Jan. 2, 1934. F. H. HEITGER 1,941,862

CARBURETOR

Filed Sept. 25, 1929 2 Sheets-Sheet 1

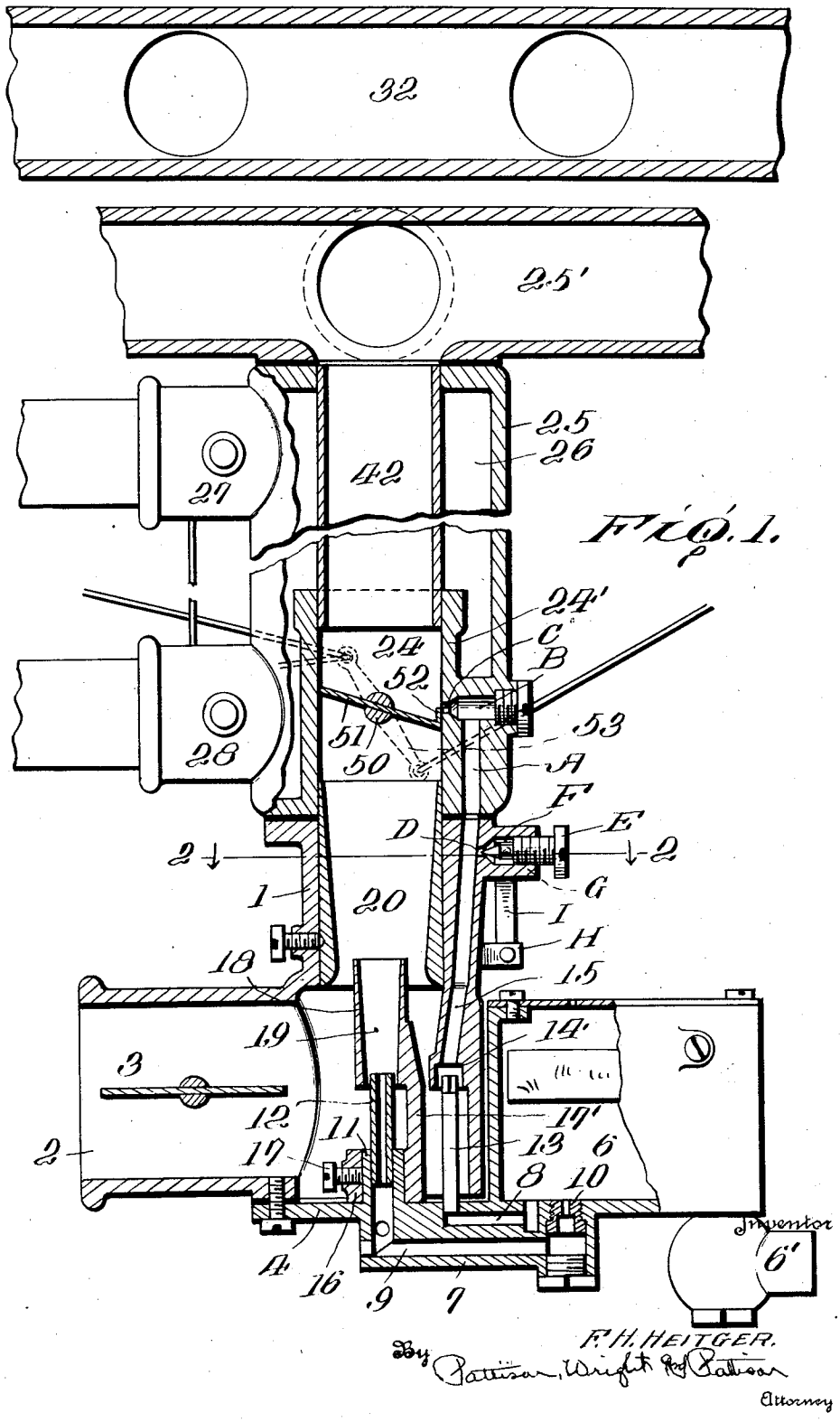


Fig. 1.

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FIG. 2.

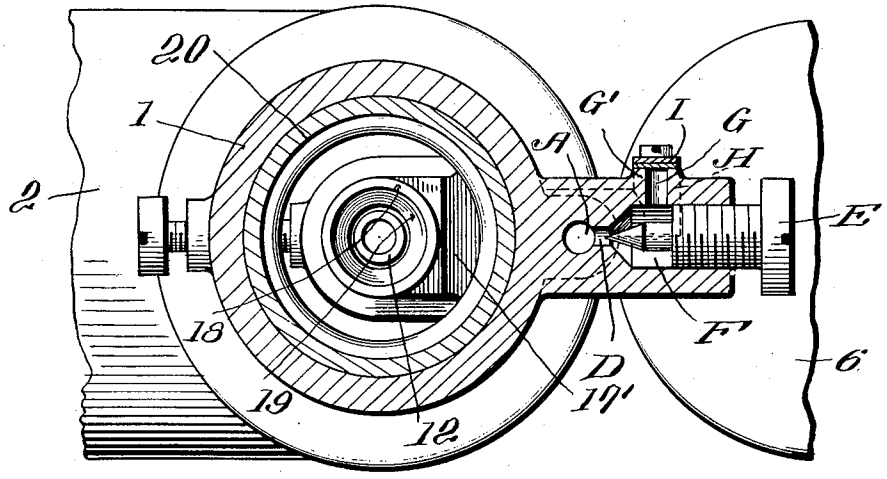


FIG. 4.

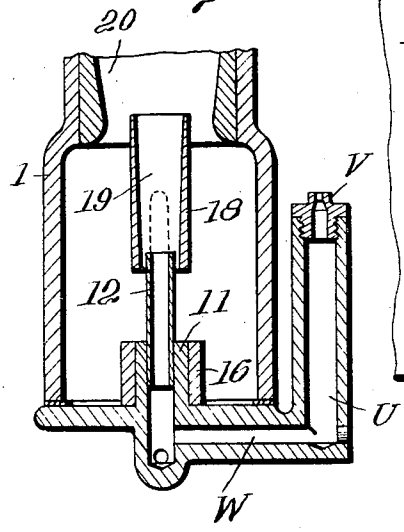
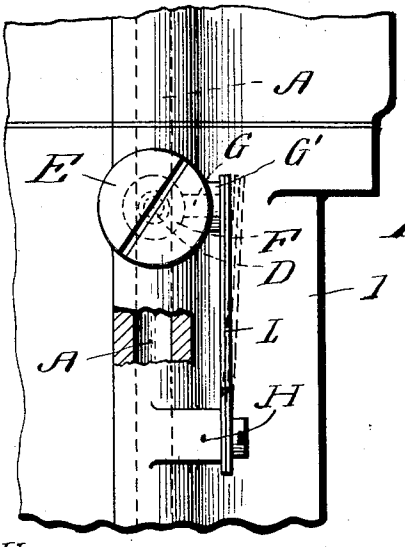


FIG. 3.



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Patented Jan. 2, 1934 1,941,862

UNITED STATES PATENT OFFICE

1,941,862

CARBURETOR

Frank H. Heitger, Flint, Mich.; Mattie G. Heitger, Flint, Mich., administratrix of said Frank H. Heitger, deceased

Application September 25, 1929
Serial No. 395,076

1 Claim. (Cl. 261—41)

This invention relates to certain new and useful improvements in charge forming means for internal combustion engines and more particularly to that type of charge forming means in which an idling passage extends from a nozzle or fuel feeding means and terminates posterior of the throttle, the object being to provide thermostatically controlled means for controlling the admission of air to the idling passage and is a continuation of my application filed August 15, 1929, Serial Number 386,174.

Another object of my invention is to provide a riser with an idling passage in communication with the idling passage of the carburetor so constructed and mounted in respect to the throttle of the charge forming and feeding means that the idling fuel mixture will be heated and delivered posterior of the throttle. In this form of feeding means where a riser is used, it is the practice to place the throttle in the riser above the carburetor and my invention is particularly adapted to use what is known in the art as a plain tube carburetor and to use such a carburetor provsion must be made to get sufficent suction on a fuel jet for lowest idling speed or lowest speed light load and to accomplish this result the suction must be from posterior of the throttle and the idling feed must be arranged to discharge posterior of the throttle and in order to produce a satisfactory charge forming and feeding means provisions must be made to augment or to add to the idling feed as the throttle begins to open and before the main fuel feed starts and I have provided means for accomplishing this result.

I am aware that I am not the first in the art to use a heated riser in connection with a carburetor of what is known as the air valve type, but my invention relates to a new combination of plain tube carburetor, riser and idling passage so constructed that the idling feed produced in the carburetor can be carried and delivered posterior of the throttle and in such a manner that the engine will run at the various speeds and a sufficient fuel mixture will be delivered to the engine as the speed increases or decreases. By my particular construction of idling feed, I am able to heat the idling mixture and to thermostatically control the richness thereof in order to produce a proper explosive mixture under all atmospheric conditions as to temperature, reducing the richness of the mixture as the heat of the motor increases, and giving rich mixture on starting of cold motor with throttle in idling position.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claim.

In the drawings,

Figure 1 is a vertical section of a charge forming and feeding means constructed in accordance with my invention showing the same connected to the intake and exhaust of an internal combustion engine;

Figure 2 is a horizontal section taken on line 2—2 of Figure 1;

Figure 3 is a detail side elevation partly in section showing the thermostatic control for the air inlet to the idling passage; and

Figure 4 is a detail vertical section showing the accelerating well.

In the embodiment of my invention as shown 1 indicates the body of what is known as a plain tube carburetor (one without air valves), said body having a carbureting passage extending therethrough to provide an air inlet 2 having the usual choker valve 3 mounted therein for controlling the admission of air. The body is provided with a movable bottom portion 4 secured in position by one or more bolts 5 as shown in Figure 1 and while I have shown this particular manner of constructing the body with a removable bottom, it is, of course, understood that the body could be formed integral. However, I have found that by having a removable bottom, certain advantages are obtained in the manufacturing of the carburetor. In this embodiment where the bottom is formed of a separate piece, I provide the bottom with a fuel reservoir 6 which is provided with the usual construction of float control needle valve for controlling the admission of fuel through the inlet 6′ which is connected to a source of fuel supply for maintaining a constant level of fuel within the reservoir. The bottom portion 4 and reservoir 6 is provided with an enlarged portion 7 provided with fuel passages 8 and 9, fuel passage 8 is in direct communication with the fuel reservoir 6 and the fuel passage 9 is in communication with the fuel reservoir through a calibrated plug 10 as shown in Figure 1. The passage 9 terminates in a boss 11 formed in the inside of the bottom portion 4 and has secured therein the main nozzle 12 of the charge forming device or carburetor and the cross section area of said nozzle is greater than the cross section area of the calibrated plug 10 so that under normal conditions, fuel from the accelerating well will accumulate in the nozzle and be discharged therefrom upon the opening of the throttle valve as will be later described.

The passage 8 terminates in an upwardly extending portion in which is secured an auxiliary nozzle 13 having its upper end extended into the passage of the body and terminates in an annular enlarged lower end 14 of an idling passage 15 formed in the wall of the body for producing an idling fuel mixture as will be later described. A collar 16 is secured around the boss 11 within the body by a screw 17 and is provided with an upwardly extending arm 17' carrying an atomizing tube 18 having a tapering bore 19 gradually increasing in size from the lower end to the upper end thereof, said upper end terminating in a Venturi tube 20 secured in the carbureting passage of the body and preferably of such a size that a portion of said Venturi tube will extend upwardly beyond the body for the purpose of overlapping the joint between the body and riser as will be later described.

The main nozzle 12 has its upper end extended into the lower end of the atomizing tube 18 and of such a size that an annular air passage is formed around the same so that a portion of the air passing through the air passage of the body will pass through the atomizing tube to form a rich mixture of fuel and air which is delivered into the Venturi tube. The upwardly extending portion of the Venturi tube 20 extends into a central mixture passage 24 of a riser 25 secured on the upper end of the body 1 by any suitable means to form a tight joint between the body and riser, the Venturi tube overlapping the joint between the members. The upper end of the mixture passage 24 registers with an inlet of an intake manifold 25' connected to an internal combustion engine, not shown.

The mixture passage 24 of the riser is surrounded by an annular heat chamber 26 having an inlet nipple 27 and an outlet nipple 28 for the exhaust gases which are adapted to be conveyed by suitable conduits from the exhaust manifold 32 so that the passage of exhaust gases can be fed through the heat chamber 26 in order to heat the fuel mixture in its passage to the engine.

The lower end of the mixture passage 24 of the riser is formed by an integral tubular portion 24' of the riser and the upper end by a steel tube 42 secured in the tubular portion 24' as shown in Figure 1 so as to subject the fuel mixture in its passage to the internal combustion engine to the heat of the exhaust gases. Extending transversely through the tubular portion 24' and the outer wall of the heat chamber of the riser 24 is a throttle valve shaft 50 carrying a throttle valve 51 provided with a lip 52 for the purpose hereinafter fully described. The shaft 50 is provided with a control arm 53 at one end adapted to be operated in the usual manner from the seat by the operator of the motor vehicle to which the charge forming and feeding means is attached.

While I have shown and described a particular construction of charge forming device and riser, I wish it to be clearly understood that my invention consists in providing thermostatic control means for admitting air to the idling passage and is capable of being used in connection with any carburetor or charge forming device in which an idling passage is provided for conveying fuel and discharging the same posterior of the throttle valve.

The idling passage 15 registers with a passage A formed in the riser and terminates in a chamber B having an outlet port C posterior of the throttle valve 51, the particular construction of which is covered in an application filed July 28, 1928, Serial Number 296,004, so that the idling fuel mixture produced by the nozzle 13 and the air will be discharged posterior of the throttle. Formed in the idling passage 15 is an air inlet D controlled by an adjusting screw E which receives air from a chamber F open to the atmosphere through a port G formed in a boss G'. Extending outwardly from the body is a projection H to which is secured a thermostatic bar I preferably formed of a series of strips of metal of different coefficients of expansion, well known in the art. The free end of the bar I is adapted to close the air port G when the motor is cold, so that a rich mixture will be produced for starting the motor with the throttle nearly closed or in idle position. As the motor warms up, the ambient air is heated and the thermostatic bar moves outwardly in the position shown in Figure 3 so as to uncover the air inlet and reduce the richness of the mixture being fed posterior of the throttle by the idling passage.

While I have shown certain details of construction of the thermostatic means for controlling the admission of air to the idling passage in which a thermostatic bar is formed of strips of metal of different coefficients of expansion, I am aware that any construction of thermostatically operated valve can be used for controlling the air inlet to the idling passage, therefore I do not wish to limit myself to the details of construction shown. As for example, a valve could be fixed to the free end of the thermostatic bar so as to cooperate with the air inlet for controlling the passage of air through the air inlet into the idling passage.

In the embodiment of my invention as herein shown, I form integral with the bottom portion 4 of the body an auxiliary reservoir U having secured in its upper end an apertured plug V and having an opening in its bottom communicating with a fuel passage W extending from the fuel passage 9 in which fuel accumulates when the main fuel nozzle is out of operation and from which fuel is drawn to increase the fuel supply for acceleration through the main nozzle when the throttle valve is suddenly opened.

In experimenting I have found that the best results can be obtained especially for pick-up or acceleration when the idle fuel feed and main fuel feed are supplied with fuel by separate passages from the float chamber as the idle feed does not interfere with the level in the auxiliary fuel reservoir so that the level in the main fuel nozzle and auxiliary fuel reservoir stand at the same height at all levels of the fuel in the float chamber.

In the construction of carburetor or charge forming device as herein shown, the idling passage is provided with a fixed air inlet and an auxiliary air inlet, the auxiliary air inlet being controlled by a manual and thermostatic means so that the richness of the mixture of air and fuel passing through the idling passage can be controlled to a nicety and automatically.

While I have shown a certain construction of charge forming device wherein an idling passage is provided with an auxiliary air inlet having thermostatic means for controlling the passage of air therethrough, I am aware that the broad invention of controlling the supply of air to an idling passage by thermostatic means can be employed in various constructions of carburetors and charge forming devices wherein an idling

passage is constructed to deliver fuel posterior of the throttle and therefore I do not wish to limit myself to any particular construction of idling passage and thermostatic means as my invention consists broadly in controlling the supply of air to an idling passage.

From the foregoing description it will be seen that I have provided a charge forming device with an idling passage extending from the carburetor or source of supply and terminating posterior of the throttle provided with means for controlling the richness of the mixture passing through the idling passage by providing an air inlet with means for manually adjusting the size of the same and thermostatic means controlling the admission of air.

In the construction of charge forming device as herein shown, assuming that the throttle is in the position shown in Figure 1, the idling fuel mixture passes through the passage 15 and is delivered posterior of the throttle, the same being heated as it passes through the bore formed in the thickened portion of the heat chamber and the richness of this mixture is automatically controlled by the thermostatic controlled valve so that the proper explosive mixture will be produced and delivered posterior of the throttle until the throttle moves into such position that sufficient suction is produced upon nozzle 12 to cause the nozzle to deliver fuel into the atomizing tube. This particular construction allows the transfer of one speed to another without any dead spots in the transfer. I am aware that my invention which consists in controlling the richness of the mixture passing through the idling pasage by a thermostatically controlled means can be used in connection with various forms af carburetors and charge forming devices which use an idling passage and therefore I do not wish to limit myself to the details of construction shown as I am aware that various changes can be made without departing from the spirit of my invention.

What I claim is:

A charge forming device for internal combustion engines comprising a body having a carbureting passage extending therethrough having an air inlet at its lower end and a mixture outlet at its upper end, a throttle valve in said carbureting passage, said body being provided with a projection in its bottom having a fuel passage, a nozzle disposed in said fuel passage and extending upwardly therefrom, a collar surrounding said projection and adjustably mounted thereon, means for locking said collar in adjusted position, said collar being provided with an upwardly projecting arm carrying an atomizing tube surrounding said nozzle, a venturi disposed in said carbureting passage surrounding the upper end of said atomizing tube, said body being provided with a projection in the inner wall thereof having a vertically disposed idling passage enlarged at its lower end and in communication at its upper end with said carbureting passage posterior of said throttle valve, an auxiliary nozzle carried by the bottom of said body extending into the enlarged lower end of the idling passage and a constant level reservoir for feeding fuel to said nozzles.

FRANK H. HEITGER.