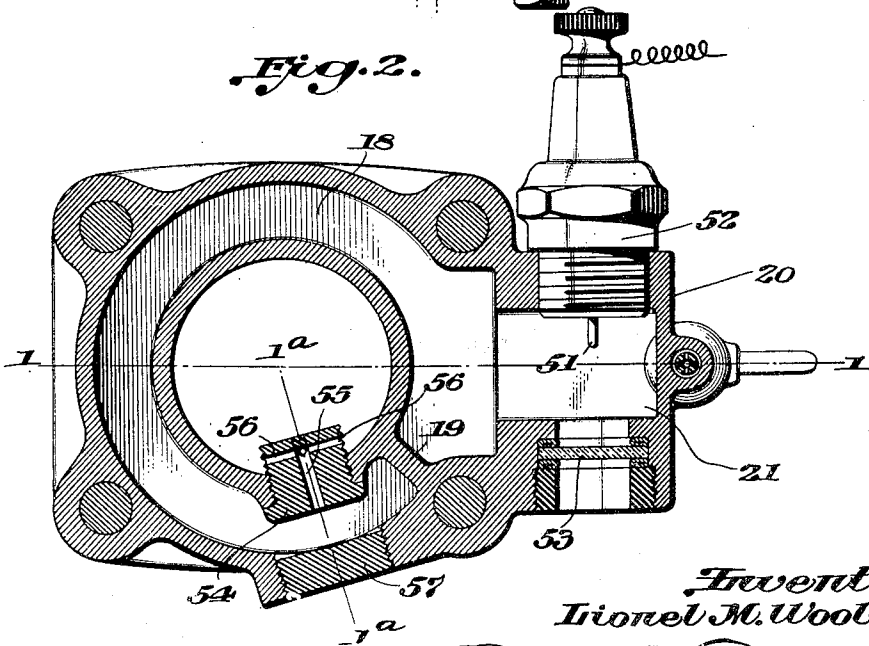
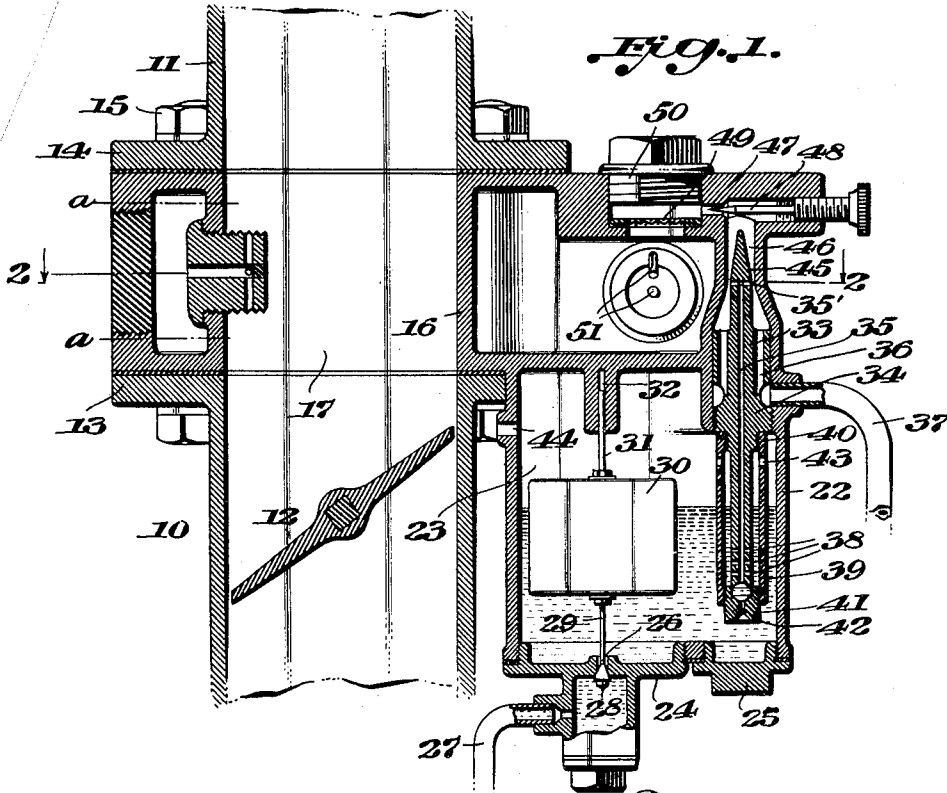


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L. M. WOOLSON
HYDROCARBON MOTOR

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UNITED STATES PATENT OFFICE

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HYDROCARBON MOTOR

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This invention relates to hydrocarbon motors and particularly to means for heating the mixture passing from the carburetor to the motor cylinders.

One of the objects of the present invention is to provide a particularly compact heater unit for connection to a motor intake pipe.

Another object of the invention is to provide a combustion heater unit in which the combustion chamber and carburetor and float chamber are closely associated.

Another object of the invention is to provide a combustion heater unit in which the carburetor is formed in the same casting as the combustion chamber itself.

Another object of the invention is to provide a combustion heater device which may be readily connected to two separated sections of a motor intake conduit.

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 motor intake conduit and combustion heater unit built in accordance with this invention, the section being taken on the line 1—1 of Figure 2, except the part thereof between the broken line *a—*a**, which is taken on the line 1^a—1^a of Figure 2; and

Figure 2 is a transverse section on the line 2—2 of Figure 1.

Referring to the drawings, 10 and 11 represent two sections of a motor intake conduit and 12 is a throttle valve arranged in the lower section. Without the heater unit hereinafter described, these sections may be connected together as by flanges 13 and 14 and bolts 15. In the use of the present invention, however, these sections are separated and arranged so that the heater unit may be clamped between them and form a part of the conduit.

The heater unit is indicated generally by the numeral 16 and it comprises, as shown in the drawings, a casting having several com-

partments. A part of this casting is formed to be connected between the flanges 13, 14 of the sections 10, 11 and to be connected to them as by the bolts 15 above referred to, and this part has a passage or conduit 17 passing directly therethrough, this passage coinciding with the interior of the sections 10, 11 so that it forms a connection between or a continuation of the passages in those sections.

Formed in the casting and surrounding the passage 17 is a combustion chamber 18 and a transverse wall 19 makes of this chamber an elongated passage surrounding the through passage 17.

The casting forming the unit 16 is formed with an extension 20 at one side and an extension of the chamber 18 is formed in this part of the casting, this part of the chamber being indicated at 21.

The unit 16 also has integrally formed therewith a part 22 which extends downwardly from the extension 20 and forms a float chamber 23. The bottom of the float chamber 23 has threaded-in covers 24 and 25 to permit of the insertion therein of parts hereinafter described. In the cover 24 is the inlet port 26 which is fed by a pipe 27 connected to a suitable source of liquid fuel, such as gasoline. The port 26 is controlled by a valve 28 upon the stem 29 of which is a float 30, which float has a guide rod 31 operating in a guiding slot 32 formed in the upper part of the chamber 23. From this construction it will be seen that the float 30 closes the valve 28 when the liquid in the chamber 23 has reached a predetermined level and of course it opens the valve 28 to admit more fuel through the port 26 when the liquid drops below that level.

Formed directly in the heater unit 16 is a carburetor 33 which is shown as of compensating form so that a rich mixture is provided for starting and a thinner mixture for continued operation.

This carburetor 33 comprises a main piece

34 having a through passage 35 therein and air passages 36, which latter passages communicate with a pipe 37 which brings air from any suitable source. The lower part of the piece 34 extends into the liquid in the float chamber 23 and is provided with a series of radially arranged inlet ports 38 near its lower end. A tube 39 surrounds the lower part of the piece 34, being threaded thereto as at 40, and a plug 41 closes the lower end of the tube 39 and bottoms against the lower end of the piece 34. The plug 41 has a restricted inlet opening 42 through which the liquid fuel may pass to the passage 35 and through the ports 38 to the interior of the tube 39. Said tube is provided with air ports 43 near its upper end, air being taken through these ports from the upper part of the float chamber 23 and said chamber being supplied with air through a port 44 shown at the left-hand side of said chamber.

The upper end of the piece 34 tapers as shown at 45 and is arranged in a passage 46 which communicates with air passages 36 above referred to. This end 45 also has lateral openings or ports 35' arranged at the most restricted part of the passage 46. The outlet of passage 46 is through the port 47, the size of which is controlled by a needle valve 48, and through a screen 49 to the part 21 of the combustion chamber 18. The screen 49 may be reached for cleaning or renewal by the removal of the plug 50 threaded into the casting.

Arranged within the combustion chamber 18 are the terminals 51 of an igniter 52, shown in the form of a spark plug, and opposite the igniter is an observation window 53 through which the operation of the heater may be seen.

At the opposite end, so to speak, of the elongated passage or combustion chamber 18, and consequently on the opposite side of the partition or wall 19, above referred to, is the outlet from said chamber into the passage 17. This outlet is formed by a plug 54 having a longitudinal passage 55 and transverse distribution passages 56 therein. A threaded plug 57 in the outer wall of the chamber 18 gives access to the plug 54.

In operation, the hydrocarbon motor is turned over by hand or by a suitable electric starting motor, which causes a depression in the conduit section 11 and consequently in the passage 17 and the chamber 18. This depression is communicated to the carburetor 33 which immediately draws the liquid from the tube 39 and mixes with it air drawn from the pipe 37. This is a comparatively rich mixture due to the fact that the gasoline may be drawn into the passage 35 from the tube 39 through the several ports 38. When the level of the liquid in the tube 39, however, drops below the ports 38 air is then drawn through said ports and through the ports 43

and the only liquid that can be supplied to the passage 35 is through the restricted port 42 in the plug 41. Thus the mixture is made less rich after the motor has started.

The mixture formed by the carburetor 33 passes through the port 47 and is broken up by the screen 49 and passes into the combustion chamber 18 where it is ignited by the igniter 52. The burnt gases are then drawn into the passage 17 through the plug 54 where they mingle with and heat the mixture passing from the main carburetor of the motor to the motor cylinders. Not only, therefore, is the mixture heated through the walls of the passage 17, but the hot burnt gases of the combustion heater themselves come in direct contact with the mixture and produce a much greater heating effect.

The compact arrangement of the combustion heater unit of this invention makes it particularly adaptable to motors that are already in service and for use on motors during part of the year only. For instance, it may be found desirable to use this heater unit in the winter time only and in that event it can be easily connected to and removed from the motor without disturbing any other parts of the motor.

Other advantages and uses may be found, and other forms may be made or devised, without departing from the spirit or scope of this invention.

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

1. A heater unit comprising a casting having a through passage therein for the mixture from the motor carburetor, a combustion space surrounding said passage, and a float chamber, and a carburetor arranged in and formed in part by said casting, said latter carburetor extending into said float chamber, and said casting having a passage from said latter carburetor to said combustion space.

2. A combustion heater comprising a casting having a passage therethrough for the motor intake mixture and a combustion chamber surrounding said passage, said casting having a transverse wall, means for supplying mixture to said combustion chamber adjacent one side of said wall, means for igniting the mixture in the combustion chamber near its point of entrance, and means forming a communication between said combustion chamber and said intake passage adjacent the opposite side of said wall so that the burned gases in the chamber are caused to pass entirely around the intake passage before entering said passage.

3. In a hydrocarbon motor, the combination with two separate sections of the intake conduit, of a heater unit connected to said sections and having a through passage in communication with said conduit, said heater unit also having an elongated passage sur-

rounding said through passage and forming
a combustion chamber, there being a port or
opening between said chamber and said
through passage near one end of said cham-
ber, whereby the burned gases in the chamber
are caused to pass entirely around the
through passage before entering it.

4. In combination with the intake mani-
fold of an internal combustion engine, a stove
in position to heat the manifold, and means
for supplying an automatically measured
quantity of liquid fuel to the stove.

In testimony whereof I affix my signature.

LIONEL M. WOOLSON.

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