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OIL BURNER NOZZLE

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Fig. 1.

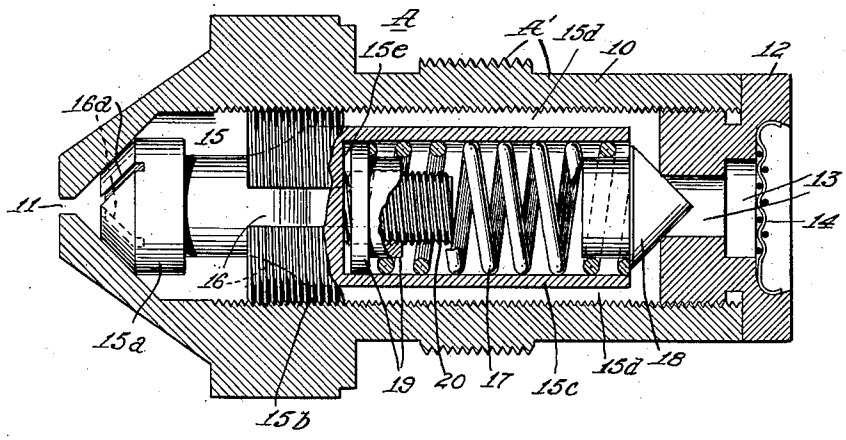
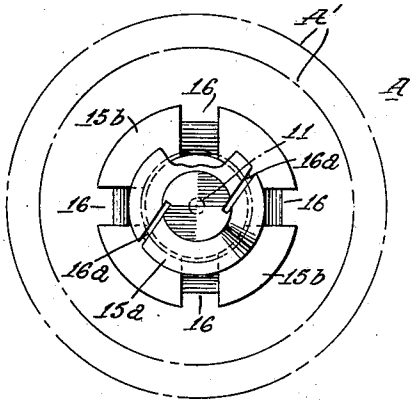


Fig. 2.



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OIL BURNER NOZZLE

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1 Claim. (Cl. 299—118)

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This invention relates to oil burning heating units, and more particularly to means for curing the faults prevalent in many of the units in use at the present time.

As is well known, many of the oil burner units comprise a pump, a bellows valve and a means for discharging the fuel in spray form into a combustion chamber where it is ignited by means of an electric spark. In operation, the pump is rendered operative automatically in response to a drop in temperature of an enclosed area which is to be heated to a predetermined value. The pump builds up pressure sufficient to open the bellows valve and force the oil from a suitable source of supply through the bellows into the discharge portion or nozzle from which it is sprayed, still under pressure supplied by the pump, into the combustion chamber and ignited by the aforementioned spark. The system continues in operation until a predetermined temperature value is reached in the area being heated, at which time the pump is automatically rendered inoperative causing the pressure to be reduced and the bellows valve to close, thus preventing further feeding of oil to the combustion chamber.

These heating units are open to the objection that when the pump stops and the bellows valve closes, the oil remaining in the line between the bellows valve and the nozzle, instead of being discharged in a fine spray which is needed to insure combustion, simply drips into the combustion chamber and remains in an unburned state. This unburned fuel due to the heat remaining in the chamber will vaporize and the resultant gases thus formed may be set off when the pump is again rendered operative and the igniting spark activated, to result in an explosion.

Another objection to such units is that the bellows valve frequently fails to close properly with the result that it does not completely shut off the flow of fuel to the discharge nozzle. The fuel in the line between the pump and the bellows valve will leak into the discharge nozzle and thence into the combustion chamber, where the fuel will vaporize due to the residual heat in the chamber and result in an accumulation of combustible gases. These gases may be exploded when the unit is again activated and the spark created. In addition, in many of the discharge nozzles in use in oil burner units, the fuel takes a more or less circuitous path from the inlet port to the point at which it is discharged into the combustion chamber. This may result in an unsteady flow of fuel. Furthermore, in order to permit ease of manufacture and assembly, features which many nozzles in use do not possess, it is an aim of the present invention to provide a unitary structure within the nozzle housing to obviate the necessity for a complicated manufacturing process.

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The above as well as other objections will be overcome in the present invention by means of an adjustable valve which is adapted to open as soon as the bellows valve opens under the pressure applied by the pump. The valve will close as soon as the pump ceases to function, and will trap the fuel in the line between the bellows valve and the discharge nozzle, also serving to prevent fuel from leaking into the discharge nozzle if the bellows valve fails to close properly. When the pump is activated the bellows valve and the adjustable valve will open to permit fuel to enter the discharge nozzle. Also in accordance with the present invention, the fuel will flow in an unimpeded path from the inlet port of the discharge nozzle to the discharge aperture once the unit is activated when the temperature of the enclosed area drops to a predetermined value.

For a clear understanding of the present invention reference may be made to the accompanying drawing wherein the invention has been shown merely by way of example and in preferred form. However, many variations and modifications may be made therein which will still be comprised within its spirit. It is to be understood therefore, that the invention is not to be limited to any specific form or embodiment except insofar as such limitations are specified in the appended claim.

Referring to the drawings—

Fig. 1 is an enlarged elevation partly in section of a discharge nozzle.

Fig. 2 is an end view of the discharge portion of the internal structure of the discharge nozzle with the external housing shown in broken lines.

Referring to the drawings, a nozzle, generally represented by the reference character A, of the type used in connection with an oil burning unit, is provided with an external threaded portion A' to enable it to be coupled as usual to the feed line (not shown) leading from the bellows valve (also not shown).

In accordance with the present invention, the nozzle A is provided with an outer housing 10, which has a small aperture 11 formed in its forward end to permit the discharge of fuel, and is adapted at its rearward end to be coupled with a cap 12, having an inlet port 13 provided with a screen filter 14, to prevent the inflow of

solid material into the chamber formed by the inner periphery of the housing 10. Positioned between the end of the housing 10 and the inlet port 13 and adapted to be threadably coupled to the internal portion of the housing 10 is a second housing 15, formed with a head 15*a* adjacent the discharge end of the housing 10, a threaded portion 15*b* and a hollow stem portion 15*c*. The outer diameter of the stem 15*c* is substantially smaller than the inner diameter of the housing 10, and an annular passageway 15*d* is thus formed rearwardly of the threaded portion 15*b* of the inner housing 15. To connect the passageway 15*d* with the head portion 15*a* of the inner housing 15, the threaded portion 15*b* is provided with a series of radial slots 16. Formed in the forward portion of the head 15*a* is a plurality of channels 16*a* which serve finally to provide access to the discharge aperture 11. Thus, a continuous path of flow through the nozzle A is provided for fuel injected through the screened inlet port 13.

Serving to maintain the inlet port 13 closed when the oil burner is inactive is a valve 18 held in engagement with the inlet port by a spring 17, which latter is contained within the hollow stem 15*c* of the inner housing 15. In order to adjust the pressure of the spring 17 against the valve 18 so that the valve will open the inlet port at or slightly below the pressure exerted against it by the pump of the oil burner unit, there is provided an adjustable sleeve 19 threadably coupled to a screw 20 which banks against the inner wall 15*e* of the hollow stem 15*c*, and is maintained in that position by the pressure of the spring 17 against the sleeve 19. The force exerted by the spring 17 may be increased or decreased by manually adjusting the position of the sleeve 19 on screw 20 forwardly or rearwardly with respect to the valve 18.

It may be seen, therefore, that when oil is injected under pressure supplied by the pump through the screened inlet port 13, the valve 18 will open to permit the passage of the oil through the passageway 15*d*, through the slots 16, and thence through the channels 16*a* to the discharge aperture 11 from which point it enters the combustion chamber in the form of a spray and is ignited in the usual manner. When the pump ceases the function in the course of its regulated operation and the pressure drops, the valve 18 under the pressure exerted by the spring 17 will close immediately, shutting off the flow of oil into the nozzle A and trapping it in the line between the bellows valve and the valve 18.

Having thus described my invention what I claim is:

In a nozzle for use with liquids discharged under pressure, the combination of an external housing having a discharge aperture, an inlet port, a valve, a unitary internal structure threadably coupled to said external housing, said unitary internal structure having at one end a head portion adjacent the discharge aperture, a coupling portion, and an open ended stem of tubular cross section arranged adjacent said valve, said stem having therein a threaded stud abutting its rearward wall, a sleeve adjustably threaded upon said stud, a yielding member arranged between said sleeve and said valve, said sleeve being capable of endwise adjustment upon said stud with respect to said yielding member to exert pressure upon said yielding member of a predetermined and adjustable value, a passageway formed between the outer periphery of said stem and the inner periphery of said external housing and channels through said coupling portion and said head portion, said passageway and said channels providing a continuous and unobstructed path between said valve and said discharge aperture.

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