine is idling because a negative pressure in the mixing passage 24 of the carbureter 10 is reduced. When this is the case, the fuel introduced into the fuel chamber 12 fills the fuel well 14 and excess fuel overflows through the gap 19 into the chamber 15. The excess fuel passed into the chamber 15 is returned through an outlet port 26 and a return passage 29 to the fuel tank 11 by means of a pump 30 operated in conjunction with the driving of the engine.

The carbureter of the overflow type according to one aspect of this invention is constructed as aforementioned. The invention permits to store a large quantity of fuel in the fuel well 14 at all times. If the cock 28 is operated in conjunction with the starting of the engine, then a rate of reduction of the liquid level in the fuel well 14 is not so great by virtue of the automatic operation of the cock 28 even if the fuel delivered from the fuel tank 11 to the fuel well 14 through the fuel supply line 27 is smaller in quantity than the fuel passed from the fuel well 14 through the main jet 21 into the main nozzle 23 to be injected into the mixing passage 24. With this arrangement, a shortage of fuel does not occur when the engine is started. When the carbureter as a whole is swayed to and fro by vibrations of high magnitude while the consumption of fuel is small in quantity and the liquid level in the fuel well 14 is almost flush with the liquid level in the overflow chamber 15, the gap 19 serves as a throttling portion and prevents the splashing of the fuel in the fuel well 14 into the overflow chamber 15. When the fuel delivered through the fuel supply line 27 to the fuel well 14 is greater in quantity than the fuel consumed, such as when the engine speed is low or the engine is idling, excess fuel is spilled through the outlet port 26 of the overflow chamber 15 and returned through the passage 29 to the fuel tank 11, thereby keeping the liquid level in the fuel well 14 constant at all times.

FIG. 2 shows a second embodiment of this invention. In this embodiment, the carbureter comprises buffer means, such as a screen, porous plate or the like, which is provided horizontally at an upper end of the fuel well 14 or near the overflow liquid level.

The wall 13 is formed at its upper end with a plurality of small projections 31 each of which is formed with an internally threaded portion for receiving therein a screw 33 after a screen 32 is placed on the projections 31 so as to firmly secure the screen thereto.

In the third embodiment shown in FIG. 3, a screen 34 is provided horizontally in the fuel well 14 and disposed at a level higher than that of the main jet 21 but lower than that of the fuel inlet port 16. The screen 34 is held in place by screws 35.

Like the first embodiment, the second and third embodiments permit excess fuel to overflow to be returned to the fuel tank 11. Thus, the liquid level in the fuel well 14 is kept constant at all times and the splashing of fuel is minimized when the carburetor sways due to vibrations because the screen preforms a throttling action.

The third embodiment shown in FIG. 3 is particularly effective to markedly reduce disturbances in the flow of fuel introduced into the fuel well 14 through the inlet port 16 at a substantial rate by the flow regulating action of the screen or porous plate member which is disposed horizontally in a middle portion of the fuel well 14. For this reason, a lower layer of fuel in the fuel well 14 is stabilized and no turbulent current is formed in the vicinity of the fuel jet (main jet) 21. This is conducive to the prevention of fluctuations in the pressure at the fuel inlet port of the fuel jet 21 which might otherwise be caused by a turbulent flow of fuel and the elimination of fluctuations in the quantity of fuel injected into the mixing passage.

FIG. 4 shows a fourth embodiment which comprises a cylindrical partition wall 36 mounted vertically in the fuel well 14. The cylindrical partition wall 36 is slightly smaller in height than the wall 13 and divides the well 14 into a chamber 40 and an annular space 41. The fuel delivered through the inlet port 16 fills the annular space 41 and then overflows the wall 36 into the chamber 40. Then, the fuel is passed through the fuel jet 21 and main nozzle 23 to be injected into the mixing passage 24. When the quantity of injected fuel is reduced due to engine speed, the fuel in the fuel well 14 overflows into the chamber 15 and is returned to the tank 11.

The fifth embodiment shown in FIG. 5 comprises the cylindrical partition wall 36 and a screen 37 mounted in the fuel well 14. The annular space 41 defined by the cylindrical partition wall 36 is closed at its upper end by an annular plate 38 formed at an upper edge of the partition wall 36. The partition wall 36 is formed near its upper end with a plurality of small openings 39 through which the annular space 41 maintains communication with the chamber 40. In this embodiment, the fuel delivered through the inlet port 16 is stored in the annular space 41 and passed through the small openings 39 into the chamber 40 from which it is passed through the fuel jet 21 and injected into the mixing passage 24 through the main nozzle 23. Thus, the fuel introduced into the fuel well 14 has its flow rate adjusted by the partition wall 36 and screen 37, so that a fuel layer in the vicinity of the fuel jet can be stabilized.

Each of the fourth and fifth embodiments controls by means of the partition wall 36, the flow rate of fuel

delivered into the fuel well 14 through the inlet port 16 so as to thereby stabilize a fuel layer near the fuel jet 21. The provision of the screen 37 in the chamber 40 in addition to the wall 36 makes it possible to minimize fluctuations in the quantity of fuel injected into the mixing passage, even when the fuel is delivered into the fuel well at a considerable rate, by more effectively stabilizing a fuel layer in the fuel well in the vicinity of the fuel jet than would be the case if there were no screen.

The various embodiments of the present invention have been described as being incorporated in carburetors of the type in which the fuel tank 11 is disposed at a level higher than that of the fuel chamber 12. It is to be understood that this invention can be incorporated in carburetors of the type in which the fuel tank 11 is disposed at a level lower than that of the fuel chamber 12 so that the fuel supplied from the fuel tank is delivered to the fuel chamber of the carburetor by means of a fuel delivery pump and excess fuel overflows and spills back to the fuel tank by gravity.

What I claim is:

1. An overflow type carburetor comprising a carburetor body forming a horizontal mixing passage including a Venturi portion, walls means secured to said carburetor body and forming a fuel chamber located below said mixing passage, a main nozzle support tube positioned within said fuel chamber, said main nozzle support tube having a main nozzle at its upper end in communication with said Venturi portion of said mixing passage and having a main jet at its lower end within said fuel chamber, an upright wall located within said fuel chamber dividing it into a fuel well and an overflow chamber, an upright cylindrical partition wall positioned within said fuel well inwardly from said upright wall and dividing said fuel well into an inner chamber containing said main nozzle support tube with said main jet thereof located below the upper end of said cylindrical partition wall and an annular space encircling said inner chamber, the upper end of said cylindrical partition wall located below the upper end of said upright wall, said wall means including an inlet port communicating with said annular space for supplying fuel from a supply source into said fuel well and an outlet port in communication with the base of said overflow chamber for returning excess fuel to the supply source so that said cylindrical partition wall affords a stabilized fuel layer in said inner chamber in the vicinity of said main jet for preventing fluctuations in the quantity of fuel injected into said mixing passage.

2. An overflow type carburetor, as set forth in claim 1, wherein a horizontally arranged annular plate is secured to the upper end of and forms a closure for the upper end of said annular space, a plurality of small openings formed in the upper end of said upright cylindrical partition wall for affording flow from said annular space into said inner chamber, and a second upright partition wall formed of a pervious material positioned within said inner chamber inwardly of the other said partition wall and said second partition wall extending for the height of said inner chamber and laterally encircling said main nozzle support tube.

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