May 26, 1931. J. E. McCUTCHEN 1,806,636

THERMOSTATIC CUT-OFF

Filed Sept. 6, 1927

Fig 2

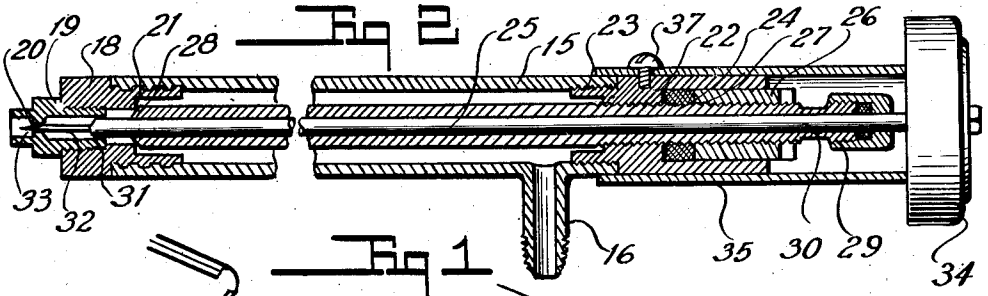


Fig 1

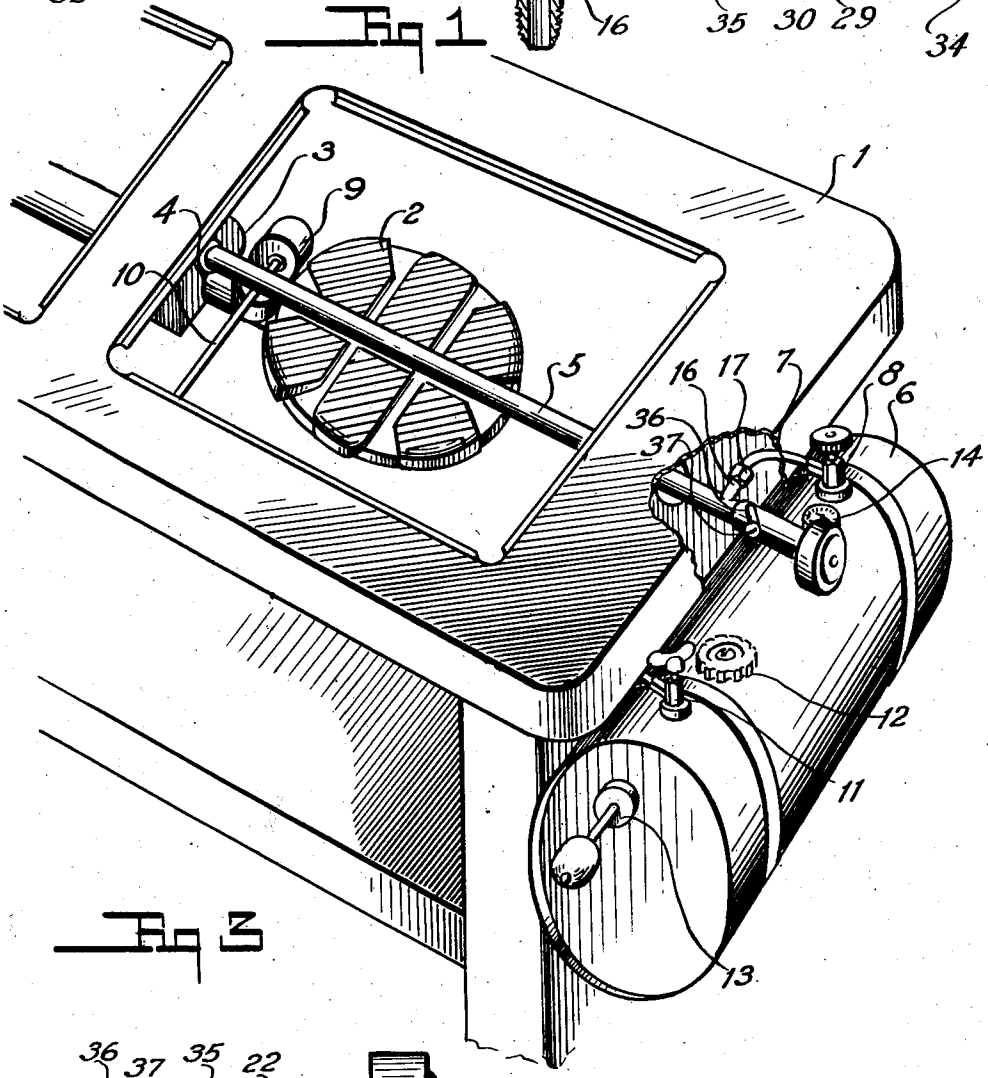
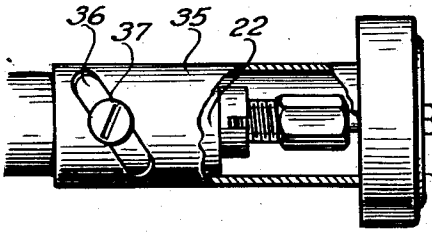


Fig 3



INVENTOR
John E. McCutchen
BY
B. F. Funk
ATTORNEY

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UNITED STATES PATENT OFFICE

JOHN E. McCUTCHEN, OF WICHITA, KANSAS, ASSIGNOR TO COLEMAN LAMP AND STOVE CO., OF WICHITA, KANSAS, A CORPORATION OF KANSAS

THERMOSTATIC CUT-OFF

Application filed September 6, 1927. Serial No. 217,559.

This invention relates to hydrocarbon fuel burners and the primary object is to provide a burner arrangement in which the passage of fuel through the generator will be thermostatically controlled. In other words, fuel will not be permitted to flow to the burner or burners until the generator is hot enough to generate the liquid fuel into gaseous fuel and whenever the generator has reached a temperature below that required to vaporize the liquid fuel, the passage-way to the burners will automatically close. In addition to the thermostatically controlled valve, I may employ a regulating or needle valve so that the flow of fuel from the generator to the burners may be controlled. With the arrangement just referred to liability of the burners flooding, while the control valve is open, will be prevented. In other words, the thermostatically controlled safety valve will shut off the supply to the burners whenever the generator is below vaporizing temperature as it would be when the burner was not consuming fuel. This arrangement I believe to be new in connection with hydrocarbon or liquid fuel consuming stoves and it is a very important feature in connection with stoves using gasoline under pressure.

In order to understand the invention reference should be had to the accompanying drawings in which:

Fig. 1 is a perspective view of one end of a stove to which my invention is applied.

Fig. 2 is a longitudnal sectional view through the generator and

Fig. 3 is a elevational view of the controlling end of the generator showing parts broken away.

Referring now to the drawings by numerals of reference, 1 designates the frame of a stove which may have a burner 2 fed from a mixing chamber 3 and a manifold in the usual way.

The generator which constitutes the important part of my invention is indicated at 5 and it discharges into the mixing chamber, being supplied from a fuel pressure tank 6 through a medium of a pipe 7 controlled by a valve 8 in a well understood manner. Beneath the generator is a priming cup 9 which is supplied from the tank 6 through the medium of a pipe 10 controlled by a valve 11. The tank 6 may be filled through an opening controlled by a plug or closure 12 and pressure may be supplied to the tank by any convenient method, a "built-in" pump 13 being shown. A pressure gage 14 may, also, be connected to the tank.

All of the structure thus far described, except the novel construction of the generator and its generic co-relation with complementary parts, is old and as heretofore explained, it is important for the purposes of safety that when the generator is cold the supply of hydro-carbon fuel will be cut off and that it will be necessary to heat the generator before liquid hydro-carbon, either in the liquid phase or the gaseous phase, may be delivered to the mixing chamber. With this in mind, it will be apparent that primarily it is the thermostatic controlled supply valve which constitutes my invention and of course, the invention also contemplates such novel structures and arrangements of parts as make such an invention commercially practicable.

The generator is shown as comprising a cylinder or tube. The tube 15 constitutes a chamber or reservoir into which the liquid fuel is admitted from the pipe 7. The pipe 7 is connected to the tube 15 through the medium of a nipple 16 and a coupling nut 17 in a well understood manner. One end of the tube 15 is closed by a nipple 18 and a valve seat forming plug 19. The plug 19 has a small orifice 20 to receive a needle valve to be hereinafter referred to. The nipple 18 has a valve seat 21. At the opposite end of the tube 15 is a packing gland 22 which constitutes a plug closure for the end of the tube 15. There is a screw connection 23 between the gland and the tube 15. Threaded in the central orifice 24 of the gland is a valve stem 25 which has threaded connections with a packing nut 26 to exert pressure against the packing 27 surrounding the threaded portion of the valve stem 25 in rear of the main body portion of the gland. At one end of the valve stem 25 is a fuel controlling valve 28 normally seated on the seat 21. On

the opposite end of the stem 25 is a packing gland 29 through which a regulating valve stem 30 passes. The regulating valve stem 30 is adapted to move in the recess 31 in the plug 19 and it carries a needle valve 32 having a tapered end 33 passing through the orifice 20 so as to effect regulation of the fuel passing through the orifice 20 into the mixing chamber.

Fixed on the end of the stem 30, distant from the needle valve, is a hand wheel 34. The hand wheel 34 carries a sleeve 35 with a cam slot 36 in it through which passes a pin or screw 37 fixed to the gland or block 22. Consequently, when the hand wheel 34 is turned in a clockwise direction, the needle valve will be projected through the orifice. When it is turned in a reverse direction, the needle will be withdrawn, at least partially from the orifice, so that regulation can take place in a manner common to needle valve construction.

The generator is shown as lying over the burner 2 and in juxtaposition to the priming cup. In the drawings, a priming cup is immediately beneath the generator.

Assuming all parts to be properly assembled with the gasoline tank 6 supplied with pressure, the generator will first open the valve 11 to allow fuel to enter the priming cup 9. If the priming cup used is of the hot blast type, the valve will be left open long enough for the generator to become hot. If the priming pan is of the ordinary cup type, a small amount of gasoline or other volatile liquid will be supplied to the priming device and ignited. When the shell of the generator (that is the tube 15) becomes heated, it will "grow" or expand longitudinally. This will cause the seat 21 to move away from the valve end 28. If the valve 8 has been previously opened, the fuel in the form of vapor will pass through the orifice 20 into the mixing chamber and then to the burner. When the burner is lighted, the heat therefrom will keep the tube 15 expanded so that there may be a continuous flow of fuel through the generator, so long as the generator is maintained at a predetermined temperature. The regulation of the burner may be controlled from the hand wheel 34. Should the burner not function on account of being snuffed out or blown out, the generator tube 15 will immediately contract and since the valve stem 25 is rigidly attached to one end, it is obvious that the valve 28 will seat on the seat 21 automatically closing off communication between the source of supply and the source of consumption.

From the foregoing it will be apparent that whenever the temperature of the generator is below a predetermined point, the supply of fuel from the tank to the burner will be cut off and whenever it is above that point, the passage-way from the tank to the burner will be opened. Therefore, perfect thermostatic control of the fuel supply will be insured.

Obviously, the metal of which the outside casing or tube is composed will have a different co-efficient of expansion than that of the valve stem. In actual practice, I prefer to cause the outside tubular member to expand more than the inside member but the particular member which has the greater expansibility will be determined by the interior construction of the generator.

What I claim and desire to secure by Letters-Patent is:—

1. A vaporizing generator for hydrocarbon fuels having two primary members, namely, an outer casing having an inlet and an outlet, and a hollow valve stem longitudinally disposed within the outer casing having a valve for closing off the outlet, the primary members differing one from the other in rate of expansion and contraction at varying temperatures so that the valve will close off the outlet at low temperature and open it at high temperature and a manually operable valve stem within the hollow valve stem having a valve at one end to vary the effective port area of a constricted discharge opening in the outer casing.

2. A vaporizing generator for hydrocarbon fuels having two primary members, namely, an outer casing having an inlet and an outlet, and a hollow valve stem longitudinally disposed within the outer casing having a valve for closing off the outlet, the primary members differing one from the other in rate of expansion and contraction at varying temperatures so that the valve will close off the outlet at low temperature and open it at high temperature, a manually operable valve stem within the hollow valve stem having a valve at one end to vary the effective port area of a constricted discharge opening in the outer casing, a sleeve on the last named valve stem surrounding the outer casing having a cam slot and a projection carried by the outer casing projecting into the slot to limit the rotative movement of the sleeve.

In testimony whereof I affix my signature.

JOHN E. McCUTCHEN.