

J. C. FULLER.
VAPORIZER NOZZLE.
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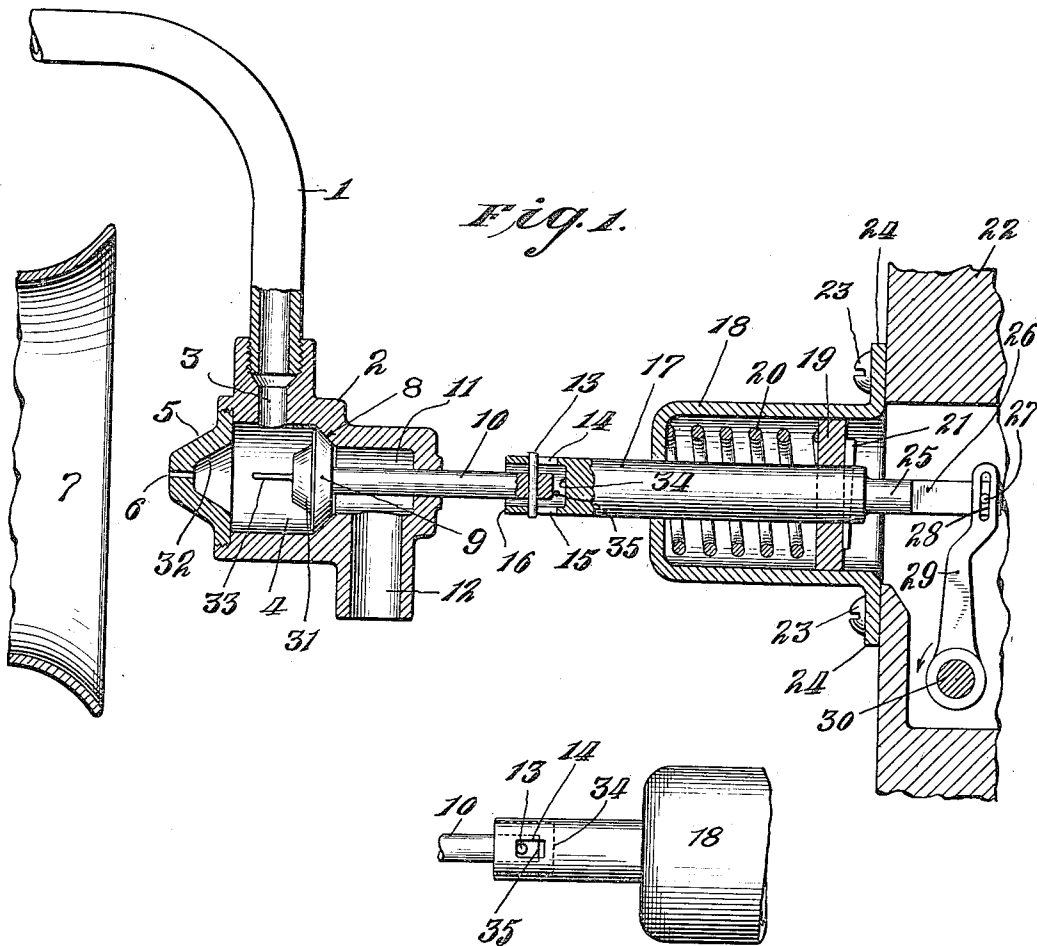


Fig. 2.

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VAPORIZER-NOZZLE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEPH C. FULLER, a citizen of the United States, residing in the city of Perth Amboy and State of New Jersey, have invented certain new and useful Improvements in Vaporizer-Nozzles, of which the following is a specification.

My invention relates to devices which are particularly adapted for use in vaporizing hydrocarbon fuels prior to their ignition and more especially the heavier hydrocarbons, such as kerosene.

It is well known that in vaporizers designed for utilizing this general class of fuel, difficulty has been experienced from the fact that the fuel contains particles of more or less solid impurities, held mechanically in suspension in the liquid, and these tend to clog up the necessarily small orifice of the vaporizer and otherwise interfere with the proper operation of the device. In one well-known type of vaporizing apparatus—that used in connection with the Stanley steam automobile and also for many other purposes, the fuel is maintained under a pressure which may attain to several hundred pounds per square inch, usually by the use of air domes in which a cushion of compressed air is utilized. Under the influence of this pressure, the fuel is forced through a vaporizing or atomizing nozzle into the bell-shaped mouth of a mixing tube. Owing to the high pressure, the pre-heated fuel leaves the nozzle at a high velocity and, rushing into the mixing tube, it carries with it the requisite amount of air for completely vaporizing it and affording the proper combustible mixture of fuel and air.

In such appliances, the impurities in the fuel together with particles of carbon which may form within the fuel container or piping leading from it to the vaporizing nozzle frequently clog the vaporizing or atomizer orifice and also may clog some of the fine tubing or small ports in the apparatus between the nozzle and the source of fuel supply.

In order to dislodge the impurities from the nozzle itself, it has been proposed to clean the orifice mechanically with a wire or needle-like object, and to free the tubing and ports of any accumulated obstructions, it has been customary to release the fuel under pressure suddenly through a by-pass by opening a valve communicating from the

fuel line to the outer air. This permits the fuel under its high pressure to rush into the open air and thus mechanically clear any obstruction existing in the fuel line or ports of the vaporizer. This operation is commonly known as "sneezing."

My invention aims to provide a simple device in which the dual operations of mechanically cleaning the vaporizer aperture and of clearing the other passages by a "sneezing" action may be simultaneously accomplished. This mechanism is so arranged that while it is always under the control of the operator or attendant, it is ready for instant use upon necessity arising and it is, therefore, directly coupled to the vaporizer or atomizer castings. Nevertheless, it does not have the objection of conducting away any substantial amount of heat from the vaporizer. It will be appreciated that especially in the use of heavy hydrocarbons, such as kerosene, the continuation of efficient operation, and in fact, frequently of any combustion whatever, is dependent upon maintaining the vaporizer at a relatively high temperature in order to insure the vaporizing of the fuel as it emerges from the vaporizer orifice. Consequently, it is essential that any device mechanically connected to the vaporizer be so constructed as to prevent such a degree of heat transference which would reduce to an appreciable extent the temperature of the vaporizer and the fuel passing through it.

In the accompanying drawings which form a part of this specification, Figure 1 is a vertical sectional view of one type of device embodying my invention, and Fig. 2 is a plan view of a portion of the operating mechanism.

Referring to the drawings in detail, the numeral 1 designates a fuel feed pipe entering a vaporizer casting 2 having a passage 3 alining with the bore of the pipe and communicating with the barrel 4 of the vaporizer. The barrel 4 is closed at one end by a conical tip or head 5 which is provided with the vaporizer orifice 6 axially disposed with reference to the mixing tube 7. The rear of the barrel 4 is provided with a port 8 against which the valve 9 normally seats. This valve is provided with the stem 10 passing through a chamber 11 and projecting through the rear wall of the vaporizing casting. The chamber 11 communicates

with a passage 12 leading to the open air. The rear end of the valve stem 10 is provided with a pin 13 entering the slots 14, 15 in the tubular end 16 of a plunger 17 passing through a bracket 18 and carrying near its other end a head or washer 19 against which seats the spring 20. A pin 21 is adapted to hold in place the washer 19, which preferably has a sliding fit in the interior of the bracket 18, so as to act as a guide for the plunger 17. The bracket 18 may be fixed to a stationary part 22 of the machine in any suitable way, as by means of screws 23 passing through the flange 24. The rear of the plunger 17 is provided with a longitudinally extending arm 25 having a flattened portion 26, provided with a projecting pin 27 received in the slot 28 in an arm 29 secured to the operating shaft 30. The forward end of the valve 9 is provided with a conical valve surface 31 adapted to seat against the conical surface 32 of the nozzle tip and is also provided with a pin or needle 33, alining both with the axis of the valve stem 10 and with the vaporized orifice 6 and smaller in diameter than the orifice.

In the operation of the device shown in the drawings, the parts are normally in the position illustrated. Fuel under pressure flows through the pipe 1 into the passage 3, thence to the barrel 4 and so on out of the nozzle tip through the orifice 6, rushing with high velocity into the mixing tube 7, where it picks up sufficient air to form a combustible mixture. When the attendant in charge of the device finds that any of the parts have become clogged—either the nozzle orifice or the piping or any of the parts connected therewith—he may turn the shaft 30 in the direction of the arrow, thus causing the arm 29 to swing through a suitable angle, and push the plunger 17 to the left against the force of the spring 20. The first movement thus produced will cause the slot 14 to advance relatively to the pin 13 without producing any movement of the pin, but when the left-hand end 34 of the solid part of the plunger 17 engages the abutting end 35 of the stem, it will move the pin, valve stem 10 and the valves carried by it to the left. This first opens the port 8, so as to afford communication between the chamber 11 and the barrel 4, whereupon the greater part of the fuel passing through the pipe 1 will rush out into the open air through the passage 12. Further movement to the left causes the valve 31 to seat against the inside of the nozzle tip, while the needle 33 passes through the nozzle or vaporizer orifice 6. This at once shuts off communication between the barrel 4 and the orifice and simultaneously causes the positive cleaning of the orifice of any foreign matter which may have clogged it, while producing a swift

rush of fuel under pressure into the open air through the chamber 11 and passage 12. This causes the apparatus to "sneeze" and effectively clears the pipe 1 and its associated passages of any impurities which may have clogged them.

It will be noted that while under normal conditions the valve 9 is tightly seated against its seat by means of the pressure of the spring upon the washer 19 transmitted through the plunger 17 and pin 13, there is negligible heat transference from the valve stem 10, since the only metal-to-metal contact between the parts is that of the pin 13 and the forward end of the slots 14, 15. Thus there is not sufficient heat conducted away from the vaporizer chamber to interfere with its efficient operation.

I claim:

1. A vaporizer including a casing provided with an inlet passage, a nozzle opening and a vent, means to normally close the said vent, means adapted to close the nozzle opening, and means to simultaneously actuate both of said vent and nozzle controlling means to simultaneously open the said vent and close the said nozzle opening.

2. A vaporizer including a casing having an inlet passage, a nozzle opening and a vent, means to normally close said vent, means for mechanically cleaning said nozzle opening, and means to actuate said vent closing means and nozzle cleaning means to simultaneously open the said vent and mechanically clean the nozzle opening.

3. A vaporizer including a casing having an inlet passage, a nozzle opening and a vent, said nozzle opening and inlet passage being normally in free communication, a valve to normally close said vent, means adapted to close said nozzle opening, and means to actuate said vent closing valve and nozzle opening controlling means to simultaneously open said vent and cut off communication between said inlet passage and nozzle opening.

4. A vaporizer including a casing having an inlet passage, a nozzle opening and a vent, said inlet passage and nozzle opening being normally in free communication, a valve to normally close said vent, a second valve adapted to move with said first mentioned valve and being adapted to close communication between said inlet passage and nozzle opening, and means for actuating said valves.

5. A vaporizer including a casing having an inlet passage, a nozzle opening, and a vent, said inlet passage and nozzle opening being normally in free communication, a valve to normally close said vent, a second valve adapted to move with said first mentioned valve and being adapted to close communication between said inlet passage and

nozzle opening, means carried by said valves to mechanically clean said nozzle opening when the vent valve is opened, and means to actuate said valves.

5 6. A vaporizer including a casing having an inlet passage, a nozzle opening and a vent, a double faced valve mounted in said casing, one face of which is adapted to normally close the said vent and the other face
10 being adapted to close the nozzle opening when the vent is opened, and means to actuate said valve.

7. A vaporizer including a casing having an inlet passage, a nozzle opening and a
15 vent, a valve to normally close said vent, means to actuate said valve, and means to connect said valve and actuating means to provide a lower thermal conductivity between said valve and actuating means when
20 the valve is closed than when it is opened.

8. A vaporizer including a casing having an inlet passage, a nozzle opening and a vent, a valve to normally close said vent, means to actuate said valve; and means to connect said valve and actuating means so
25 that the actuating means has a lesser area of contact with said valve when the said valve is closed than when opened.

9. A vaporizer including a casing having an inlet passage, a nozzle opening and a
30 vent, a valve to normally close said vent, said valve being provided with a stem, a pin in said valve stem, means to actuate said valve, said actuating means directly engaging said valve stem to open the valve and
35 being provided with a slot to receive said pin on the valve stem, said actuating means being out of direct contact with said valve stem when the valve is closed.

JOSEPH C. FULLER.