

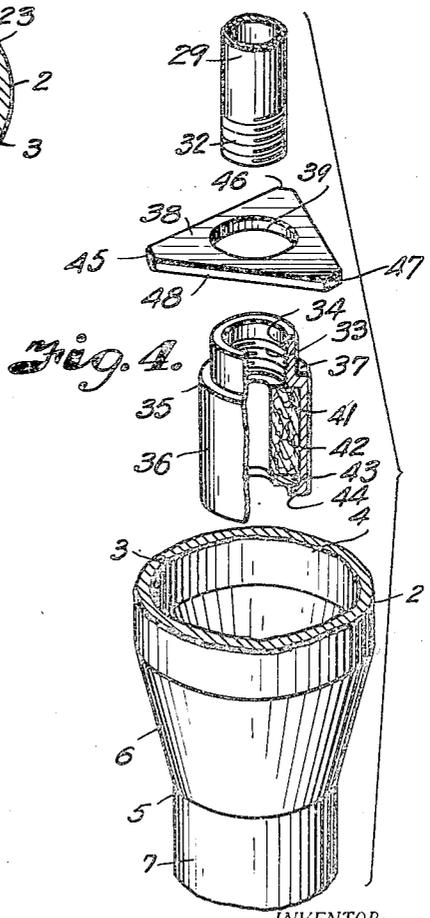
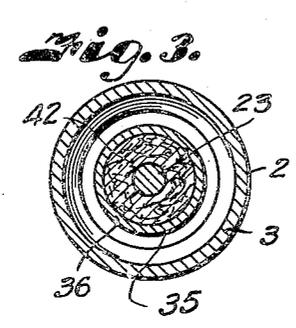
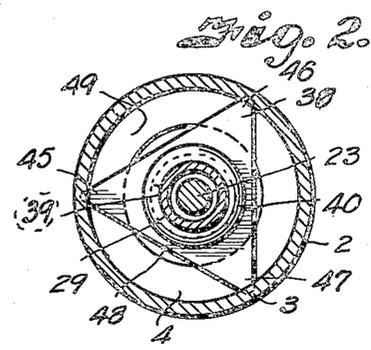
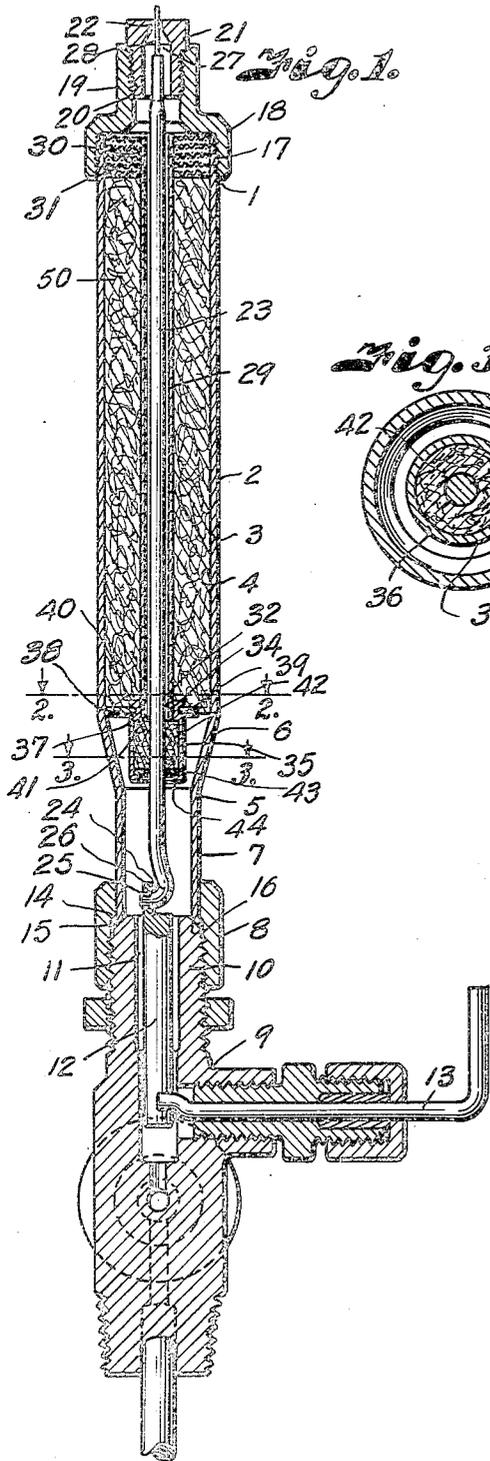
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VAPORIZING UNIT FOR RETORT BURNERS

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VAPORIZING UNIT FOR RETORT BURNERS

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11 Claims. (Cl. 158—53)

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This invention relates to vaporizers of the type employed in vaporizing liquid fuel delivered to liquid fuel burning appliances.

Prior to the present invention vaporizers of this character have been constructed for vaporizing straight run gasolines, and a warning was given by the manufacturer to avoid the use therein of ordinary motor fuels, particularly those containing anti-knock compounds, gums, and like objectionable compounds. This warning was necessary because the objectionable compounds decomposed at vaporizing temperature of the fuel and solid particles resulting from decomposition collected within the vaporizers to such an extent that the vaporizers clogged and the contained parts such as the cleanout needle became relatively immovable after a few hours' burning operation.

Straight run gasolines are not readily available in all communities and it has been highly desired to provide a vaporizer that operates successfully on ordinary motor fuels, as such fuels can be purchased even in the more isolated places.

It is, therefore, the principal object of the present invention to provide a vaporizer capable of operating over relatively longer periods using ordinary motor fuels.

Another object of the invention is to provide a relatively simple and inexpensive vaporizer having a relatively large capacity so that it may be operated over a long period, then discarded and replaced by a new unit.

Further objects of the invention are to provide a vaporizer constructed as a unit for facilitating replacement thereof; to provide a vaporizer with a cleanout needle guide that forms a part of the replacement unit and which provides for ready insertion of the cleanout needle when replacing the vaporizer; and to provide a vaporizer with a needle guide which eliminates interference with operation thereof by decomposed particles of fuel which result when a motor fuel is used.

In accomplishing these and other objects of the invention, I have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawing wherein:

Fig. 1 is a longitudinal sectional view through a vaporizer constructed in accordance with the present invention and showing its attachment to the fuel control valve of a liquid fuel burning appliance.

Fig. 2 is a cross section through the vaporizer on the line 2—2 of Fig. 1 particularly illustrating support of the entrance end of the needle guide.

Fig. 3 is a cross section through the vaporizer

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particularly illustrating packing of the needle to prevent leakage into the needle guide.

Fig. 4 is a detail perspective view of the inlet portion of the vaporizer tube and the adjacent portions of the needle guide parts shown in disassembled spaced relation to better illustrate construction thereof.

Referring more in detail to the drawing:

1 designates a liquid fuel vaporizer embodying the features of the present invention and which includes an elongated tubular body 2 having a relatively thin wall 3 forming a cylindrical vaporizing chamber 4 having ample diameter for collection of solid particles resulting in decomposition of fuel when the vaporizer is in operation. The inlet end 5 of the vaporizer tube is swaged as at 6 to provide a supporting neck 7 of smaller diameter and which slidably and rotatably mounts a union nut 8 by which the vaporizer tube is mounted upon a fuel control valve 9 of a fuel burning appliance (not shown). The valve 9 is of the usual construction in that it has an externally threaded branch 10 on which the nut 8 is turned to connect the vaporizer tube. The branch of the valve is provided with a bore 11 in which is reciprocally mounted a needle actuating plunger 12 that is manipulated by a rotary lever 13 as in usual practice. The nut 8 has an internal shoulder 14 engaging an outwardly flaring flange 15 on the neck of the vaporizer and which seats upon an annularly beveled edge 16 of the branch 10 of the regulating valve. With this arrangement the nut is retained upon the neck of the vaporizer and forms a part thereof.

The opposite end of the vaporizer is externally threaded as at 17 to mount a cap 18 for closing that end of the vaporizer tube and which carries a collar 19 having an internally threaded bore 20 to mount a fuel discharge tip 21, the tip 21 being provided with a relatively small outlet orifice 22 located within the extended axis of the vaporizer tube as shown in Fig. 1.

Reciprocally supported within the vaporizer tube is a cleanout needle including a rod 23 having a hook-shaped end 24 engaging within the aperture 25 of the ear 26 on the plunger 12 whereby the cleanout needle is operably connected with the plunger and the rotating lever therefor. The opposite end of the cleanout needle projects within the bore of the collar 19 and into a recess 27 of the fuel tip where it carries a needle point 28 adapted to reciprocate through the orifice 22 when the rotating lever is actuated as later described.

In order to prevent interference with operation of the needle by any solid particles collecting

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within the vaporizer, the portion of the needle which extends through the vaporizing section of the tube is supported within a tubular guide or shield 29, the tube having an inner diameter to freely pass the body portion of the cleanout needle so that the cleanout needle is freely movable therein. The end of the guide tube located within the discharge-end of the vaporizer tube is supported within an opening 30 formed within a porous support comprising a plurality of screen disks 31 that are pressed within the end of the tube closed by the cap 18 as shown in Fig. 1. The opposite end of the tube is threaded as at 32 to engage in the threads 33 of a collar 34 which forms a part of a packing box 35 as best shown in Fig. 4. The packing box includes a cylindrical wall portion 36 of larger external diameter than the collar 34 to provide an annular shoulder 37 for seating the packing box against a plate-like bracket 38 when the collar 34 is projecting through an opening 39 of the bracket, the free end of the collar being spun over the upper face of the bracket as indicated at 40 to retain the packing box anchored thereto as shown in Fig. 1.

An internal shoulder 41 is also provided for engaging one end of a packing sleeve 42 inserted in the packing box and held in sealing contact with the body portion of the needle by a washer 43 which is retained in position within the packing box by spinning the free edge 44 thereof over the face of the washer. The plate-like bracket 38 is of substantially triangular shape to provide relatively pointed ends 45, 46, and 47 that are slightly indented into the wall of the tube adjacent the enlarged end of the swaged portion 6 thereof to anchor the bracket against longitudinal movement within the vaporizer tube upon reciprocation of the cleanout needle. The sides 48 of the bracket cooperate with the wall of the vaporizer tube to provide a plurality of passageways 49 wherethrough the fuel is adapted to flow into the vaporizing portion of the tube. The vaporizing portion of the tube is preferably loosely filled with metallic wool or the like 50 (Fig. 1) to enhance heat conduction from the wall of the vaporizer and promote heat contact area with the fuel being passed through the vaporizer tube when in operation.

It is thus obvious that the vaporizer tube 2, needle guide 29, cap 18, fuel tip 21, and union nut 8 form a unit assembly so that the vaporizer units may be readily removed when necessary and replaced with a new unit.

In assembling the unit, the packing sleeve 42 is inserted in the packing box 35 followed by the washer 43 and the projecting edge 44 is spun thereover to cooperate with the internal shoulder 41 at the opposite end of the packing to hold the packing in compressed position for sealing contact with the cleanout needle when passed there-through. The collar 34 of the cleanout tube is then passed through the opening 39 of the bracket 38 so that the shoulder 37 seats thereagainst and then the free edge of the collar is spun over the plate-like bracket as shown in Fig. 1. The tubular guide 29 for the cleanout needle 23 is then screwed into the internally threaded collar 34 and the assembly is inserted through the larger open end of the vaporizer tube 2 and moved to a position so that the relatively pointed ends 45, 46, and 47 of the bracket plate 38 engage the enlarged end of the swaged portion 6 of the tube whereupon a contracting pressure is applied to the walls of the vaporizer tube to cause the ends 45, 46, and 47 to slightly indent the metal of the tube for anchoring

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the guide tube therein. The metallic wool or the like 50 is rolled in tubular form and inserted within the vaporizing chamber portion of the tube and with an inner diameter of the roll sufficient to pass over the cleanout needle guide tube. After the wool is inserted in the vaporizer chamber the screens 31 are pressed into the open threaded end of the tube 2 for supporting the adjacent end of the cleanout needle guide in axial relation with the vaporizer tube. The cap 18 is then screwed upon the threaded end of the vaporizer tube and the fuel tip inserted within the collar portion 19 thereof. The union nut 8 may be slid upon the reduced portion of the vaporizer tube after which the free end of the neck is belled outwardly to provide the flange 15.

When thus assembled, the parts form a complete unit that is furnished for replacement of similar units when replacement is necessary.

In applying the vaporizer unit the old unit is removed by unscrewing the union nut 8 and the cleanout needle is unhooked from the apertured ear 26 of the plunger 12. The needle is then withdrawn from the vaporizer and the vaporizer is discarded. The cleanout needle is then passed through the guide tube of a new vaporizer unit so that the point thereof is adapted to pass through the orifice 22 of the fuel tip 21. The hooked end 24 of the cleanout needle is then engaged with the apertured ear 26 of the operating plunger 12 after which the bell-shaped flange 15 is moved in seating contact with the beveled seat 16. The union nut 8 is then turned upon the neck 7 into engagement with the threads on the branch 10 of the control valve. When the nut is tight the internal shoulder 14 therein is in clamping engagement with the bell-shaped flange of the vaporizer tube to provide a leak-tight joint and support for the vaporizer unit on the control valve. When the fuel control valve is open liquid fuel flows around the plunger 12 through the neck 7 of the vaporizer tube into the space between the swaged portion 6 and the packing box 35 and through the passageways 49 into the vaporizing section of the tube wherein the liquid is changed to a vapor by heat which is transmitted responsive to burning of the fuel in the burner (not shown) which the vaporizer is serving. The vapor passes through the screen 17 and through the orifice 22 of the fuel tip 21.

Any solid particles which may result from decomposition of objectionable components of the fuel collect within the vaporizing chamber of the tube but the capacity thereof is such as to accommodate a large amount of the material before it is necessary to replace the vaporizing unit. At times the orifice of the fuel tip may tend to clog with the solid particles but these are readily removed upon projecting the needle point through the orifice 22 by actuation of the rotary lever 13. From the foregoing it is obvious that I have provided a vaporizer unit of simple and inexpensive construction so that it is economically practicable to discard the unit when necessary and replace it with a new unit, thereby permitting use of ordinary automotive fuels.

It is also obvious that the contained guide tube and packing box carried thereby prevents any interference of the particles which may result through decomposition of portions contained in the fuel from interfering with operation of the cleanout needle.

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

1. A vaporizer unit adapted for use with a

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cleanout needle including, a tubular body, a fuel discharge tip at one end of said body, a guide tube coaxially arranged within the tubular body, a plurality of screens in said end of the body and having registering openings coaxially aligning with the discharge tip for receiving and supporting one end of the guide tube, a spider-like plate having points indented in said tubular body for supporting the other end of the guide tube, a packing box connected with the guide tube adjacent the spider-like plate, and a packing sleeve in the packing box adapted to seal about the stem of the cleanout needle when projected through the guide tube.

2. A vaporizer unit adapted for use with a cleanout needle including, a tubular body, a fuel discharge tip at one end of said body, the opposite end of the tubular body having a reduced neck portion forming a fuel inlet to said body, a plurality of screen elements in the end of the tubular body carrying said discharge tip, a spider-like member engaging within the tubular body near the reduced portion thereof, said screen elements and plate having coaxial openings, a guide tube supported in said openings, a stuffing box connected with the guide tube at the plate supported end of said tube, and a packing in said box adapted to seal about the stem of the cleanout needle when projected through the guide tube.

3. A vaporizer unit adapted for use with a cleanout needle including, a tubular body, a fuel discharge tip at one end of said body, the opposite end of the tubular body having a reduced neck portion forming a fuel inlet to said body, a plurality of screen elements in the end of the tubular body carrying said discharge tip, a substantially triangular-shaped plate in said body at the reduced portion thereof, said screen elements and plate having coaxial openings, a guide tube supported in said openings, a stuffing box connected with the guide tube within said reduced portion of the tubular body, and a packing in said box adapted to seal about the stem of the cleanout needle when projected through the guide tube.

4. A vaporizer unit adapted for use with a cleanout needle including, a tubular body, a coaxial guide tube within the tubular body, a fuel discharge tip at one end of said body, a plurality of screens in said end of the body and having an opening coaxially with the discharge tip for receiving and supporting one end of the guide tube, a spider-like plate supporting the other end of the guide tube in said body, a packing box connected with the guide tube, and a packing sleeve in the packing box adapted to seal about the stem of the cleanout needle when projected through the guide tube.

5. A vaporizer unit including a tubular body having a swedge portion at one end terminating in a reduced cylindrical neck, a discharge tip on the opposite end of the tubular body, a cleanout needle guide tube, means supporting the cleanout needle guide tube coaxially with the discharge tip including a plate having apexes thereof indented within the tubular body at the base of said swedge portion and provided with an axial opening, a sleeve-like packing box having a reduced collar portion engaged in said opening and having an annular shoulder engaging the plate, an outturned flange on said collar cooperating with the shoulder to anchor the packing box to the plate-like support, a sleeve-like packing within the packing box, a follower in the packing box for compressing the sleeve-like packing, and an

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inturned flange on the packing box retaining the follower.

6. A vaporizer unit including a tubular body having a swedge portion at one end terminating in a reduced cylindrical neck, a discharge tip on the opposite end of the tubular body, a cleanout needle guide tube, means supporting the cleanout needle guide tube coaxially with the discharge tip including a plate having apexes thereof indented within the tubular body at the base of said swedge portion and provided with an axial opening, a sleeve-like packing box having a reduced collar portion engaged in said opening and having an annular shoulder engaging the plate and cooperating with a turned over portion of the collar to anchor the packing box to the plate-like support, a sleeve-like packing within the packing box, a follower in the packing box for compressing the sleeve-like packing, an inturned flange on the packing box retaining the follower, fastening means rotatably slidable on the neck, and an outwardly flaring flange on said neck cooperating with the swedge portion to retain the fastening means.

7. A vaporizer unit including, a tubular body, a fuel discharge tip at one end of said body, a cleanout needle guide tube in said body, a fuel inlet connection at the opposite end of the tubular body, means supporting one end of the guide tube in said body coaxially with the discharge tip, means spaced from said inlet connection in the direction of the fuel discharge tip for supporting the other end of the guide tube coaxially of the tubular body, and packing means connected with the end of the guide tube between said inlet connection and the last named supporting means for sealing about the stem of a cleanout needle when the cleanout needle is projected through the guide tube, both of said supporting means being arranged to pass fuel from the fuel inlet connection to the fuel discharge tip.

8. A vaporizer unit including, a tubular body having a coaxial fuel inlet at one end, a fuel discharge tip at the other end of said body, a cleanout needle guide tube in said body, means in the tubular body and spaced from the fuel inlet end for coaxially supporting the adjacent end of the guide tube, said supporting means being arranged to pass fuel from the inlet toward the fuel discharge tip, foraminated means supporting the other end of the guide tube within said body, and packing means connected with the guide tube at said inlet-supported end to seal about the stem of a cleanout needle when the cleanout needle is projected through the guide tube.

9. A vaporizer unit including, a tubular body, a fuel discharge tip at one end of said body, a fuel inlet connection at the other end of the tubular body, a coaxial guide tube within the tubular body, a plurality of screens in the tip end of the body having registering openings coaxially aligning with the discharge tip to support an end of the guide tube, a support in the tubular body between the inlet connection and said screens for supporting the other end of the guide tube, a packing box connected with the support and the guide tube, and a packing sleeve in the packing box adapted to seal about the stem of a cleanout needle when projected through the guide tube, said support being arranged to pass fuel from the inlet connection toward the fuel discharge tip.

10. A vaporizer unit including, a tubular body,

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a coaxial cleanout needle guide tube within the tubular body, means supporting the cleanout needle guide tube coaxially with the discharge tip including a plate having apexes thereof indented within the tubular body and provided with an axial opening, a sleeve-like packing box having a reduced collar portion engaged in said opening and having an annular shoulder engaging the plate, an inturned flange on said collar cooperating with the shoulder to anchor the packing box to the plate of said support, a sleeve-like packing within the packing box, a follower in the packing box for compressing the sleeve-like packing, and an inturned flange on the packing box retaining the follower.

11. A vaporizer unit including a tubular body, a fuel discharge tip at one end of said body, the opposite end of said body having a reduced neck portion forming a shoulder in said body, a union nut slidable on said neck, a flange on said neck cooperating with the shoulder portion to retain the union nut, a cleanout needle guide tube extending coaxially of the tubular body, a spider-like support within the tubular body and seated on the shoulder for retaining one end of said guide tube in coaxial relation, a porous supporting means at the tip end of the tubular body for

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supporting the other end of the guide tube, and a packing material filling the space between the tubular body and tubular guide and extending between the spider-like support and said porous supporting means.

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