April 17, 1956 H. W. McCLAIN 2,742,271

CARBURETOR OF THE AIR DISPLACEMENT TYPE

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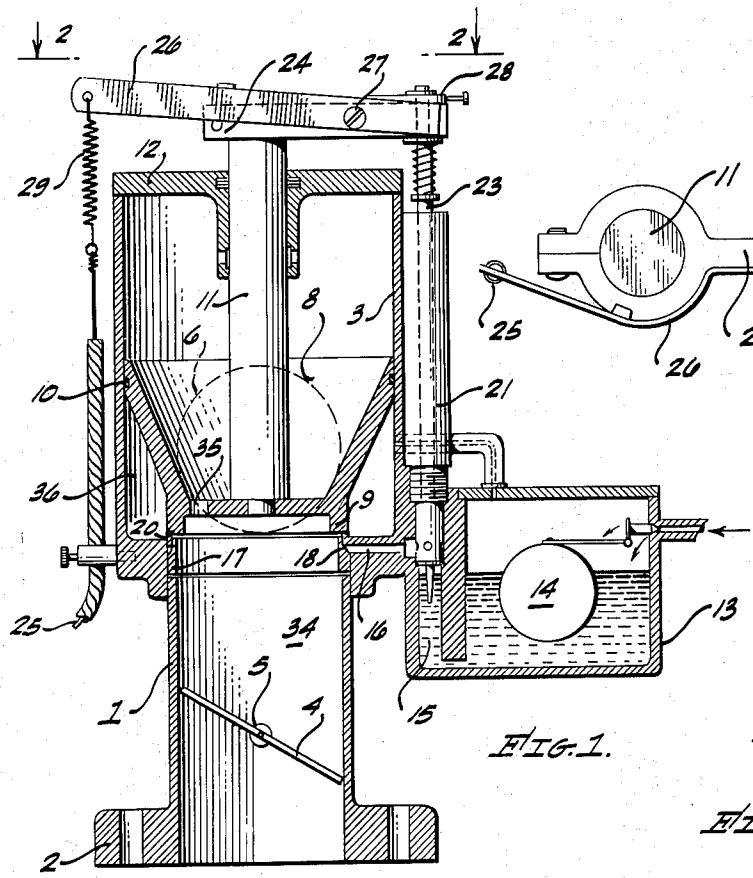


FIG. 1.

FIG. 2.

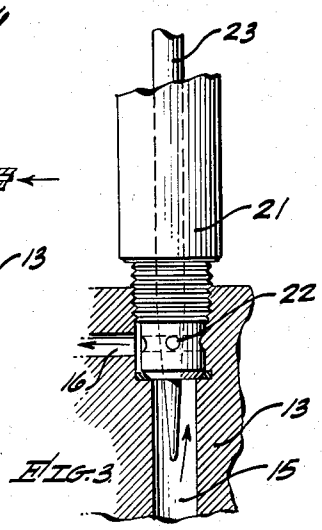


FIG. 3.

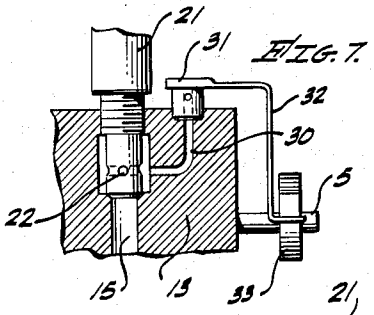


FIG. 7.

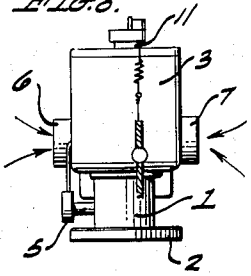


FIG. 8.

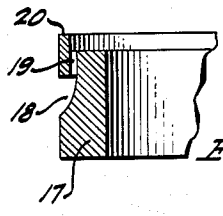


FIG. 5.

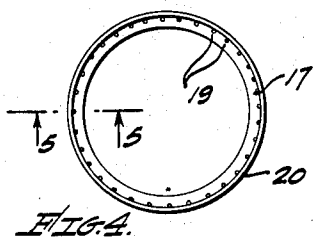


FIG. 4.

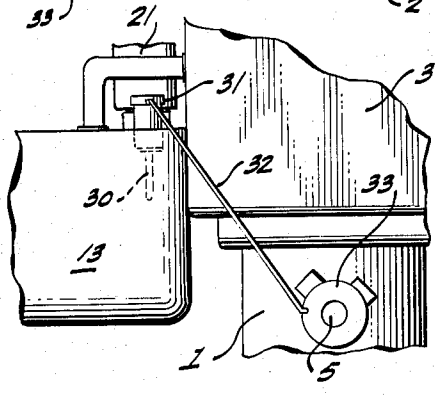


FIG. 6.

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CARBURETOR OF THE AIR DISPLACEMENT TYPE

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2 Claims. (Cl. 261—44)

This invention relates to a carburetor of the air displacement type, and particularly one in which the vacuum above the throttle actuates the vacuum cone to move this cone for the purpose of varying the capacity of the carburetor.

An object of my invention is to provide a vacuum operated variable capacity carburetor so arranged that there is no friction or cocking action of the carburetor due to the vacuum or the outside air pressure, or the air velocity as the air enters the carburetor. This allows for accurate and exact metering.

A feature of my invention is to provide a novel carburetor of the character stated in which air enters on both sides of the shell or carburetor, the air entrances being exactly opposed to each other, thus the same air pressure is exerted on both sides of the vacuum cone.

Another object of my invention is to provide a novel carburetor of the character stated in which the capacity of the carburetor is increased by transferring the vacuum through the vacuum cone to the upper surface of the cone, thus moving the cone upwardly by differential air pressure above and below the cone.

Another object of my invention is to provide a novel means of feeding fuel into the carburetor through a drilled ring, this ring being formed with a lip on the outer edge over which the air passes, thus drawing the fuel through the drilled holes on the inside of the ring. The vacuum cup sets directly above the fuel ring and the incoming fuel is moved upwardly and inwardly creating a sheet of atomized fuel over the main throat of the carburetor, which is then drawn downwardly by the air stream and into the manifold.

Another feature of my invention is to provide the metering needle on the outside of the carburetor where it is unaffected by internal temperatures of the carburetor, and also no fuel will flood into the carburetor due to leakage of the metering needle.

Another object of my invention is to provide a complete atomization of fuel and a thorough mixing with air before the fuel mixture reaches the intake manifold. This feature of the carburetor prevents precipitation and fuel lag and provides a more uniform distribution of fuel to all of the cylinders.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing:

Figure 1 is a vertical sectional view of my carburetor.

Figure 2 is a top plan view of the metering needle control and adjustment.

Figure 3 is a fragmentary vertical sectional view of the lower part of the metering needle.

Figure 4 is a top plan view of the fuel ring.

Figure 5 is an enlarged fragmentary sectional view taken on line 5—5 of Figure 4.

Figure 6 is a fragmentary side elevation of the carburetor showing the air control for the fuel needle.

Figure 7 is a fragmentary vertical sectional view showing the means of controlling the air to the fuel needle.

Figure 8 is a side elevation of my carburetor illustrating the air intake from opposite sides thereof.

Referring more particularly to the drawing, an intake pipe 1 is provided with the usual mounting flange 2, so that the carburetor may be attached to the intake manifold of the engine in the usual and well known manner. The pipe 1 extends into the bottom of a cylinder 3 which is considerably larger in diameter than the pipe 1. A throttle valve 4, of usual and well known design, is mounted in the pipe 1, and this throttle valve is rotated manually by the operator of the engine, all of which is usual and well known. The throttle 4 is fixedly mounted on, or is an integral part of the shaft 5 which is journaled in the pipe 1, and also protrudes from this pipe, as shown in Figure 8, and for a purpose which will be subsequently described. Two air intake pipes 6 and 7 extend into each side of the cylinder 3, and these air pipes are directly opposed and are substantially horizontal. The air intake pipes 6 and 7 admit air into the cylinder 3, and this air is controlled and eventually finds its way into the pipe 1 and thence into the manifold of the engine. A frustro conical valve 8 is slidably mounted within the cylinder 3, the narrow portion of this valve being pointed downwardly, and an annular flange 9 is formed on the lower end of the frustro conical valve and projects downwardly. A packing ring 10, on the upper part of the valve 8, packs off against the inside of the cylinder 3 and thus seals the space between the valve and the cylinder.

A post 11 rises from the valve 8 and is guided in the top or cover 12 of the cylinder 3. The post 11 thus guides the valve 8 accurately in its vertical movement and also acts to meter the fuel through a metering needle, as will be subsequently described. A fuel bowl 13 is mounted on the outside of the cylinder 3 and is provided with the usual float valve 14 to control the flow of fuel into the bowl. A vertical passage 15 within the bowl extends to a fuel duct 16 in the bottom wall of the cylinder 3. A fuel ring 17 is fixedly mounted in the lower wall of the cylinder and directly above the pipe 1, as shown in Figure 1. This fuel ring includes an external annular groove 18 into which the duct 16 extends. A plurality of jet holes 19 extend upwardly from the groove 18 and admit fuel to the space below the valve 8 and within the annular flange 9. A lip 20 is provided on the outside of the ring 17 and air, in passing horizontally over this lip, will create a partial vacuum on the inside of the lip, thus drawing fuel upwardly through the jet holes 19, thus forming a sheet of atomized fuel horizontally across the top of the pipe 1 and the incoming air then strikes this sheet of atomized fuel and carries it downwardly into the engine manifold. A tube 21 screws into the top of the fuel bowl 13 and the lower end of this tube is provided with holes 22 which are in alignment with the duct 16, as shown in Figure 3.

A fuel needle 23 extends into the tube 21 and vertical movement of this needle will permit fuel to pass upwardly from the fuel passage 15 and thence into the duct 16, where it feeds to the ring 17. The needle 23 is secured to the post 11 by means of the bracket 24, which bracket is secured at one end to the post 11 and at the other end to the needle 23. To enrich the fuel, an ahrens cable 25 is attached at one end to a lever 26, the lever 26 is pivotally secured at 27 to the bracket 24, and the free end of the lever extends under the cap 28 on the needle 23, thus lifting the needle to enrich the fuel mixture when the ahrens cable 25 is pulled downwardly. A spring 29 may be provided between the ahrens cable and the lever 26.

An air bleed is provided to the holes **22** and consists of an air passage **30** in the wall of the bowl **13**, which is open at the upper end and extends into the holes **22** at the lower end. The upper end of the passage **30** is opened and closed by a cover **31** on an arm **32** which extends from a ring **33** on the shaft **5**. The arm **32** is so positioned that when the throttle **4** is closed the cap **31** closes the passage **30**. As soon as the throttle is open, however, the passage **30** is open and air can pass into the holes **22**, thus permitting fuel to be drawn freely into the duct **16** and thence to the fuel ring **17**.

The reciprocation of the pistons in the engine creates a vacuum and this vacuum is transmitted to the space **34** above the throttle **4** as soon as that throttle is partly open. The vacuum in the space **34** is transmitted to the space above the valve **8** through the hole **35** in the bottom of the valve. The partial vacuum above the valve **8** will, therefore, cause the valve to move upwardly due to atmospheric air pressure below the valve, or within the cylinder **3** in the space **36** into which the air intakes **6** and **7** extend. The upward movement of the valve **8** will move the flange **9** upwardly, thus exposing the fuel holes or jets **19**, permitting fuel to enter through the ring **17**, and incoming air under atmospheric pressure over the lip **20** will draw the fuel horizontally and inwardly, thoroughly admixing the fuel and air and causing considerable turbulence so that the air and fuel is completely admixed before the fuel mixture enters the manifold.

In operation the needle **23** is normally down so that idling fuel only will enter the duct **16** and thence to the ring **17**. As soon as the pistons move in the engine, a partial vacuum is created in the space **34**, this vacuum being transmitted to above the valve **8**, and the valve will rise due to the atmospheric air pressure in the space **36**. As soon as the valve **8** moves upwardly the needle **23** is also raised, and fuel flows through the holes **22**, thence through the duct **16** and into the ring **17**, and thence through the various jet holes **19**. The movement of the incoming air over the lip **20** will cause a sheet of atomized fuel to be spread across the top of the pipe **1**, and this atomized fuel is then moved downwardly with the incoming air and thoroughly admixed therewith.

Having described my invention, I claim:

1. A carburetor comprising a cylinder, a pipe depending from the cylinder, a throttle valve in the pipe, a pair of air intake pipes extending into the side of said cylinder, said intake pipes being diametrically opposed and above said first named pipe, a frustro conical valve slidably mounted in the cylinder in axial alignment with the first named pipe, the base of said frustro conical valve slidably engaging the wall of the cylinder and the apex of the frustro conical valve extending downwardly, a wall closing the lower end of the frustro conical valve, said wall having a hole extending therethrough to permit evacuation of the space above the frustro conical valve, a post rising from said frustro conical valve and extending through the upper wall of said cylinder, said post being journaled in the upper wall, a fuel chamber, a fuel ring mounted in the cylinder between said pipe and the lower end of the frustro conical valve, said cylinder having a fuel duct therein extending from the fuel chamber to said ring, said ring having fuel jet holes therein, a needle valve extending into said fuel duct and controlling the same, a bracket projecting from said post, means slidably mounting said needle valve on the bracket, a lever, said lever being pivotally mounted on the bracket, one end of said lever engaging the needle valve to adjust said needle valve vertically in the fuel duct, and manually operable means extending to the lever to swing said lever on its pivot.

2. A carburetor comprising a cylinder, a pipe depending from the cylinder, a throttle valve in the pipe, a pair of air intake pipes extending into the side of said cylinder, said intake pipes being diametrically opposed and above said first named pipe, a frustro conical valve slidably mounted in the cylinder in axial alignment with the first named pipe, the base of said frustro conical valve slidably engaging the wall of the cylinder and the apex of the frustro conical valve extending downwardly, a wall closing the lower end of the frustro conical valve, said wall having a hole extending therethrough to permit evacuation of the space above the frustro conical valve, a post rising from said frustro conical valve and extending through the upper wall of said cylinder, said post being journaled in the upper wall, a fuel chamber, a fuel ring mounted in the cylinder between said pipe and the lower end of the frustro conical valve, said cylinder having a fuel duct therein extending from the fuel chamber to said ring, said ring having fuel jet holes therein, an annular lip extending upwardly from the ring, said holes being on the inside of the lip, an annular flange depending from said frustro conical valve and positioned above the lip to engage said lip in one position of the frustro conical valve, a needle valve extending into said fuel duct and controlling the same, a bracket projecting from said post, means slidably mounting said needle valve on the bracket, a lever, said lever being pivotally mounted on the bracket, one end of said lever engaging the needle valve to adjust said needle valve vertically in the fuel duct, and manually operable means extending to the lever to swing said lever on its pivot.

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