

[54] NOISE SUPPRESSOR FOR BURNER 3,684,424 8/1972 Zink et al. 431/114

[75] Inventor: Harry C. Santisi, Dresher, Pa.

[73] Assignee: Selas Corporation of America, Dresher, Pa. Primary Examiner—Edward G. Favors

[22] Filed: Oct. 3, 1974

[21] Appl. No.: 511,938

[57] ABSTRACT

[52] U.S. Cl. 431/114

[51] Int. Cl.² F23C 7/04

[58] Field of Search..... 431/114, 167, 166

The invention provides a sound absorbing construction for industrial burners. The sound produced by the burner is forced to move in a labyrinth path lined with sound absorbing material.

[56] References Cited

UNITED STATES PATENTS

2,964,121 12/1960 Zink, Jr. et al. 431/114 X

3 Claims, 2 Drawing Figures

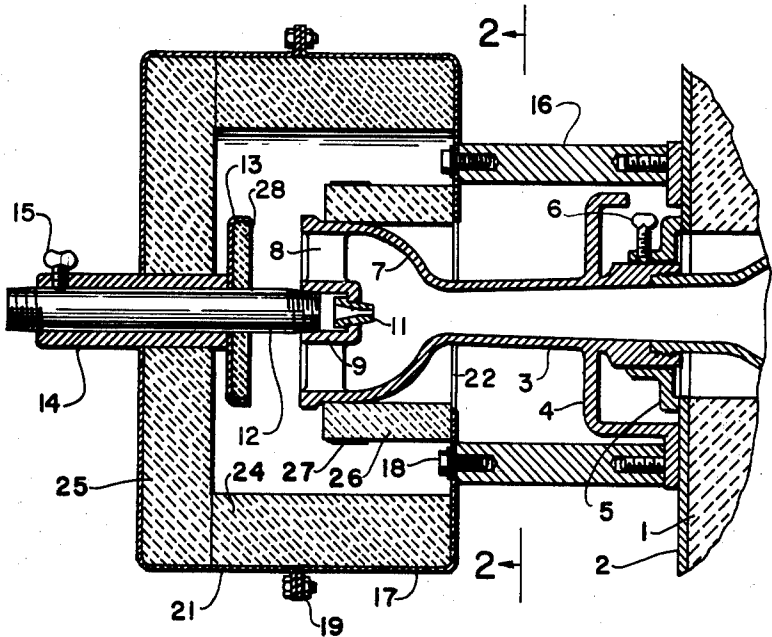


FIG. 1

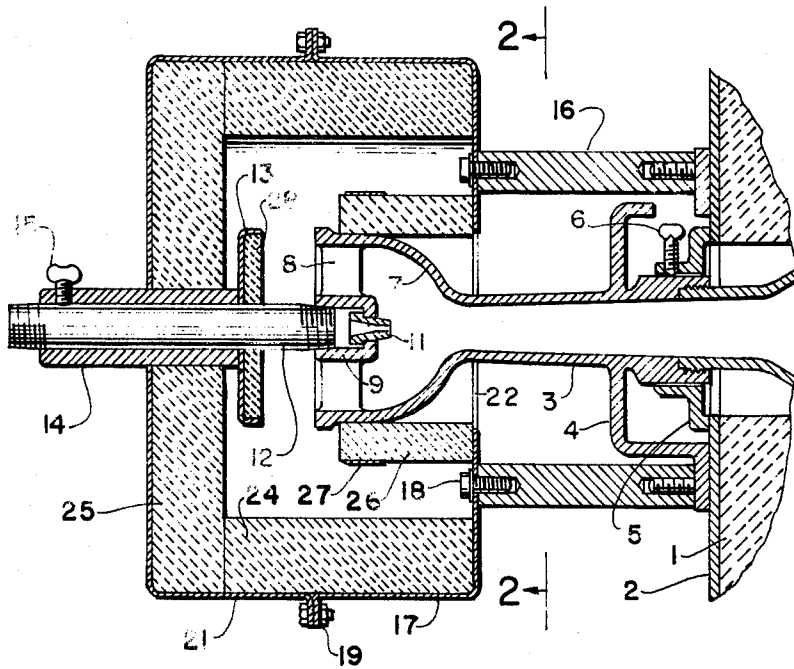
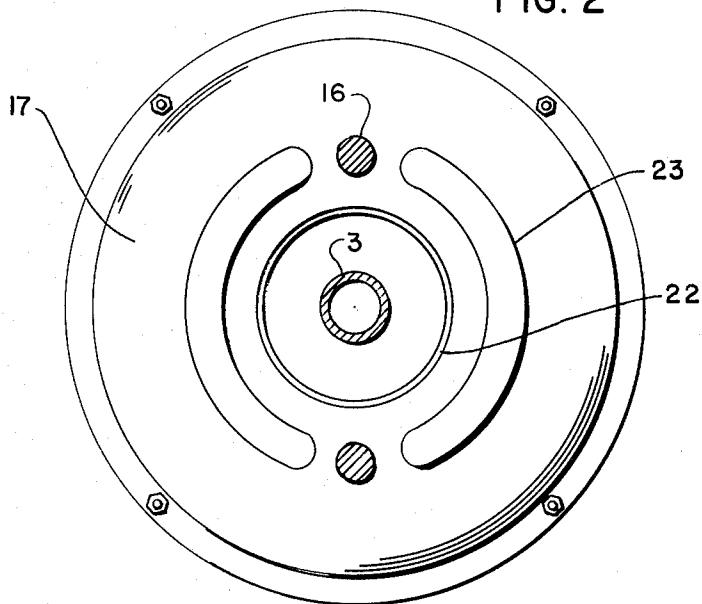


FIG. 2



NOISE SUPPRESSOR FOR BURNER

BACKGROUND OF INVENTION

The present invention relates to industrial gas burners and more particularly to silencers to be used with inspiring gas burners.

Inspirator type burners employ a gas orifice inserted close to the throat of a venturi. Gas is discharged at pressures as high as 30 p.s.i. through the orifice to create a low pressure area in the throat of the venturi for entraining the combustion air. Actual burner pressures produced by this type of mixing are quite low which means that large open areas are required for the combustion air in order to avoid excessive pressure drop. With such large areas, the noise generated by the high pressure, high velocity gas can readily escape from the furnace. It is not unusual for the high pressure jet to produce noise levels above 100 decibels.

This type of noise can be quite objectionable and is believed, after prolonged exposure to levels above 90 decibels, to result in some loss of hearing. Consequently, many furnace users are now specifying equipment with low noise levels.

In addition, regulations under the Occupational Safety and Health Act require noise levels lower than those normally produced by some burners, particularly for prolonged exposure to the noise.

SUMMARY OF THE INVENTION

The present invention includes baffle means of fibrous sound absorbing material arranged around the fuel and air supply end of a burner in such a manner that a labyrinth passage is defined for the air supply. The structure holding the fibrous material is so arranged that there is provided adequate cross-sectional area to permit uninterrupted entrainment of atmospheric air to the burner.

It is an object of the invention to provide a sound absorbing unit to be used with an industrial gas burner.

It is a further object of the invention to provide structure with labyrinth paths for air being supplied to a burner thereby to dampen out burner noise.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, its advantages and specific objects attained with its use, reference should be had to the accompanying drawings and descriptive matter in which I have illustrated and described a preferred embodiment of the invention.

IN THE DRAWINGS

FIG. 1 is a sectional view of the silencer showing it mounted on a burner, and

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

DETAILED DESCRIPTION

Referring to the drawing, there is shown a portion of a furnace wall 1 having a metal backing plate 2. Both the wall and the plate are provided with an opening through which a burner is inserted for heating the furnace. As shown, the burner comprises a venturi 3 having its discharge end extending through the wall opening into the furnace interior. The venturi is provided with a radially and axially extending flange 4 by means

of which it is fastened in position on the furnace wall. A secondary air shutter 5 is slideable on the venturi and is held in adjusted position by a thumb screw 6. This shutter is of a size to close the opening in the furnace wall as shown. Axial adjustment of this shutter along the venturi regulates the amount of secondary air that can flow through the wall opening and around the burner into the furnace.

The left or inlet end of venturi 3 is provided with the usual bell 7 that has a spider 8 supporting concentrically a sleeve 9. An orifice, or spud as it is usually called, 11 is threaded into sleeve 9. Fuel gas under pressure is supplied to the burner by a pipe 12 to be discharged through the spud. As the fuel gas is discharged through orifice 11 it will aspirate primary air in the bell 7 and supply a fuel air mixture to the furnace. The amount of primary air aspirated is controlled by a shutter 13 attached to a sleeve 14 that is slideably received on pipe 12. The shutter is held in its adjusted position by a thumb screw 15. The escaping fuel gas produces a noise, varying with the pressure and the gas composition, that can be quite loud and objectionable.

A silencer to be used with the burner is mounted on the furnace wall by a pair of studs 16. The silencer includes a first part 17 that is attached to studs 16 by bolts 18. Part 17 is provided with a radial flange 19 to which is attached by a similar flange, a cup-shaped part 21 which, along with part 17 forms a silencer casing. As best shown in FIG. 2, the end face of part 17 is provided with a central opening 22 that is moved over bell 7 when this part is being mounted on studs 16. The face is also provided with a plurality of arcuate openings 23 through which primary air flows to the burner.

The interior surface of the cylindrical portion of parts 17 and 21 are lined with a thick layer 24 of sound absorbing material such as fibreglas. A similar layer 25 of fibreglas or the like is placed against the radially extending wall of part 21. The diameter of the casing will depend upon the size of the burner with which it is used. As an example, a burner in which bell 7 is five inches in diameter would have a casing approximately fourteen inches in diameter and the sound absorbing material will be about two inches thick.

Additional sound absorbing material in the form of a sleeve 26 is held in place by a strap 27 with the ends of the sleeve abutting against a flange on bell 7 and the end face of part 17. Thus, an annular passage for air is formed between two bodies of sound absorbing material. In addition, shutter 13 is shown as being dish-shaped and provided with a disc 28 of sound absorbing material immediately back of the primary air opening in bell 7.

It will be seen that the construction requires sound waves produced by the jet of fuel gas exiting from spud 11 must move in a tortuous or labyrinth path and against the flow of primary air before they are dissipated to the surroundings. The entire path of travel of the sound waves is lined on both sides by heavy layers of sound absorbing material. Thus, the sound waves are substantially reduced as they travel outwardly from the burner. Any noise that might be produced by the inflowing primary air is also dampened as it moves toward bell 7. It is noted that the passages provided for the air are large enough so that there is no real reduction of its pressure or velocity as it flows into the burner.

It will therefore be seen that the construction of this invention substantially encloses the noise producing gas flows in a sound absorbing chamber thereby trapping the noise by repeated exposure to sound absorbing surfaces. The result is that burner noise is reduced to such an extent that it is well below objectionable levels.

While in accordance with the provisions of the Statutes I have illustrated and described the best form of embodiment of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the form of the apparatus disclosed without departing from the spirit and scope of the invention set forth in the appended claims, and that in some cases certain features of my invention may be used to advantage without a corresponding use of other features.

What is claimed is:

1. In combination, a burner having a portion adapted to be inserted in a furnace wall and being provided with a venturi having an open bell spaced from said wall, a cylindrical casing having one end closed, means to mount said casing surrounding and spaced from said bell with the closed end thereof facing the open end of the bell, a layer of sound absorbing material lining the interior of said casing, a sleeve of sound absorbing material mounted on and surrounding said bell, the exte-

rior of the sleeve and the interior of the casing lining forming an annular passage for primary air to the burner, and means to discharge gas under pressure into said bell thereby to aspirate air through said annular passage.

2. The combination of claim 1 in which said means for discharging gas extends axially through the closed end of said casing, a damper for said bell slideable axially on said gas discharging means in said casing, and a facing of sound absorbing material on the bell side of said damper.

3. In combination, a burner having a venturi with a bell, the end of the bell being open, a sound absorbing device comprising a cylindrical casing having one end closed, means to mount said casing in a position surrounding said bell with the closed end thereof facing the open end of the venturi bell, a layer of sound insulating material on the interior surface of said casing, a sleeve of sound insulating material surrounding said bell to provide an annular air passage between the interior of said casing and the exterior of said sleeve, and means to discharge gas under pressure into said bell thereby aspirating air through said annular passage.

* * * * *

30

35

40

45

50

55

60

65