Aug. 24, 1965 G. H. KNOBLOCH 3,202,197

FURNACE INCLUDING REFRACTORY SEALING SLEEVE FOR THE NOZZLE OF AN OIL BURNER

Filed April 16, 1963

Fig. 2.

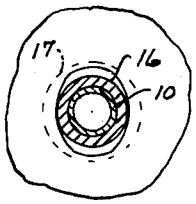


Fig. 1.

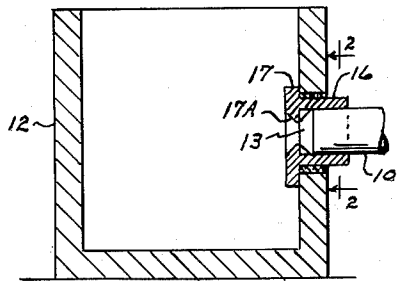


Fig. 3.

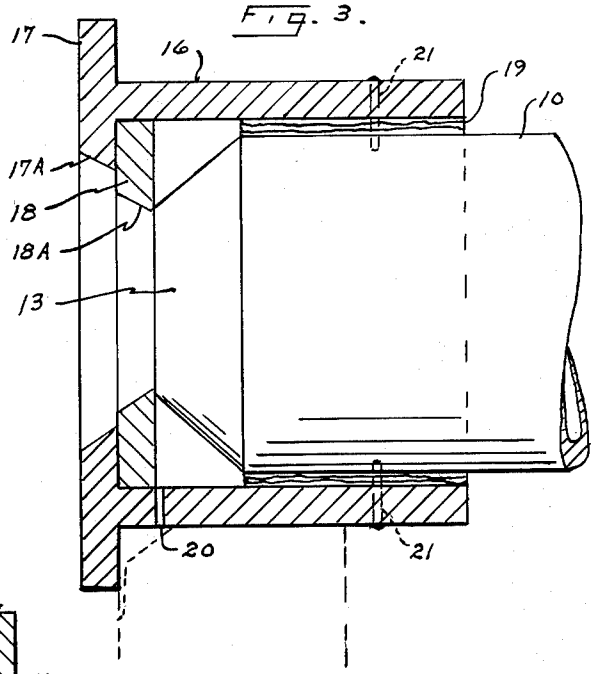
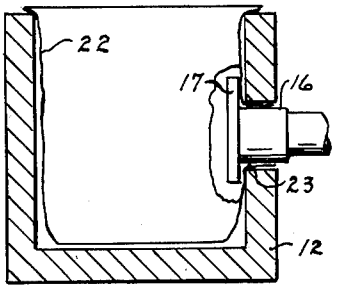


Fig. 4.



INVENTOR.

GEORGE H. KNOBLOCH

BY Howard J. Jeanson

AGENT

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FURNACE INCLUDING REFRACTORY SEALING SLEEVE FOR THE NOZZLE OF AN OIL BURNER

George H. Knobloch, Atlantic Highlands, N.J. (3424 SE. 12th St., P.O. Box 2524, Pompano Beach, Fla.)

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3 Claims. (Cl. 158—4)

This invention relates to oil or gas burners of the gun type and more particularly to an improved air cone refractory sleeve for the gun end of the burner.

With a gun type oil burner the air cone end of the gun must be positioned within an already formed aperture in a refractory fire chamber that is mounted within the fire chamber of a furnace. With the various gun-type oil burners the distance from floor to the centerline of the gun nozzle varies and to permit a proper installation in an already mounted refractory fire chamber the manufacturer of these refractory fire chambers provide an oval-shaped opening or aperture, thus permitting the adjustment of the height of the gun, however, when the gun of the burner is mounted in this aperture in position for firing it is necessary to cement and close the aperture around the barrel of the gun nozzle to prevent an excess of air being drawn in to change the characteristics of the normal burner blaze. In attempting to cement this surrounding area surrounding the barrel, in view of the fact that the refractory chamber is mounted within a furnace and there is very little opening such as the door of the furnace to permit reaching in to properly cement this aperture, it becomes difficult to fill the aperture completely and it also permits the forcing of an excess amount of cement through the aperture so that the cement may overhang the air cone distorting the air delivery to the flame or drops into the air cone, blocking or partially blocking the oil spray from the nozzle. To overcome this type of mounting and insure a perfect fit it is an object of this invention to provide a refractory sleeve that may be mounted from within said fire chamber of the refractory box, through the aperture, and the gun end of a burner inserted into a perfect circular aperture of the refractory sleeve. After these elements have been mounted the remaining oval-shaped aperture not completely filled by the sleeve is easily cemented without excess cement and without a chance of the cement being vibrated loose from around the air cone or burner by the fire in use.

It is a further object of this invention to provide a refractory sleeve for a refractory fire chamber through which the gun end of an oil burner may be inserted and sealed to provide an airtight seal.

A still further objective of this invention is to provide a refractory sleeve having an enlarged lip on the fire chamber side to permit inserting the gun end of an oil burner into a fire chamber and to permit lining said fire chamber with a high temperature fiber felt liner and by means of said sleeve to grip and retain said liner in a tight fitting sealing relation with said sleeve.

Other objectives of this invention shall be apparent by reference to the accompanying detailed description and the drawings

FIG. 1 is a cross sectional view of a refractory sleeve mounted about the nozzle end of the gun of an oil burner.

FIG. 2 is a partial cross sectional view taken on line 2—2 of FIG. 1.

FIG. 3 is an enlarged detail of the refractory sleeve showing a further embodiment of this invention, and

FIG. 4 is a cross sectional view of the refractory fire chamber with a high temperature fiber felt liner using the refractory sleeve to retain the liner in position.

Referring to the drawings, the burner gun **10** is mounted through a burner aperture **11** of a wall of the refractory fire chamber **12**. Referring to FIG. 2 the burner aperture **11** is illustrated as being oval-shaped so that the nozzle or gun end **10** may be easily mounted in aperture **11** even though the height from the combustion chamber floor level **14** may vary with different nozzle sizes of oil burners. For example, a one gallon nozzle is set 5½ inches from the combustion chamber floor, while a 1.65 gallon nozzle is set 7" from the floor. Also the outside diameter of the gun may vary from 4 to 5½ inches. When the gun end **10** has been mounted in aperture **11** it is necessary to close the aperture around the barrel of the gun end **10** with a fire clay or refractory cement **15**. However, due to the fact that the mounting of the gun end **10** is done with very limited room for installation as the furnace (not shown) is closed about the fire chamber **12**, therefore, in attempting to cement aperture **11** to seal it there is a tendency to either push too much cement **15** into the aperture which may fall about or into the air cone **13** of the burner or may fall into the fire chamber. Also, there is a tendency to cement the upper portion of the aperture **11** but to fail to seal the lower portion which is difficult to reach in this type of installation. Thus the aperture **11** is in a great many cases not completely sealed, allowing air to be drawn in and thus upset the proper atomizing balance of oil and air provided by the oil burner.

Referring to FIGURE 1 it illustrates a refractory fire chamber **12** with burner aperture **11** and an oil burner gun end **10** mounted through aperture **11**. However, in this instance a refractory sleeve **16** is provided that is fitted around the burner barrel of the gun **10** within the burner aperture **11** and thus providing a seal. However, in view of the oval-shaped opening **11** it is fairly easy to cement the small remaining opening above and below the burner and no excessive cement may be forced through the opening due to a larger sealing formation **17** on the inner end of the sleeve **16** and of course, in the event the cement does not fill the aperture the formation **17** of the refractory sleeve **16** provides a seal over the opening to prevent the intake of air directed toward the flame pattern, and of course this prevents any blow out of the sealing cement due to this formation **17**.

Referring to FIG. 3 there is illustrated an enlarged detail of the refractory sleeve **16** illustrating the overlapping formations **17** and **17A**. The lip may be circular with a much larger diameter than the sleeve and with a much smaller aperture than the bore or internal diameter of the sleeve. In this particular embodiment with sleeve **16** cemented in place there is also provided an additional ring **18** positioned within the bore of the sleeve **16** and retained by formation **17** to about with the burner air cone **13** of the gun **10**. It is to be noted that the aperture **18A** is beveled to prevent any interference with the spray and flame pattern. Thus there is little or no possibility of oil impingement on the aperture **18A**. This ring **18** is used with the smaller sizes of burner air cones whereas the larger size gun end **10** will fit within sleeve **16** and abut with the lip of sleeve **16** as illustrated in FIG. 1. The formation **17A** of the refractory sleeve **16** and the addi-

tional refractory ring 18 also provide a protective cover for the cone end of the burner, thus the heat of combustion cannot burn out the cast iron or steel cone. With the smaller types of gun 10 it is also essential to seal the area between the barrel of gun 10 and the inside diameter of sleeve 16 with a high temperature fiber felt liner 19 as illustrated. It is also to be noted in the refractory sleeve 16 that a small aperture 20 is provided in the lower portion of sleeve 16 as installed. This is essential to permit the drainage of any oil leakage around the cone so that it will flow onto the sloped inner face of the fire box and thus into the fire-box. In addition sleeve 16 may be provided with a plurality of apertures 21 about its periphery as a means of bolting to the gun barrel thus holding the sleeve in position as illustrated where desired.

In many installations of oil burners the refractory fire chamber 12 becomes badly burned out in use and rather than dismantle the burner there is presently in use a high temperature fiber felt liner that may be inserted within the fire chamber. This felt is not recommended to be cemented to the old burned rough surface of the inside area of the old fire chamber. Thus the liner must be provided with an aperture 23 to mate with the aperture 11 of the old fire chamber 12. There is little or no chance of retaining the liner in this position in the present installations and there is a tendancy for this to be ruptured or blown away from the chamber wall by the burner. In this invention the refractory sleeve 16 with its enlarged lip end 17 may be installed after the liner 22 has been installed, thus the sleeve will clamp the liner 22 between formation 17 and the wall of the fire chamber to retain the liner 22 in its intended position as illustrated in FIG. 6.

Various changes and modifications may be made in the general shape of the refractory sleeve utilized in this invention; that is, the sleeve may be made in various sizes to permit installation such as that illustrated in FIG. 4 even though the size of the gun may vary or the sleeve may be made of a standard size utilizing an adapter ring such as that illustrated in FIG. 5 and the sleeve 16 will be cemented around the sleeve filling the oval-shaped aperture 11 found in most of the refractory fire chambers. Likewise, although the refractory sleeve has been illustrated in combination with the refractory type fire chamber the refractory sleeve may also be used with a stainless steel or other type fire chamber without departing from the spirit of this invention and this invention shall be limited only by the appended claims.

What is claimed is:

1. In combination a gun type oil burner and a walled combustion chamber, said combustion chamber being provided with an oval-shaped burner aperture, said oil burner having a gun type barrel for atomizing the oil, said barrel being provided with an air cone at its end a refractory sealing sleeve with its inside diameter fitted to said barrel of said gun type oil burner, said sleeve being provided with an enlarged formation at one end, said sleeve inserted through said oval-shaped aperture from within said wall of said combustion chamber to fit over the barrel of said burner and abut with the air cone end, said enlarged formation of said sleeve covering and sealing said oval-shaped aperture.

2. In a device according to claim 1 in which the barrel of the gun type oil burner is smaller than the inside diameter of said sleeve and in which a refractory ring is inserted within said sleeve to abut with the enlarged lip end, said refractory ring being provided with an aperture of a size to abut with and mate with the air cone of the smaller barrel.

3. In a device according to claim 1 in which the walled combustion chamber is covered with a high temperature fiber felt liner and in which said liner is provided with an aperture to mate with the burner aperture of the wall of said combustion chamber and in which said enlarged lip of said refractory sleeve abuts with said internal face of said liner to hold said liner in juxtaposition with said wall of said combustion chamber.

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JAMES W. WESTHAVER, *Primary Examiner.*