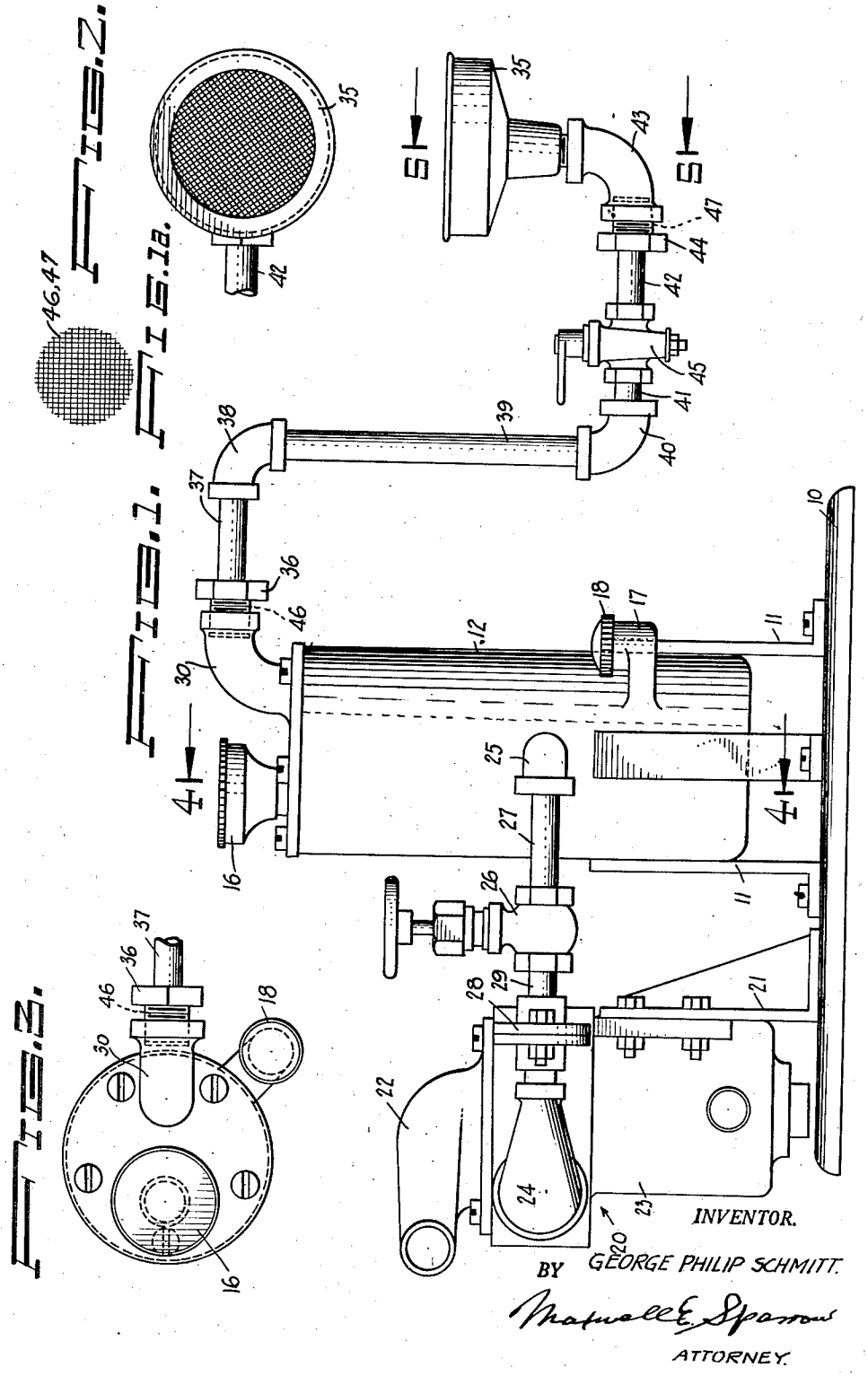
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CATALYTIC HEATER

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CATALYTIC HEATER

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Fig. 7.

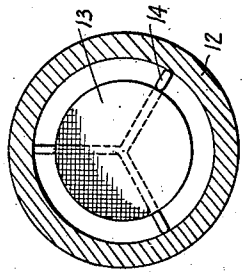


Fig. 8.

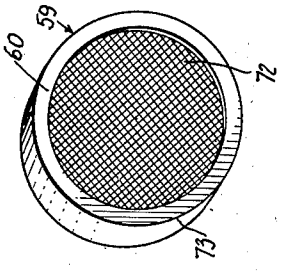


Fig. 5.

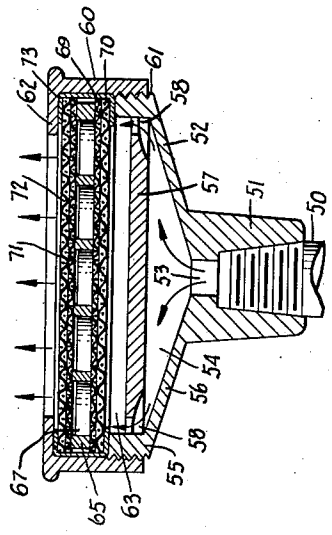


Fig. 6.

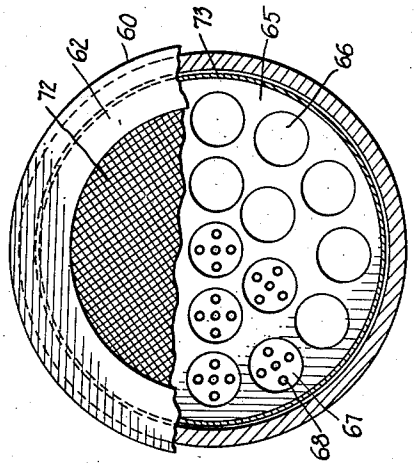


Fig. 4.

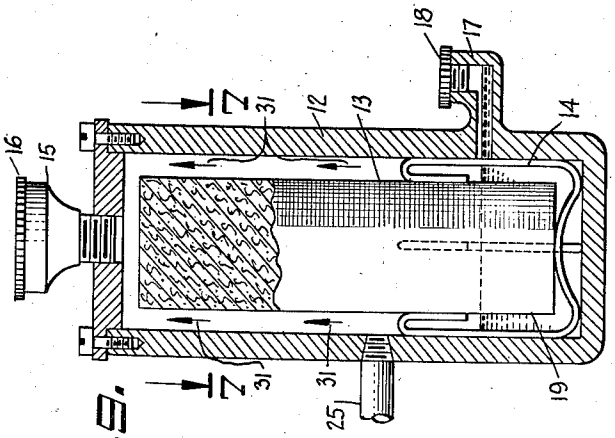
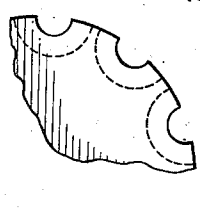


Fig. 9.



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CATALYTIC HEATER

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Application April 23, 1943, Serial No. 484,192

4 Claims. (Cl. 158—96)

This invention relates to catalytic heaters of the flameless type wherein a catalyst is employed which becomes incandescent in coaction with a vaporizable fluid, in the presence of air.

It is an object of the present invention to provide an efficient, practical, economical and simple heater for heating a compartment, room, etc., and which may be employed for cooking purposes.

It is another object of the present invention to provide a catalytic heater wherein the vaporizable fuel-air mixture for incandescing the catalyst is derived from a tank or receptacle containing the vaporizable fuel and in which air has been admitted by a blower or the like..

A further object of the present invention is to provide a catalytic heater unit adapted for use to heat the motor compartment of aircraft and other motor vehicles. Thus the device may be employed when the motor is not in operation for keeping the motor and its compartment warm and preventing the oil from thickening or freezing and motor parts from cracking.

It is a still further object of the present invention to provide means in the aforesaid catalytic unit indicating when the wick in the fuel container becomes saturated with the liquid fuel.

Another object of the present invention is to provide means in a catalytic heater for preventing the heat from striking back or backfiring into the fuel tank.

Still another object of the present invention is to provide a novel catalytic unit for the heater.

This invention accordingly consists in the features of construction, combination of parts and in the unique relations of the members and in the relative proportioning and disposition thereof, all as more completely outlined herein.

To enable others skilled in the art so fully to comprehend the underlying features thereof that they may embody the same by the modifications in structure and relation contemplated by this invention, drawings depicting a certain form of the invention have been annexed as a part of this disclosure, and in such drawings, like characters of reference denote corresponding parts throughout all of the views, of which:

Fig. 1 is a front elevational view of a catalytic heater embodying the invention;

Fig. 1*a* is a top plan view on enlarged scale of a screen employable in the invention;

Fig. 2 is a top plan view of the catalytic unit shown in the device of Fig. 1;

Fig. 3 is a top plan view of the blower shown in the device of Fig. 1;

Fig. 4 is a view mostly in vertical section taken through 4—4 of Fig. 1 looking in the direction of the arrows;

Fig. 5 is a vertical sectional view taken through 5—5 of Fig. 1;

Fig. 6 is an enlarged view, partly in section of the catalytic unit;

Fig. 7 is a transverse sectional view taken through 7—7 of Fig. 4 and looking in the direction of the arrows;

Fig. 8 is a perspective view of the catalytic unit; and

Fig. 9 is a fragmentary view of an element of the catalytic unit.

Referring now more particularly to the drawings there is disclosed a base 10 which may be any suitable or desired part upon which the heater device may be mounted. Upon base 10 there is mounted by means of brackets 11, a cylindrical casing or housing 12 containing a cylindrical contoured fuel charged absorbent mass or wick 13, which is preferably of a smaller outside diameter than the inside diameter of casing 12, thereby providing a space all around the wick. A spring 14 or other suitable standard may be employed to maintain the wick in position. The wick acts as an absorbent for the fuel which may be gasoline or alcohol fed into the casing through the fuel inlet 15 normally closed by the cover 16.

Above the bottom of casing 12 and projecting from its cylindrical wall is an outlet 17 threadedly engaging a closure cap 18. In filling the tank or casing 12, cap 18 is removed. The liquid fuel is poured into casing 12 and saturates the absorbent mass 13. After the mass or wick 13 becomes saturated, the liquid fuel 19 will rise in the casing 12 and overflow through outlet 17, indicating that the absorbent mass 13 has been saturated.

Disposed preferably in proximity to tank 12, is a conventional blower unit 20, which may be mounted on base 10, as by means of the bracket 21. Blower 20 is equipped with the air intake nozzle 22, casing 23 which houses the usual motor (not shown) and air outlet fitting 24. Tank 12 is provided with an air inlet pipe 25, disposed above overflow outlet 17. A valve 26 is interposed between outlet 24 and inlet 25. This valve 26 may be connected to inlet pipe 25 by means of a short length of pipe 27 and with outlet fitting 24 by means of a suitable packing unit 28 and short length of pipe 29. It is evident that the amount of air which may be fed into tank 12 may be regulated or controlled by valve 26. The purpose of providing air within tank 12 is to produce a volatilizable air and fuel mixture there-

within to be conducted through the pipe fitting 30 located at the top of tank 12, to the catalyst unit as hereinafter explained. The arrows 31 indicate the direction of this mixture. Any other means may be employed to provide air within chamber 12, as for example, a suction device to draw air through chamber 12.

The catalytic holder is generally indicated by the numeral 35. Conventional pipe connections may be employed to connect pipe fitting 30 to the catalytic holder 35, as for example, coupling 36, short conduit 37, elbow 38, conduit 39, elbow 40, nipples 41, 42; the latter nipple being connected to elbow 43 by coupling 44. Interposed between nipples 41, 42, is a valve 45 for regulating or controlling the air-fuel vapor mixture to the catalytic unit in holder 35. Although the drawings show but one catalytic unit being fed with the vaporizable mixture, it is understood that multiple outlets may be provided, either controlled by the single valve 45 or a valve for each outlet, to feed a plurality of catalytic units.

In order to prevent the heated fuel-air mixture backfiring from the catalytic unit in holder 35 into tank or chamber 12 it has been found desirable to interpose one or more screens or perforated disks in the feed line between the catalytic holder 35 and tank outlet 30. A relatively fine screen 46 may be inserted preferably in coupling 36 and another relatively fine screen 47 may be inserted in coupling 44. This screen 46 or 47 is shown in Fig. 1a on an enlarged scale.

Reference will now be made more particularly to the catalytic holder 35 and its catalyst unit (Figs. 5–8). Secured to elbow 43 is a nipple 50 which threadedly engages the hollow stem 51 of base 52. Stem 51 of base 52 has a perforation 53 providing communication between nipple 50 and the chamber 54 within base 52. Base 52 is cup-shaped having the annular portion 55 extending upwardly from the conically-shaped bottom 56 from the latter of which downwardly projects the stem 51. Seated within hollow base 52 and against annular portion 55 is a plate 57 having a plurality of peripherial notches 58. Resting on top of annular flange 55 of base 52, is the catalyst unit 59 which is held in place by a retainer member 60. Retainer member 60 threadedly engages base 52 as indicated at 61 and has an upper flanged portion 62 which overlies the catalyst unit 59. The space 63 between catalyst unit 59 and plate 57 provides a chamber for the fuel vapor from whence it contacts the catalytic elements within the catalyst unit 59.

The catalyst unit 59 comprises a plate 65 having a plurality of holes 66 within which are received catalytic elements 67. Each of the elements 67 is shown as being in the form of a pellet, block or disk which may be composed of a suitably spongy platinum composition or the like. Catalysts 67 may be provided with a plurality of perforations 68. Any number of catalytic elements 67 may be employed and they may be of any suitable size. It is possible to use a single catalyst of appropriate size, but it has been found expedient and practical to use a number of relatively small pellets.

Immediately below plate 65 there is disposed a wire screen 69, preferably of approximately seventy to one hundred mesh and under this screen 69 is a coarser wire screen 70 of approximately eight mesh. These screens are preferably made of an alloy of nickel and copper or nickel and chromium, which may be of the types known generally in the trade as "Monel" metal and "Nichrome." Immediately above plate 65 there is disposed a wire screen 71 preferably of approximately seventy to one hundred mesh and over screen 71 there is disposed another but coarser screen 72 of approximately eight mesh. Screens 71, 72 are preferably made of a nickel-chromium alloy, which may be of the type known generally in the trade as "Nichrome." The coarse screens 70 and 72 act as protective members for the finer screens 69, 71, and also prevent buckling thereof.

Plate 65 with its catalyst pills 67 and screens 69, 70, 71, 72, are all maintained in assembled positions by a channelled retainer ring 73, the whole comprising the unit illustrated in Figs. 5 and 8.

Although the catalytic heater hereinabove described may be employed generally for heating and cooking purposes, it is particularly useful in motor vehicles including air planes, where it may be placed in the motor compartment while the motor is not running for keeping the motor and compartment warm and preventing the oil from thickening or freezing, in cold weather. This device may be arranged such that the burner unit only is placed in the motor compartment, and put in operation immediately after the motor is shut off to maintain the motor and motor housing warm.

To operate the catalytic heater, blower 20 is put in operation, the amount of air entering tank 12 being controlled by valve 26. The air and fuel vapor mixture flows through valve 45 into contact with the catalytic elements 67. The catalysts 67 become incandescent in the presence of this combined fuel and air heats the complete unit.

It will thus be seen that there has been provided by this invention a catalytic heater in which the various objects hereinabove set forth, together with many thoroughly practical advantages, are successfully achieved.

As many possible embodiments may be made of the above invention, and as many changes might be made in the embodiments above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A catalytic heater comprising a casing, absorbent material to be saturated with vaporizable fuel, contained within said casing, said casing having a fuel inlet and a fuel overflow outlet below said inlet, air supply means connected to said casing between said inlet and said outlet for enabling air to contact with said absorbent material, a holder remotely disposed relative to said casing, a catalyst in said holder, hollow means connecting said holder with said casing and through which fuel charged air may flow from said casing to said catalyst, a valve in said hollow means for controlling said fuel charged air, and spaced-apart perforated members disposed across said hollow means.

2. A catalytic heater comprising a casing, absorbent material to be saturated with vaporizable fuel, contained within said casing, said casing having a fuel inlet and a fuel overflow outlet below said inlet, means connected to said casing between said inlet and said outlet for supplying air, a holder remotely disposed relative to said casing, a catalyst in said holder, hollow means connecting said holder with said casing and

through which fuel charged air may flow from said casing to said catalyst, and a perforated member disposed across said hollow means.

3. A catalytic heater comprising a casing, absorbent material to be saturated with vaporizable fuel, contained within said casing, said casing having a fuel inlet, a device connected to said casing for producing a supply of air to contact with fuel in said casing, a holder remotely disposed relative to said casing, a catalyst in said holder, hollow means connecting said holder with said casing and through which fuel charged air may flow from said casing to said catalyst, and a perforated member disposed across said hollow means.

4. A catalytic heater comprising a casing, absorbent material to be saturated with vaporizable fuel, contained within said casing, said casing having a fuel inlet, a device connected to said casing for producing a current of air under pressure to mix with fuel in said casing, a holder remotely disposed relative to said casing, a catalyst in said holder, and hollow means connecting said holder with said casing and through which fuel charged air may flow from said casing to said catalyst.

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