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FUEL VAPORIZER

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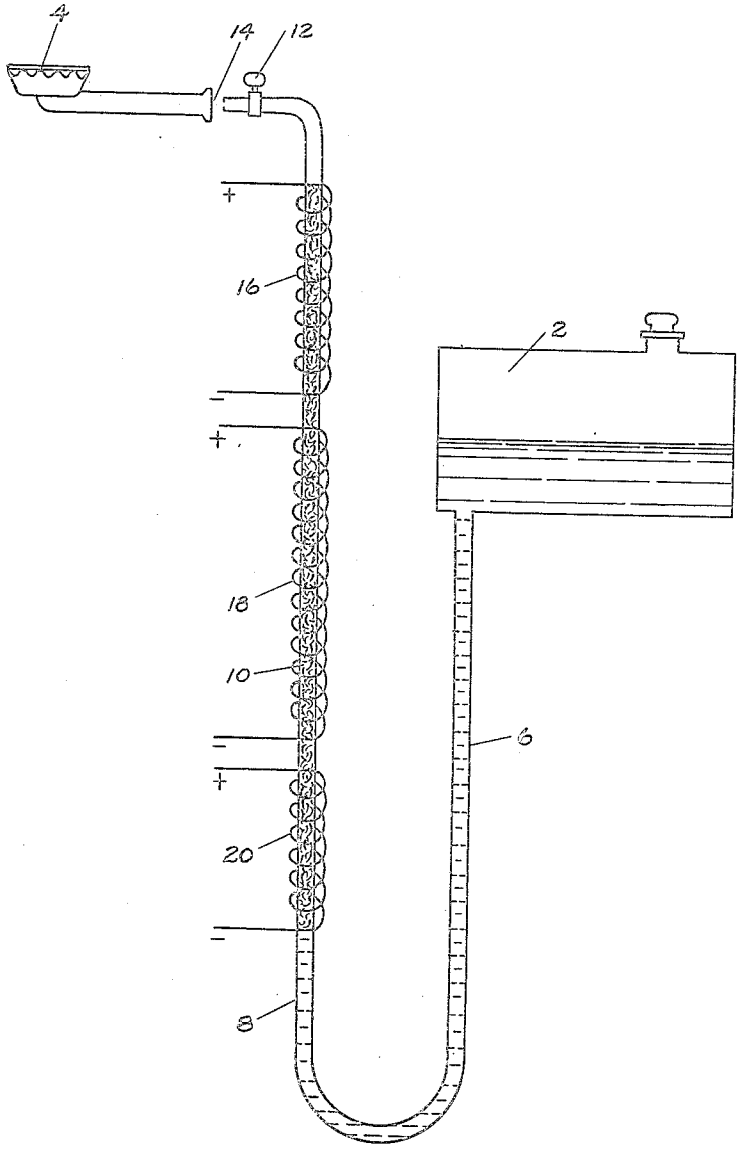


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## FUEL VAPORIZER

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1 Claim. (Cl. 219—39)

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This invention relates to the vaporization of liquid fuels which are to be burned in ovens, heaters, or other heating apparatus.

In present heating devices, such as stoves or hot water heaters using a liquid fuel, the fuel is vaporized at the point of use by the heat of the flame which is produced. The fuel is fed to the burner by means of a pump, or by means of air pressure supplied to the fuel tank. In some instances, the fuel feed is obtained by gravity flow from the fuel tank to the burner, the fuel tank thus being mounted higher than the burner. In these devices, the pressure on the liquid fuel is constant and independent of the existence of the flame, so that if the flame is accidentally extinguished, the pressure will continue and fluid will be discharged through the orifices of the burner. Assuming that the flame is accidentally extinguished, only a temporary gasification of the liquid will take place due to the residual heat in the burner, but as soon as the burner cools, which will take place rather rapidly, liquid will be discharged from the burner. This is a very serious fault in known heaters because it sets up a condition from which a violent explosion is likely to result. Again, an excess pressure in the fuel feed might cause the flame to be extinguished and the injection of partially gasified fluid through the burner will create an explosive condition.

It is an object of the instant invention to produce a heating apparatus in which liquid fuel is vaporized and passed to the burner under predetermined pressure conditions. Another object of the invention is to produce a heater in which it is impossible to pass the liquid fuel to the burner without first being vaporized.

Generally, these objects are obtained by mounting the fuel tank at a lower level than the burner, and providing auxiliary heating means so that the liquid fuel is vaporized in the pipe leading from the fuel tank to the burner, only vaporized fuel reaching the burner by this means. A filling is provided in the pipe through which the liquid fuel penetrates partially by capillary action, and from which the vaporized fuel can escape, this filling material serving the dual purpose of providing a steady flow of vaporized fuel and preventing surges in the pipeline.

The means by which the objects of the invention are obtained are more fully described with reference to the accompanying drawing, which diagrammatically illustrates one form of the invention.

The fuel tank 2 is connected to a burner 4 by

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a U-shaped pipe 6, it being noted than tank 2 is at a lower level than burner 4. The vertically rising portion 8 of pipe 6 is partially filled with a porous material 10 such as asbestos fibers. At the top of this section of the pipe, a valve 12 is provided for regulating the flow of gas from the pipe, the gas being mixed with air, or carburated as indicated by the air gap 14 between the pipe and the throat of the burner 4.

Enclosing the section 8 of the pipe are a series of electrical resistance heating coils 16, 18, and 20, these coils being connected to any conventional source of electricity.

The operation of the apparatus is as follows: Liquid fuel is placed in the tank 2, the fuel flowing through pipe 6 into the vertical section 8, where it penetrates the porous material 10 and passes a substantial distance therethrough under hydrostatic pressure. Liquid fuel as such, however, will not rise above the liquid level in tank 2, except as such additional rising as occurs under the capillary action. Valve 12 is closed, and the electric current applied to resistances 16, 18 and 20, the heat from the same causing the liquid fuel to become vaporized. The gas thus formed accumulates in the upper portion of the pipe, and as the gas continues to be generated, the increasing pressure causes a displacement of the liquid fuel toward the bottom of pipe 8. Consequently, the gas in pipe 8 is subject to the hydrostatic pressure of the liquid fuel from tank 2, as well as being under the expansive pressure caused by the heating of the gas. When burner 4 is to be lit, valve 12 is opened, the gas mixed with air at 14 and passed to the burner.

The degree of heating of the fuel depends of course upon the kind of fuel being used. A range of heating can be obtained by selectively using one or a plurality of the resistances 16, 18 and 20. Again, the rate of vaporization can be regulated by employing a greater number of resistances when, for example, it is desired to increase the rate of flow of the gas to the burner 4.

When the heating by the resistances is stopped, vaporization stops, and the liquid in pipe 8 can rise substantially no higher than the liquid level in tank 2, the danger of liquid fuel being accidentally discharged onto a hot burner being nonexistent.

The material 10 facilitates the rise of liquid by means of capillary action and smooths the rate of the vaporization of the liquid fuel, this is turn giving a greater steadiness of the flame at the burner. Material 10 also prevents any pulsing, or surging of the liquid in the pipe such

as might be occasioned by localized overheating and would result in the splitting of liquid fuel into the upper portion of the pipe.

Having now described the means by which the objects of the invention are obtained.

I claim:

In a liquid fuel feeding and vaporizing system including a fuel tank, a burner mounted at a higher elevation than said tank, and means for conveying fuel from said tank to said burner while vaporizing the same, the improvement in said fuel conveying means comprising a tube in communication with and having a portion descending from said tank to an elbow at a lower level than said tank, and then a portion ascending from said elbow and spaced from and independent of said tank to a point above said tank, and thence a horizontal portion in communication with said burner, a valve mounted in said horizontal portion, and electrical heating resistances mounted on said ascending portion whereby fluid is heated in the ascending portion of said tube without causing thermal disturbances in the fluid in said tank and descending portion of said tube, and the gas pressure in said ascending portion is regulatable by said valve.



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