Sept. 12, 1961 H. WAGNER 2,999,534

CATALYTIC HEATING DEVICE

Filed Aug. 13, 1956

FIG. 1

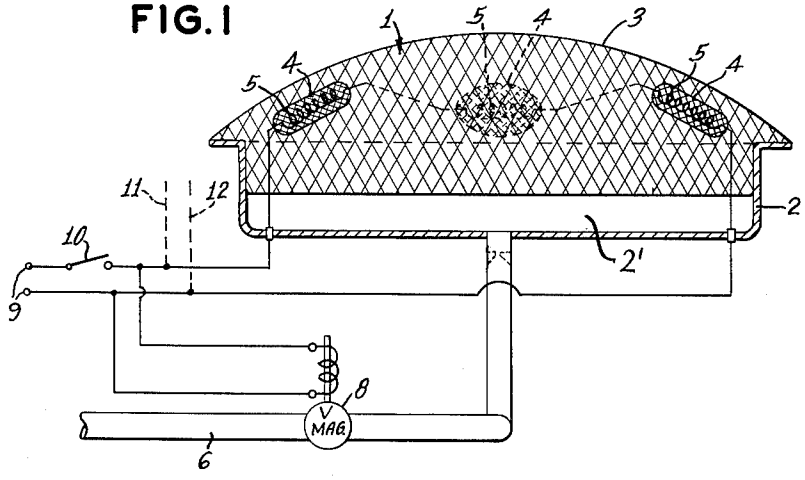
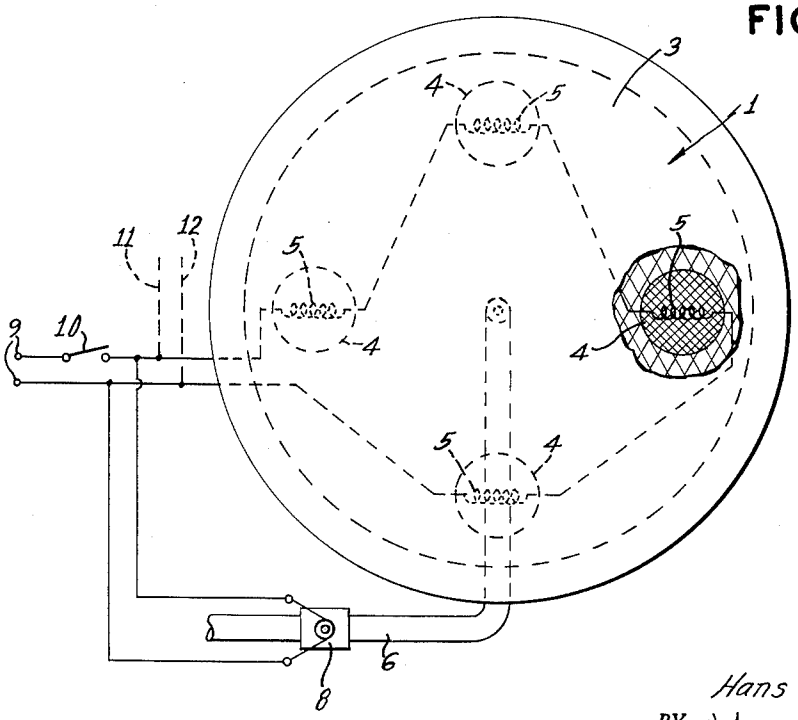


FIG. 2



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CATALYTIC HEATING DEVICE

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The invention relates to a catalytic heater for operation with gaseous or gasified liquid fuel whose catalytic heating pad consists of a substance of low catalytic activity in which pockets of a substance of high catalytic activity are embedded and which is fitted with electrical resistance-heating wires.

To operate the heater, the resistance heating wires are switched into a circuit and supplied with current until the heating pad is heated sufficiently to initiate and maintain catalytic reaction.

Thus, the resistance heating wires serve as an aid in warming the heater up, but not as protection against interruption of the catalytic reaction while the heater is in operation—because of temporarily cut-off gas, for instance.

The object of the invention is to provide a heater of the type under discussion which serves both as a warming-up aid as protection against the mentioned lack of gas. This is accomplished by locating the resistance heating wires in the immediate vicinity of the pockets and keeping them supplied with current while the device is in operation. Placing the source of heat directly within the range of the catalytically highly active heating pad areas offers, moreover, the advantage that less electric energy is needed to warm up the heating pad, since the catalytically highly active parts will cause a vigorous catalytic reaction even after a slight warming up and thus become a source of heat for the rest of the heating pad.

The aforementioned protection against operating trouble resulting from disruption of the catalytic reaction because of lack of gas works as follows:

If the gas supply to the heating pad is cut off for some reason, the main section of the heating pad cools off, and the catalytic reaction dies down.

However, the electrically heated pockets within the heating pad remain highly heated while this condition prevails.

When the gas supply to the heating pad is restored, a brisk catalytic reaction sets in within the range of the pockets. As a result, sufficient heat will be released to bring the entire heating pad up to the heat level required for catalytic reaction and to restore proper operation of the heater.

In this way, unburned gases are largely prevented from escaping into the room to be heated.

In a practical embodiment of the object of invention, an electromagnetic valve is connected to the source of current that supplies the resistance heating-element circuit. This valve controls the fuel supply to the heating device in such a way that it acts as current-shortage protection. In another embodiment, a hand switch is inserted in the electromagnetic-valve circuit.

In the drawing, the object of invention is shown in the form of an embodiment.

FIG. 1 is a vertical sectional view of the heater covered by the invention and a diagrammatic illustration of the controls therefor.

FIG. 2 is a plan view of the device with a portion cut-away for illustrative purposes.

The heating device consists of a catalytic heating pad 1 and a housing 2 into which the heating pad is set in such a way that there is an empty space 2' below the heating pad which serves as a gas-distribution chamber.

The heating pad consists essentially of a material permeable to gas and of low catalytic activity in which, however, pockets 4 of material permeable to gas and of high catalytic activity are embedded. These pockets are preferably set apart from one another and close to the surface 3 of the heating pad.

Directly within the range of the pockets are electrical resistance heating wires 5, which are connected to a source of current and supplied with current while the heater is in operation.

The electrical wiring is laid out in such a way that all resistance heating wires are within the same circuit. The source of current also supplies an electromagnetic valve 8 which controls the gas supply line 6 to the heating pad in such a way that the gas supply is open when current flows from the source, but closed when no current flows. In this way, the device is protected against lack of current. The electric power lines are indicated at 11 and 12 and a switch 10 may be provided in the power circuit and connecting terminals 9 may also be provided in the power circuit.

While I have shown and described the preferred embodiments of my invention, it will be understood that various changes may be made in the idea or principles of the invention within the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A catalytic heater for operation with gaseous or gasified liquid fuel comprising, a catalytic heating pad made of a material of low catalytic activity, said pad having a plurality of spaced portions made of a material of high catalytic activity and being embedded internally of said pad and entirely enclosed by said pad entirely beneath the outer surface thereof and spaced from said outer surface, electric heating elements operatively associated with said spaced portions of high catalytic activity, respectively, for causing vigorous catalytic reaction in said spaced portions, whereby said spaced portions of high catalytic activity activate said heating pad in adjacent spaced portions thereof for accelerating the catalytic operation of said heating pad.

2. A catalytic heater for operation with gaseous or gasified liquid fuel comprising, a catalytic heating pad made of a material of low catalytic activity, said pad having a portion made of a material of high catalytic activity and being embedded internally of said pad and entirely enclosed by said pad entirely beneath the outer surface thereof and spaced from said outer surface, an electric heating element operatively associated with said portion of high catalytic activity and located directly within the range thereof for causing vigorous catalytic reaction in said portion whereby said portion activates said heating pad for accelerating the catalytic operation thereof, a valve for controlling the flow of fuel to said heating pad, and an electromagnet operable in response to the flow of current to said electrical heating element for automatically opening said valve only when current flows through said heating element and for automatically closing said valve when no current flows through said heating element.

3. A catalytic heater for operation with gaseous or gasified liquid fuel comprising, a housing, a catalytic heating pad mounted on said housing, a fuel conduit connected to said housing for conducting fuel to said heating pad, said pad comprising material of low catalytic activity and having a portion made of material of relatively high catalytic activity embedded in said pad internally thereof and entirely enclosed by said pad entirely beneath the outer surface thereof and spaced from said outer surface, an electrical heating element operatively associated with said highly catalytic portion and located

directly within the range thereof for causing vigorous catalytic reaction in said portion, whereby said portion activates said heating pad in adjacent portions thereof for accelerating the catalytic operation of said heating pad, a valve for controlling the flow of fuel through said conduit to said heating pad, and an electromagnet operable in response to the flow of current through said electrical heating element for automatically opening said valve only when current flows through said electrical heating element and for automatically closing said valve when no current flows through said heating element.

4. A catalytic heater for operation with gaseous or gasified liquid fuel comprising, a catalytic heating pad made of material of low catalytic activity, said pad having a portion made of a material of high catalytic activity embedded internally of said pad entirely beneath the outer surface thereof and entirely enclosed by said pad and spaced from said outer surface, and heating means operatively associated with said highly catalytic portion and

located directly within the range thereof for causing vigorous catalytic reaction in said portion, whereby said highly catalytic portion activates said heating pad in adjacent portions thereof for accelerating the catalytic operation of said heating pad.

References Cited in the file of this patent

UNITED STATES PATENTS

613,990	Guyenot	Nov. 8, 1898
1,575,170	Knopp	Mar. 2, 1926
2,735,483	Brodbeck et al.	Feb. 21, 1956
2,803,295	Ambrose et al.	Aug. 20, 1957

FOREIGN PATENTS

491,859	Germany	Feb. 25, 1930
659,698	Germany	May 9, 1938
710,012	Germany	Sept. 1, 1941