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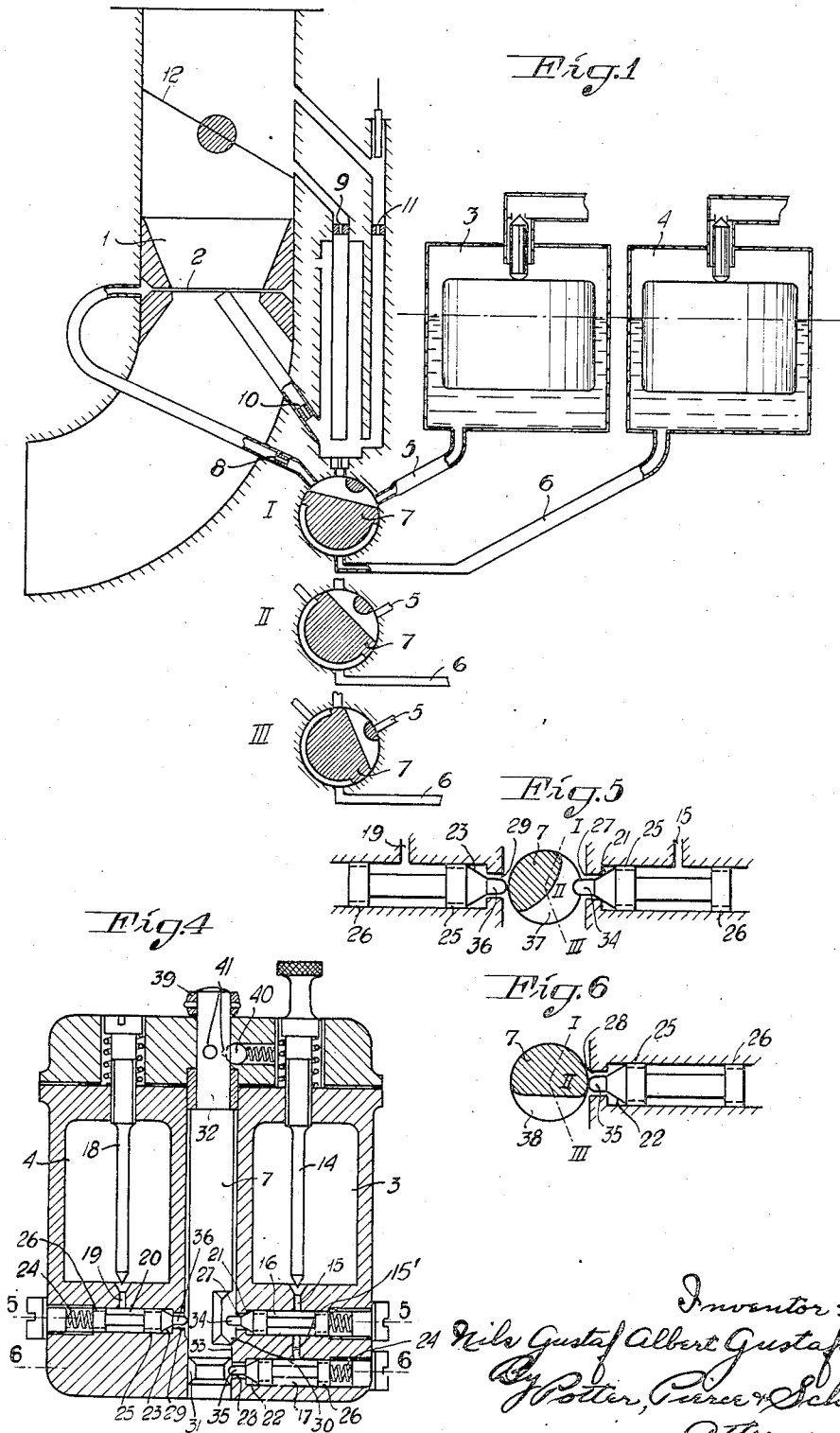
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CARBURETOR FOR INTERNAL COMBUSTION MOTORS

Filed Sept. 23, 1933

2 Sheets-Sheet 1



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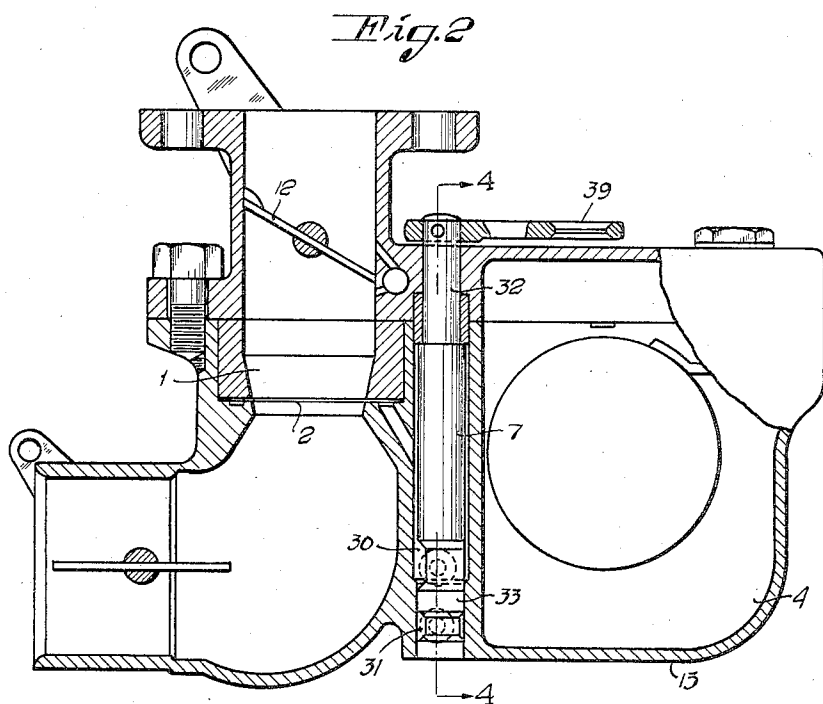
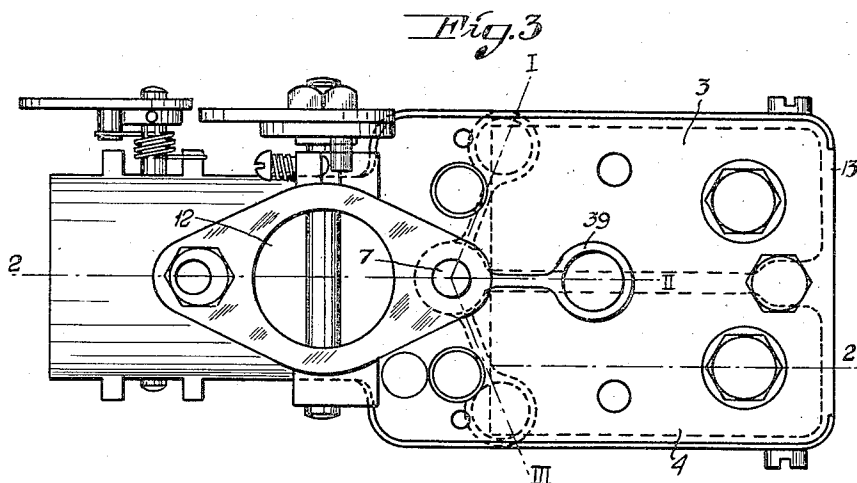
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UNITED STATES PATENT OFFICE

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CARBURETOR FOR INTERNAL COMBUSTION MOTORS

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9 Claims. (Cl. 261—18)

The present invention refers to such carburetors for internal combustion motors which are intended for a light fuel such as benzine and for a heavy fuel such as petroleum or crude oil, and which are provided with a shifting device adapted to control the supply of the different kinds of fuel to the nozzles of the carburetor.

With the use of heavy fuels, such as petroleum and crude oil, for the operation of a carburetor motor, heat must always be supplied to the mixture of fuel and air to gasify the fuel. Even if heat is supplied, such heat must then be taken from the exhaust gases of the motor, but inasmuch as the exhaust gas temperature and also the quantity of the exhaust gases is reduced in no load or light load running, the heat quantity available on the said occasions will be too small to permit of gasification of the heavy fuel.

The present invention has for its object to obviate the above-mentioned drawbacks, and substantially consists in that the shifting device controlling the fuel supply and the nozzles connected thereto is so arranged that in no load or light load operation the light fuel only can be supplied to the mixing chamber for fuel and air of the carburetor. The shifting device may then be constructed that in one position of the same both kinds of fuel may be supplied to the mixing chamber of the carburetor at the same time, preferably so that the light fuel is supplied to no load, starting and transition nozzles pertaining to the carburetor, whereas the heavy fuel is supplied to one or more main nozzles of the carburetor. The arrangement is such that the carburetor supplies only the light fuel to the engine so long as the throttle is closed or nearly closed, and supplies heavy fuel through one nozzle and a smaller quantity of light fuel through the no load nozzle or through transition or starting nozzles when the throttle valve is opened wider. The shifting device can also be set to either of two other positions for supplying either only the heavy fuel or only the light fuel to the engine.

An object of the invention is to provide a multiple fuel carburetor having a plurality of nozzles opening into a mixing chamber, supply chambers for fuels of different density, and a common valve device adjustable to different positions for controlling communication between each nozzle and the respective supply chambers. An object is to provide a carburetor of the type stated in which the valve device and the passages to the nozzles are so constructed that different types of fuels cannot mix together in the valve device. A further object is to provide a carburetor of the type

stated in which the valve device is operable independently of the throttle valve to determine the type of fuel which may be supplied to the several nozzles, and in which the position of the throttle valve determines whether or not fuel is supplied to the engine through certain of the nozzles.

The accompanying drawings illustrate a form of embodiment of a carburetor according to this invention. Fig. 1 shows diagrammatically the carburetor with its shifting device and the fuel supply conduits controlled thereby. Fig. 2 is a vertical section on line 2—2 in Fig. 3 of a constructional embodiment of the carburetor, Fig. 3 being a plan view and Fig. 4 a cross section thereof on line 4—4 in Fig. 2. Figs. 5 and 6 represent cross sections of the shifting device on lines 5—5 and 6—6 in Fig. 4 respectively.

In Fig. 1, the mixing chamber of the carburetor is designated by 1, said mixing chamber being provided with an atomizer for the main fuel in the form of a narrow annular slit 2. The float chamber of the carburetor, intended for benzine, for example, is denoted by 3, and the float chamber intended for petroleum, for example, is designated by 4. The said chambers 3 and 4 communicate through conduits 5 and 6 respectively with a shifting device 7 which, in turn, is connected to a main nozzle 8 in the conduit leading to the slit 2, and is also connected to a no load nozzle 9, as well as to a transition nozzle 10 and to a starting nozzle 11. The throttle valve is denoted by 12.

In the position I of the shifting device 7, benzine is supplied to all nozzles through the conduit 5, while the supply of petroleum is cut off entirely. The carburetor then operates in known manner as an ordinary benzine carburetor.

In the position II of the shifting device, the supply of benzine takes place to the no load nozzle 9, the transition nozzle 10 and to the starting nozzle 11, while supply of petroleum may take place to the main nozzle 8 and to the atomizer 2. In the no load position, with the throttle valve closed, the motor operates with benzine only, inasmuch as the pressure below atmospheric in the mixing chamber 1 is too small to permit of any fuel being forced through the slit 2, whereas, when the throttle valve 12 is opened, the carburetor automatically adjusts itself to operate principally with petroleum.

In the position III of the shifting device, the supply of benzine is cut off entirely, and the carburetor operates with petroleum only which is supplied to the atomizer 2 through the main nozzle 8. If in this position of the shifting device

the throttle valve 12 is closed, the motor will stop for lack of fuel supply.

In the constructional embodiment of the carburetor shown in Figs. 2-6, the same reference numerals as in Fig. 1 have been used for corresponding parts. The nozzles and the passages leading thereto, which are arranged in the carburetor housing 13 in known manner, have been omitted, however, for the case of simplicity, but are taken to be arranged according to the basic diagram shown in Fig. 1.

The fuel supply to the chambers 3 and 4 is effected in known manner through valves controlled by floats. From the benzine chamber 3, the benzine is conducted through an opening 15 adapted to be controlled by means of a needle valve 14 to a valve chamber 16 and, furthermore, to a second valve chamber 17 through a passage 15. The petroleum is conducted through an opening 19 adapted to be controlled by means of a needle valve 18 to a third valve chamber 20, Fig. 4. In each of these chambers there is provided a valve 21, 22 and 23 respectively, which are each kept in their closed positions through the influence of springs 24, and which each have two guides 25, 26, preferably of triangular cross section, so that the fuel may flow to outlet openings 27, 28 and 29 respectively controlled by the valves, said openings leading to chambers 30 and 31, in which the spindle 7 of the shifting device is rotatably mounted. This spindle is tightly guided at the top, as at 32, and also at the bottom, as at 33, but otherwise is free from the surrounding chamber walls, so that the fuel introduced into the chambers 30 and 31 may flow freely to the appropriate carburetor nozzles. Here, the chamber 30 communicates with the main nozzle (8 in Fig. 1) of the carburetor, while the chamber 31 is in communication with the no load and the transition nozzles and with any starting nozzle that may be provided (9, 10 and 11 respectively in Fig. 1).

Each of the control valves 21, 22 and 23 is provided at its inner end with a pin 34, 35, 36 protruding through a corresponding opening 27, 28 and 29 respectively. These pins will then, depending on the angular position of the shifting spindle 7, either project into a recess 37 or 38 respectively provided in the spindle, Figs. 5 and 6, the corresponding valve or valves being then kept closed by the spring 24, or be directly actuated by the spindle, the corresponding valve or valves being then kept open against the action of the corresponding spring. The adjustment of the shifting spindle 7 into the positions marked I, II and III in Fig. 3 is effected by means of an arm 39 secured to the outer end of the spindle, the said positions being fixed by means of a spring actuated locking ball 40, Fig. 4, snapping into corresponding seats 41 in the spindle.

In the intermediate position II of the shifting spindle 7 illustrated in Figs. 2-6, the valve pins 35 and 36 bear directly on the circumference of the spindle, as will be best seen from Figs. 5 and 6, the valves 22 and 23 being then kept open, with the consequence that the light fuel may be supplied through the chamber 31 to the no load nozzle and the transition and starting nozzles respectively of the carburetor, and that the heavy fuel may be supplied through a chamber 30 to the main nozzle of the carburetor, with the result above described. The valve pin 34 projects into the recess 37 of the spindle 7, and the corresponding valve 21 is kept closed by its spring,

so that the supply of light fuel to the main nozzle of the carburetor is cut off.

When the spindle 7 is adjusted into the position I, the valve pin 34 slides up on the circumference of the spindle, while the valve pin 35 is still in contact with the circumference and the valve pin 36 projects into the recess 37, which results in that the valve 21 is opened, the valve 22 remains open and the valve 23 is closed. Light fuel only will then be supplied through the chambers 30 and 31 to all of the carburetor nozzles, while the supply of heavy fuel is cut off entirely.

When the spindle is adjusted into the position III, the valve pins 34 and 35 project into the recesses 37 and 38, while the valve pin 36 slides up on the circumference of the spindle, so that the valves 21 and 22 are closed and the valve 23 is opened, only the heavy fuel being then supplied through the chamber 30 to the main nozzle of the carburetor only, all in agreement with the operation of the device according to the basic diagram illustrated in Fig. 1.

In the case the carburetor is provided with an acceleration pump, the latter should be in communication only with the chamber 3 containing the light fuel.

What I claim is:—

1. A carburetor, comprising a mixing chamber, a throttle valve for controlling flow through said mixing chamber, a supply chamber for relatively light fuel, a supply chamber for a relatively heavy fuel, an adjustable valve device, a supply conduit from each of said fuel chambers to said valve device, two discharge conduits from said valve device opening into said mixing chamber at different positions with reference to said throttle valve, said valve device being manually adjustable into one position to connect both of said discharge conduits with the supply conduit from the light fuel chamber for starting and idling and in another position to connect one discharge conduit with the supply conduit from the light fuel chamber and the second discharge conduit with the supply conduit from the heavy fuel chamber, the said relative locations of the discharge conduit openings with reference to the throttle valve effecting an automatic decrease in the relative quantity of light fuel supplied to said mixing chamber upon an opening movement of the throttle valve when the valve device is adjusted to the second position.

2. A carburetor, comprising a mixing chamber, a supply chamber for a relatively light fuel, a supply chamber for a relatively heavy fuel, two conduits opening into said mixing chamber, and an adjustable valve device including a valve in each of said conduits, said valve device being manually adjustable into one position to connect both of said conduits with the light fuel supply and into another position to connect one conduit with the light fuel supply and the second conduit with the heavy fuel supply, said valve device preventing introduction into said mixing chamber of both said fuels simultaneously through one and the same conduit.

3. In an internal combustion engine carburetor having a throttle valve and a supply chamber for a relatively light fuel, a supply chamber for a relatively heavy fuel, a plurality of conduits opening into said mixing chamber, an adjustable valve device, and means to operate said throttle valve and said valve device independently of each other in all positions, said valve device being adapted to control said conduits to connect same with said fuel supplies and to prevent introduction

tion into said mixing chamber of both said fuels simultaneously through one and the same conduit while permitting the introduction of both fuels simultaneously through separate conduits.

5 4. In an internal combustion engine carburetor having a throttle valve and a mixing chamber, a supply chamber for a relatively light fuel, a supply chamber for a relatively heavy fuel, two conduits opening into said mixing chamber, an
10 adjustable valve device, and means to operate said throttle valve and said valve device independently of each other in all positions, said valve device being adapted in one position to connect said two conduits with the light fuel supply and in another
15 position to connect one conduit with the light fuel supply and the second conduit with the heavy fuel supply while preventing introduction into said mixing chamber of both said fuels simultaneously through one and the same conduit.

20 5. A carburetor, comprising a mixing chamber, a supply chamber for a relatively light fuel, a supply chamber for a relatively heavy fuel, separate means to introduce said fuels into said mixing chamber, and an adjustable valve device com-
25 mon to said separate introducing means to control their connection with said fuel supplies, said valve device being adapted in one position to connect both said introducing means with the light fuel supply and in another position to con-
30 nect one introducing means with the light fuel supply and the second introducing means with the heavy fuel supply and preventing introduction into said mixing chamber of both said fuels simultaneously through one and the same introducing
35 means.

6. A carburetor, comprising a mixing chamber, a supply chamber for a relatively light fuel, a supply chamber for a relatively heavy fuel, an adjustable valve device communicating with said
40 fuel supplies, means comprising a nozzle to introduce said light fuel into said mixing chamber from said valve device and means comprising another nozzle to introduce said heavy fuel into the mixing chamber from said valve device, said
45 valve device comprising means to connect said two introducing means simultaneously with their respective fuel supplies.

7. In an internal combustion engine carburetor,

a throttle valve, a mixing chamber, a supply chamber for a relatively light fuel, a supply chamber for a relatively heavy fuel, a main nozzle opening into said mixing chamber, a supplementary nozzle opening into said mixing cham-
5 ber on the engine side of said throttle valve when said valve is nearly closed, and an adjustable valve device adapted to control said nozzles to selectively connect same with said fuel supplies, said valve
10 device comprising means to connect said mixing chamber simultaneously with both said fuel supplies.

8. A carburetor comprising a mixing chamber, a supply chamber for a relatively light fuel, a supply chamber for a relatively heavy fuel, a
15 main nozzle, a plurality of supplementary nozzles, said nozzles opening into said mixing chamber, an adjustable valve device, a connection or inlet between said valve device and said main nozzle, a common connection or inlet between said valve
20 device and said supplementary nozzles, said valve device being adapted in one position to connect both said connections with the light fuel supply and in another position to connect the main
25 nozzle connection with the heavy fuel supply and said common connection with the light fuel supply.

9. In a carburetor for use with an internal combustion engine, the combination with a mixing chamber, separate supply chambers for a
30 relatively light and for a relatively heavy fuel, a throttle valve, a main fuel inlet and a no-load fuel inlet opening into said mixing chamber, said no-load fuel inlet opening being on the engine side of said throttle valve, of means adjustable alter-
35 nately to two different positions to supply either one or the other of said fuels to said mixing chamber and to a third position for automatically controlling the supply of said fuels to said mixing chamber in accordance with the load on the
40 engine, said adjustable means comprising a valve adjustable to two different positions to connect both of said fuel inlets alternately to the respective supply chambers and to a third position to connect the main fuel inlet to the heavy fuel
45 chamber and the no-load fuel inlet to the light fuel chamber.

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CERTIFICATE OF CORRECTION.

Patent No. 2,039,990.

May 5, 1936.

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It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 31, claim 1, for "suppy" read supply; and line 67, claim 3, after the word "and" insert the words and comma a mixing chamber,; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of July, A. D. 1936.

(Seal)

Henry Van Arsdale
Acting Commissioner of Patents.