Dec. 8, 1936. P. E. MACK 2,063,107

CARBURETOR

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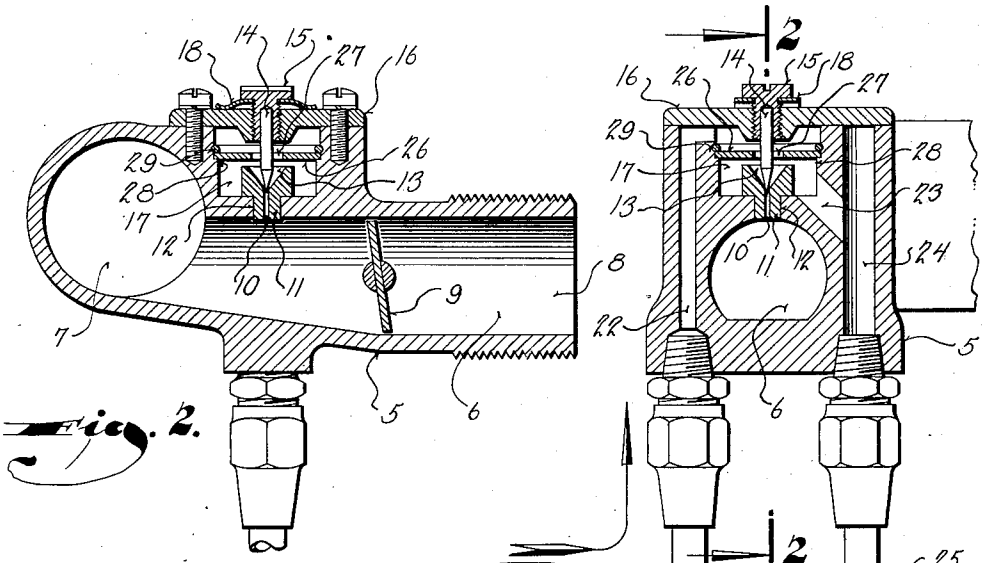


Fig. 2.

Fig. 1.

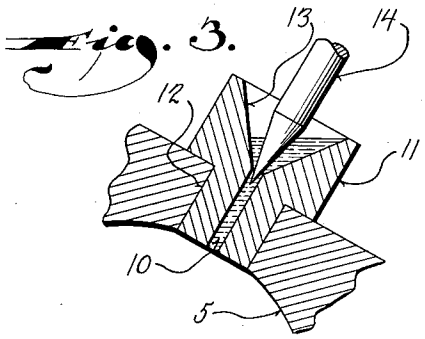


Fig. 3.

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CARBURETOR

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12 Claims. (Cl. 261—36)

This invention relates to improvements in carburetors and has as a general object to provide a carburetor of simplified construction particularly adaptable for use with small engines.

More specifically it is an object of this invention to provide a "floatless carburetor" of improved and simplified construction.

Another object of this invention is to provide a carburetor of the character described having novel means for supplying fuel to the metering jet which is so designed and constructed that regardless of tilting of the engine out of a normal vertical position proper fuel feed will be maintained.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein-disclosed invention may be made as come within the scope of the claims.

The accompanying drawing illustrates one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a cross section view through a carburetor embodying this invention and illustrating the manner of supplying the same with fuel;

Figure 2 is a section view through the carburetor taken on the plane of the line 2—2 of Figure 1; and

Figure 3 is an enlarged detail view of the fuel jet per se illustrating the manner in which proper fuel feed is maintained regardless of tilting of the engine.

Referring now more particularly to the accompanying drawing in which like numerals indicate like parts throughout the several views, the numeral 5 designates the body of the carburetor which, as shown, is formed with an air passage 6 having an inlet 7 and an outlet 8. The inlet 7 may be provided with an air cleaner or may open directly to the atmosphere, and the outlet is connected in any conventional manner to the intake manifold of the engine. The type of engine for which this carburetor is particularly designed, although not restricted thereto, is the small single or double cylinder engine used on lawn mowers, household and farm appliances, and in the many other well known ways.

A butterfly throttle valve 9 is mounted in the air passage 6 to control the quantity of fuel mixture drawn into the engine, and between the inlet 7 and the throttle valve 9, a metering jet is arranged to discharge into the air passage 6. The metering jet comprises a small diameter orifice 10 through a jet plug 11 which is pressed into a bore 12 in the wall of the air passage 6. The upper end of the orifice 10 opens into a cone-shaped well 13 which is adapted to be kept full of fuel in a manner to be hereinafter more fully described.

To properly meter the fuel flowing through the orifice and into the air stream, a needle valve 14 is mounted above the orifice to seat on the upper end thereof. The needle valve is carried by an adjusting screw 15 threaded in a cover 16 which closes a fuel chamber 17 formed in the body of the carburetor. A spring washer 18 confined between the head of the screw and the top of the cover serves to hold the screw against accidental rotation.

Fuel is supplied to the metering orifice by being pumped into the chamber 17 from a supply tank 19. For purposes of illustration, a pump 20 is shown interposed in a supply line 21 leading from the tank to an inlet port 22 formed in the body 5 of the carburetor and opening to the top of the chamber 17, as shown in Figure 1.

The chamber 17 also communicates through a diagonal bore 23 opening to the bottom thereof, with an outlet port 24 to which a return line 25 is connected to return the excess fuel back to the tank 19. In this manner, fuel is constantly kept flowing into the chamber 17.

It will be observed that a partition wall 26 extends horizontally across the upper portion of the chamber 17 above the top of the conical well 13, and that this partition has a central hole 27 substantially larger than the diameter of the metering pin 14 and arranged directly above the open top of the conical well. This hole 27 is the only communication between the upper and lower portions of the chamber 17 and being directly above the well 13, all of the fuel entering the chamber flows into the well 13 from which it overflows to reach the drain 23. The well 13 is thus kept full to provide proper fuel feed under all circumstances.

The partition wall 26 may be secured in place in any desired manner and in the present instance is shown seated on a shoulder 28 formed by counterboring the upper end of the chamber 17, where it is held by a spring ring 29.

From the foregoing description taken in connection with the accompanying drawing, it will

be readily apparent to those skilled in the art to which this invention appertains, that this invention provides a floatless carburetor of simplified construction and one in which the objections of faulty fuel feed arising from possible tilting of the motor are entirely eliminated. As particularly shown in Figure 3 even though the motor is tilted to an angle of 30°, the well 13 at all times contains fuel in sufficient quantity to afford proper metering thereof.

What I claim as my invention is:

1. In a floatless carburetor, a body formed with an air passage and means for introducing a metered quantity of fuel into the air passage comprising inner and outer chambers, one within the other, an orifice leading from the bottom of the inner chamber to the air passage to drain fuel from said inner chamber into the air passage, means for draining excess fuel from the outer chamber at a point beneath the open top of the inner chamber, and means for constantly conducting fuel into the inner chamber at a rate greater than its flow through the orifice whereby said inner chamber is maintained full and excess fuel flows into the outer chamber to be drained therefrom.

2. The combination with a carburetor for internal combustion engines, of means to constantly supply a metered quantity of fuel thereto comprising a supply tank, a closed circuit through which fuel may be circulated from the tank and back into the tank, a fuel chamber forming part of said closed circuit which the fuel enters at the top and leaves at the bottom, a pump to circulate fuel through said circuit and thereby maintain fuel in said chamber, a jet orifice leading from the chamber to the carburetor, and a well to supply the orifice with fuel, said well being disposed in the fuel chamber with its open top located above the discharge of the fuel chamber to receive fuel therefrom and having a converging bottom leading to the orifice so as to conduct fuel thereto even though the carburetor and the axis of the jet orifice are inclined from the vertical.

3. In a floatless carburetor having a body formed with an air passage and a fuel chamber, means to constantly supply the chamber with fuel, means for draining excess fuel from said chamber, an orifice communicating the chamber with the air passage, a well disposed within the chamber and draining at all times into the orifice, and means within the chamber between said well and the point of fuel admission to the chamber to insure the filling of the well at all times regardless of normal inclinations of the carburetor.

4. In a floatless carburetor, a body formed with an air passage and a fuel chamber, an orifice leading from the chamber into the air passage, a well opening at its bottom to the orifice to supply the orifice with fuel, means for introducing fuel into the top of the chamber, means for draining excess fuel from the bottom of the chamber, the top of the well being spaced from the bottom of the chamber so that fuel in said well is not drained therefrom, and means between the top of the well and the point of fuel admission to the chamber at all times in position for causing all of the fuel entering the chamber to first flow into the well so as to maintain the well filled at all times.

5. In a carburetor, a body provided with an air passage and having a fuel chamber and an orifice leading from the chamber to the air passage, means within the chamber extending above the bottom thereof and forming an open topped well draining into said orifice, a drain for excess fuel leading from the bottom of the chamber, and a partition wall extending across the chamber between the top of said well and the point of fuel admission, said partition having an opening disposed above the top of the well so that all fuel entering the chamber flows into the well before reaching the bottom of the chamber and the drain leading therefrom to thereby insure keeping the well full at all times.

6. In a carburetor, a body provided with an air passage and having a fuel chamber and an orifice leading from the chamber to the air passage, means within the chamber extending above the bottom thereof and forming an open topped well draining into said orifice, a drain for excess fuel leading from the bottom of the chamber, a partition wall extending across the chamber between the top of said well and the point of fuel admission, said partition having an opening disposed above the top of the well so that all fuel entering the chamber flows into the well before reaching the bottom of the chamber and the drain leading therefrom to thereby insure keeping the well full at all times, and a metering pin passing through the opening in the partition wall and extending into the well to meter the fuel flowing from the well into said orifice.

7. In a carburetor, a body provided with an air passage and having a fuel chamber and an orifice leading from the chamber to the air passage, means within the chamber extending above the bottom thereof and forming an open topped well draining into said orifice, a drain for excess fuel leading from the bottom of the chamber, and a partition wall extending across the chamber between the top of said well and the point of fuel admission, said partition having an opening disposed above the top of the well so that all fuel entering the chamber flows into the well before reaching the bottom of the chamber and the drain leading therefrom to thereby insure keeping the well full at all times, the bottom of the well converging toward its point of communication with the orifice so that the fuel within the well flows to the orifice regardless of inclination of the carburetor from a true vertical.

8. In a floatless carburetor, a body formed with an air passage and means for introducing a metered quantity of fuel into the air passage, comprising a chamber formed in the top wall of said air passage, there being a fuel discharge orifice leading from the bottom of said chamber through said wall directly into the air passage, said chamber having an inlet for fuel at its top and an outlet for excess fuel leading from the bottom thereof, means for supplying fuel to the chamber in a volume in excess of the capacity of the discharge orifice, and means within said chamber for constantly and at all times leading the fuel entering the chamber directly to said discharge orifice.

9. In a floatless carburetor, a body formed with an air passage and means for introducing a metered quantity of fuel into the air passage, comprising a chamber formed in the top wall of said air passage, there being a fuel discharge orifice leading from the bottom of said chamber through said wall directly into the air passage, said chamber having an inlet for fuel at its top and an outlet for excess fuel leading from the bottom thereof, means for supplying fuel to the

chamber in a volume in excess of the capacity of the discharge orifice, means within said chamber for constantly and at all times leading the fuel entering the chamber directly to said discharge orifice, and means encircling the entrance to the discharge orifice and forming a well whose bottom wall is shaped to drain into the discharge orifice at all times regardless of normal inclinations of the carburetor to positions at which the axis of said orifice is inclined from its normal position.

10. In a floatless carburetor, a body formed with an air passage and means for introducing a metered quantity of fuel into the air passage, comprising a chamber formed in a wall of the air passage, there being a discharge orifice leading from the bottom of said chamber through said wall and directly into the air passage, means within the chamber providing an open topped well whose bottom is formed so as to drain at all times into the discharge orifice so that as long as fuel is supplied to the well it flows through the discharge orifice into the air passage, means for positively conducting fuel directly into said well at all times regardless of normal inclinations of the carburetor disposing the axis of the well at an inclination so that a supply of fuel is at all times maintained in the well, and said chamber having an outlet located beneath the open top of the well to drain fuel which overflows the open top of the well from said chamber.

11. In a floatless carburetor having an air passage, means for introducing a metered quantity of fuel into the air passage comprising a discharge orifice leading to the air passage, an open topped well having its bottom leading to said discharge orifice and so shaped as to drain into the orifice at all times, means for supplying fuel to the well, and common means for positively leading the fuel into the well and for metering the flow of fuel from the well into the discharge orifice.

12. In a floatless carburetor having an air passage, means for introducing a metered quantity of fuel into the air passage comprising an orifice leading into the air passage, an open topped well arranged to drain into the orifice and having its bottom so shaped as to drain all of its contents into the orifice at all times, means for conducting fuel to the open topped wall including a chamber having an outlet disposed above the open top of the well, and a metering pin passing vertically through said outlet into the well for positively leading the fuel flowing through said outlet into the well and for metering the flow of fuel from the well into the orifice.

PERRY E. MACK.