July 22, 1941. S. M. UDALE 2,249,992

FUEL SUPPLY CHAMBER

Filed June 17, 1939 2 Sheets-Sheet 1

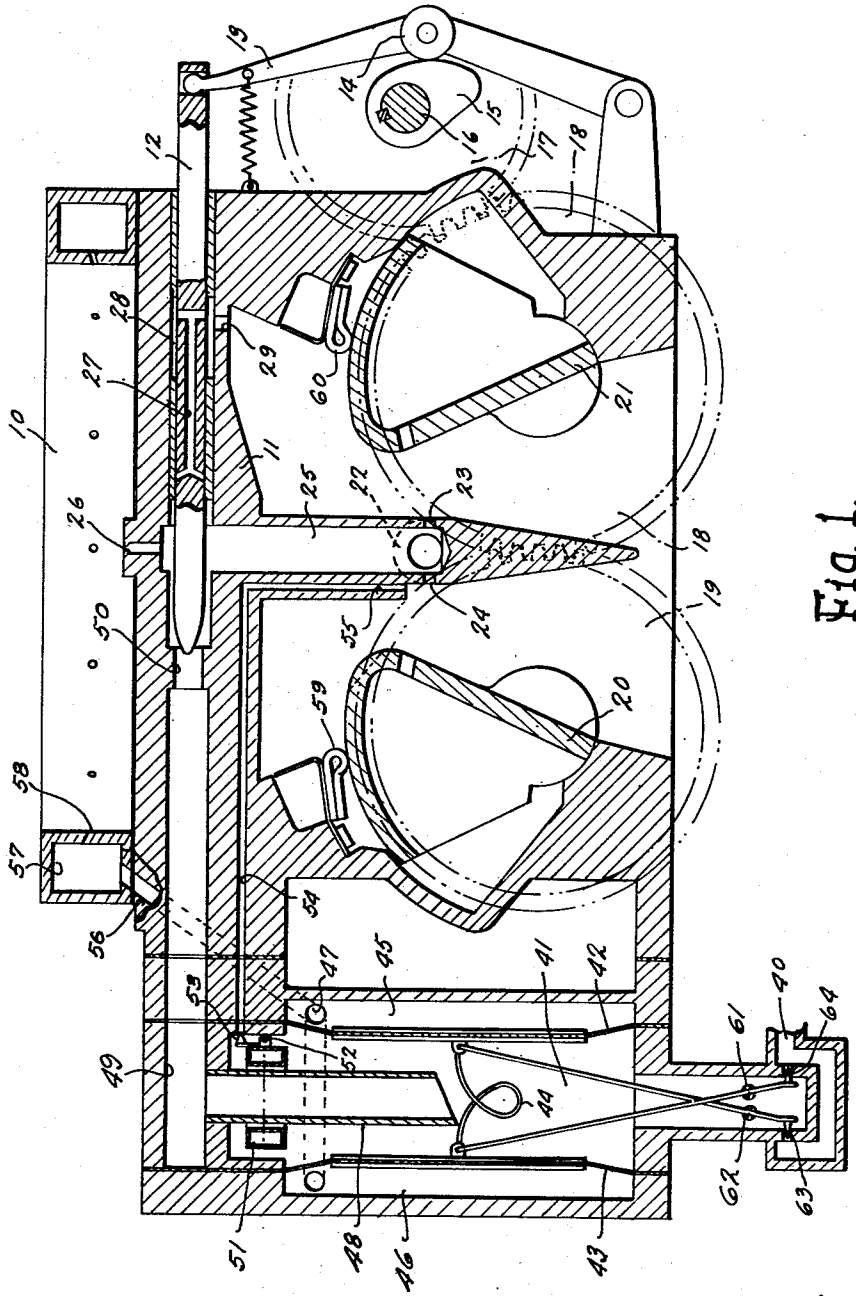


Fig. 1.

Stanley M. Udale

INVENTOR.

July 22, 1941. S. M. UDALE 2,249,992

FUEL SUPPLY CHAMBER

Filed June 17, 1939 2 Sheets-Sheet 2

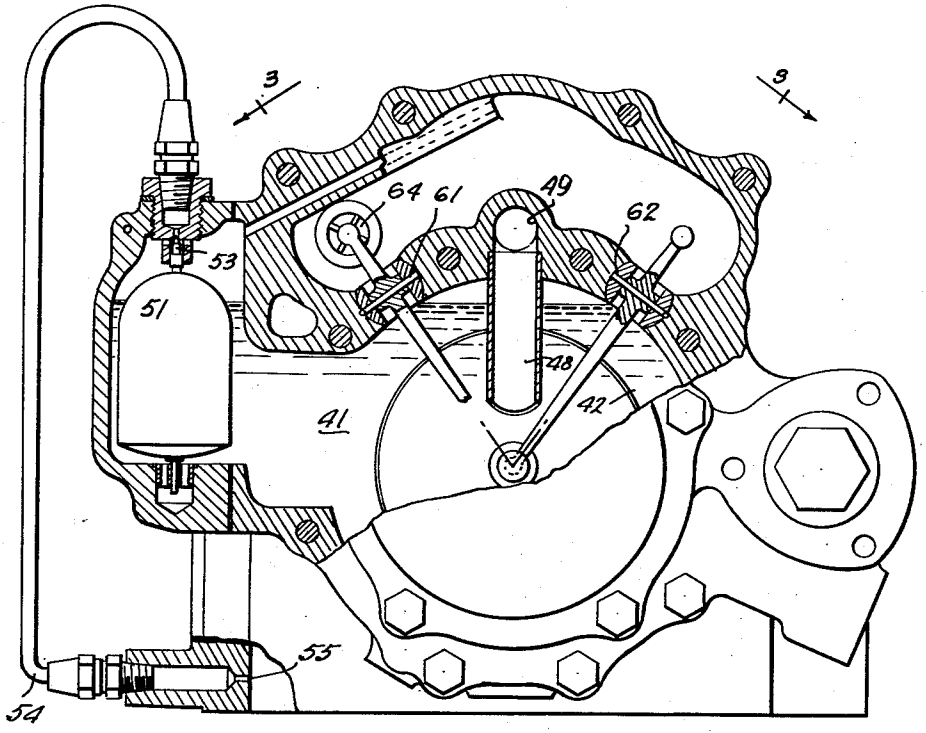
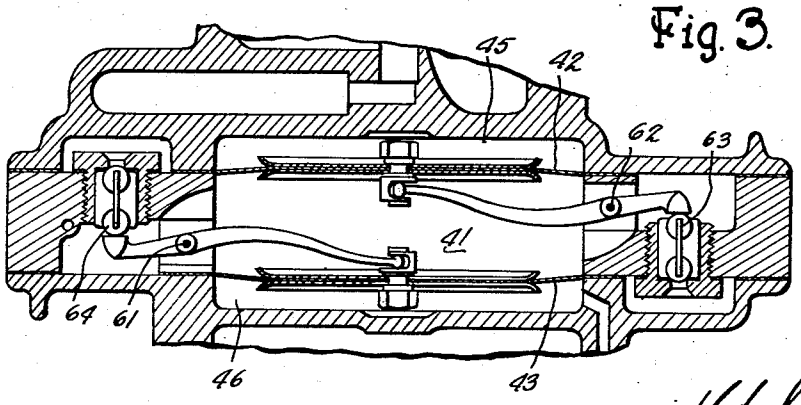


Fig. 2.

Fig. 3.



Stanley M. Udale

INVENTOR.

Patented July 22, 1941 2,249,992

UNITED STATES PATENT OFFICE

2,249,992

FUEL SUPPLY CHAMBER

Stanley M. Udale, Detroit, Mich., assignor to George M. Holley and Earl Holley

Application June 17, 1939, Serial No. 279,643

1 Claim. (Cl. 261—72)

The object of my invention is to free liquid gasoline of gasoline vapor when the gasoline is supplied to a closed chamber formed by diaphragms.

In the ordinary float chamber of a carburetor, the gases are automatically removed, either by the provision of a passage leading from the space above the level of the liquid in the mixture outlet, or of a passage leading to the air entrance. When the fuel is supplied in a diaphragm chamber, all the liquid which passes into the diaphragm chamber must pass out, together with any vapor entrained with the liquid. As the liquid enters the diaphragm chamber, there is a drop in pressure of approximately seven pounds per square inch. This drop in pressure releases small quantities of vapor which may accumulate and cause irregular running. In the applicant's construction, this vapor is automatically removed at all times and the vapor is removed independently of the discharge of the liquid from the chamber. By this means, the metering characteristics of the carburetor are not interfered with by the removal of the vapor. The weight of the vapor removed is so small that no appreciable change in the mixture ratio is caused, provided this vapor is drawn into the engine independently of the flow of the main body of gasoline.

The invention is applied to a carburetor as shown in the Patent 2,088,464, issued to Chandler and Kittler.

In the drawings:

Figure 1 illustrates diagrammatically the invention.

Figure 2 shows the detail of the actual construction used.

Figure 3 shows a plan view on the plane 3—3 of Figure 2.

In Figure 1, in the air entrance 10 is located a bridge 11 in which slides a needle valve 12, which controls the discharge of the fuel from the diaphragm chamber 41. This needle valve 12 is operated by a lever 13 which carries a roller 14 which engages with the cam 15 keyed to a shaft 16.

Three gears 17, 18 and 19 intermesh with each other. The gear 17 is mounted on the shaft 16; the gear 18 is mounted on the throttle 21, and the gear 19 is mounted on the throttle 20. These two throttles 20 and 21 approach and recede from the bridge 22 which is streamlined. The opening between the bridge 22 and the throttles 20, 21 thus constitute variable venturi passages.

The fuel controlled by the needle valve 12 discharges through the openings 23, 24 into the throat of the venturis and discharges on the engine side of the throat of the venturis formed between the throttle valves 20, 21 and the bridge 22. The fuel flows past the restriction 50 and down the passage 25. This fuel is mixed with a small quantity of air drawn through the opening 26, and when the throttles are closed (during the time that the engine is idling) by another small quantity of air admitted through the opening 27 in the center of the needle valve 12. This air is supplied from the annular passage 28 which communicates with the air entrance 10 through an opening 29. The fuel, which is metered between the restriction 50 and the needle 12, flows through the passage 49 and is obtained from the lower part of the diaphragm chamber 41 through the tube 48. The diaphragm chamber 41 is formed by the two diaphragms 42 and 43 held together by the spring 44. These diaphragms control the needle valves 63, 64 which are pivoted at 61, 62 and control the fuel entrance from the passage 40.

The fuel is supplied to the fuel chamber 41 under a substantial pressure, but the leverage is such and the diaphragms are so large, and the needle valves 64, 63 are so small, that the pressure in the chamber 41 is substantially constant and the level when the engine is not running is below the passage 49. The pressure of the fuel in the chamber 41, or rather its head, is determined by the pressure in the air chambers 45, 46. These two pressures are balanced by the passage 47 which communicates through the pipe 56 with the annular equalizing air passage 57 which is connected to the air entrance through the opening 58. So far the description refers to a well known airplane carburetor. The means for the removal of the vapor are as follows: A float 51 pivoted at 52 is located in the upper part of the diaphragm chamber 41 and controls a valve 53 which closes the entrance to the horizontal passage 54 which terminates in the passage 55 in the throat of the variable venturi formed between the throttles 20 and the bridge 22.

Operation

When the engine is running, vapor accumulates in the upper part of the diaphragm chamber 41 and displaces a certain quantity of liquid. The float 51 descends and in doing so, opens the valve 53. The upper part of the chamber 41 is then subjected to the suction in the throat of the variable venturi. Before any liquid can flow through the passage 54 the float 51 rises and closes the needle valve 53. The level of fuel in

the chamber 41 is thus maintained at the level shown by the broken lines through the center of the float 51.

In Figures 2 and 3, similar numbers refer to similar parts. For example, the diaphragm 42 operates the lever pivoted at 62, the lever pivoted at 61 being operated by the diaphragm 43. Instead of a needle valve, ball valves 63, 64 are used. The float 51 is located in a chamber on the side of the main body of the carburetor and the needle 53 is located centrally of the float 51. The vapor is drawn through a pipe 54 to an outlet 55 located in the mixture outlet rather than in the throat of the variable venturi. As the float is not located in the highest part of the diaphragm chamber, it is necessary to provide a passage so that the vapor is drawn from the highest point in the diaphragm chamber.

What I claim is:

In combination with a carburetor having a mixing chamber, a throttle valve, a mixture outlet and a normally closed fuel supply chamber controlled by a movable wall, a fuel mechanism adapted to limit the head of fuel in said chamber, a fuel discharge passage having an entrance located substantially at the center of said supply chamber, a vapor outlet leading out of the upper portion of said chamber, both of said passages being adapted to discharge into said mixing chamber, a float in said fuel supply chamber located above said center so as to be responsive to the fall of the fuel toward said center, a valve connected to said float, said valve being adapted to open said vapor outlet passage when the level in said fuel supply chamber falls toward said center and to close the passage whenever the fuel rises considerably above said center and a passage connecting the vapor outlet with the mixture outlet.

STANLEY M. UDALE.