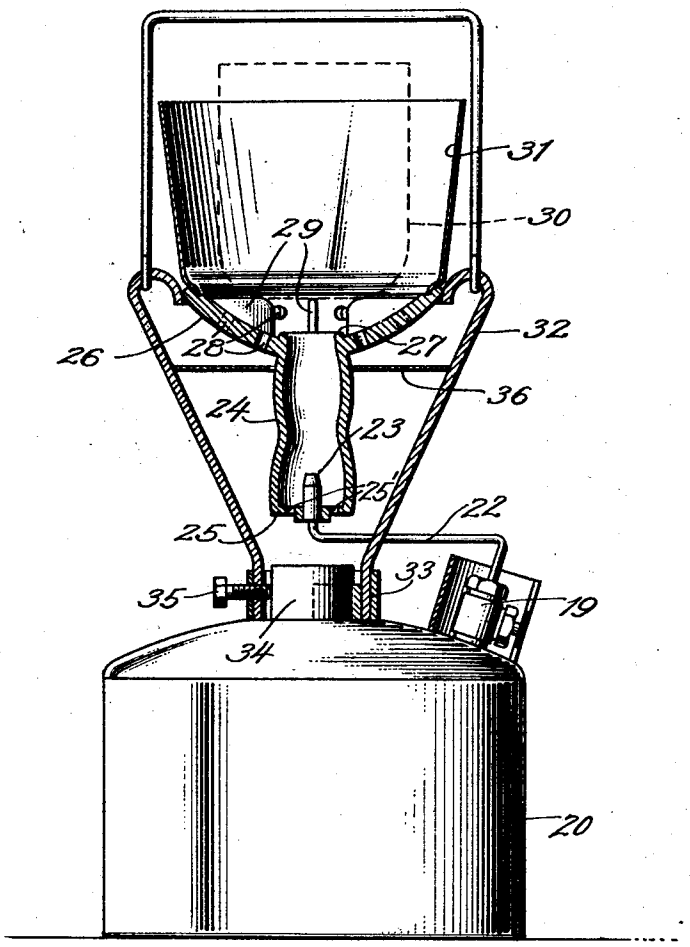
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APPARATUS FOR GENERATING HEAT

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## APPARATUS FOR GENERATING HEAT

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This invention relates to a method of and apparatus for generating heat, and particularly pertains to a plumber's furnace.

At the present time most plumbers' furnaces of the portable type are provided with a gasoline tank into which gasoline or some other similar commodity is placed, and within which the liquid is compressed by the use of a pump. Such structures are associated with a suitable generating burner which causes the compressed liquid to gasify and produce combustion when ignited. Such structures require frequent filling in order to insure proper continuous performance, and are otherwise objectionable in view of the necessity for maintaining the fuel pressure by a hand pump. These structures also make it necessary to lose considerable time waiting for proper generation to take place within the burner.

It is the principal object of the present invention to provide a plumber's furnace which is provided with a detachable tank carrying a fuel, this fuel preferably being in the form of a petroleum product of relatively high vapor tension maintained at a pressure which will cause it to vaporize and create a desired pressure within the tank, sufficient to cause the gaseous product to be projected from the tank through a jet in a manner satisfactory for the proper combustion of the gas and proper heat.

The present invention contemplates that the burner structure shall be detachable and interchangeable upon the fuel tanks, thus making it possible for the filled fuel tanks to be supplied as a part of a regular fuel service, as the empty tanks may be detached from the burner and returned for filling.

The present invention contemplates the provision of a burner structure suitably mounted upon a liquid and gaseous fuel container, and which structure embodies means by which it may be detachably secured upon the container, and also means for baffling and protecting the container from excessive heat generated in the burner.

The invention is illustrated by way of example in the accompanying drawing in which:—

The figure is a view in central vertical section through the complete burner, and shows the arrangement of the burner and the manner in which it is mounted upon the tank.

As has been stated hereinbefore the device of this invention is particularly adapted to employ a hydrocarbon fuel capable of vaporizing when released under pressure. This fuel in the present case is obtained from hydrocarbons of the homologous series at a point between that of propane $C_3H_8$ and butane $C_4H_{10}$ and may include these hydrocarbons, and has a formula of the order of $C_4H_9$. It has been found that the vapor tension at one hundred degrees pressure is approximately 74 pounds, and that the boiling point is 17 degrees F.

The filled containers 20 are fitted with a valve 19 by which the control of gas from the container may be established. A pipe 22 leads to a burner jet 23. This jet extends upwardly into the throat of a venturi 24. The venturi has a substantially closed lower end wall 25 through which air openings 25′ are formed. These openings are arranged in a circular row around the jet 23, and their areas are so proportioned with relation to the area of the Venturi throat as to insure proper mixture of the gas and air with a desirable resulting combustion. The upper end of the Venturi casting 24 is formed integral with a combustion bowl 26. This bowl is relatively large in diameter and is separated from the mouth of the venturi by an upwardly extending lip 27 to prevent extraneous matter from flowing into and clogging the venturi. A plurality of air holes 28 is formed through the wall of the bowl to provide air for combustion.

Mounted within the bowl and formed as a part thereof are fins 29 which may support a ladle, indicated by dotted lines at 30. A removable apron 31 is positioned upon the lip of the bowl and tends to confine the heat around the ladle. The bowl and the burner are supported by uprights 32. These uprights extend downwardly and are secured within a collar 33, which collar is detachably secured around an upwardly extending fitting 34. This fitting is secured to the top

of the tank and is merely provided as an attachment fitting for the burner. A set screw 35 extends through the wall of the collar, and may be tightened to insure that the burner structure will be temporarily fixed with relation to the collar and the container 20.

In operation of the present invention, it has been found that the heat generated by the burner is of great advantage in accelerating the vaporization of the gaseous and liquid fuels within the container 20, and to protect the liquid from freezing, since it has a relatively low boiling point. Under some circumstances, however, this heat may be very intense, and in order to equalize the temperatures of the radiant heat as received by the container 20 a baffle disc 36 is provided. This disc is disposed below the burner bowl 26 and above the container, as clearly shown in the drawing.

In the operation of the present invention, iso-butane or a fuel having similar characteristics, is employed. The pressure initially within the container during the time it is being filled, will be approximately 165 pounds.

The air entrapped within the container during filling is drawn out until the pressure indicated upon the gauge 39 is of the order of 70 pounds. At a pressure of 70 pounds the vapor tension of the liquid will be sufficiently great to insure vaporization of the liquid and a resultant gasification thereof. This gas will create a pressure within the tank sufficient to cause it to be projected from the tank and under control through the burner nozzle.

It is to be understood that the containers 20 are to be filled at a plant, and that they are to be interchanged for empty containers at the place of use by the customer. The containers will, therefore, be called for and returned, and will be separately adjusted to the burner structure which is adapted to be mounted upon them.

After a container has been properly filled, as previously described, it is delivered to the user who attaches the burner by mounting it upon the fixture 34 and fastening it into position by the set screw. After making connection to the valve the burner is then ready for use, and may be used by opening the valve 19 and igniting the gas which will project upwardly through the Venturi casting 24 and commingles with a pre-determined proportion of air as it reaches the burner bowl 26.

It will be understod that in order to insure proper combustion the size and number of holes 25 in the end of the Venturi fitting, as well as the combined area of the holes 28 in the burner bowl will be accurately determined to provide a proper mixture of air and gas for combustion.

It will thus be seen that by the use of a particular gas, here set forth, within a container, and by the method of filling the container, as well as the particular burner construction, it is possible to provide a plumber's furnace which is of great efficiency, may operate without the use of auxiliary pressure means, and will tend to operate continuously for a long period of time before the pressure and combustion properties of the gas have been exhausted.

While I have shown the preferred form of my invention as now known to me, it will be understood that various changes might be made in the combination, construction and arrangement of all parts without departing from the spirit of the invention as claimed.

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

1. A plumber's furnace comprising a fuel tank, a burner disposed thereover, said burner including a vertical venturi, the discharge end of which is surrounded by a combustion bowl, a conduit leading from the lower end of the burner to the tank and detachably connected therewith, a valve for closing the tank when the conduit is disconnected and for regulating the flow of fuel therethrough, a projecting element on the tank, an embracing element carried by the burner and adapted to fit over said projecting element, and means for detachably fastening said elements together whereby fuel tanks may be interchanged upon the burner.

2. A plumber's furnace comprising a tank for fuel, a fitting extending from said tank, a collar provided with upright members extending from said collar, means for detachably attaching said collar to said fitting, a combustion bowl supported by said uprights above said fuel tank in heat-radiating relation thereto, a mixing chamber in the form of a Venturi tube directed into said bowl, a ported spider in the lower end of said venturi, a fuel nozzle positioned axially of said ported spider and directed into said venturi, and a valved gas feed tube connecting said fuel nozzle and said tank at a point above the level of the liquid therein.

3. A plumber's furnace comprising a tank for fuel, a fitting extending from said tank, a collar detachably attached to said tank, upright members extending from said collar, a combustion bowl supported by said uprights, a mixing chamber in the form of a Venturi tube directed into said bowl, a ported spider in the lower end of said venturi, a fuel nozzle positioned axially of said ported spider and directed into said venturi, a valved outlet communicating with the upper portion of said fuel tank, and a feed tube connecting said valved outlet with said fuel nozzle.

4. A furnace comprising a fuel tank, a collar on the top of said tank, a burner supporting structure detachably secured to said

collar, a concaved combustion chamber secured in the top of said burner supporting structure, fins in said combustion chamber to support an object to be heated, a fuel mixing chamber in the form of a Venturi tube extending downwardly from said combustion chamber, an annular flange in said combustion chamber to prevent extraneous matter from entering said mixing chamber, a fuel tip in the bottom of said Venturi tube, a plurality of air ports surrounding said tip, a valved pipe to convey fuel from said tank to said fuel tip and a guard resting in an annular recess in said concaved combustion chamber to keep winds from said combustion chamber.

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