Aug. 9, 1932. J. R. BELLVILLE 1,870,438

CARBURETOR

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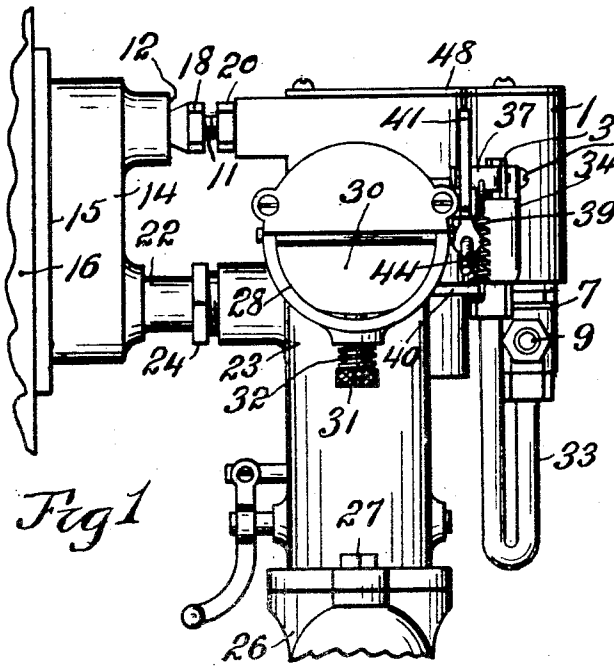


Fig 1

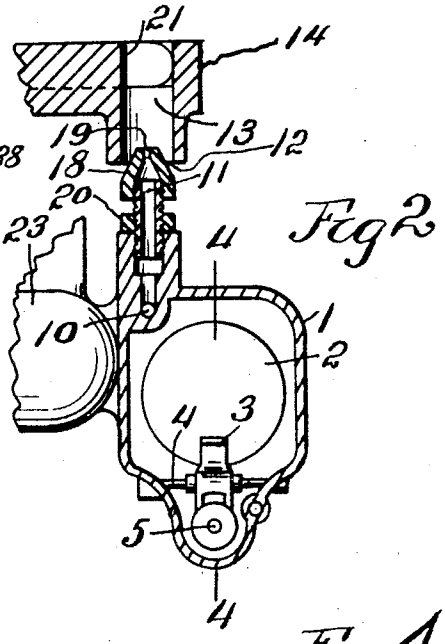


Fig 2

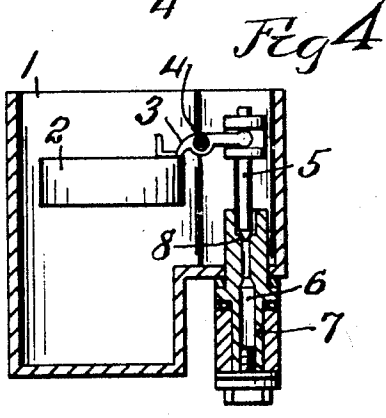


Fig 4

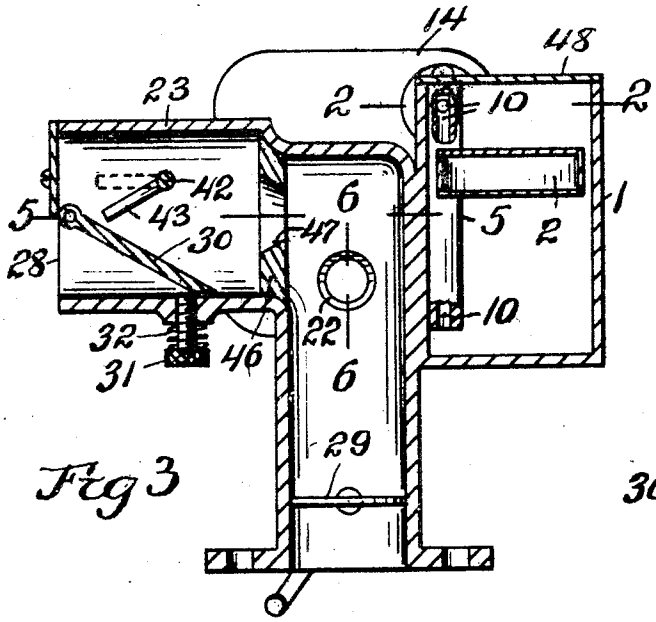


Fig 3

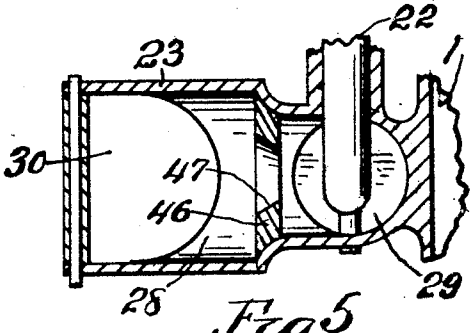


Fig 5

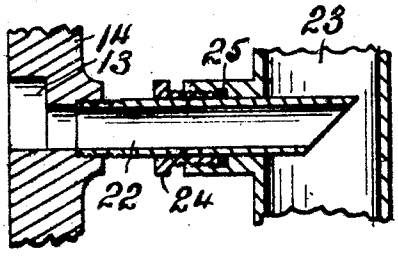


Fig 6

Witness
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Aug. 9, 1932. J. R. BELLVILLE 1,870,438

CARBURETOR

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Fig 7

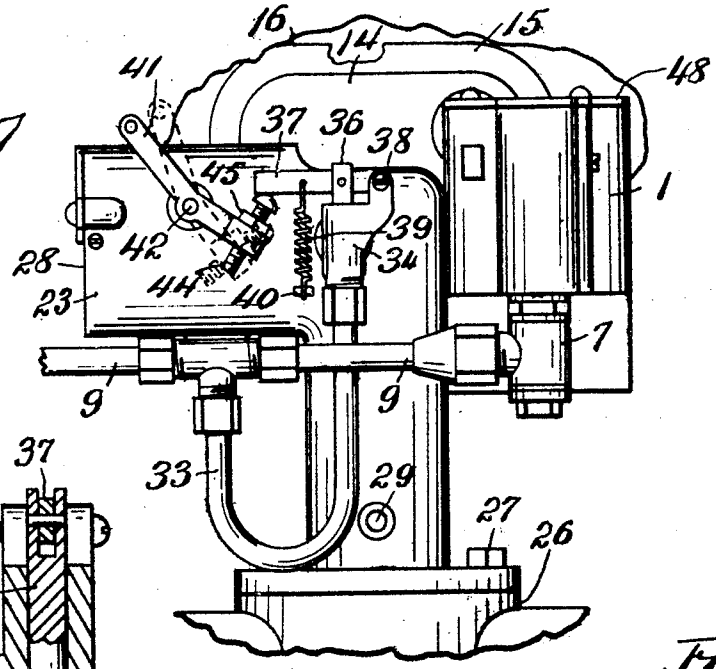


Fig 11

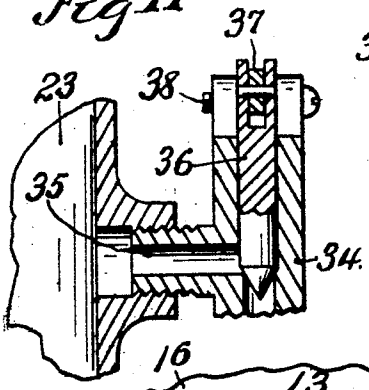
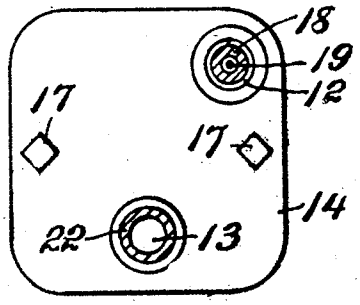


Fig 9



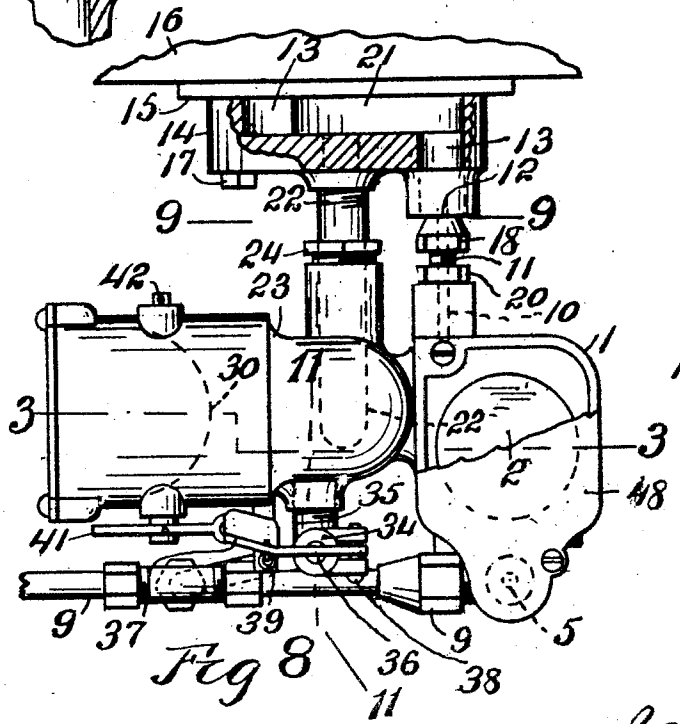


Fig 8

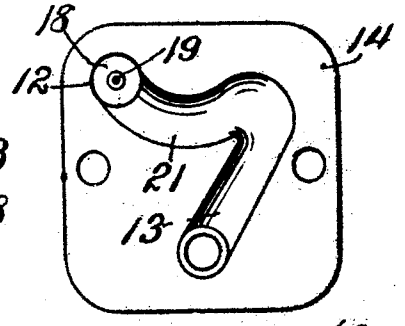


Fig 10

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Patented Aug. 9, 1932 1,870,438

UNITED STATES PATENT OFFICE

JAMES R. BELLVILLE, OF KANSAS CITY, MISSOURI

CARBURETOR

Application filed August 21, 1929. Serial No. 387,391.

My invention relates to improvements in carburetors.

One of the objects of my invention is to provide a novel carburetor adapted to be attached to engines now in use, which has novel means for forming a liquid fuel spray and mixing therewith an initial charge of air, which has novel means for highly heating the mixture so made prior to the discharge of the mixture into a mixing chamber wherein a further amount of air is introduced to form an efficient explosive compound.

My invention provides further novel means for catching and holding liquid fuel which passes into the heating means until such liquid fuel vaporizes.

A further object of my invention is to provide novel means for restricting communication of the mixing chamber with the atmosphere simultaneously with the admission of fuel into the carburetor as a priming or starting charge.

My invention provides further novel means for adjustably regulating the closing movement of the suction opened valve controlling the closing of the air intake into the mixing chamber.

My invention provides still further a construction which is simple, cheap, durable, not likely to get out of order, and which is very efficient in its operation.

The novel features of my invention are hereinafter fully described and claimed.

In the accompanying drawings, which illustrate the preferred embodiment of my invention,

Fig. 1 is a top view of my improved carburetor shown attached to an exhaust manifold and to an intake manifold.

Fig. 2 is a section on the line 2—2 of Fig. 3.

Fig. 3 is a section on the line 3—3 of Fig. 8, partly broken away.

Fig. 4 is a section on the line 4—4 of Fig. 2.

Fig. 5 is a section on the line 5—5 of Fig. 3.

Fig. 6 is a section on the line 6—6 of Fig. 3.

Fig. 7 is a side elevation of my improved carburetor shown connected to an exhaust manifold and an intake manifold, parts only of which are shown.

Fig. 8 is a top view, partly broken away, of what is shown in Fig. 7.

Fig. 9 is a section on the line 9—9 of Fig. 8.

Fig. 10 is an elevation looking at the inner side of the block shown in Fig. 9.

Fig. 11 is a section on the line 11—11 of Fig. 8.

Similar reference characters designate similar parts in the different views.

1 designates a float chamber containing the usual float 2 which is provided with a lateral arm 3 pivoted on a horizontal pin 4 having its ends mounted in the opposite walls respectively of the float chamber, Figs. 2, 4 and 8.

The arm 3 is bifurcated at its free end and its bifurcations respectively engage opposite sides of a vertically movable vertical needle valve 5 slidably mounted in a vertical fuel passage 6 in a fitting 7 which extends upwardly into the float chamber 1 through the bottom thereof. Fuel entering the float chamber 1 through the passage 6 lifts the float 2 so as to move the valve 5 toward the seat 8 in the passage 6, and the float in falling lifts and opens the valve in the usual manner.

A fuel supply conductor 9 connects with the fitting 7 and discharges into the passage 6.

The float chamber 1 has in it an outlet passage 10, for fuel, which outlet passage extends upwardly from near the bottom of the float chamber and then laterally, its upper outlet end being threaded and having fitted therein an externally threaded nozzle 11, which is axially alined with and is adapted to more or less close an air inlet 12 of a fuel heating passage 13 in a block 14, having a flat side adapted to be fitted against a flat portion 15 of the outer side of an exhaust manifold 16, to which the block 14 is clamped by bolts 17, which are respectively fitted in threaded holes already provided in the manifold 16, Figs. 2, 3, 4 and 8.

The nozzle 11 has a tapered head 18 having a jet discharge opening 19, and is adjustable in the outlet end of the passage 10, whereby the head 18 will more or less close the air inlet 12, according to the adjustment of the nozzle. A lock nut 20 on the nozzle 11 bears against the float chamber 1 so as to hold the

nozzle in the position to which it is adjusted, Figs. 2 and 8.

As shown in Fig. 10, the passage 13 in the block 14 extends laterally and is provided with a basin 21 which catches liquid fuel which is not vaporized by contact with the hot wall of the exhaust manifold 16, and holds such liquid until it vaporizes. The passage 13 inclines downwardly from the basin 21 and then extends laterally outwardly to the outer side of the block 14 where it is threaded and has fitted in it one end of a horizontal pipe 22, Figs. 3, 6 and 8, which pipe 22 extends through a threaded hole in the adjacent wall of a mixing chamber 23. A stuffing collar 24, rotatably fitted on the pipe 22, fits in said threaded hole and bears at its inner end against packing 25, Fig. 6.

As shown in Figs. 9 and 10, the block 14 comprises a unitary structure adapted to be interposed between an exhaust manifold and a mixing chamber to serve as a heating element, one side of the block having a channel adapted to be closed by the exhaust manifold which forms with the block a part of the passage 13 having the air and fuel inlet 12 communicating with the atmosphere, and the passage having an outlet adapted to discharge fuel mixture into a mixing chamber 23 through the pipe 22.

The lower end of the mixing chamber 23 is open and is fastened to an intake manifold 26 by bolts 27, Figs. 1 and 7. The mixing chamber in its upper part is provided with a lateral air inlet 28 communicating with the atmosphere and through which air is taken and combined with the mixed fuel and air which enters the mixing chamber 23 through the pipe 22, said mixed fuel and air when entering the mixing chamber 23 not having an amount of air, which is taken in at the inlet 12, sufficient to make an explosive compound. The amount of air admitted through the air inlet 28 is sufficient to make, with the fuel and air with which it is mixed, an efficient explosive mixture.

This explosive mixture passes downwardly past a throttle valve 29, in the lower part of the chamber 23, into the intake manifold 26.

Nearly closing the air inlet 28, when suction is not being effected in the mixing chamber by the engine, is a self closing flap valve 30, which is opened by engine suction effected in the mixing chamber 23, and which normally rests by gravity against the upper end of a vertically adjustable screw 31 fitted in a threaded hole provided vertically in the wall of the mixing chamber 23, Figs. 1 and 3. A coil spring 32 encircles the screw 31 and bears against the head of the screw and against the wall of the mixing chamber, and by its tension prevents accidental turning of the screw 31. The latter restricts the closing of the valve 30, so that, when the valve 30 is held closed, a proper amount of air may still enter the chamber 23 through the air inlet 28.

The valve 30 is held in the closed, or nearly closed position, shown in Fig. 3, when it is desired to prime the engine at starting.

For priming the engine, the conductor 9 has connected to it a branch fuel conductor 33, Figs. 1, 7 and 8, which includes a valve casing 34 and a pipe 35, Fig. 8, the latter connecting with the discharge outlet of the valve casing 34 and extending into and through the adjacent wall of the mixing chamber 23 into which the pipe 35 discharges liquid fuel carried by it.

In the valve casing 34 is the usual needle valve 36, which is adapted to shut off the flow of fuel through the conductor 33 into the mixing chamber.

The needle valve is opened and closed by a lever 37 which is pivoted to the valve casing 34 by a horizontal screw 38 mounted in the valve casing 34, Figs. 7 and 8. A coil spring 39 having one end fastened to the lever 37 and the other end fastened to a lug 40 on the wall of the mixing chamber 23, below the lever 37, Figs. 1 and 7, normally swings the lever 37 downwardly to close the needle valve 36.

For opening the needle valve by lifting the lever 37, there is provided at the outer side of the mixing chamber 23 a manually operated lever comprising a swinging member 41, Figs. 7 and 8, which has a cylindrical portion 42 extending through and pivotally mounted in opposite walls of the mixing chamber 23, said portion 42 in the mixing chamber having a lateral arm 43, Fig. 3, which is adapted to be moved to a position in which it will engage and hold the valve 30 from opening.

The member 41, outside the mixing chamber 23, has a threaded hole in which is fitted a longitudinally adjustable screw 44, the head of which is adapted to engage the under side of the lever 37 and lift the latter to open the needle valve 36. On such movement of the member 41, the arm 43 is made to simultaneously engage and hold the valve 30 closed. A lock nut 45 on the screw 44 bears on the member 41 and holds the screw 44 from moving from its adjusted position.

In the mixing chamber 23 between the valve 30 and the mixture discharge pipe 22 is a transverse partition 46 having through it a hole 47 which converges toward the side of the partition at which is located the pipe 22. The passage of air inwardly through the inlet 28 and through the hole 47 is restricted by the presence of the partition with the hole 47, so that the velocity of the air is increased, thereby aiding in intimately mixing the air entering the mixing chamber through the inlet 28 with the mixed fuel and

air discharged into the mixing chamber by the pipe 22.

In starting the engine, when it is cold, the operator swings the member 41 so as to lift the lever 37 to open the needle valve 36 and so as to cause the arm 43 to simultaneously engage and hold the valve 30 from further opening when the engine starts and suction is effected in the mixing chamber 23 thereby. After the engine is started, the member 41 is released, upon which the spring 39 will close the needle valve 36 through the lever 37 thus shutting off flow to the mixing chamber through the conductor 33.

The suction effected by the engine in the mixing chamber 23 will cause fuel to be drawn from the float chamber 1 through the passage 10 thereof, and such drawn off fuel will pass through the nozzle 11 and the jet opening 19 of the head 18.

The liquid fuel will be discharged as spray into the heating passage 13 of the block 14 through the air inlet 12 of the passage 13. The nozzle 11 is adjusted to a position in which a small amount of air will be taken into the passage 13 and mixed with the sprayed fuel therein, just enough air being taken in as will serve as a vehicle to carry the particles of fuel along through the passage, preferably an amount insufficient to make an explosive mixture.

The nozzle 11 has its head, preferably, normally spaced apart from the heating block 14, so that the fuel discharged by the nozzle into the air inlet 12 of the passage 13 will not be heated until it strikes and mixes with the small amount of air which is taken into the passage 13 through the air inlet 12, whereby the fuel will not be vaporized in the nozzle, due to the heating thereof. A uniform flow of fuel is thus obtained through the jet opening of the nozzle 18. As shown in Fig. 2, the diameter of the nozzle 11 at the large end of the tapered portion is such that when the nozzle is adjusted to its limit toward the block 14, the nozzle will close the air inlet 12. After such adjustment has been preliminarily made, the nozzle is backed away so as to leave a space between the periphery of the tapering portion and the wall of the air inlet of an area sufficient to admit an amount of air suitable for proper combustion. This construction affords an adjustment which ranges from no admission of air to a maximum within the limits of such adjustment.

The mixed fuel and small amount of air, will pass downwardly through the passage 13, and any liquid fuel will be caught and held in the basin 21 until vaporized therein. The vaporized mixture will pass downwardly from the basin 21 and into the pipe 22 from which it will be discharged into the mixing chamber 23 where it is mixed with a proper amount of air entering through the air inlet 28. The resultant efficient explosive mixture will pass the throttle 29, which is opened, and will enter the intake manifold 26.

The fuel and air which passes through the heating passage 13 will be highly heated by the heat derived from the wall of the exhaust manifold 16. The large amount, relatively, of air which enters the mixing chamber through the air inlet 28 is cold and dense, whereby a larger amount will combine with the fuel mixture resulting in great efficiency.

The float chamber 1 is provided with a removable plate 48 which may be removed for access to the interior of the chamber, when desired.

I do not limit my invention to the structure shown and described, as any modifications, within the scope of the appended claims, may be made without departing from the spirit of my invention.

What I claim is:—

1. A carburetor having a mixing chamber, a heating member having a heating passage discharging into said chamber and having an air inlet, a fuel conductor having an outlet, and a nozzle normally spaced from said heating member and discharging into said air inlet and longitudinally adjustable in said outlet to and from a position in which it will close said inlet.

2. A carburetor having a mixing chamber, a heating member having a heating passage discharging into said chamber and having an air inlet, a fuel conductor having an outlet, and a nozzle normally spaced from said inlet and having a tapering discharge end adapted to enter and to discharge into said inlet, said nozzle being longitudinally adjustable in said outlet to and from a position in which it will close said air inlet.

3. A carburetor having a mixing chamber provided with an air inlet, a suction opened valve for closing said inlet, a fuel conductor discharging into said mixing chamber, a second valve operable independently of said suction opened valve for closing said conductor, means for normally closing said second valve, and manually operated means for opening said second valve and for simultaneously restricting the opening movement of said suction opened valve.

4. A carburetor having a mixing chamber having an air inlet, a suction opened valve for closing said inlet, a fuel conductor discharging into said mixing chamber, a second valve operable independently of said suction opened valve for closing said conductor, means for opening and closing said second valve, and a manually operated lever adapted to engage and operate said valve opening and closing means to open said second valve and having an arm adapted to engage and restrict the opening of said suction opened valve simultaneously with the opening of said second valve.

5. A carburetor having a mixing chamber having an air inlet, a suction opened valve for closing said inlet, a fuel conductor discharging into said mixing chamber, a second valve operable independently of said suction opened valve for closing said conductor, a lever engaging and adapted to open and close said second valve, a spring normally swinging said lever to close said second valve, and a manually operated lever adapted to engage and swing said first lever to open said second valve and having an arm adapted to engage and restrict the opening of said suction opened valve simultaneously with the opening of said second valve.

6. A carburetor having a mixing chamber having an air inlet, a suction opened valve for closing said inlet, a fuel conductor discharging into said mixing chamber, a second valve operable independently of said suction opened valve for closing said conductor, a lever engaging said second valve for opening and closing said second valve, means for normally swinging said lever to close said second valve, and a manually operated lever comprising a swinging member having a screw adjustable thereon toward and from and adapted to engage said first lever to move the latter to open said second valve, said swinging member having an arm adapted to engage and restrict the opening movement of said suction opened valve simultaneously with the opening of said second valve.

7. A carburetor having a mixing chamber provided with an air inlet, a suction opened valve for closing said inlet, a main fuel inlet in said mixing chamber, an auxiliary fuel conductor discharging into said chamber, a second valve operable independently of said suction opened valve for closing said auxiliary conductor, means for normally closing said second valve, and manually operated means for opening said second valve and simultaneously restricting the opening movement of said suction opened valve.

8. A carburetor having a mixing chamber, a member having a passage discharging at one end into said chamber and having its other end communicating with the atmosphere, a fuel conductor having an outlet, and a nozzle normally spaced from said member and having a tapering end portion discharging into said other end of said passage, said nozzle being longitudinally adjustable in said outlet to different positions in which said tapering portion will be partly within and partly outside of said other end of said passage.

In testimony whereof I have signed my name to this specification.

JAMES R. BELLVILLE.