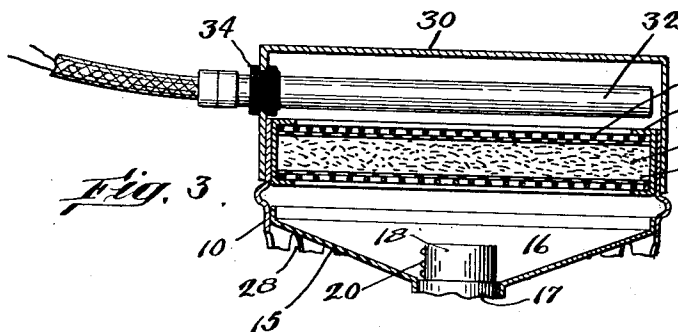
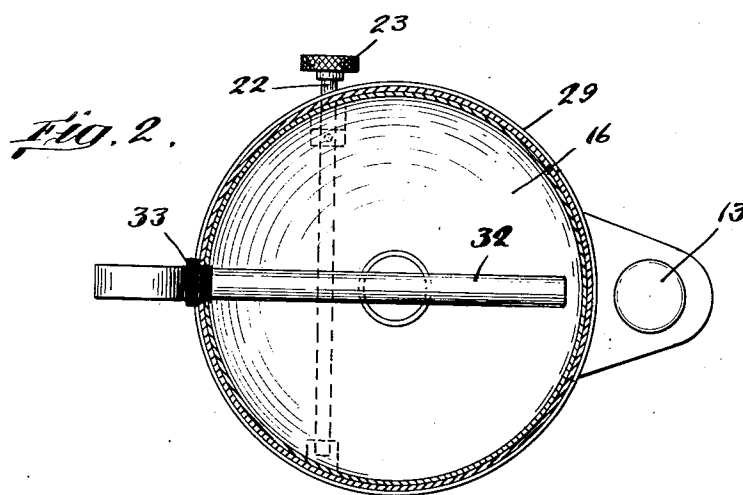
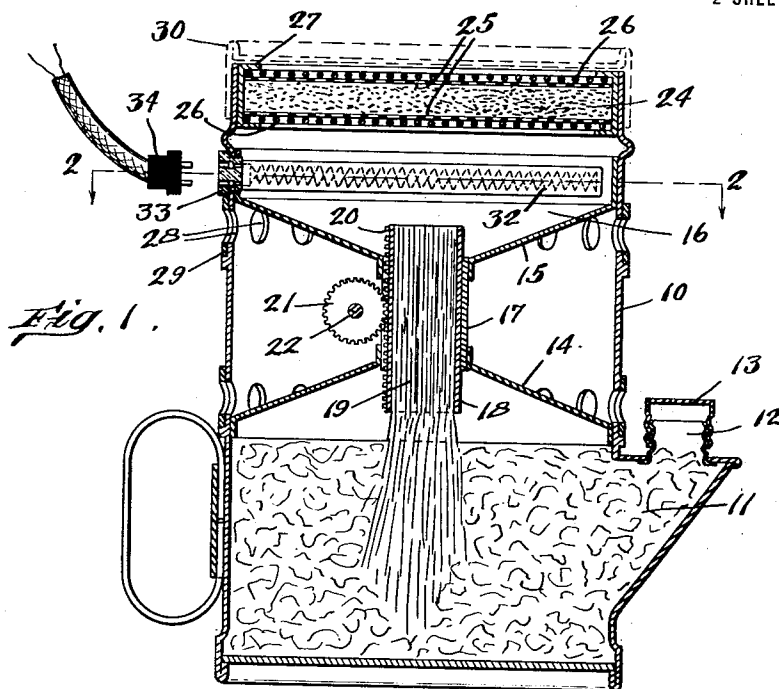


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J. HERCK.
CATALYTIC HEATING APPARATUS.
APPLICATION FILED APR. 25, 1917.

Patented July 27, 1920.

2 SHEETS—SHEET 1.



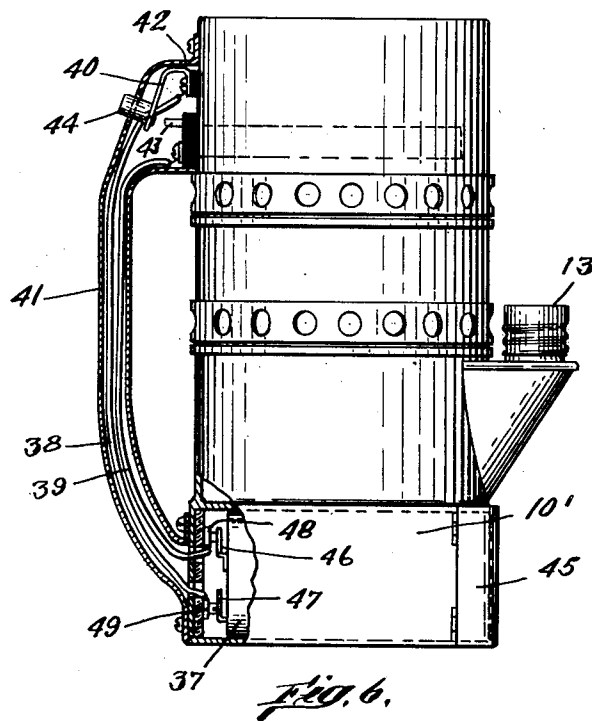
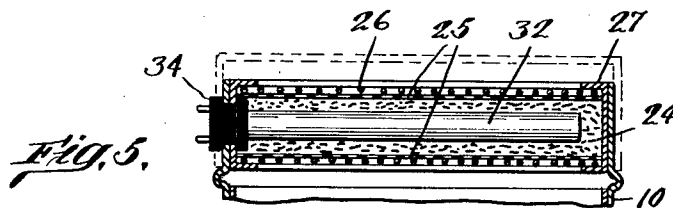
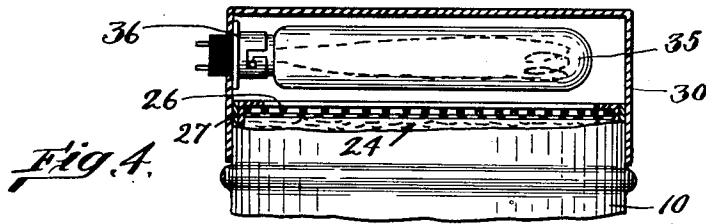
Inventor,
Jean Herck
by
B. V. Noyes
att'y

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2 SHEETS—SHEET 2.



Inventor.

Jean Herck
by
B. V. Noyes
Sally

UNITED STATES PATENT OFFICE.

JEAN HERCK, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS,
TO LA SOCIETE LYONNAISE DES RECHAUDS CATALYTIQUES, CAMELL, COCHET,
GRITTE & CIE., OF LYON, FRANCE.

CATALYTIC HEATING APPARATUS.

1,347,631.

Specification of Letters Patent.

Patented July 27, 1920.

Application filed April 25, 1917. Serial No. 164,392.

To all whom it may concern:

Be it known that I, JEAN HERCK, a citizen of the French Republic, residing at New York, in the county of New York and State of New York, have invented an Improvement in Catalytic Heating Apparatus, of which the following is a specification.

My invention relates to that type of heating apparatus in which a catalytic body is interposed in the path of flow of a combustible vapor and in which the vapor is heated upon its passage through the catalytic body sufficiently to unite with the air upon egress from the catalytic body and burns upon the surface of the catalytic body.

The object of my invention is to provide a safe and convenient means for starting the operation of the apparatus, after which the combustion may continue as long as desired.

The means I employ to accomplish the object of my invention is the provision of an electric heating element disposed adjacent the catalytic body, the action of which is to create an initial flow of combustible vapor from the volatile liquid employed as fuel through the catalytic body, which, as it issues into the air from said catalytic body, burns with the air and generates heat to maintain a flow of combustible vapor through the catalytic body to maintain the combustion for an indefinite period, or until the supply of the volatile liquid is exhausted.

Figure 1 shows a sectional elevation of a catalytic heating apparatus embodying my invention.

Fig. 2 is a sectional plan view of Fig. 1 along plane 2—2.

Fig. 3 is a partial sectional elevation of a modified heater disposition.

Fig. 4 illustrates a partial sectional elevation disclosing a modification of the heating element.

Fig. 5 is a partial sectional elevation of a further modification of the heating element disposition.

Fig. 6 is an elevation, partially in section, of a heater having an entirely self-contained means of starting the combustion.

As here shown, the heater comprises a casing 10 in the bottom of which is disposed a quantity of an absorbent material 11, such as cotton wool, which is adapted to absorb

the volatile liquid employed as fuel and which is introduced through the opening in the filler neck 12 which is normally closed by the cap 13.

That part of casing 10 containing the absorbent material 11 forms a chamber for the liquid fuel and is inclosed at the top by the cover or plate 14, formed as a truncated cone and secured within casing 10 above the absorbent material 11 by soldering.

A second similar plate 15 is disposed in casing 10 in an inverted position above plate 14, and forms one inclosure for the combustible vapor chamber 16, the other inclosures of which are the casing 10 and the catalytic body. A short tube 17 connects the two plates 14 and 15, and a wick holder 18 containing a wick 19 is slidably disposed in this tube and forms a means for access of volatile fluid from its chamber to the vapor chamber 16. As the liquid employed for fuel is volatile, the chamber 16 will always contain the vapor of the liquid.

Wick holder 18 is adjustable in tube 17 by means of a rack 20, incorporated with it, which is engaged by a pinion 21 secured to a shaft 22 journaled in bearings in the casing 10. An end of the shaft projects through the casing and terminates in a thumb wheel 23 by means of which the shaft may be rotated to vary the position of the wick in the vapor chamber 16 for the purpose of varying the supply of vapor to the chamber for a reason to be hereinafter explained, although the apparatus operates satisfactorily without any wick-adjusting means.

The catalytic heating unit, which is disposed in casing 10 above plate 15 and forms one inclosure for the vapor chamber 16 as heretofore noted, comprises a porous catalytic body 24, such as platinized asbestos, inclosed between two disks of a perforated material 25, such as wire gauze, and further protected by two coarse mesh screens 26, all of which are inclosed between the flanges of the channel section ring 27 secured in the upper part of the casing 10.

The combustible vapor contained in the vapor chamber 16, as it flows through the catalytic body 24, becomes heated in its passage therethrough to such a degree that, as it reaches the outer surface of the catalytic body exposed to the atmosphere, it unites with the air and burns, heating the surface

of the catalytic body to incandescence, or giving off what is termed "radiant heat," without perceptible flame.

Some of the heat of combustion of the vapor is communicated to the vapor chamber 16 by the catalytic body and aids in the vaporization of the liquid supplied by wick 19, and the amount of the fuel vaporized may be regulated by moving the wick nearer to or farther away from the catalytic body, as may be necessary to adjust the apparatus for the amount of heat desired.

The chamber formed between the two truncated cones or plates 14 and 15 is maintained at suitable temperature by permitting a circulation of air to take place therein through air holes 28 disposed in casing 10 at the top and bottom of the chamber. The amount of opening of these air holes is controlled by the rotatable rings 29 which serve to determine the volume of air circulating in the chamber, and consequently the temperature of the vapor chamber 16, and, therefore, the amount of vapor generated, and this, in addition to the adjustment provided for in the wick 19, determines the amount of heat generated by the device.

When it is desired to stop the operation of the apparatus, which, when once started, is continuous so long as fuel is supplied to it, the cover or cap 30 is slipped on the casing 10 over the catalytic heating unit. This serves to prevent access of air to the catalytic body and consequently combustion immediately ceases.

When the heating device is cold, the mere removal of the cap 30 and the consequent exposure of the catalytic body to the air is not sufficient to start the combustion, and some means must be provided to create an initial flow of the combustible vapor through the catalytic body. The preferred and most convenient means of accomplishing this result is to place an electric heating unit, shown here as consisting of a coil of resistance wire inclosed in the tube 32 secured to the wall of casing 10 by an insulating bushing 33, within the vapor chamber 16.

The resistance unit is connected to a source of current supply by means of a plug 34, when it is desired to start the operation of the apparatus.

When the resistance unit is connected to the source of current, the heat generated serves to increase the temperature of the vapor in the chamber 16, which serves to vaporize additional fuel supplied by the wick 19, and also to create a slight pressure difference between the vapor chamber 16 and the external atmosphere which results in an initial flow of vapor through the catalytic body. This vapor, as it flows through the catalytic body, is heated and burns with the air supplied at the top of the catalytic heating unit and the heat of com-

combustion is sufficient to create a draft to pull more vapor through the catalytic body and to vaporize additional vapor from the wick 19 to maintain a sufficient supply in the vapor chamber. After the initial flow of vapor is set up through the porous catalytic body and combustion has begun, the heating element may be disconnected from the current source and the combustion will continue as long as fuel is supplied to the fuel chamber.

The heating unit may be placed in many positions with respect to the catalytic heating unit and be successful in operation, and the heating unit may take any desired form. Fig. 3 illustrates a disposition of the electric heating unit above the catalytic heating unit in the detachable cover 30. In this case the combustion is started with this cap on casing 10 over the catalytic body and after sufficient heat has been generated to cause the continuous operating of the heating apparatus the cap may be removed.

Fig. 4 illustrates a modification of the electric heating unit to replace the unit of Fig. 3 in which an electric lamp 35 serves the same purpose as the coils of wire in tube 32, the lamp being secured in a suitable socket 36 attached to cap 30.

In Fig. 5 the electric heating unit is inserted directly in the catalytic body.

In the electric heating units previously described, the source of current, such as an electric lighting main, was disposed without the heating apparatus, but in Fig. 6 is shown a design of heating apparatus in which the current source is a battery 37 contained in the base of the casing 10, under the fuel chamber and connection is made from said battery, through wires 38 and 39 and switch member 40 concealed in the tubular handle 41, to the terminals 42 and 43 of the electric heating unit disposed in said casing. Switch member 40 is provided with an insulating button 44 which projects through a hole in said handle and is adapted to be depressed for a short interval to permit current to flow through the electric heating unit to start the operation of the device after which the button is released and the combustion is self-maintained.

Access to the battery 37 in its chamber may be obtained through the door 45 which is normally closed and serves to maintain the battery spring terminals 46 and 47 in contact with the terminals 48 and 49 of the wires 38 and 39.

I claim:—

1. A portable catalytic heating apparatus comprising a closed container adapted to receive a supply of volatile combustible fluid, a porous body of catalytic material arranged in the top of said container above the fluid therein and forming a closure therefor, an electric heating element arranged in said

container adjacent said catalytic body to heat it, and also the vapor of the volatile fluid therein, said heating element having its terminals extended through the side wall of said container and arranged for detachable connection to a source of electric energy.

2. A portable catalytic heating apparatus comprising a closed container having a heat-conducting side-wall, said container arranged to receive a supply of volatile combustible fluid in the lower portion thereof, a porous body of catalytic material arranged in the top of said container and forming a closure therefor, said container arranged to provide a chamber between said catalytic body and the fluid supply adapted to be filled with vapor of the fluid, an electric heating element disposed within said chamber adjacent said catalytic body arranged to heat said catalytic body, the vapor of the combustible fluid and the wall of the container, by which latter heat is imparted to the volatile fluid for its vaporization, said electric heating element having its terminals extended without said container and arranged for detachable connection with a source of electric energy.

3. A portable catalytic heating apparatus

comprising a container adapted to receive a supply of volatile combustible fluid in the bottom thereof, a porous catalytic body arranged in the top of said casing above the liquid therein, said catalytic body comprising an annular ring of substantial width having its peripheral portion in substantial engagement with the wall of said container, screens secured to the top and bottom edges of said ring, and a porous catalytic mass inclosed therebetween, said ring having an aperture therethrough, and the wall of said container having an aperture therethrough alined with the aperture in the wall of said ring, an insulating bushing extended through the alined-apertures, and an electric heating element arranged in said catalytic mass having its terminals extended through said bushing and arranged for detachable connection with a source of electric energy.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JEAN HERCK.

Witnesses:

WM. E. BARBER,
OTTO F. SEIRER.