

C. L. RAYFIELD.
 HEATER FOR CARBURETERS.
 APPLICATION FILED DEC. 26, 1917.

1,335,392.

Patented Mar. 30, 1920.
 2 SHEETS—SHEET 1.

Fig 1

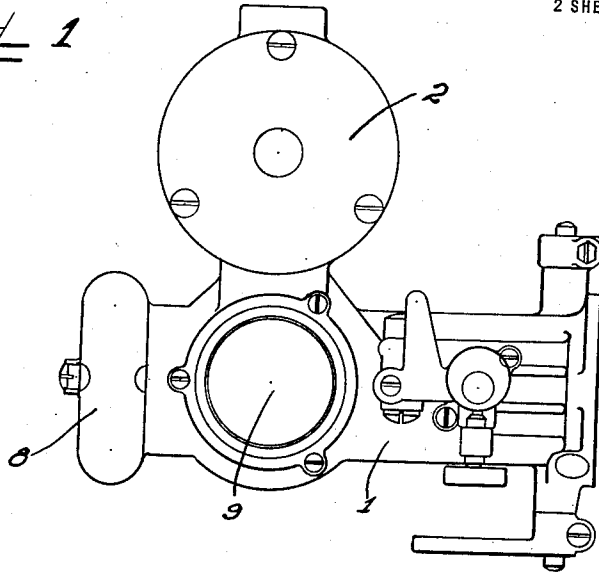
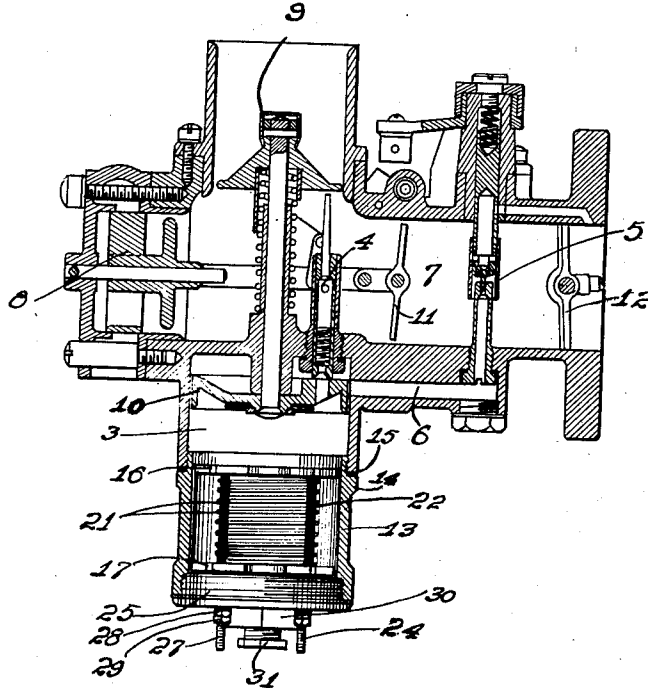


Fig 2



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2 SHEETS—SHEET 2.

Fig. 4

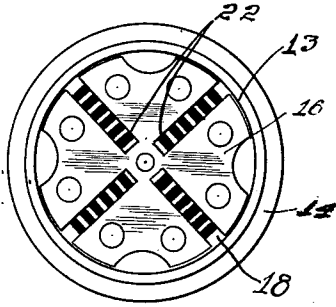


Fig. 5

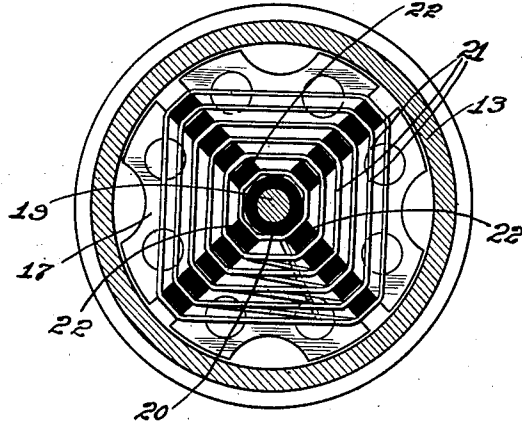


Fig. 6

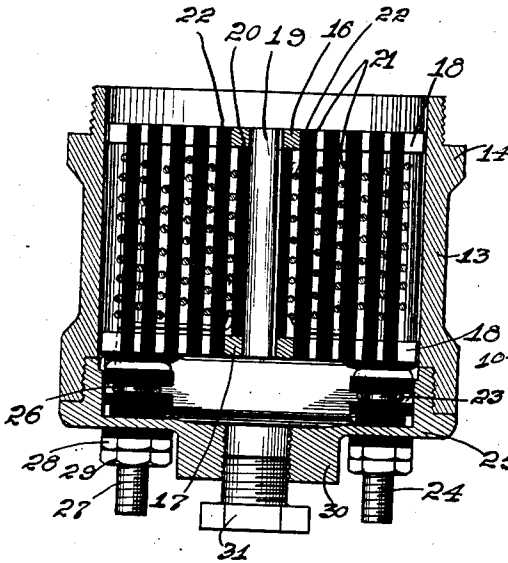
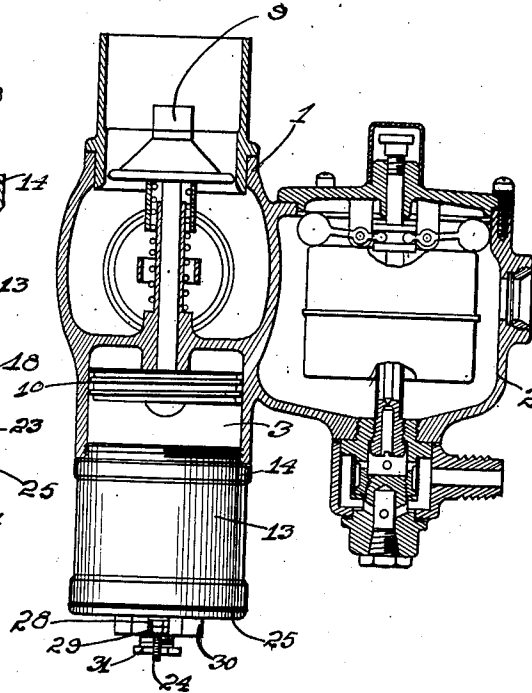


Fig. 3



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UNITED STATES PATENT OFFICE.

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HEATER FOR CARBURETERS.

1,335,392.

Specification of Letters Patent. Patented Mar. 30, 1920.

Application filed December 26, 1917. Serial No. 208,904.

To all whom it may concern:

Be it known that I, CHARLES L. RAYFIELD, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Heaters for Carbureters; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form part of this specification.

Owing to the poor quality of hydro-carbon fuels for internal combustion engines sold under the name of gasoline, great difficulty is often experienced in starting the engine owing to the poor volatilization of the fuel. This is especially so in cold weather, for while in warm weather the atmospheric temperature is such as to permit ready volatilization of the fuel into a gas, yet in cold weather this is not the case, and the result is that an enormous amount of trouble is experienced by the aggregate users of automobiles and other devices using hydro-carbon engines.

It is an object of my invention to provide a heater which may be attached to any carbureter for the purpose of heating the hydro-carbon fuel to a sufficiently high temperature to insure rapid and ready volatilization thereof.

It is further an object of my invention to provide a heating device for raising the temperature of the fuel in a carbureter to such a temperature that the liquid fuel will readily and rapidly volatilize into a gas, but in which there is no danger of heating the fuel to such a high temperature as will cause danger from explosion of the fuel or gas.

It is further an object of my invention to provide a heating device for hydro-carbon liquids in which the hydro-carbon liquid may circulate through the device or may be heated by convection.

Other and further important objects of the invention will be apparent from the disclosure in the drawings and specification.

The invention (in a preferred form) is

illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 illustrates a top plan view of a carbureter to which is attached a heater embodying my invention.

Fig. 2 is a sectional view of the carbureter shown in Fig. 1, showing the heating device embodying my invention attached thereto.

Fig. 3 is a sectional view of the carbureter taken at right angles to Fig. 2, showing the device in elevation.

Fig. 4 is a top plan view of the heater.

Fig. 5 is an enlarged transverse section taken any place through the heater between two rows of resistance coils.

Fig. 6 is a vertical section taken through the heater.

As shown on the drawings:

The heater is a complete unit and may be attached to any carbureter. For the purpose of illustration, however, I have shown the same attached to the carbureter shown in my pending application for patent, filed Dec. 16, 1916, Serial No. 137,372.

As the detailed construction of the carbureter forms no part of this invention, only a very brief description thereof will be given.

The reference numeral 1, indicates the carbureter as a whole, 2, indicates the float chamber, 3, indicates a piston or dash pot chamber which communicates with the float chamber, having a fuel nozzle 4, and a fuel nozzle 5, opening from a passage 6. These nozzles open into a mixing chamber 7. Automatic air valves 8—9, open into the mixing chamber which are controlled by the suction of the engine, and air valve 9, is connected with a piston 10, to pump fuel through the nozzles. A throttle valve 11, is connected to move with the air valves, and a throttle valve 12, is controlled from the dash board of the automobile. This, it is believed, is sufficient description of the carbureter, as the heater is constructed to be attached to any suitable type of carbureter.

Numerals 13, indicates the heater casing which is shown as cylindrical and contains the heater. Said casing has its upper end

threaded to thread into the lower end of the piston chamber 3, and a flange or shoulder 14, is provided between which and the lower end of the piston chamber, a packing 15, is inserted to insure a fluid tight joint.

The heater comprises upper and lower spiders 16—17, which have radially disposed slots 18, and a stem 19, rigidly connects said spiders together. Engaged on the stem 19, is an insulating sleeve 20, around which the first lap of a resistance coil 21, is wound after which insulating bars 22, one for each slot is inserted in the slots to lie against the first winding of the resistance coil. The winding is then carried around this set of insulating bars or members after which another set of insulation members are used and another winding, and so on, until a resistance coil of the required capacity is built up.

One end 23, of the resistance coil is attached to a binding post or terminal 24, which terminal projects through a cap member 25, and is insulated therefrom by suitable insulation washers or members. The opposite end 26, of the resistance coil is secured to a terminal or binding post 27, and also projects through the cap 25. Each terminal member 24—27 has clamping nuts 28—29, between which the supply wires are engaged. The binding posts are insulated from the spider 17.

The cap member 25, is threaded into the lower end of the heater and is provided with a central boss 30, in which may be threaded a drain cock for draining off impurities and water, but a plug 31, is shown threaded therein.

The operation is as follows:

In operation, the heating unit is attached to the carbureter, in this instance, it is shown as attached to the piston chamber, but in other types of carbureters, may be attached to the float chamber and the feed of hydro-carbon fuel may pass through the boss 30, directly into the heater and then into the float chamber or the device may be attached in any manner so that the hydro-carbon fluid may be heated by the device.

In whatever place or position attached, the feed or supply wire from the dry cells, storage battery or generator is attached to one binding post 24 or 27, and the return wire from the other terminal is grounded or connected with the source depending, of course, upon the system of ignition used.

The heat generated by the resistance coil or heater, heats the fuel, raising the temperature to that degree which is most desirable for ready and rapid volatilization, but not, sufficiently to cause any danger from explosion.

The warmer gasoline rises to the top following the laws of heated liquids and is adjacent the nozzles to be sprayed or discharged therethrough in gaseous form ready

to commingle and mix with the air to provide the combustible mixture. This mixing operation being common to all carbureters, and the throttling action and control being well understood, it is not gone into at this time.

The resistance coil, of course, may be built to the size and constructed of such material as to supply just the exact amount of heating effect to the liquid to obtain the desired degree of volatilization thereof for cool or cold weather. The advantages of this are obvious as the heater is started in operation prior to starting the car by simply turning a switch which closes a circuit from the battery to heat the coil and liquid. The liquid being warmed readily volatilizes and the engine can be started instantly instead of wearing the starter out in continuously cranking the same which may eventually start the engine or may not. Heretofore hot water was frequently used to heat the cylinders or carbureter before the engine could be started.

Many changes may be made and details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting my application for patent otherwise than necessitated by the prior art.

I claim as my invention:

1. A carbureter heater comprising a liquid tight casing containing a pair of radially slotted spaced spiders insulated therefrom, a plurality of concentric connected resistance coils between the spiders, and a plurality of spaced insulating bars supported in the slots in the spiders for insulating the coils from each other and from the spider.

2. The combination with a carbureter provided with the usual fuel and mixing chambers and fuel supply pipe, of a detachable liquid tight casing forming an extension of the fuel chamber, a detachable cover for the casing, an electric heating element supported in and insulated from the casing, insulated terminals for the heating element on the detachable cover, an apertured internally threaded boss adapted to receive the fuel supply pipe, and removable means for closing said apertured boss when the fuel supply pipe is connected at another place.

3. The combination with a carbureter having a mixing chamber and a fuel chamber, of a detachable casing affording an extension of said chamber, liquid tight means for connecting the casing with said chamber, a fuel nozzle at the upper end of said chamber discharging into the mixing chamber, and an electrical heating element in the detachable casing below the point of entrance of fuel into the nozzle.

4. The combination with a carbureter
having a mixing chamber and a fuel cham-
ber having a plunger for injecting fuel into
the mixing chamber, a detachable exten-
5 sion for the fuel chamber, and a heating
coil arranged therein so as to heat the fuel
forced by the plunger into the mixing
chamber.

In testimony whereof I have hereunto
subscribed my name in the presence of two 10
subscribing witnesses.

CHARLES L. RAYFIELD.

Witnesses:

FRANK A. BREMER, Jr.,
FRED E. PAESLER.