

Oct. 14, 1958

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2,855,770

DEVICE FOR THE AUTOMATIC RE-LIGHTING OF GAS BURNERS

Filed June 30, 1954

FIG.1

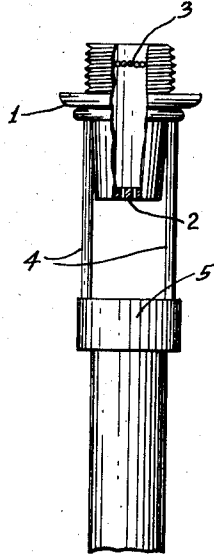
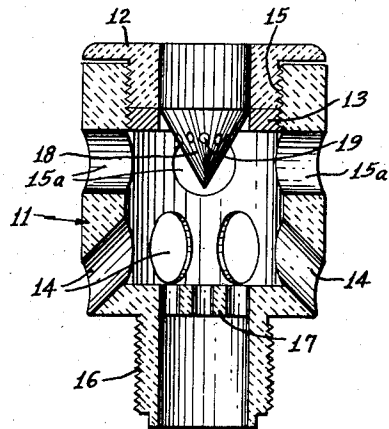


FIG. 2



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Application June 30, 1954, Serial No. 440,399

Claims priority, application Germany July 4, 1953

7 Claims. (Cl. 67—19)

The present invention relates to gas burners, particularly those intended for use with relatively heavy gaseous hydrocarbons such as propane or butane. It is an object of the invention to provide protection against the gas flames becoming accidentally extinguished. A further object is to provide improved means which ensure automatic relighting when the gas flame has become extinguished under external influences such for example as strong draughts of air.

A further object of the invention is to solve this problem in a progressive and technically advantageous manner. According to the invention there is arranged, facing the gas-outlet aperture of the burner orifice at the location of the burning gas flame, a highly heat-resistant body capable of storing heat, which carries a metallic catalyst effecting the ignition. Particularly suitable for the purpose of the invention is a body, capable of heat storage, made of customary ceramic materials, such for example as steatite.

The device according to the invention is mainly intended for gas burners destined for use in the open air, particularly in equipment for street, rail and sea traffic, for example in signal lamps and in railway-point heating devices, where they are liable to be exposed to extreme external influences, such as humidity or moisture, draughts of air which, in the case of employment in railway-point heating apparatus may be generated by passing railway trains, further gales and vibrations and variations of position, it is necessary for these circumstances to be taken into consideration in the construction of the apparatus.

It is therefore a further object of the invention to ensure that the heat-storage device will maintain the catalyst sufficiently warm after extinction for an extended period of time, up to the length of a few minutes, to enable it to relight the hydrocarbon-air mixture when the influence of the interfering circumstance has terminated. A ceramic front member heated by the burning gas flame in the construction according to the invention, which for example may consist of steatite, will after extinction of the gas flame yield its heat relatively slowly to the surrounding air or to a passing draught of cold air, and maintain the metal catalyst connected with it at a sufficiently high temperature to ensure that as soon as the combustible gas-air mixture passes it again after cessation of the interference, the catalyst will be raised to bright incandescence and is thus enabled to relight the gas-air mixture within a few seconds.

Two gas-burner constructions according to the invention shall now be explained by way of example with reference to accompanying drawings.

Fig. 1 is a side elevation showing the end of a gas burner in which a heat-storing ignition front member according to the invention has been mounted in front of its gas outlet aperture, part of the body being broken away to show the interior.

Fig. 2 is an axial section, showing a different con-

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struction of an ignition front member according to the invention.

Fig. 1 illustrates a simple embodiment of the invention. A hollow cylindrical ceramic body 1 having the size of a normal ceramic burner mouthpiece is arranged approximately in the middle of the gas flame. Across the cylindrical bore of the heat-storing body 1, preferably at the lower aperture thereof or else in its central portion, there is disposed a screen plate 2 having multiple perforations, which serves to ensure thorough mixing of the combustible gas with air and to reduce the flow velocity. Extended across that aperture of the hollow ceramic cylinder 1, through which the gas-air mixture flows out, there is arranged a metal catalyst 3, preferably consisting of platinum, in the form of a netting or of several wires, which serves to effect the ignition. It is advisable for the ceramic heat-restoring body to be also impregnated with platinum metal, in order to increase still further the reliability of ignition. The ceramic heat-storing body is connected with the burner mouth piece by means of a framework 4 which preferably consists of two rods made of temperature-resistant material.

The distance between the hollow ceramic body and the burner mouth piece is preferably determined in such manner according to the oxygen requirement of the combustible gas and to the oxygen content of the gas mixture flowing out of the burner head that the distance is the greater, the less the air content of the mixture is and the higher the oxygen requirement of the pure gas is; for the quantity of air admixed and thus the inflammability of the mixture increases up to a predetermined upper limit with the distance from the burner mouthpiece. Since only a fraction of the gas-air mixture will flow through the heat-storing ceramic body, it is only necessary for this small quantity of gas to be ignited.

Fig. 2 illustrates an ignition attachment which constitutes a further development in various respects. According to the invention it mainly consists of a hollow cylinder 11 of highly heat-resistant material, preferably of ceramic material, and is mounted directly upon the burner mouthpiece proper, into which it is screwed with the help of a screw-threaded projection 16 of the attachment member. A substantial part of the catalytically acting platinum or other platinum metals of suitable catalytic action is distributed in the form of an impregnation over the surface of the porous, non-metallic, heat resistant small ceramic bodies 19, so called ignition pills the surface of which is large relative to their volume, and which are threaded on wires 18 of platinum or platinum metals or supported thereon. These pills are thus exposed in such a manner to the flow of gas or to the flame that they are heated when the flame is burning and that when the flame has become extinguished they will, due to their highly heat-conductive metal connection with the wall of the heater accumulator 11, remain for a relatively long time at a temperature which will substantially assist catalytic re-ignition when the interference has ended.

The wire netting 18, which may be flat or funnel shaped, and which carries the ignition pills, is advantageously held in heat-conductive contact with the surface of the heat accumulator by means of a ring 13 made of highly oxidation resistant material, for example of the silicon-chromium-iron alloy known under the name "Sicromal," and adapted to be inserted into the flame-outlet aperture of the attachment. A nut 12 made of the same material or of any suitable ceramic material may be screwed into the outlet aperture 15 to secure the annular frame 13.

In order to increase reliability operation the shell of the ceramic heat-storage member is preferably provided

with suction passages 14 leading to the outer air, which ensure adequate supply of secondary air to the gas flame and which preferably should form an acute angle with the direction of gas flow in order to increase the suction effect and thus to assist the introduction of air. Advantageously furthermore flames are arranged to originate not only from the front aperture 15 but also from lateral apertures 15a of the heat storage member 11. A screen plate 17, the object of which is to thoroughly mix the burner gases and primary air forms a further constructional element and is placed in the gas-entry aperture facing the burner.

As material for the porous ceramic bodies referred to as ignition pills 19 meerschaum and steatite have been found very satisfactory but other ceramic materials may be just as suitable.

Practical experience has shown that the ignition attachment according to Fig. 2, is distinguished not only by great reliability of operation but also by its convenience of handling which is due to its short length and its consequent relatively low sensitivity to impacts and vibrations. Due to the high porosity of the ceramic ignition pills 19, the catalytic action of the platinum impregnated surfaces is particularly high so that catalytic ignition will take place at substantially lower catalyst temperatures than in the case of bright platinum wires. The shell of the ceramic heat-storage member protects the burners against the external draughts of air to which they are liable to be greatly exposed for example when used as signal lamps or in railway-point heating apparatus or other apparatus for use in street, rail and sea traffic. Also the danger of soiling and the influence of moisture upon the sensitive ignition pills is thereby greatly reduced.

Although the usual highly heat-resistant ceramic materials such as sintered aluminum oxides or steatite are particularly recommended for the manufacture of the heat-storage member, there is no objection to the latter and other parts of the apparatus being made from highly oxidation resistant metal alloys for example of the Si-Cr-Al-Fe alloy known under the registered trade mark Sicromal or of sintered ceramo-metallic material consisting of metals or metal-oxide mixtures, which are distinguished by relatively great resistance to temperature changes.

The provision of the inclined lateral passages 14 for the supply of secondary air also greatly contributes to the desirable qualities of this embodiment, since it allows the suction effect of the gas flame to come more strongly into effect so as to ensure an adequate supply of air even when employing what may be referred to as "heavy" gaseous hydrocarbons which, as compared with methane and ethane, have a high molecular weight. The invention is however also of advantage in burners which are fed with ordinary gaseous hydrocarbons such as methane and ethane.

Preferably devices are additionally provided which by utilising the injector effect of the gas flow ensure good admixture of air to the burning gas, even in the case when the flame has become extinguished, thus preventing complete displacement of the air from the ignition chamber of the heat storage member by the combustion gas.

The device according to the invention is mainly intended for burners fed with gaseous hydrocarbons to safeguard the flame against extinction or relight it automatically. It is particularly suitable for gas burners which are used in the open air, for example for burners used in railway systems for preventing the freezing over of railway points or for the thawing of frozen points, in which case a whole series of gas burners are arranged side by side in a single device. In this case, in which the gas flames are liable to be blown out by the wind caused by the movement of passing rail vehicles, the present in-

vention provides a decisive remedy by on the one hand reducing the danger of extinction and on the other hand in any case ensuring automatic re-ignition even after relatively long interruptions which may extend over several minutes.

Similar conditions occur in sea traffic, where for example buoys and lamps equipped with gas burners are generally exposed to strong sea winds or gales.

The invention has been found particularly useful when the burners are fed with "heavy" gaseous hydrocarbons such as propane and butane. These, as is known, require several times the volume of air which is required for the quantitative combustion of town gas or of ethane or methane. It has been previously endeavoured to take this fact into consideration by employing for the ignition of burners fed with propane or butane instead of ordinary platinum catalysts, one or several platinum coils; these coils however, had first to be raised to dark red glow-heat temperature by electrical resistance heating in order to enable them to ignite the gas mixture rich in air. The same effect is obtained in a much simpler and more economical manner by the device according to the present invention.

I claim:

1. A device for the automatic re-lighting of a gas flame, comprising a heat resistant body capable of storing heat, a catalyst supported by the heat resistant body in the path of flow of a gas-air mixture, and the heat storing body being mounted to receive gas from a supply source.

2. A device, according to claim 1, wherein the heat-storing body consists of ceramic material.

3. A device, according to claim 1, wherein the heat-storing body consists of a highly oxidation resistant metal alloy.

4. A device, according to claim 1, characterized in that the heat-storing body is made of a sintered ceramo-metallic material composed of metal and metal oxides.

5. A device for the automatic re-lighting of a gas fed to a burner, comprising a cylindrical shell of highly heat resistant and heat-storing material carrying metallic catalyst, said cylinder shell arranged in front of the gas supply aperture of the burner so that the burner flame with its hot zone extends through said shell, and said shell encompassing, arranged crosswise to its cylinder axis, and a platinum wire netting in good heat conducting contact with the shell.

6. A device for the automatic re-lighting of a gas fed to a burner comprising a highly heat resistant cylindrical shell body capable of storing heat, provided with a gas entrance aperture at one end and with a flame outlet aperture at its opposite end and openings in the cylinder shell for the admission of air, said body being mounted directly upon the burner mouthpiece, so that the burner flame extends through said shell in the direction of the longitudinal axis thereof, including porous bodies of heat resistant and heat storing material impregnated with platinum mounted within the cylinder shell crosswise to the flow of gas and carried by a wire netting of platinum metal, said netting being secured on the inner wall of said heat storing body in heat conducting contact with said body.

7. A device, according to claim 6, wherein passages are provided which extend through the cylinder shell adjacent the gas-entry end at an acute angle to the direction of the flow of gas, to supply air under the suction effect of the flow of gas.

References Cited in the file of this patent

UNITED STATES PATENTS

70	757,219	Oberlander	Apr. 12, 1904
	1,120,363	Berthold	Dec. 8, 1914
	2,073,448	Fruth et al.	Mar. 9, 1937
	2,558,061	Schmitt	June 26, 1951