

1

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FLAME ROD SUPPORT

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It is common practice to provide burners with flame detectors as a safety measure, the flame detectors performing such functions as shutting off the fuel if no flame appears within a reasonable time or precluding the main supply of fuel if a pilot flame is not present.

According to one modern practice for detecting the presence of a flame issuing from a burner, a flame rod is used. This rod is in the nature of an electrode and is connected to the control devices through an amplifier so that the flame may be used as a conductive path for the passage of a minute current which will impose a voltage on the flame rod and through it to the control grid of the amplifier.

Heretofore, these flame rods have been supported by porcelain insulators. According to the present invention, they are positioned with axial adjustment in a holder which is carried by a glass disk or plate which may serve the additional purpose of permitting visual checking of the position of the flame rod or viewing the flame. Preferably, a small blast of air circulates over the glass, keeping it free of condensation and thereby improving its insulation value and its visibility.

Additional objects and advantages of the invention will be apparent from the following description and from the drawings.

Designation of figures

Figure 1 is a longitudinal sectional view through the flame rod holder of this invention, showing somewhat diagrammatically its association with a burner.

Figure 2 is a transverse sectional view taken approximately on the line 2—2 of Figure 1.

Although the law requires a full and exact description of at least one form of the invention, such as that which follows, it is, of course, one purpose of a patent to cover each new inventive concept therein no matter how it may later be disguised by variations in form or additions of further improvements; and the appended claims are intended to accomplish this purpose by particularly pointing out the parts, improvements, or combinations in which the inventive concepts are found.

General description

The invention has been illustrated in connection with a sealed burner 11, the various parts of which have been indicated somewhat diagrammatically. Sealed burners are used where pressure conditions at the outlet of the burner require supplying air and gas under pressure. Thus conduits 12 and 13 may be used for supplying gas and air under pressure. They may be initially ignited by a pilot light or by a spark ignition device represented by the spark electrodes 14.

It has been common practice heretofore to provide with various types of burners a flame rod 16 connected by a wire 17 to a control circuit and otherwise insulated. Where a pilot flame is used, the flame rod may be used to detect the presence of the pilot flame and through the control circuit prevent operation of the main burner unless the pilot flame is present. Whether or not a pilot flame is used, a flame rod 16 and a suitable control circuit may be used to shut off the flow of fuel to the associated main burner whenever ignition does not occur after a predetermined short interval or in the event that a flame is discontinued for any reason. This prevents the accumulation of a large mass of explosive mixture which, if ignited, would cause damage.

In the past, it has sometimes been difficult to determine

2

the position of the end of the flame rod to determine whether it needed replacement or adjustment. It should be understood that the flame rods gradually shorten and that occasionally adjustment or replacement is necessary so that they will project far enough into the burner to reach the flame zone. When the position of the flame rod has been readily ascertainable before this invention, it has been by virtue of the provision of a separate viewing port or window. Thus there would have to be two apertures through the wall of the burner or the associated tile, one for the flame rod and one for viewing.

According to the present invention, the flame rod 16 is carried by a glass disk 18 which serves also as the viewing window. The glass disk 18 is preferably capable of circulating air on its inner face, thus ensuring good visibility and good insulation of the flame rod 16. Air may be admitted under pressure through a pipe 19 communicating through a port 21 in the tubular fitting 22 for receiving the flame rod 16.

Mounting of flame rod

The flame rod 16 may be carried by a flame rod holder 23 which is in the nature of a tube through which the flame rod 16 may slide easily. The flame rod 16 is sealed to the tube and held in position therein by a ferrule 24 which may be squeezed into intimate contact with the flame rod 16 and the holder 23 by a screw cap 26. A suitable nut 27 threaded on the holder 23 secures the holder 23 to the glass disk 18, suitable sealing washers preferably being provided. All washers and gaskets should be of a heat-resisting type, such as copper or asbestos.

A second nut 28 may secure the terminal of wire 17 against the nut 27.

At its periphery, the glass disk 18 may be sealed to the fitting 22. To this end a clamping ring 31 may draw a flanged tube 32 toward the fitting 22, squeezing the disk 18 between sealing gaskets. The purpose of tube 32 is mainly to prevent accidental touching of the uninsulated parts of the holder assembly for the flame rod 16. The fact that the tube 32 is open permits the use of a relatively long flame rod 16 so that it may be fitted further into the burner many times before it has to be replaced. The protruding end of the flame rod 16 is preferably covered by an insulating tube 33 which may conveniently be a piece of rubber hose.

From the foregoing it is seen that the glass plate or disk 18 serves to support and insulate the flame rod 16 and at the same time serves as a viewing window to permit inspection of the flame rod or the flame. Surprisingly, the glass disk proves to be a better insulator than the porcelain insulators used heretofore. This is apparently due not only to the inherent insulating properties of the glass but also to the fact that condensation on it is prevented by the air blast through port 21. Foreign particles have little tendency to stick to the glass when it is kept dry. In any event, it can easily be removed for cleaning by removing the ring 31.

I claim:

60 1. A combined flame rod and viewing window assembly including a tubular holder, a flame rod extending through the holder, a sealing ferrule sealing the rod to the holder and positioning the rod in the holder, a glass transparent plate having flat parallel faces and an aperture through which the holder extends, the holder being sealed to the plate, means engaging the glass plate along a line surrounding and spaced from the aperture to leave an annular glass insulator and window surrounding the holder and adapted to secure the plate in the vicinity of a burner with the flame rod projecting into the zone of the flame, and means for circulating air over the surface of the glass exposed toward the flame zone for maintaining it free of condensation, said window being exposed to view from the side remote from the zone of the flame along a line passing through the window to the zone of the flame.

75 2. A combined flame rod and viewing window assembly including a tubular holder, a flame rod extending through the holder and sealed thereto, a glass transparent plate having an aperture through which the holder extends, the holder being sealed to the plate, means engaging the

3

glass plate along a line surrounding and spaced from the aperture to leave an annular glass insulator and window surrounding the holder and adapted to secure the plate in the vicinity of a burner with the flame rod projecting into the zone of the flame, and means for circulating air over the surface of the glass exposed toward the flame zone for maintaining it free of condensation.

3. A combined flame rod and viewing window assembly including a tubular holder, a flame rod extending through the holder and sealed thereto, a glass transparent plate having an aperture through which the holder extends, the holder being secured to the plate, means engaging the glass plate along a line surrounding and spaced from the aperture to leave an annular glass insulator and window surrounding the holder and adapted to secure the plate in the vicinity of a burner with the flame rod projecting into the zone of the flame, and means for circulating air over the surface of the glass exposed toward the flame zone for maintaining it free of condensation.

4. A combined flame rod and viewing window assembly including a tubular holder, a flame rod extending through the holder and sealed thereto, a glass transparent plate having an aperture through which the holder extends, the holder being secured to the plate, means engaging the glass plate along a line surrounding and spaced from the aperture to leave an annular glass insulator and window surrounding the holder and adapted to secure the plate in the vicinity of a burner with the flame rod projecting into the zone of the flame.

5. A combined flame rod and viewing window assembly including a glass transparent plate, a flame rod ex-

4

tending through an aperture in the plate and sealed to the glass plate, means engaging the glass plate along a line surrounding and spaced from the aperture to leave an annular glass insulator and window surrounding the aperture and adapted to secure the plate in the vicinity of a burner with the flame rod projecting into the zone of the flame, and means for circulating air over the surface of the glass exposed toward the flame zone for maintaining it free of condensation.

6. A combined flame rod and viewing window assembly including a glass transparent plate having flat parallel faces, a flame rod extending through an aperture in the plate and sealed to the glass plate with longitudinal adjustability of the flame rod, means engaging the glass plate along a line surrounding and spaced from the aperture to leave an annular glass insulator and window surrounding the flame rod and adapted to secure the plate in the vicinity of a burner with the flame rod projecting into the zone of the flame, said window being exposed to view from the side remote from the zone of the flame along a line passing through the window to the zone of the flame.

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