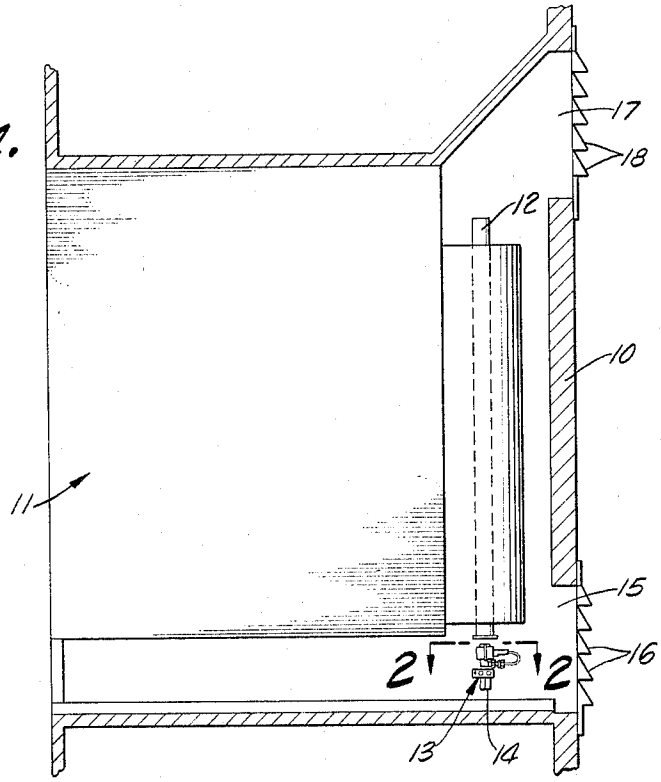
Oct. 4, 1966 A. B. FREDHOLD, JR., ETAL 3,276,509

FLAME PROTECTOR FOR GAS BURNERS

Filed March 30, 1964

FIG. 1.



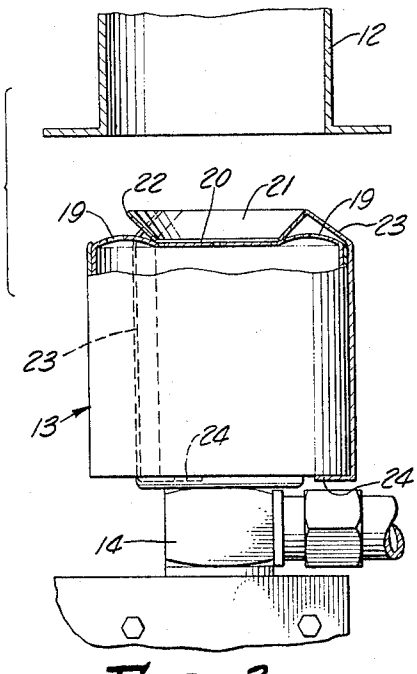


FIG. 3.

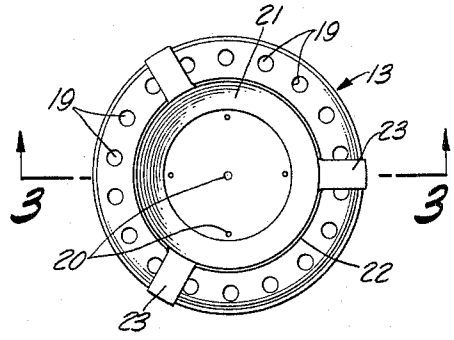


FIG. 2.

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3,276,509

Patented Oct. 4, 1966

3,276,509

FLAME PROTECTOR FOR GAS BURNERS

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Filed Mar. 30, 1964, Ser. No. 355,858
1 Claim. (Cl. 158—113)

This invention relates to a flame protector or flame retention ring for gas burners and particularly to a type of gas burner used in the construction of gas refrigerators used in house trailers, campers, and the like.

Explanatory for the present invention, house trailers, campers, and the like now frequently employ gas refrigerators which are operated by a gas burner having a relatively low stand-by flame. Such a burner is usually located vertically beneath and in spaced relation to the lower end of a vertical flue tube around which there may be arranged a heat exchange coil containing the fluids of the gas refrigerator. The flue tube and the burner structures as applied to this invention are usually located near an outside wall of the house trailer or camper and louvered vents are usually arranged near the bottom of the flue tube and near the top of the flue tube in the outside wall. The lower louvered vent is usually relied upon to permit ingress of air to supply the oxygen for combustion of the gas issuing from the burner, and the upper louvered vent is usually relied upon to permit the products of combustion after they have risen to the flue tube to escape through the outside wall of the trailer to the exterior thereof. The burner conventionally employed for this purpose is a small cylindrical burner having a top in which there is usually an annular row of perforations. There may or may not be central perforations in the top of the burner.

It has been found that frequently the flame of the burner which is usually small becomes blown out and extinguished. This may occur as a result of either of two different circumstances. A strong wind blowing against the exterior of the trailer or camper and through the lower vent may blow across the top of the burner with sufficient force to blow out the flame and cause the flame to be extinguished. The other circumstance may be occasioned when the trailer or camper is moving in one direction along a road or highway and passes a truck or vehicle that is moving along the highway in the opposite direction. Under these conditions, there may be a sudden puffs of air through the upper vent which is caused to pass suddenly down through the flue tube. This puff which is directed by the flue tube down against the top of the burner spreads the flame of the burner and extinguishes it.

A primary object of the present invention is to provide a shield or flame retention ring which can be easily and quickly applied to the burner and which will protect the flame of the burner from being extinguished in the event of either of the above mentioned contingencies.

With the foregoing and other objects in view which will become manifest in the following detailed description and specifically pointed out in the appended claim, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

FIGURE 1 is a partial view in vertical section through a portion of an exterior wall of a house trailer or camper showing the refrigerator adjacent thereto and its burner supplied with the flame retention ring embodying the present invention.

FIGURE 2 is a view of the burner taken substantially upon the line 2—2 upon FIGURE 1 in the direction indicated.

FIGURE 3 is a partial view largely in section taken substantially upon the line 3—3 upon FIGURE 2.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, 10 indicates an exterior wall of a house trailer or camper adjacent which there is installed a gas refrigerator generally indicated at 11. The details of construction of the gas refrigerator 11 are variable and are immaterial except for environmental use of the burner and protector in so far as the present invention is concerned. However, most constructions of this type have a vertical flue tube 12 that is located at the back of the refrigerator adjacent the exterior wall 10 and beneath which there is a gas burner generally indicated at 13, that is supplied with gaseous fluid through a conduit 14 from a tank or other source of supply (not shown). The lower end of the flue tube 12 is disposed near a lower vent 15 in the wall 10 that is normally covered by louvers 16. The upper end of the flue tube 12 is disposed adjacent an upper vent 17 in the wall 10 which is likewise normally covered by louvers 18. The burner 13 is of generally cylindrical shape having in its top an annular row of perforations 19. There may or may not be in addition to these perforations central perforations 20. A typical burner used for this purpose is a "Teddington type TZ," although the invention is applicable to other types of burners having the same general construction or configuration.

As previously stated, a strong wind blowing laterally against the exterior wall 10 and through the lower vent 15 can sweep across the top of the burner and blow out and extinguish all of the flames issuing from the perforations 19 and the perforations 20, if the latter perforations exist. Also, in the course of travel, if the trailer or camper passes a truck or other large vehicle that is moving in the opposite direction, a momentary puff of air sometimes enters the upper vent 17 and passes down through the flute tube 12 against the top of the burner 13. In the latter event, the flames issuing from the perforations 19 are caused to spread radially and the flame to be extinguished. The blowing out of the flames in either contingency is rather easily accomplished, particularly when the flame is small as is the case when only a stand-by flame is being employed.

The device embodying the invention consists of a concavo-convex ring 21 that may be stamped from sheet metal or otherwise constructed. This ring may be frustoconical in shape, as shown, or may be in the form of a section of spherical shape. It rests at its inner and lower edge on the top of the burner 13 and extends upwardly and outwardly terminating in an outer annular edge 22, which is disposed adjacent but not directly over the perforations 19. This edge 22 should be sufficiently close to the flow issuing from the perforations 19 so that the ring will be heated thereby and avoid the deposit of carbon thereon. The ring is held centrally on the burner, such as by three integral attaching arms 23, which extend from the edge 22 outwardly and downwardly, then downwardly along the sides of the burner, and finally inwardly as at 24 beneath the burner.

In the event that wind blows against the wall 10 and through the lower vent 15 across the top of the burner, flames issuing from those perforations 19 that are closest to the vent or which are between the flame retention ring 21 and the vent 15 may actually be blown out. However, those flames which are on the opposite side of the retention ring from the vent 15 are effectively protected by the retention ring from being extinguished. Consequently, when the draft through the vent 15 is relieved, these flames that have been thus protected by the retention ring will re-ignite the gas jets issuing from

the perforations **19** most adjacent the lower vent **15**.

In the event that a puff of air is caused to enter the upper vent **17** and blow downwardly through the flue tube **12**, this air encounters the concave upper face of the ring **21**. The upwardly and outwardly inclined ring effectively protects the flames issuing from the perforations **19** from being blown out by this reversed flow of air downwardly through the flue tube **12**.

Where the burner is not equipped with the central perforations **20**, the center of the ring **21** need not be left open, as shown, and the shield under these circumstances may be in the nature of a concavo-convex disc that is held on the top of the burner such as by the securing arms **23**.

It will be appreciated from the above described construction that the flame protector embodying the present invention is of very simple and durable construction and will effectively prevent the burner from having its flame blown out under circumstances that commonly cause the flame to be extinguished in burners of this type. It has been our observation that in many instances the combustion of the burner is improved by the presence of the flame protector and that the carbon monoxide content of the products of combustion is materially reduced. This improvement may be caused by the increased air turbulence or air mixing created by the presence of the ring **21** in the immediate vicinity of the perforations **19**. Combustion improvement is not invariably obtained, but is noticeable in certain instances depending upon the size of the flame and other physical conditions of the systems.

Various changes may be made within the scope of the present invention, as defined by the appended claims.

We claim:

In combination with a gaseous fuel burner having annularly arranged fuel orifice means disposed beneath and

in spaced relation to a flue tube surrounded by a refrigeration means which in turn has its top and bottom disposed adjacent to air supply and combustion air vents in an outer contiguous wall, a flame protector from down drafts and cross drafts comprising a concavo-convex arcuate shield disposed on top of the burner with a lower portion contacting the top of the burner inwardly of said annularly arranged orifice means and having a higher outward portion in upwardly sloping spaced relation to the top of the burner and lying closely adjacent to but inwardly concentric from said orifice means and arranged to be heated by the flame therefrom to prevent deposit of carbon thereon, and straps secured to the upper rim of the flame protector, said straps subtending the lower end of the burner body whereby the flame protector is secured to the burner unit.

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