Oct. 15, 1929. L. I. ALDRICH 1,731,806

FUEL ATOMIZER

Filed July 5, 1924 2 Sheets-Sheet 1

Fig. 1.

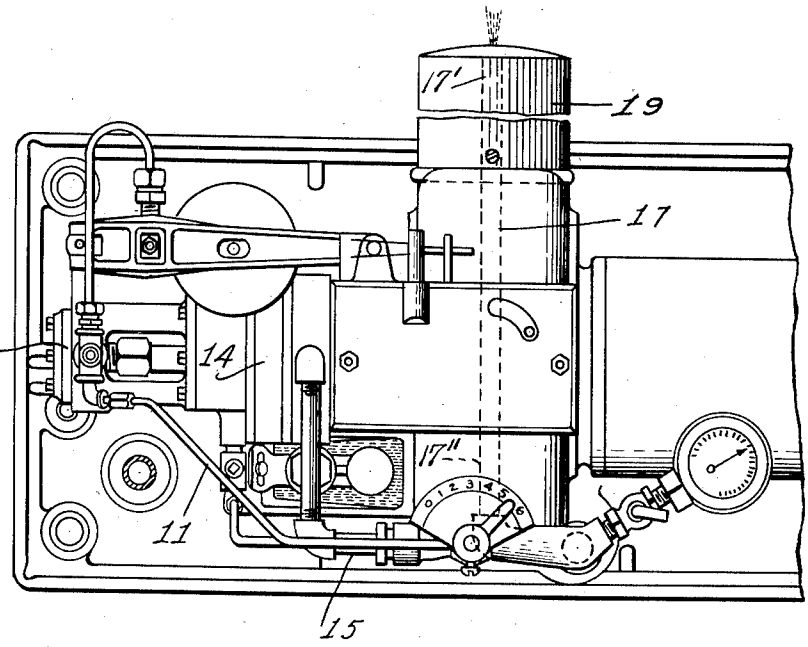
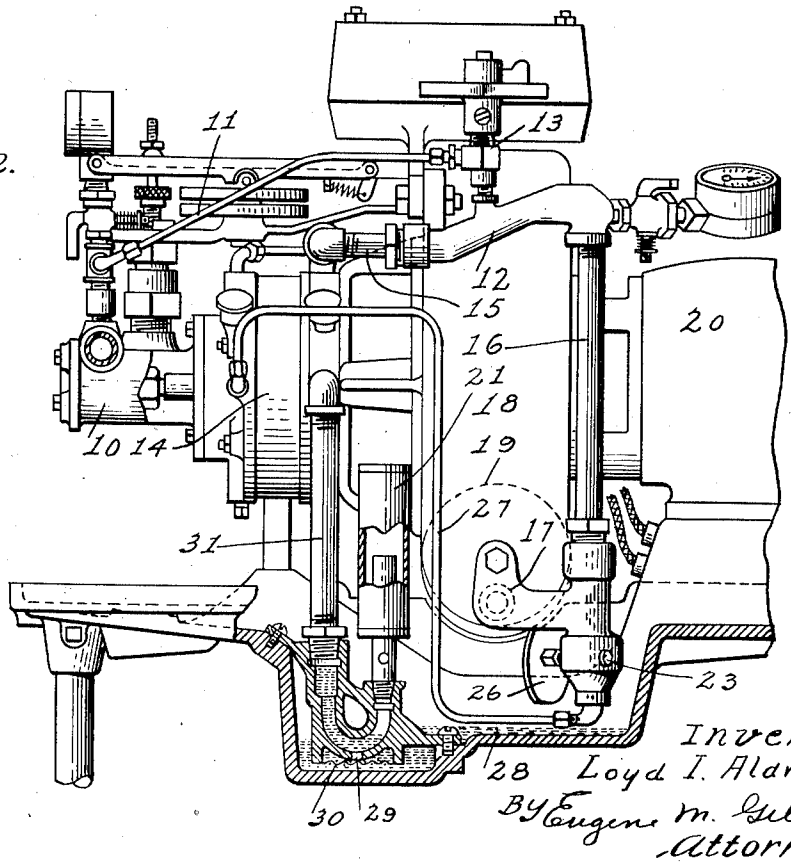


Fig. 2.



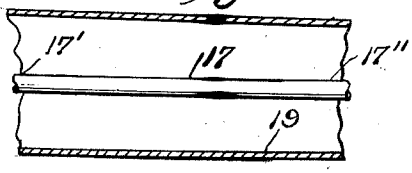
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Fig. 5.



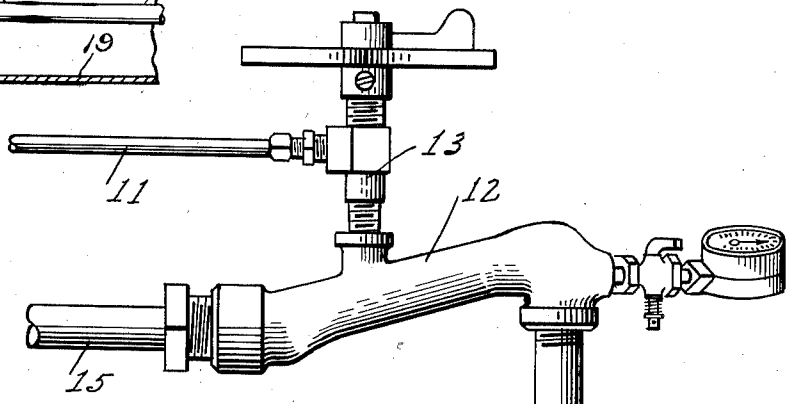


Fig. 3.

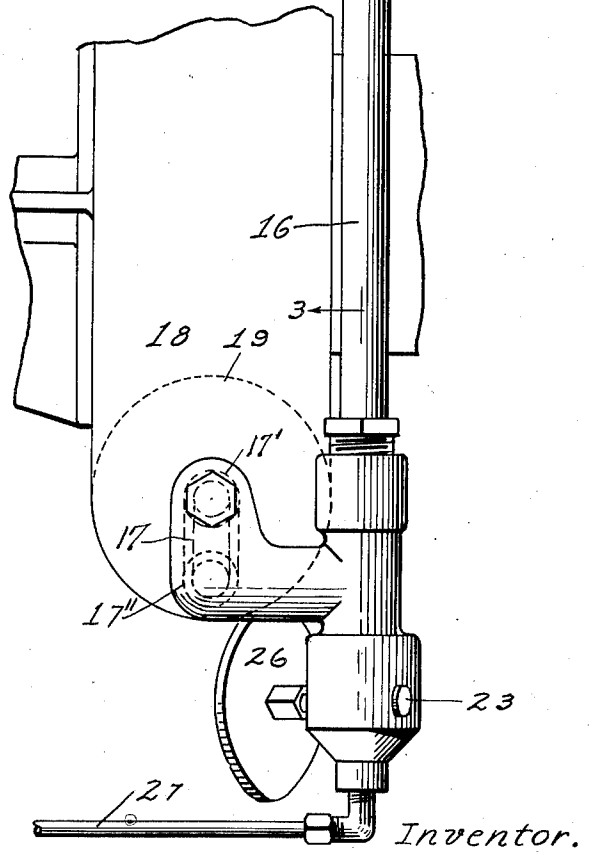
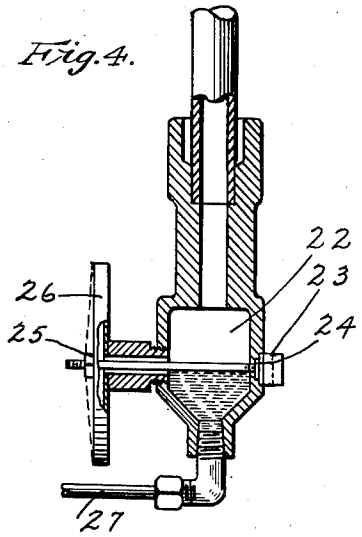


Fig. 4.



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UNITED STATES PATENT OFFICE

LOYD I. ALDRICH, OF PEORIA, ILLINOIS, ASSIGNOR TO PREFERRED OIL BURNERS, INC., OF PEORIA, ILLINOIS, A CORPORATION OF ILLINOIS

FUEL ATOMIZER

Application filed July 5, 1924. Serial No. 724,543.

My invention relates to fuel atomizers and more particularly to a specific means in connection therewith for draining the main fuel discharge tube thereof upon a cessation of operation of the burner.

The object of my invention is in the provision of a specific drain mechanism in connection with a formal fuel atomizing device whereby the main discharge tube thereof is drained upon a cessation of operation of the device and thereby preventing a smoky initial fire upon the commencement of the device thereafter.

Another object of my invention is in the provision of a specific means for preventing initial discharge of a considerable quantity of fuel that remains in the discharge tube upon a cessation of operation, and thereby the doing away of an initial smoky fire, or puff.

Still another object of my invention is in the provision of a specific means for preventing the initial discharge of a poorly atomized fuel mixture which would result in an initial smoky fire, or puff.

A further object of my invention is in the provision of a simple valve mechanism in connection with operating portions of a fuel atomizer, for draining the main discharge tube to prevent the discharge of a poorly atomized mixture upon the commencement of operation of the burner.

Other objects of my invention will appear in connection with the annexed drawings and specifications in which

Fig. 1 is a plan view of my fuel atomizer.

Fig. 2 is a rear elevation thereof.

Fig. 3 is an enlarged detail of my specific mechanism for preventing an initial discharge of a poorly atomized fuel mixture.

Fig. 4 is a sectional elevation of the specific valve mechanism, and

Fig. 5 is a fragmentary section taken longitudinally and centrally of the blast housing 19 of Fig. 1 to show the inclination of the fuel discharge pipe.

The present invention is directed to a means for preventing the undesirable and dangerous initial puff that is almost universal upon the commencement of operation of the conventional domestic fuel atomizer or burner.

This so called domestic fuel burner as is well known in the art, is disposed in any conventional furnace and its operation is controlled by a thermostat located in some room in the dwelling that is to be heated.

In connection with my specific mechanism for preventing this disagreeable puff, I have shown a fuel atomizer which has formed the basis of a number of co-pending applications, the main application directed to the burner per se, being No. 633,272 filed April 19th, 1923, although it is to be understood that my present anti-puff device is adapted to be used in connection with any conventional fuel atomizer.

The conventional fuel tanks are not shown, but fuel is withdrawn from a container not shown, by a pump 10, said pump discharging the fuel under pressure through a tube 11 into a mixing chamber, or venturi 12. A means for adjusting the amount of fuel flow being shown in a conventional valve mechanism 13. In view of the necessity of supplying air to fuel for complete atomization, an air pump is shown at 14. Although the present air pump is of the so called liquid type, nevertheless, any type of pump adapted to discharge air under pressure might of course well be used. Air from this pump is discharged through an appropriate tube 15 to the above mentioned mixing chamber 12 wherein there is a mixing or atomizing of the fuel. This fuel mixture is carried through the tube 16 to the main discharge tube 17 of the device, said fuel being discharged through a conventional burner nozzle disposed at a point just within the combustion chamber (not shown). Under

ordinary circumstances an added draft member is utilized for more complete combustion and in the present instance, a conventional fan and housing are shown at 18, the blast therefrom passing through a conventional blast housing 19, and uniting with the discharged fuel mixture at a point adjacent the discharge nozzle as is customary in fuel atomizing devices. A formal electric motor 20, is provided for operating the atomizing portions named.

The above describes really the main operating portions of my fuel atomizing device, perhaps with the exception of indicating an air muffler 21, for supplying the air pump 14.

Any type of ignition means may be used including either a gas pilot or spark.

Upon the cessation of operation of the above described device, there will be a gradual dying down of the electric motor and hence the operating portions described, with the result that a considerable amount of fuel mixture will be left in the main discharge tube 17, whereupon and unless otherwise provided for, this unatomized mixture will be forced into the combustion chamber at the beginning of the next period of operation of the burner.

Now this mixture does not remain in the state which it had been, when blown from the mixing chamber 12 but has condensed and is nothing more than a heavy fuel. Naturally this discharge of unatomized fuel results in the accumulation of fuel, difficult to ignite. When this mixture is ignited, there will be a considerable puff which fills the combustion chamber with smoke and in some cases there being such an explosion of the gases resulting from this discharge as to blow open the formal doors in the furnace and, in some instances, to even wreck the furnace.

As said before, the object of this invention is to drain the main discharge tube to prevent this discharge of unatomized fuel and to accomplish the same, I have located the main discharge tube 17, in the blast housing 19, in an inclined position, (see Fig. 5) so that the discharge end 17′ of the tube is in a slightly elevated position with the result that any fuel remaining therein, upon a cessation of operation of the burner, will drain to the rear end 17″ of the tube 17 and pass into a chamber 22.

This chamber is positioned at the lower end of the pipe 16 and below the lateral duct which leads to the discharge tube 17 and serves, in the normal operation of the device, to collect any fuel that is not properly atomized and prevents passage of same to the burner. A pipe 27 leads from the bottom of the chamber 22 to the pump 14 so that the operation of the latter serves to evacuate the chamber 22. The pump 14 is of a type requiring a supply of liquid in its operation and this drainage of the chamber 22 by the pump serves to furnish the necessary supply of liquid to the pump.

The side wall of the chamber 22 is apertured to afford an overflow outlet which is adapted to be closed by a valve 23 which engages the valve seat 24. The stem of this valve extends through the chamber 22 and is connected at 25 to a diaphragm 26 which is subject to pressure in the chamber 22, the arrangement being such that when the device is in operation and atomized fuel supplied to the pipe 16, there is sufficient pressure built up in the chamber 22 and against the diaphragm 26 to hold the valve 23 closed against the seat 24, while cessation of operation of the device relieves the pressure in the chamber 22 and permits relaxation of the diaphragm and opening of the valve 23.

Thus, as long as the fuel supply mechanism is in operation, the valve 23 remains closed and any liquid fuel accumulating in the chamber 22 is drawn off by the pump 14 through the pipe 27. When the fuel supplying mechanism is rendered inactive, however, the pump 14 ceases operation and in view of the inclined arrangement of the discharge pipe 17, any fuel that has accumulated therein will drain back into the chamber 22. The valve 23, however, is now open and this fuel overflows through the valve outlet 24 and is collected in the pan or sump 28. The duct from the muffler 21 to the pump 14, leads close to the bottom of the sump 28 and has an aperture 29 leading thereinto and covered by a strainer 30 whereby accumulation of oil in the sump 28 is exhausted into the air pump.

In the above manner not only will any accumulation of fuel in the sump be taken care of but also any of the back flow of fuel in the main discharge tube will similarly be removed from the sump.

What I claim is:

1. In a device of the class described, the combination of a blower having a discharge duct, a fuel pipe extending lengthwise through the duct and inclined downward from the outlet end of the duct to the inlet end, a housing at the lower end of the fuel pipe having a drainage compartment, and a valve in the drainage compartment adapted to automatically open upon interruption of the fuel supply and exhaust the contents of the compartment.

2. In a device of the class described, the combination of a burner nozzle, a fuel feed pipe having a drainage pocket communicating with the burner nozzle, an air pump connected to the pocket for draining the latter, and an overflow outlet leading from the pocket and having a valve automatically opening upon interruption of the operation of the air pump.

3. In a device of the class described, the

combination of a burner nozzle, a tube inclined outwardly and downwardly from the combustion zone of the burner nozzle, an upright fuel feel pipe having the lower end connected with the lower end of the inclined tube, an atomizer at the upper end of the fuel feed pipe, a housing connecting the lower ends of the said tube and fuel feed pipe and having a drainage compartment therein with which the inclined tube and upright pipe communicate, an outlet from the drainage compartment, and a valve for said outlet adapted to open automatically upon interruption of the fuel supply.

In testimony whereof I affix my signature.

LOYD I. ALDRICH.