Jan. 10, 1933. C. A. ROSIER 1,893,682

INTERNAL COMBUSTION ENGINE

Filed May 24, 1929 2 Sheets-Sheet 1

Fig. 1.

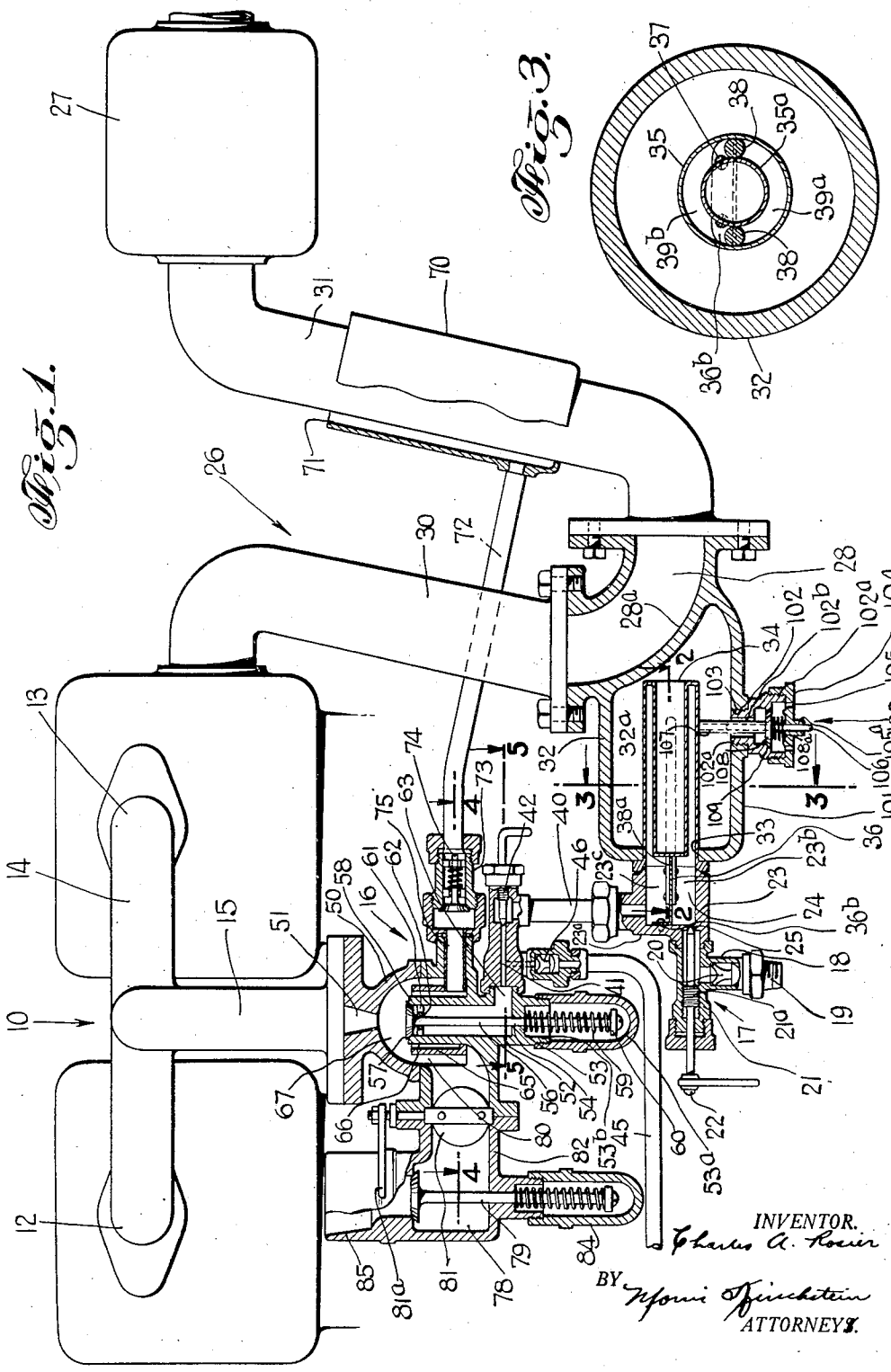


Fig. 3.

INVENTOR.
Charles A. Rosier
BY Moore & Hunchstein
ATTORNEYS.

Jan. 10, 1933. C. A. ROSIER 1,893,682

INTERNAL COMBUSTION ENGINE

Filed May 24, 1929 2 Sheets-Sheet 2

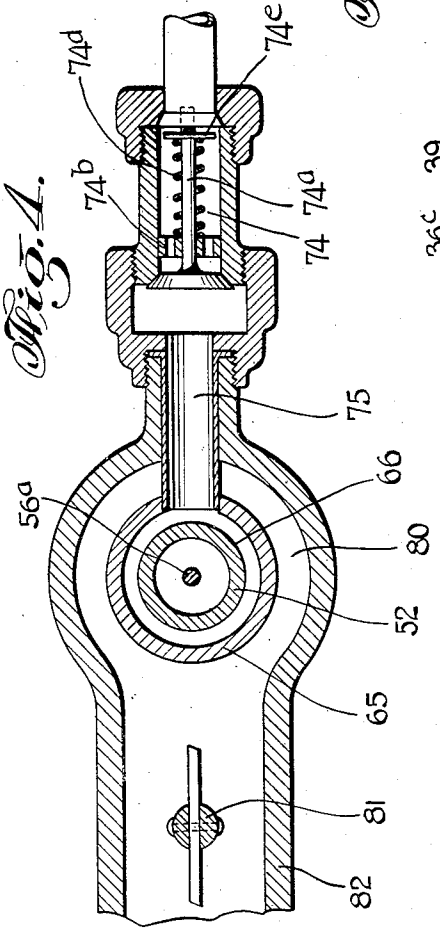


Fig. 4.

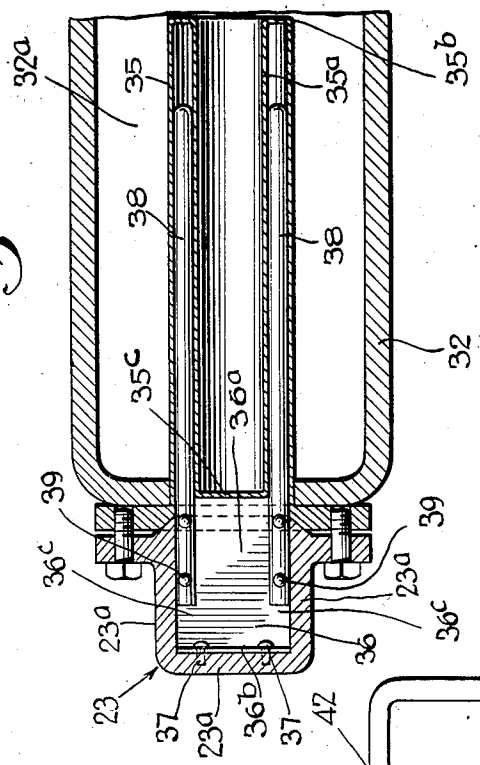


Fig. 2.

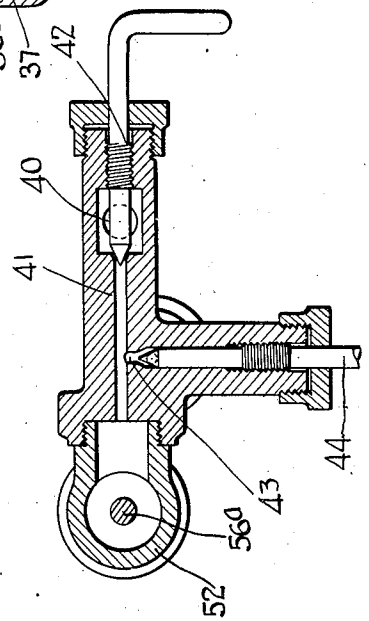


Fig. 5.

INVENTOR.
Charles A. Rosier

BY
Morris Finkelstein
ATTORNEYS.

Patented Jan. 10, 1933 1,893,682

UNITED STATES PATENT OFFICE

CHARLES A. ROSIER, OF BRONX, NEW YORK

INTERNAL COMBUSTION ENGINE

Application filed May 24, 1929. Serial No. 365,704.

This invention relates to internal combustion engines and carburetor or fuel feeding means therefor.

An object of this invention is to provide a device of the character described adapted for use with gasoline or hydrocarbon oil fuels, which will be smooth and regular in action, relatively inexpensive to manufacture, easy to control and regulate and yet practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described and of which the scope of application will be indicated in the following claims.

In the accompanying drawings, in which is shown one of the various possible illustrative embodiments of this invention—

Fig. 1 is a side, elevational, partially cross-sectional view of an engine provided with a carburetor embodying the invention;

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a cross-sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is a cross-sectional view taken on line 4—4 of Fig. 1; and

Fig. 5 is a cross-sectional view taken on line 5—5 of Fig. 1.

Referring in detail to the drawings for an embodiment of the invention, 10 designates a motor here shown as a two cylinder internal combustion type provided with the usual fuel intake ports 12 and 13 interconnected by a manifold pipe 14 communicating thru a pipe 15 with the carburetor 16.

Means is provided for selectively or simultaneously feeding gasoline and prepared hydrocarbon fuel oils to said carburetor. To this end, a T pipe fitting 17 having a branch 18 is provided with a nipple 19 for connection to any suitable supply of hydrocarbon fuel oil. Within said branch 18 is a one way valve 20 of any suitable type for preventing back flow of the fuel to the supply. The branch 21 of said fitting 17 is provided with a needle valve 21*a* actuable by a handle 22 for regulating the flow of the liquid fuel to the feeding mechanism.

Attached to said T connection 17 is a box 23 forming a chamber 24 for receiving the hydrocarbon fuel and having a valve opening 25 cooperating with the needle valve 21*a*.

For preparing the hydrocarbon oil for use in the carburetor 16, means is provided for vaporizing, expanding and gasifying the fuel fed to the chamber 24. To this end, a motor exhaust pipe 26 interconnects the motor 10 with the muffler 27. Said pipe comprises portions 30 and 31 interconnected by an enlarged box 32 forming a chamber 32*a* having an opening 33 at one side thereof, and a pipe portion 28 providing a partition wall 28*a* separating said chamber from said pipe portion. Extending into said opening 33 is a pipe 34 communicating with said chamber 24, said tube having an annular flange tightly wedged between boxes 23 and 32. It will now be clear that the air in chamber 32*a* will be heated by conduction from the hot exhaust gases in the exhaust pipe 26, the heat passing thru wall 28*a* for this purpose. In this manner, the accumulation of deposits from the exhaust gases in pipe 34 is prevented and permitting the same to function properly for long periods without the necessity for cleaning.

The tube 34 comprises an outer tubular wall 35 and an inner tubular wall 35*a* concentric therewith and spaced therefrom, said walls being interconnected by an outer end wall 35*b*. The inner tubular wall 35*a* is closed by an end wall 35*c* at the end thereof opposite to end wall 35*b*. The hot air in the preheating chamber 32*a* may thus surround the tube 34 inside and out, coming in contact with the outer wall 35 and inner wall 35*a*. For circulating the hydrocarbon fuels into contact with the heated walls of tube 35, a baffle or partition member 36 is provided. Said member 36 is preferably made of aluminum or any other suitable substance having a catalytic effect to facilitate and enhance the gasification of the fuels in tube 35. Said members comprise a plate portion 36*a* con-

tacting the side walls 23*a* of box 23 and also diametrically contacting the end wall 35*b* of tubular wall 35*a*, thus dividing the box into two chambers 23*b* and 23*c*. At one end thereof said plate 36*a* is provided with a flanged portion 36*b* contacting rear wall 23*a* and attached thereto as by screws or rivets 37. Secured to said plate 36*a* along the side edges 36*c* thereof are a pair of rods 38 projecting into the cylindrical space between tubular walls 35 and frictionally contacting the same, thus dividing said space into two semi-cylindrical chambers 39*a*, 39*b*. Said rods terminate short of the end wall 35*b* at one end and are split as at 38*a* for receiving the side edges 36*c* of said plate 36 at the opposite end, said latter end portion being secured to said plates as by rivets 39. It will now be clear that the fuel entering the lower chamber 23*b* will be expanded and heated therein and will circulate thru the lower semi-cylindrical tubular chamber 39*b*, around the end portions of the rods 38 and above said rods thru the upper semi-cylindrical chamber 39*c* and into the upper chamber 23*c*. The fuel contacting the catalyzing member 36 and the heated walls of the tube 34 will be thus thoroughly gasified.

Means is provided for maintaining a substantially even temperature in the chamber 32*a*. To this end a thermostatic control device 100 is mounted on a wall portion 101 of said box 32. Said control comprises a housing 102 having a threaded portion 102*a* screwed into a screw threaded opening 103 in said wall 101. Secured to the outer end of said housing is an end wall 104 provided with a plurality of perforations 105, and a central opening 105*a* fixedly receiving a guide pin 106 extending into said housing. The portion 102*a* is provided with a central opening 102*b* loosely receiving a sleeve member 107 contacting at one end thereof with said tube 34 and having a sliding fit on guide pin 106. Said sleeve is provided with an integral valve head 108 normally pressed upwardly by a spring 108*a* to contact valve seat 109 to close the chamber 32*a*. Upon increase of temperature of the air within the chamber 32*a*, above a predetermined point, the metal tube or sleeve 107 expands against the pressure of said spring 108*a* to unseat the head 108 and permit the cooler air to enter the chamber 32*a* thru openings 105 and 102*b*. The mixing of the cooler air with the heated air of chamber 32*a* obviously lowers the temperature therein and causes contraction of the tube 107 to again close the valve. Thus an even temperature is maintained within the chamber 32*a* permitting uniform operation of the gasifying and expanding means.

The expanded and gasified hydrocarbon fuel after leaving the preheating chamber passes thru the pipe 40 to passage 41, the flow of said fuel to said passage being controlled and regulated by a needle valve 42. Communicating with said passage 41 is a passage 43 controlled by a needle valve 44. Said passage 43 communicates with a conduit 45 connected to any suitable supply of gasoline, a one way check valve 46 of any suitable type being interposed in said conduit, for preventing back flow of the gasoline to the supply. Thus, by actuating the needle valves 42 and 44, gasoline and the gasified hydrocarbon may be selectively or simultaneously fed to the carburetor 16.

Said carburetor comprises a dome shaped member 50 communicating with the pipe 15 thru a nozzled passage 51. Centrally disposed within said dome shaped member 50 is a tubular member 52 provided with a bottom wall 53 having an opening 54 slidably receiving the stem 56*a* of a spring pressed poppet valve 56. Said valve is provided with a head 57 normally maintained in seated condition against the upper end 58 of said tube 52 by a spring 59 interposed between the underside of said wall 53 and a washer 60 attached to the lower end of the valve stem. A tubular housing 53*a* having a screw threaded engagement with flange 53*b* depending from said wall 53 houses and protects the lower end of said valve. A perforated guide piece 61 may be secured within the tube 52 adjacent the upper end thereof, said piece being provided with a central opening 52 for slidably receiving the valve stem 56*a*. Said tube 52 communicates thru a passage 63 with passages 41, 43 for receiving the fuels. Surrounding said tube 52 and concentric therewith is a cylindrical wall 65 forming an annular chamber 66 communicating with the chamber 67 formed by the dome shaped housing 50.

Means is provided for feeding preheated air to said annular chamber 66 for forming a proper combustible mixture. To this end, a jacket 70 surrounding a portion of the pipe 31 is provided with an open end 71 for receiving air which becomes heated due to contact with said pipe 31. A pipe 72 connects said jacket 70 with a fitting 73 provided with a poppet valve 74, said valve having a stem 74*a* slidably mounted on a perforated washer 74*b* fixed in said fitting. Fixed to said stem at the outer end thereof is a washer 74*c* slidable within said fitting 73 and interposed between said washers 74*b*, 74*c* is a spring 74*d* mounted on said stem 74*a* and normally maintaining the valve in closed condition. Said valved fitting 73 communicates with the annular chamber 66 thru a pipe 75. Said valve 74 thus controls passage of preheated air from jacket 70 to the mixing chamber 67.

For feeding unheated or fresh air to said mixing chamber 67, an aspirator 78 is provided with a spring pressed poppet valve 79 (similar to valves 56 and 74), communicat-

ing thru a pipe 82, with an annular chamber 80 surrounding the cylinder 65 and in turn communicating with the mixing chamber 67. A housing 84 (similar to housing 53*a*) may be provided for protecting the lower end of the valve 79. The air entering the flaring chamber 85 above said valve passes into the conduit 82 when the valve 79 unseats as will hereinafter be described. A butterfly valve 81 having an actuating handle 81*a* controls the passage of the air thru said conduit 82.

The operation of the device will now be clear. Preferably, the engine is started on gasoline, the valve 42 being actuated to cut off the passage of prepared hydrocarbon fuel to the conduit 41. The valve 44 may then be opened to permit gasoline to enter the tube 22. The motor may be turned over by any suitable starting means to produce a suction in the manifold 14. The reduction of pressure in the manifold (and consequently in chambers 67 and conduits 82 and 75) will automatically and simultaneously cause the poppet valves 56, 74 and 79 respectively to unseat, thus permitting the passage of gasoline from the tube 52, the preheated air from the jacket 70, and unheated air from the aspirator 78 to enter the mixing chamber 67 and flow thru the manifold to the intake openings 12 and 13 of the motor 10. When the pistons in the motor move upwardly on the compression stroke, the pressure in the manifold will automatically increase to force the poppet valves to automatically and simultaneously close against the pressure of their respective springs. In this manner, a smooth and continuous feeding operation of the atomized fuel is effected. As the motor is in operation, the exhaust gases passing thru pipe 26 to heat the chamber 32*a*. The hot exhaust gases thus serve to preheat the gasifying means 34 and also to heat the air entering the jacket 70. When the chamber 32 is sufficiently heated, the valve 42 may be open to permit the gasified hydrocarbons prepared in said mixing mechanism 34 to be fed to the carburetor. The valve 44 may then be closed to cut off the supply of gasoline to the carburetor, and the motor operated solely on the cheaper fuel oil.

It has been found that the manual valve 81 controls the operation of all of the three poppet valves 52, 74 and 79. Thus, upon turning the handle 81*a* to cut down the supply of fresh air from the aspirator, the operation of all three automatic valves is decreased to cut down the supply of fuel to the motor.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings, is to be interpreted as illustrative and not in a limiting sense.

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

1. In combination with a motor having a fuel intake opening, a mixing chamber communicating therewith, means for feeding gasified hydrocarbon to said chamber, means for feeding preheated air to said chamber and means for feeding unheated air to said chamber, and separate valves associated with each of said means adapted to open automatically upon reduction of pressure of said intake opening.

2. In combination with the manifold of an internal combustion engine, a mixing chamber communicating with said manifold, a tubular member opening into said chamber, a cylindrical wall about said tube forming an annular space communicating with said chamber, and a wall about said last named wall forming an annular space communicating with said chamber and means associated with said tube and spaces for automatically feeding fuel, preheated air and unheated air to said chamber.

3. In combination with the manifold of an internal combustion engine, a mixing chamber communicating with said manifold, a tubular member opening into said chamber, a cylindrical wall about said tube forming an annular space communicating with said chamber, and a wall about said last named wall forming an annular space communicating with said chamber and means associated with said tube and spaces for automatically and simultaneously feeding fuel, preheated air and unheated air to said chamber.

4. In combination with the manifold of an internal combustion engine, a mixing chamber communicating with said manifold, a tubular member opening into said chamber, a cylindrical wall about said member forming an annular space communicating with said chamber, a wall about said last named wall forming an annular space communicating with said chamber, a spring pressed poppet valve within said tubular member, conduits communicating with said annular spaces, and spring pressed valves within said conduits.

5. In combination with the manifold of an internal combustion engine, a mixing chamber communicating with said manifold, a tubular member opening into said chamber, a cylindrical wall about said member forming an annular space communicating with said chamber, a wall about said last named wall forming an annular space communicating with said chamber, a spring

pressed poppet valve within said tubular member, conduits communicating with said annular spaces and spring pressed valves within said conduits, all of said valves being arranged for simultaneous and automatic opening upon reducing the pressure in said manifold below a predetermined point.

6. In combination with the manifold of an internal combustion engine, a mixing chamber communicating with said manifold, a tubular member opening into said chamber, a cylindrical wall about said member forming an annular space communicating with said chamber, a wall about said last named wall forming an annular space communicating with said chamber, a spring pressed poppet valve within said tubular member, conduits within said annular spaces, spring pressed valves within said conduits, and means for feeding preheated air to one of said spaces, unheated air to another of said spaces, and manual means for selectively or simultaneously feeding gasoline and hydrocarbon fuel to said tubular member.

7. In combination, a motor having a manifold and exhaust pipes, means for feeding hydrocarbon fuel to said manifold, means for preheating said fuel, said means comprising a chamber attached to said exhaust pipe and a tubular member extending into said chamber, and thermostatic control means for said member.

8. In combination with the manifold of an internal combustion engine, a mixing chamber communicating with said manifold, a tubular member opening into said chamber, a cylindrical wall about said member forming an annular space communicating with said chamber, a wall about said last named wall forming an annular space communicating with said chamber, a spring pressed poppet valve within said tubular member, conduits communicating with said annular spaces, spring pressed valves within said conduits, and a manually controlled valve in one of said conduits.

9. In combination with the manifold of an internal combustion engine, a mixing chamber communicating with said manifold, a tubular member opening into said chamber, a cylindrical wall about said member forming an annular space communicating with said chamber, a spring pressed poppet valve within said tubular member, conduits communicating with said annular spaces, spring pressed valves within said conduits, all of said valves being arranged for simultaneous and automatic opening upon reducing the pressure in said manifold below a predetermined point, and manual means for controlling the action of said poppet valves.

10. In combination with a manifold of an internal combustion engine, a mixing chamber communicating with said manifold, a tubular member opening into said chamber, a cylindrical wall about said member forming an annular space communicating with said chamber, a wall about said last named wall forming an annular space communicating with said chamber, a spring pressed poppet valve within said tubular member, conduits within said annular spaces, spring pressed valves within said conduits, and means for feeding preheated air to one of said conduits, unheated air to another of said conduits and manual means for selectively or simultaneously feeding gasoline and hydrocarbon fuel to said tubular member, and a single means for manually controlling the action of said spring pressed valves.

11. In combination, a motor having manifold and exhaust pipes, an enlarged box adjacent said exhaust pipe, said box having an opening, means for feeding hydrocarbon fuel to said manifold, and means extending into said box thru said opening for preheating said fuel, said means comprising a tubular member having spaced inner and outer wall portions and a plate member having portions projecting into the space between said walls.

12. In combination, a motor having manifold and exhaust pipes, an enlarged box adjacent said exhaust pipe, said box having an opening, means for feeding hydrocarbon fuel to said manifold, means extending into said box thru said opening for preheating said fuel, said means comprising a tubular member having spaced inner and outer wall portions and a plate member having portions projecting into the space between said walls, and thermostatic control means for automatically maintaining the temperature in said box at a predetermined temperature.

13. In combination, a motor having manifold and exhaust pipes, an enlarged box adjacent said exhaust pipe having an opening, means for feeding hydrocarbon fuel to said manifold, and means extending into said box thru said opening for preheating said fuel, said means comprising a tubular member having spaced inner and outer cylindrical walls connected by a closure at one end, said inner wall having a closure at an end thereof opposite to said first mentioned end, and a plate contacting the closure for said inner wall and having portions projecting into the space between said cylindrical walls, said portions terminating short of said closure which contacts said walls.

14. In combination with the intake manifold of an internal combustion engine, a mixing chamber communicating with said manifold, means for feeding fuel to said chamber, means for feeding preheated air to said chamber, means for feeding unheated air to said chamber and a control valve operatively associated with each of said means, said control valves being adapted to automatically open upon reducing the pressure within said manifold below a predetermined point.

15. In combination with the intake manifold of an internal combustion engine, a mixing chamber communicating with said manifold, means for feeding fuel to said chamber, means for feeding preheated air to said chamber, means for feeding unheated air to said chamber and a control valve operatively associated with each of said means, said control valves being adapted to automatically open upon reducing the pressure within said manifold below a predetermined point, and a single manually operative means for controlling the action of said valves.

16. In combination with the intake manifold of an internal combustion engine, a carburetor having a mixing chamber communicating with said manifold, a passage adapted to receive preheated fuel communicating with said chamber, a passage adapted to receive unheated air communicating with said chamber, and valves within each of said passages adapted to open simultaneously and automatically upon reducing the pressure within said manifold above a predetermined point.

17. In combination with the intake manifold of an internal combustion engine, a mixing chamber communicating with said manifold, a tubular member opening into said chamber, a wall about said member forming a space communicating with said chamber, and a wall about said first named wall forming a space communicating with said chamber, and means associated with said member and spaces for automatically feeding fuel, preheated air and unheated air to said chamber.

18. In combination with the intake manifold of an internal combustion engine, a mixing chamber communicating with said manifold, a tubular member opening into said chamber, a wall about said member forming a space communicating with said chamber, a wall about said last named wall forming a space communicating with said chamber, a valve within said tubular member, conduits communicating with said spaces, and valves within said conduits, all of said valves being arranged for simultaneous and automatic opening upon reducing the pressure within said manifold below a predetermined point.

19. In combination with the manifold of an internal combustion engine, a mixing chamber communicating with said manifold, a tubular member opening into said chamber, a wall about said member forming an annular chamber, a wall about said last named wall forming an annular space communicating with said mixing chamber, a valve within said tubular member adapted to be unseated upon reduction of pressure within said manifold, and means for heating said annular chamber.

20. In combination with the manifold of an internal combustion engine, a mixing chamber communicating with said manifold, a tubular member opening into said chamber, a wall about said member forming an annular space communicating with said mixing chamber, a valve within said tubular member adapted to be unseated upon reduction of pressure within said manifold, means for gasifying fuel, conduit means for carrying said gasifying fuel to said tubular member, and means for feeding free air to said tubular space.

21. In combination, an internal combustion motor having an intake opening, a mixing chamber communicating with said opening, a tubular member communicating with said mixing chamber, a heating device, means for feeding fuel oil to said heating device for gasifying the same, conduit means for carrying said gasified fuel to said tubular member, a valve in said tubular member adapted to be unseated upon reduction of pressure within said mixing chamber, a one way check valve within said oil feeding means to prevent back flow therein, a pocket formed about said tubular member, an annular chamber about said pocket communicating with said mixing chamber, means for feeding free air to said annular chamber, and means for heating said pocket whereby said tubular member and said annular chamber are heated by said heated pocket.

22. In combination, an internal combustion motor having an intake opening, a mixing chamber communicating with said opening, a tubular member communicating with said mixing chamber, a heating device, means for feeding oil to said heating device for gasifying the same, conduit means for carrying said gasified fuel to said tubular member, a valve in said tubular member adapted to be unseated upon reduction of pressure within said mixing chamber, a one way check valve within said oil feeding means to prevent back flow therein, a pocket formed about said tubular member, an annular chamber about said pocket communicating with said mixing chamber, means for feeding free air to said annular chamber, means for heating said pocket, whereby said tubular member and said annular chamber are heated by said pocket, and a manually operable valve means for controlling the flow of free air to said annular chamber.

23. A retort for gasifying liquid fuel comprising an outer tubular member, and an inner tubular member, one end of said inner tubular member having an end closure, the other end of said inner tubular member being connected by a wall to said outer tubular member, and baffle members extending between said tubular members and terminating short of said wall connecting said inner and outer tubular members.

24. A retort for heating and gasifying liquid fuel comprising an outer tubular mem-

ber, an inner tubular member spaced therefrom and connected by a wall to said outer tubular member at one end thereof, the opposite end of said inner tubular member having an end wall, a transverse plate contacting said end wall and a pair of members extending from said plate into the chamber formed between said inner and outer tubular members on opposite sides thereof and terminating short of the wall connecting said inner and outer tubular members.

25. A retort for heating and gasifying liquid fuel comprising an outer tubular member, an inner tubular member spaced therefrom and connected by a wall to said outer tubular member at one end thereof, the opposite end of said inner tubular member having an end wall, a transverse plate contacting said end wall, a pair of members extending from said plate into the chamber formed between said inner and outer tubular members on opposite sides thereof and terminating short of the wall connecting said inner and outer tubular members, means for feeding liquid fuel to the chamber formed on one side of said plate, a mixing chamber, and means for feeding the gasified fuel to said mixing chamber communicating with the chamber formed on the opposite side of said plate.

26. In combination, an internal combustion motor having an intake opening, a mixing chamber communicating with said opening, means for automatically feeding gasified hydrocarbon fuel to said chamber, said means including a spring pressed valve adapted to be unseated during the intake stroke of said motor, means for feeding preheated air and unheated air to said chamber, and a separate manually operated valve associated with said last named means adapted to control the action of said spring pressed valve.

In testimony whereof I affix my signature.

CHARLES A. ROSIER.