Oct. 6, 1925. 1,556,050

J. G. VINCENT

CARBURETOR FOR HYDROCARBON ENGINES

Filed Dec. 29, 1919 3 Sheets-Sheet 1

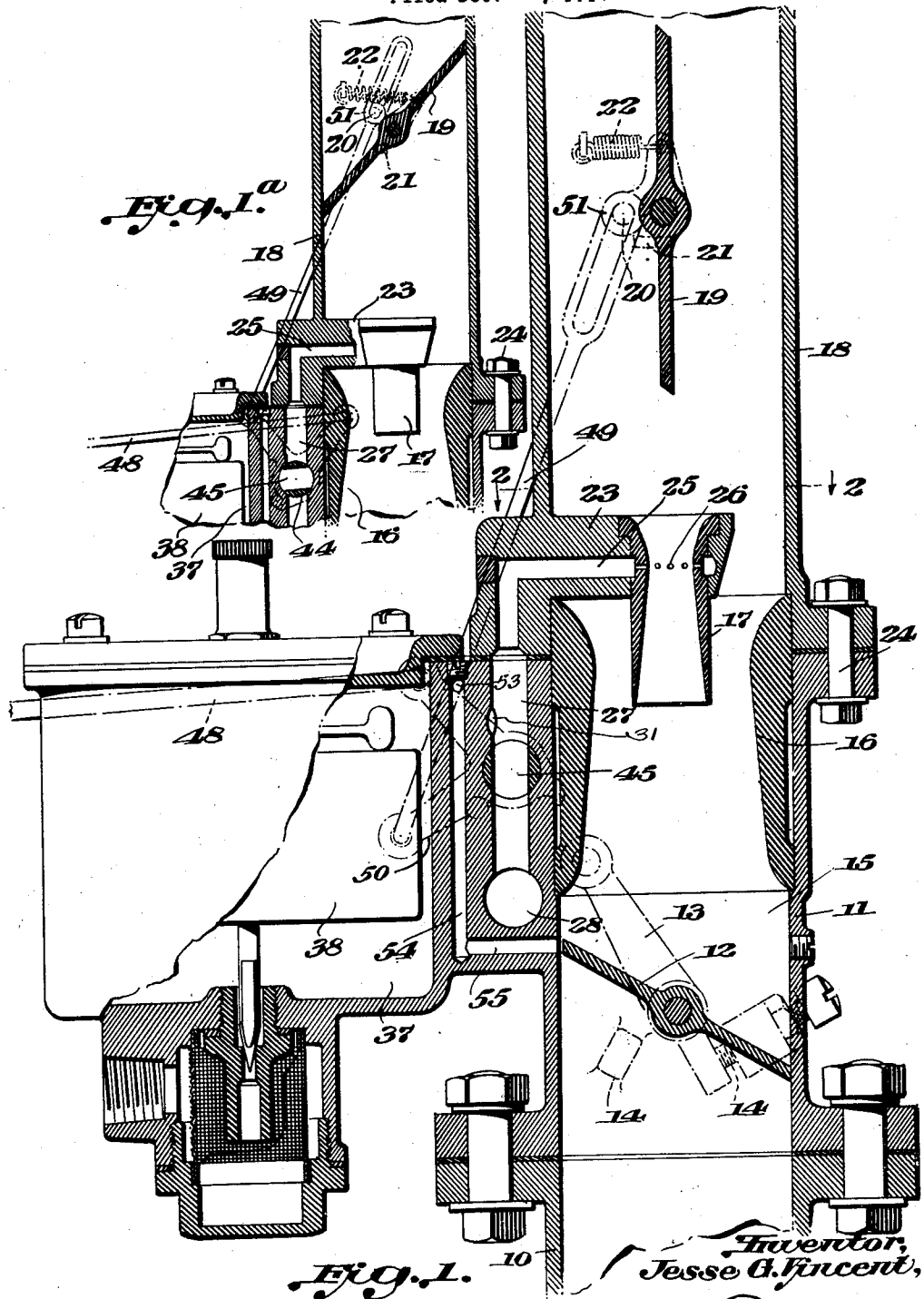

Fig. 1.

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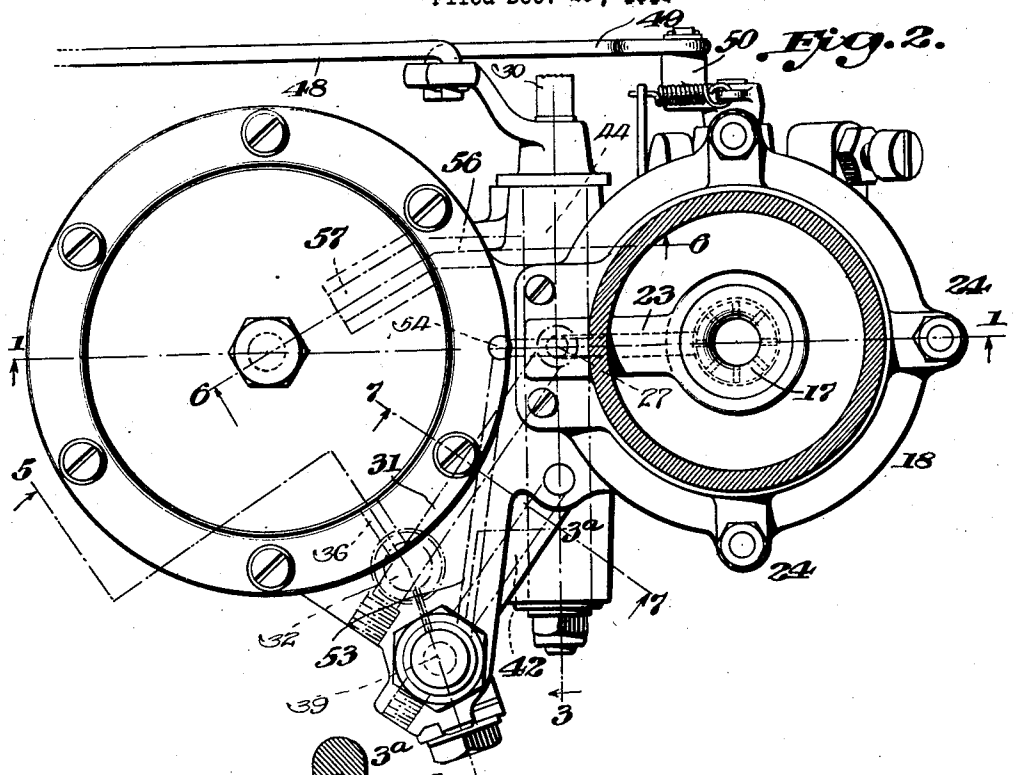

Fig. 2.

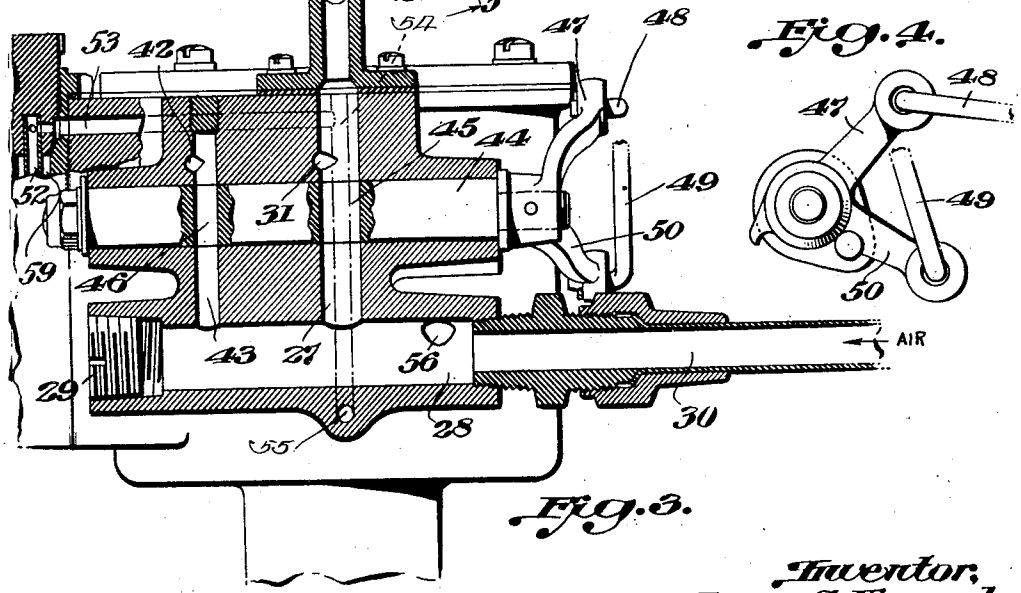

Fig. 3.

Fig. 4.

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Fig. 5.

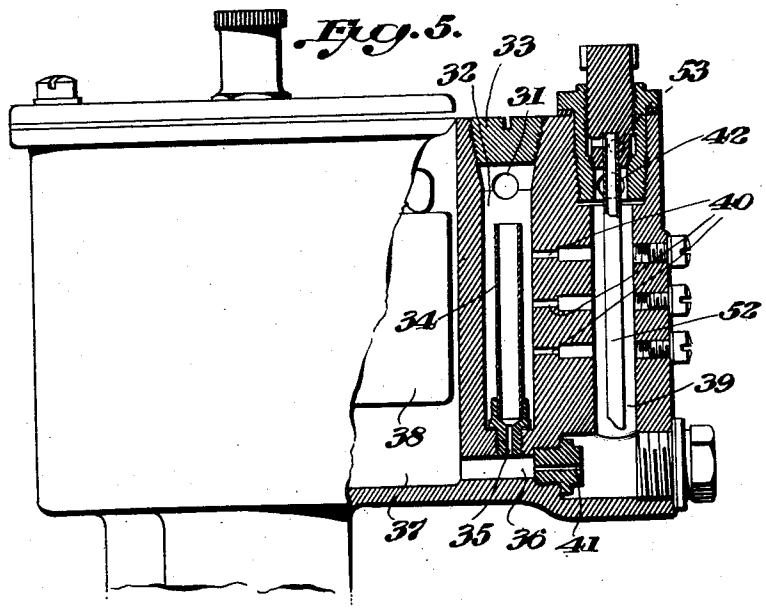


Fig. 6.

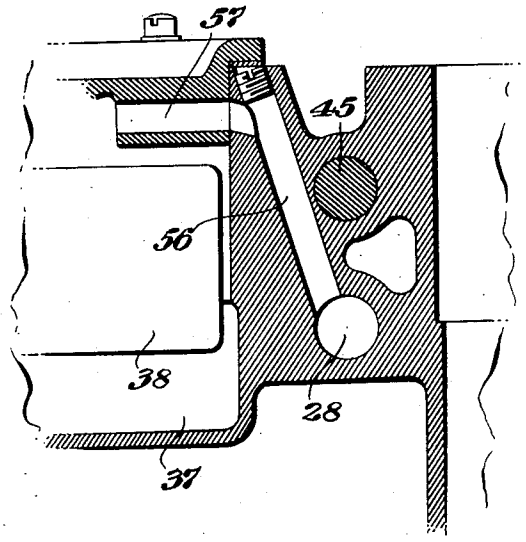
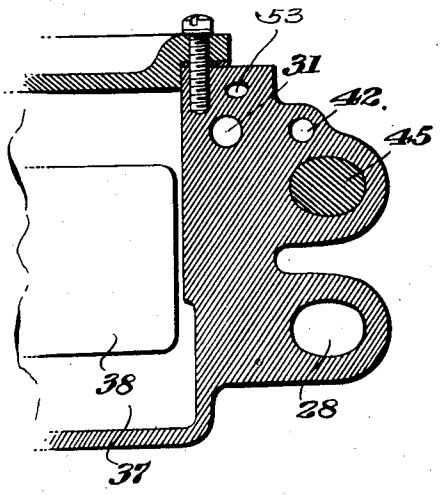


Fig. 7.



Inventor,
Jesse G. Vincent,
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Atty.

Patented Oct. 6, 1925. 1,556,050

UNITED STATES PATENT OFFICE.

JESSE G. VINCENT, OF DETROIT, MICHIGAN, ASSIGNOR TO PACKARD MOTOR CAR COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

CARBURETOR FOR HYDROCARBON ENGINES.

Application filed December 29, 1919. Serial No. 348,114.

To all whom it may concern:

Be it known that I, JESSE G. VINCENT, a citizen of the United States, and resident of Detroit, Wayne County, State of Michigan, have invented certain new and useful Improvements in Carburetors for Hydrocarbon Engines, of which the following is a specification.

This invention relates to carburetors for hydrocarbon engines.

One of the objects of the invention is to provide more full and efficient air control for carburetors of the compensating well type to thereby better adapt this type of carburetor to automobile use.

Another object of the invention is to provide full air control for a carburetor of the type having main and compensating fuel devices.

Other objects of the invention will appear from the following description taken in connection with the drawings which form a part of this specification, and in which—

Figure 1 is a vertical section through a carburetor made in accordance with this invention, the section being on the line 1—1 of Figure 2;

Figure 1ª is a smaller view of parts of the carburetor shown in Figure 1, but having the air valves in another position;

Figure 2 is a plan view and horizontal section on the line 2—2 of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 2, except the upper left hand corner, which is a section on the line 3ª—3ª of Figure 2;

Figure 4 is an end view of the plug valve 44 showing the lever arms thereon;

Figure 5 is a view partly in elevation and partly in section on the line 5—5 of Figure 2;

Figure 6 is a section on the line 6—6 of Figure 2; and

Figure 7 is a section on the line 7—7 of Figure 2.

Referring to the drawings, 10 is an intake header or conduit of a hydrocarbon engine upon which the carburetor 11 of this invention is mounted. This carburetor is of the inverted type and the mixture passes downwardly through it and downwardly into the conduit 10 where it may branch to the cylinder blocks of the engine, which engine is usually of the V-type for this form of carburetor.

A throttle valve 12 controls the amount of mixture which shall pass to the intake conduit of the engine, an arm 13 controls the position of the throttle valve, and stops 14 limit its movement in both directions.

The chamber of the carburetor immediately above and below the throttle valve 12 may be termed a mixing chamber 15, from which the mixture passes to the intake conduit 10. The upper part of this mixing chamber is somewhat contracted by a Venturi tube 16, which in turn surrounds a second tube 17, which is also interiorly formed of venturi shape. The main air intake pipe of the carburetor is above the mixture tube 17 and is shown in the form of a pipe 18 having a choke valve or air valve 19 therein. This valve normally rests with its arm 20 against a stop 21, and a spring 22 yieldingly holds it in that position so that the valve is wide open, permitting the unrestricted passage of air to the carburetor.

The mixture tube 17 is mounted on an arm 23 which may be formed, as shown, as an integral part of the pipe 18, and this arm and pipe are secured to the body of the carburetor as by a series of bolts 24.

The arm 23 has a fuel passage 25 therein and this passage communicates by a series of small holes 26 with the most constricted part of the interior of the mixture tube 17, so that the air passing downwardly through the tube 17 will carry with it the mixture or fuel delivered by the passage 25.

The passage 25 in the arm 23 registers with a passage 27 formed in the body of the carburetor and extending downwardly to an air passage 28. The air passage 28 is closed by a plug 29 at one end and is connected to a pipe 30 at the other end, this pipe being intended for bringing the air from a safe position outside of the casing of the engine, so that if any fuel leaks down through it, it will not accumulate on any part of the engine.

The passage 27 also communicates with a cross passage 31, the other end of which enters the top of the main fuel supply tube 32 of the carburetor. This is a vertical tube closed at the top by a plug 33 and communicating through a stand-pipe 34 and a constricted opening 35 and passage 36 with the interior of a float chamber 37 having a float 38 therein, said float operating in the usual

way to maintain the level of liquid fuel therein at a predetermined height.

Thus it will be seen that so far as the parts of the carburetor above described are concerned, the suction of the engine will cause a depression in the passage 25, which will communicate through the passage 27 with the air supply at 28 and through the passage 31 with the fuel supply tube 32. This will cause some air to be drawn from the passages 28 and 27 and some gasoline or other fuel to be drawn from the stand-pipe 34 so that these two will mix and form an emulsion which will be discharged through the passage 25 and the holes or orifices 26 in the mixture tube 17. Additional air passing into the carburetor through the pipe 18 will be supplied to this emulsion and a diluted mixture of gasoline and air will pass through the carburetor to the intake conduit 10 of the engine.

In practice it is found that with such carbureting means as has been described, if the air and fuel openings are properly proportioned for a correct mixture at low speeds, the mixture will be too rich at higher speeds of the engine. Compensating means are, therefore, provided for automatically thinning out the mixture at higher speeds. A compensating well 39 is arranged adjacent the tube 32 and communicates with the latter through a series of restricted openings 40. The well 39 also communicates with the large passage 36 to the float chamber by means of a constricted passage 41. At the upper end of the well 39 is a cross passage 42 which communicates with the air supply 28 through a vertical passage 43, thus allowing air to enter the upper part of the well 39. This opening 42 is sufficiently large to maintain substantially atmospheric pressure in the upper part of the well when suction is created on the restricted openings 40 from the fuel supply tube 32, and after the engine has been running a short while and drawn the supply of gasoline from the well 39 down to the lowest of the openings 40, the upper openings will supply air to the tube 32 and the lowest one will supply a mixture of gasoline and air depending upon the amount of suction. The gasoline will flow through the restricted opening 41 at a given rate regardless of the amount of suction because the well 39 is, as above stated, constantly at substantially atmospheric pressure. It will be noted that the vertical passages 27 and 43, above described, are arranged adjacent each other and parallel. For the purpose of controlling the amount of air passing to the passage 25 and the passage 42 respectively through these passages 27 and 43, a plug valve 44 is mounted in the carburetor body so that it intersects the passages 27 and 43, and this plug is provided with ports 45 and 46 for these passages respectively. An arm 47 is connected to the extended end of the valve 44 and a rod 48 may be provided for operating the valve.

By the above arrangement it will be seen that in the normal operation of the engine the ports 45 and 46 of the valve 44 will be open and the correct amount of air will be supplied to the carburetor to make it function properly. In cold weather, however, it is desirable that a very rich mixture should be supplied to the engine for starting and running the engine until it has warmed up. This may be done by turning the valve 44 so that the ports 45 and 46 will simultaneously cut off the air in the passages 27 and 43 so that the suction in the passage 25 will draw raw gasoline from the tube 32 and the well 39. The valve 44 may also be set at intermediate points so that a rich or a lean emulsion may be supplied to the passage 25.

In order to insure a sufficient degree of suction in the passage 25 of the carburetor, the present invention contemplates the use of a choke valve in the inlet pipe 18, which valve may be operated in conjunction with the valve 44 by an interconnecting device in the form of a rod 49 which is connected to the valve 44 by an arm 50 and to the arm 20 of the choke valve 19 by a pin and slot connection 51. By this connection it will be seen that the valve 44 may be rocked until its ports 45 and 46 are practically closed before there is any movement of the choke valve 19. A further movement of the valve 44, however, the lost motion having been taken up in the pin and slot connection 51, will move the choke valve 19 to its closed position, as shown in Figure 1[a]. In said figure both the valve 44 and the choke valve 19 are closed and practically no air is admitted to the carburetor. The suction of the engine will, therefore, draw practically raw gasoline from the carburetor and thus facilitate starting in very cold weather. The reverse movement of the valve 44 will first open the choke valve 19 and later open the ports 45 and 46 so that a leaner emulsion is supplied to the carburetor.

Idling means for the engine are also provided in the form of a tube 52 extending down into the well 39 and communicating at its upper end with a cross passage 53, a downwardly extending vertical passage 54 and a short passage 55 with the intake passage to the engine beyond the throttle valve 12. Thus when the throttle valve 12 is in its substantially closed position, as shown in Figure 1, there will be a suction on the tube 52 through the passages above mentioned and this will draw raw gasoline from the well 39 and air supplied through the passage between the throttle and the wall of the mixing chamber will mix with the

gasoline coming from the tube 52 and form a fairly rich mixture for idling the engine.

The air passage 28 also supplies air to the upper part of the float chamber 37 through a diagonal passage 56 and a horizontal passage 57, as shown in Figures 2, 3 and 6. The horizontal passage 57 is formed in the detachable cover of the float chamber and its outlet end is at the middle part of the top of the chamber so that inclination of the carburetor in any direction will not cause the fuel to slop over into the air passage.

It will be understood that the form shown herein is illustrative only of the invention, and various modifications thereof may be made without departing from the spirit or scope of the invention as defined by the claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a carburetor, the combination of a mixing chamber, a mixture tube arranged therein and having a supply passage, a float chamber, a main fuel supply tube connected with said float chamber and having an outlet to said supply passage, a compensating well connected with said float chamber and having an outlet connection with said main fuel supply tube, adjacent air supply conduits of different cross sectional areas connected to said supply passage and to said compensating well, and single means for simultaneously controlling said air supply conduits in proportion to their respective cross sectional areas.

2. In a carburetor, the combination of a mixing chamber, a mixture tube arranged therein and having a supply passage, a float chamber, a main fuel supply tube connected with said float chamber and having an outlet to said supply passage, a compensating well connected with said float chamber and having an outlet connection with said main fuel supply tube, air supply conduits connected to said supply passage and to said compensating well, means for choking the air supply to said mixing chamber, and means for controlling said air supply conduits, said last mentioned means having a lost motion connection to said choking means.

In testimony whereof I affix my signature.

JESSE G. VINCENT.