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F. T. COPE

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PILOT FOR FUEL BURNERS

Filed June 9, 1938

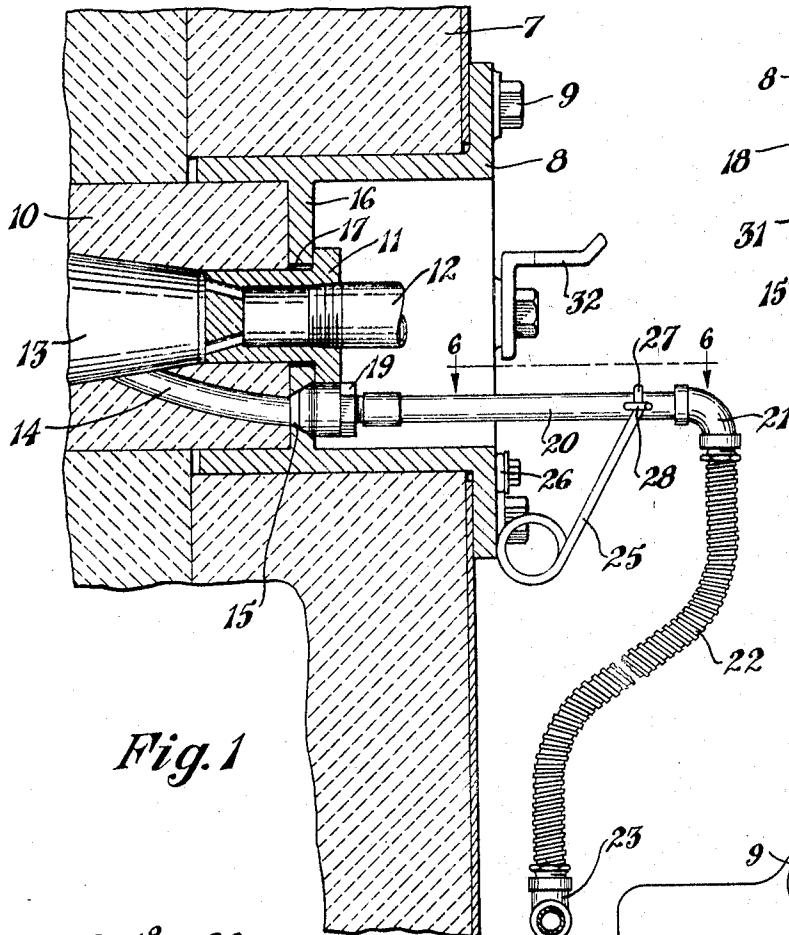


Fig. 1

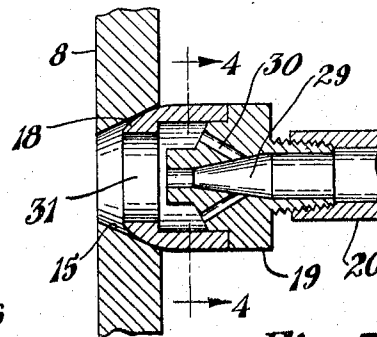


Fig. 3

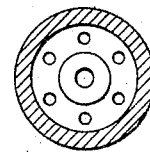


Fig. 4

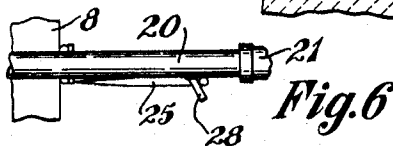


Fig. 6

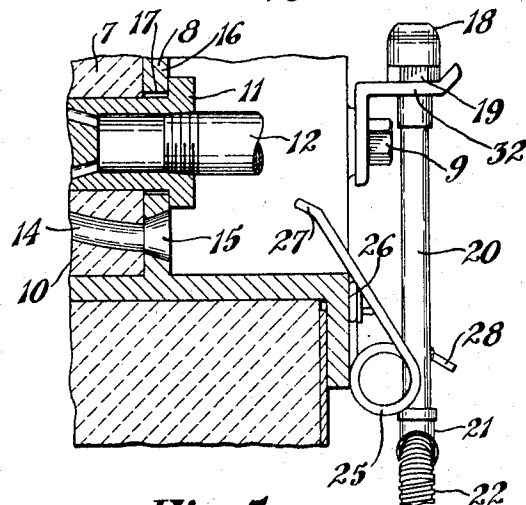


Fig. 5

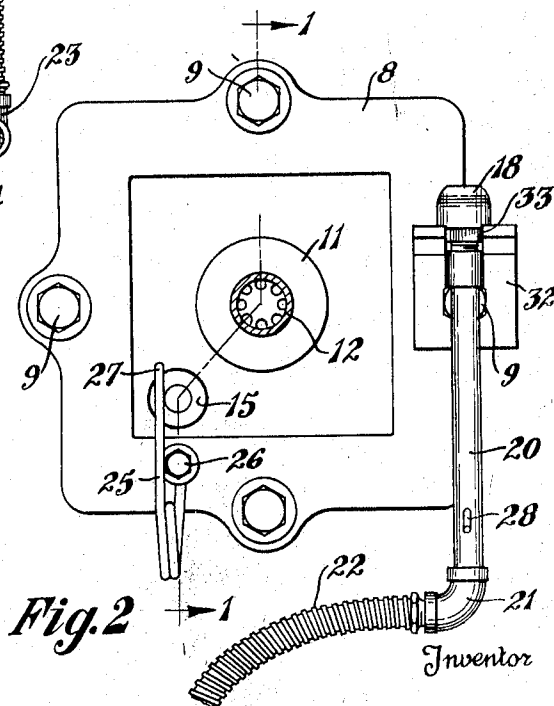


Fig. 2

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UNITED STATES PATENT OFFICE

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PILOT FOR FUEL BURNERS

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Application June 9, 1938, Serial No. 212,765

3 Claims. (Cl. 158—115)

The invention relates generally to furnaces and more specifically to special or controlled atmosphere furnaces which are oil or gas fired. More particularly, the invention relates to a pilot construction for the oil or gas burners of such furnaces.

Heretofore, furnace burners have been constructed either by rigidly connecting and sealing a pilot for the burner in the furnace wall or shell, or by locating the pilot in a position spaced from and firing into an opening in the furnace wall or shell; but serious difficulties arise in connection with the use of either of such constructions, particularly in the operation of a special or controlled atmosphere furnace.

In a sealed pilot construction, considerable difficulty is encountered in lighting the pilot either originally or at any time when the same may have become extinguished.

Moreover, difficulty is encountered in inspecting and cleaning a sealed pilot construction and particularly the pilot burner tip and/or repairing the same at times when it is necessary to do so.

These last mentioned difficulties are avoided with the spaced pilot construction; but the spaced arrangement causes other difficulties in connection with use of the same on a special or controlled atmosphere furnace. Thus, the space between the pilot and opening in the furnace wall or shell allows some of the special atmosphere from the furnace to leak or escape from the furnace when the pilot is not burning; and allows the pilot to inspire, inject or suck air into the furnace when burning, thus disturbing the special or controlled atmosphere in the furnace.

It is therefore a general object of the present invention to avoid the difficulties and disadvantages experienced in prior oil or gas burner pilot constructions for furnaces.

It is a further object of the present invention to provide a pilot construction for a furnace fuel burner, which is readily accessible for lighting and inspection.

Moreover, it is an object of the present invention to provide a pilot construction for a furnace fuel burner which is so constructed and arranged as to prevent gas from escaping from the furnace or air entering the furnace through a pilot mounting.

Likewise, it is an object of the present invention to provide a pilot construction for an oil or gas burner for a special or controlled atmosphere furnace which prevents loss or contamination of the special atmosphere and yet is read-

ily accessible for lighting, cleaning, inspection and repairs.

And finally, it is an object to generally improve and simplify the construction and operation of pilots for the burners of fuel fired furnaces.

These and other objects may be obtained by the elements, parts, combinations and constructions constituting the present invention, a preferred embodiment of which is shown in the accompanying drawing and is hereinafter described in detail and claimed, which may be stated in general terms as including in combination, a burner block and a pilot therefor, the burner block including a main burner tip and a main burner tunnel communicating therewith, a concaved preferably tapered opening and a passage communicating between said opening and the main burner tunnel; and said pilot including a pilot tip, a convex or rounded preferably spherical nose for the pilot tip adapted to be fitted in said tapered opening, a conduit leading from said pilot tip to a source of fuel including a flexible member, and yielding mounting means for the pilot including cooperating members removably seating the pilot nose in said tapered opening in substantially gas-tight relation; and preferably a clip mounted on said burner block for suspending the pilot tip for inspecting, lighting, cleaning and repairing the same.

In the drawing,

Figure 1 is a fragmentary sectional view taken as on the line 1—1, Fig. 2, illustrating the improved pilot construction for a burner of a special atmosphere furnace;

Fig. 2 is a side elevation of certain of the parts shown in Fig. 1 with the pilot removed for lighting;

Fig. 3 is an enlarged fragmentary sectional view of the pilot tip, pilot nose and burner block seat therefor;

Fig. 4 is a section taken on the line 4—4, Fig. 3;

Fig. 5 is a fragmentary view similar to Fig. 1, but showing the parts in the position shown in Fig. 2; and

Fig. 6 is a fragmentary view looking in the direction of the arrows 6—6, Fig. 1.

Similar numerals refer to similar parts throughout the various figures of the drawing.

The improved construction is shown generally in Fig. 1 wherein a wall preferably a vertical wall of a special or controlled atmosphere furnace is illustrated, at 1, in which a burner block housing 2 is mounted, preferably by bolts 3. The burner also includes a burner tunnel

block 10 mounted in the furnace wall 7 and housing 8 and a burner nozzle or tip 11 mounted in the tunnel block 9 and housing 8, connected with any suitable source of fuel by means of pipe 12.

The main burner passage 13 is formed in the tunnel block 10 communicating with the burner nozzle 11, and the tunnel block 10 also has a pilot passage 14 formed therein communicating with an opening 15 formed in the cross wall 16 of housing 8 spaced from the main opening 17 in block 8 through which the main nozzle 11 extends.

Referring more particularly to Fig. 3, the opening 15 has a concave shape in cross section preferably tapered as shown, for receiving the convex preferably spherically rounded nose 18 provided on the pilot nozzle tip 19.

The pilot nozzle tip 19 is preferably threaded into an end of a conduit 20 which may have an L 21 connected at the other end thereof to which L 21 a flexible conduit 22 is connected. The other end of the flexible conduit 22 communicates at 23 with a suitable source of fuel in main 24.

Spring means, preferably a wire spring 25 has one end mounted at 26 on burner housing 8 and the other hooked end 27 engages under a lug 28 formed on conduit 20 for mounting the pilot assembly in assembled relation with the burner unit.

As best shown in Fig. 1, spring 25 yieldingly mounts the pilot assembly and urges the nose 18 thereof into a substantially gas-tight sealed relation within opening 15 in burner housing 8 so that the special atmosphere in the furnace cannot leak out through tunnel 14 and opening 15 when the pilot is off, and so that air is not sucked into the furnace when the pilot is burning.

Pilot nozzle tip 19 per se may be of any usual construction. As shown, the nozzle tip 19 may be a flame retention nozzle tip including a central opening 29 and a series of side openings 30, all of which discharge through enlarged central opening 31 in nose 18; and the pilot nose member 18 may be and preferably is a separate member formed of stainless steel and assembled with a press fit on pilot tip 19.

Although a particular type of main burner 11 is shown, the improved pilot construction may be used with any type of main burner construction. The particular main burner tip and the particular arrangement of passage 14 shown but not claimed herein, is claimed in my copending application filed of even date herewith, Serial No. 212,764.

An L-shaped clip 32 having an upper leg forked at 33 may be mounted on burner housing 8 at one side thereof, as best shown in Figs. 1, 2 and 5, for suspending the improved pilot when removed from connection with opening 15 and passage 14 for inspecting, lighting, cleaning and repairing the same. When the pilot is so removed, spring 25 springs to the position shown in Fig. 5.

In operation, the pilot may be lighted, inspected or cleaned when in the position shown in Figs. 2 and 5 and after lighting may be guided, located and clamped with the spherical nose 18 seated in sealed relation in opening 15 by spring 25. The nature of the construction and arrangement of these parts is such that no particular exact alignment need be maintained in placing the pilot in operative position as the nose 18 and seat 15 therefor may be termed as being self-

aligned, or in other words, they properly seat and seal even though misaligned.

The spring means 25 maintains this arrangement of parts and the spring means 25 and flexible conduit 22 permit instant removal of the pilot in case the pilot goes out and requires lighting, inspection or cleaning.

Moreover, the improved construction permits the pilot to be assembled as a component part of the main burner, which is particularly advantageous in connection with the use of a substantially horizontally discharging burner. In a burner firing through the roof of a furnace, a pilot may be led in from an angle through the side wall and yet have the pilot as close as possible to the burner tip.

However, it is impossible to mount a pilot in another furnace wall discharging at an angle toward a burner unit in connection with a horizontally discharging burner. In prior pilot constructions for horizontally discharging burners, the pilot either due to its sealed construction or spaced construction, is located at some distance from the main burner, which is not a desirable arrangement.

Accordingly, the improved construction provides a pilot which overcomes the difficulties and disadvantages experienced in the prior art, provides a pilot which is readily accessible for lighting and inspection and yet prevents gas from escaping or entering the furnace through the pilot mounting, provides a pilot which may be used with a special or controlled atmosphere furnace without disturbing the atmosphere maintained therein, provides a pilot having special advantages when used in combination with a substantially horizontally firing burner, and provides a pilot and burner arrangement which is simplified in construction and operation.

Having now described the features of the invention, the construction, operation and use of a preferred embodiment thereof, and the advantages and results obtained by the improved construction; the new and useful parts, elements, combinations, constructions and devices, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

I claim:

1. Pilot construction for a furnace fuel burner having a pilot opening, including a pilot conduit having a gas-tight flexible portion and a nose, said pilot nose and opening having complementary universal seat surfaces, spring means mounting said pilot conduit with said nose removably seated in said pilot opening, and means for supporting the pilot conduit in removed position.

2. Pilot construction for a fuel burner having a tapered pilot opening, including a pilot conduit having a gas-tight flexible portion and a rounded tip nose, and means removably mounting said pilot conduit on said fuel burner and yieldably urging the tip nose into engagement with the tapered opening.

3. Pilot construction for a furnace fuel burner having a tapered pilot opening, including a pilot conduit with a gas-tight flexible portion and a nose, said nose having a spherical surface adapted to seat in said tapered opening, and spring mounting means for the pilot removably and yieldably urging said nose into seating relation in said opening.

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