Aug. 21, 1934. C. H. BUTZ ET AL 1,971,208

GAS BURNER

Filed Oct. 5, 1931 2 Sheets-Sheet 1

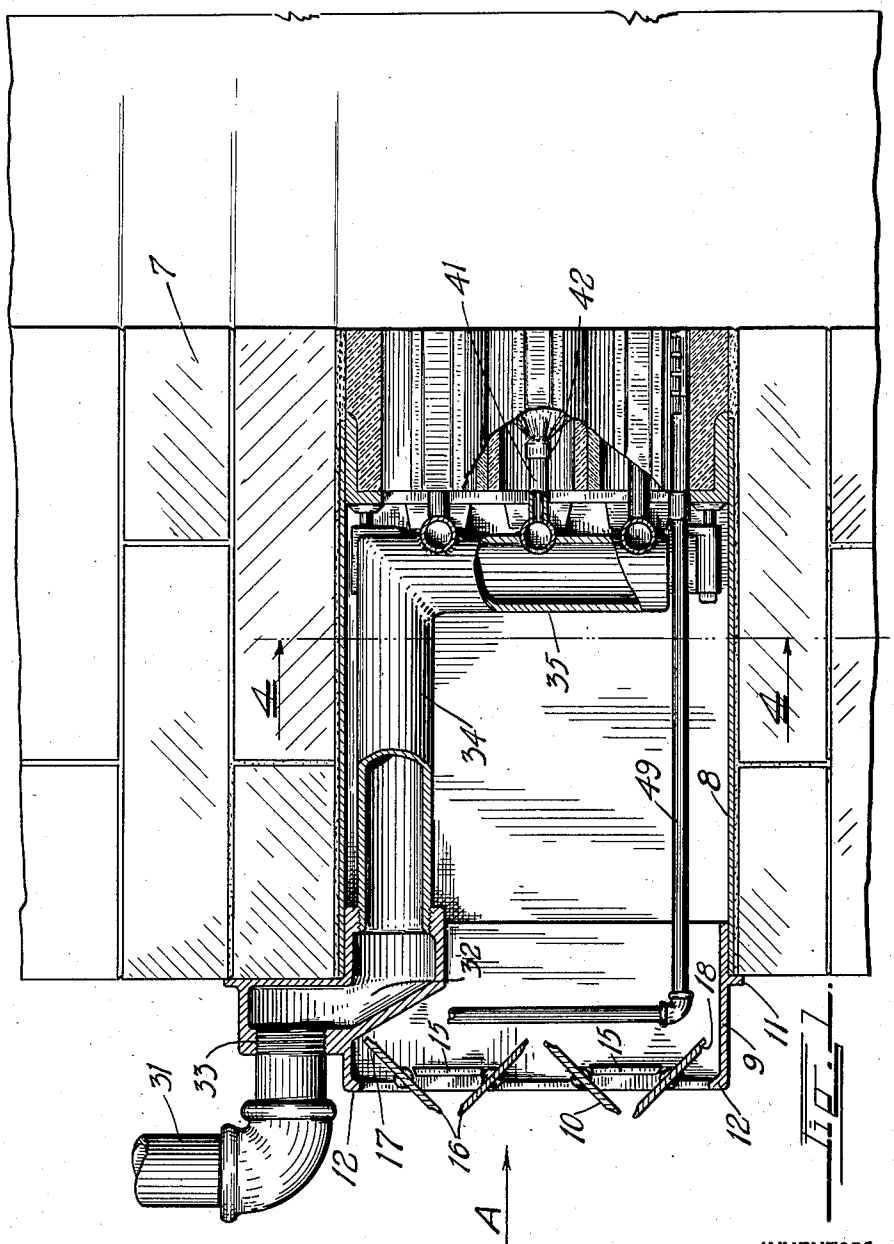


FIG. 1.

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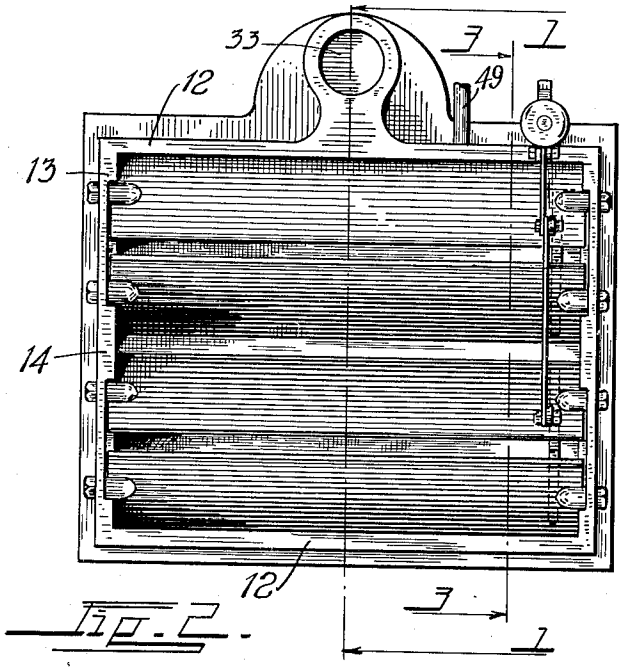


Fig. 2.

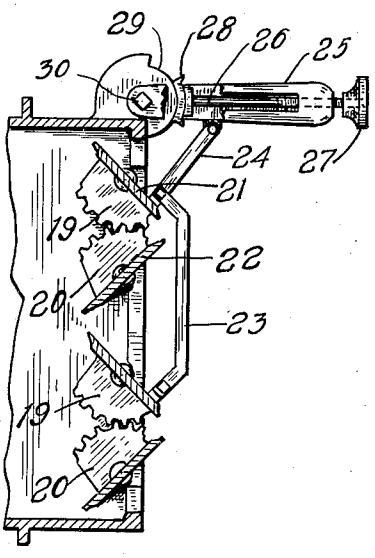


Fig. 3.

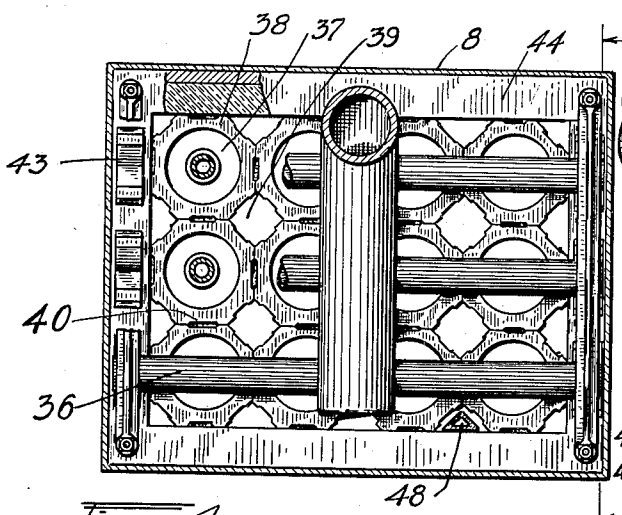


Fig. 4.

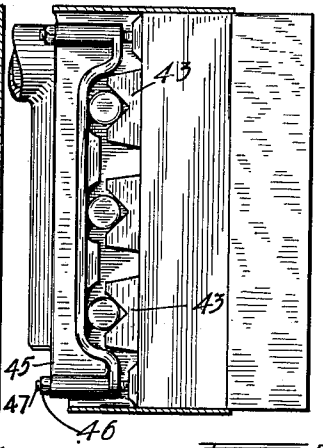


Fig. 5.

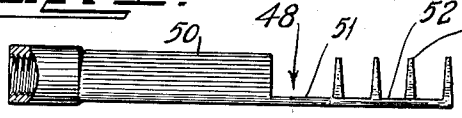


Fig. 6.

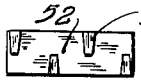


Fig. 7.

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1,971,208

GAS BURNER

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Application October 5, 1931, Serial No. 566,967

6 Claims. (Cl. 158—104)

Our invention relates to burners, and particularly to gas burners having a plurality of nozzles. An important object of the invention is to provide the maximum capacity for the frontal area of the burner.

Another object is to avoid directing the air to one side of the burner housing, which reduces the air supply to burners on the opposite side.

A further object is to supply gas to the burner nozzles without reducing the available area for entrance of air.

Still another object is to assemble the plurality of burner nozzles in a single unit, whereby they may be removed as a unit, for replacements, adjustments, repairs, etc.

Another object is to provide means for automatically centering the nozzles relative to their respective passages, when the unit is replaced.

It is also an object to provide a pilot light that will not blow out, even though there is a sudden increase in pressure in the gas supply or an increase in furnace draft sufficient to blow out an ordinary pilot light.

Other objects reside in details of construction and in novel combinations and arrangements of parts, which will appear in the course of the following description. In the drawings, like reference characters designate similar parts in the several views.

Figure 1 is a vertical section through a furnace wall, in which an embodiment of our invention has been placed, taken on the line 1—1 of Figure 2.

Figure 2 is an elevation taken in the direction of the arrow "A" in Figure 1.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is a section on the line 4—4 of Figure 1.

Figure 5 is a section on the line 5—5 of Figure 4.

Figure 6 is an enlarged elevation of the pilot light comprised in the invention.

Figure 7 is a plan view of a part of the pilot light.

Referring more in detail to the drawings, the reference numeral 7 generally designates the wall of a furnace. A shell 8 enclosing the present embodiment is set in place in an opening in said wall, flush with the inner surface of such wall, as shown in Figure 1.

At the inner end of the shell are a plurality of nozzle passages 37 through tile 38 providing initial combustion spaces. The tile are preferably polygonal, as octagonal, exteriorly, and cylindrical interiorly. The polygonal exterior provides secondary air passages 39 between the tile. The sides of the tile are hollow for cement 40. After molding and firing, the tile are ground along the edges of the hollow sides to size and to make a close fit between the tile.

The tile extend beyond the inner end of the shell 8 and are flush with the inner surface of the furnace wall, as shown in Figure 1.

Telescoping within the outer end of the shell is a frame 9 for shutters or louver 10. The frame has a flange 11 limiting inward movement of the frame within the shell and also abutting against the outer surface of the furnace wall 7.

The frame has an inwardly extending rim 12 across the top and bottom, as shown in Figure 2. At the sides, this rim is broken away to allow the shutters to extend outward from the frame. Portions 13 and 14 of the rim still remain at the corners and at the middle of the sides. Inside of the frame member are similar inturned members 15 resembling sections of the rim, but spaced from the outer face of the frame. The members 15 are disposed opposite the spaces between the members 13 and 14 of the rim.

When the shutters are closed, they engage all of said rim members 12, 13, 14 and 15 and are limited in their movement thereby. The shutters have beveled adjacent edges 16, so that they may overlap and lie in the same plane when closed. The upper and lower shutters are beveled at 17 and 18 respectively for engagement with the inner surface of the rim 12.

The shutters do not all open the same way, but preferably adjacent shutters are rotated on their longitudinal axes in opposite directions. This arrangement allows air to enter the shell 8 at opposite angles, so that a maximum amount of air is evenly distributed throughout the shell.

To effect this movement of the shutters, the top and bottom pairs have engaging gear segments 19 and 20. It will be noticed that the segment 19 is one tooth ahead of the other segment in the closing movement of the shutters, in order that the top shutter 21, for instance, may close just prior to shutter 22. Some such arrangement is necessary in order that the shutters may be moved to overlapping positions.

The pairs of shutters are connected by a link 23, to operate simultaneously. The top shutter 21 is in turn connected by a link 24 to a control lever 25. The lever has a screw rod 26 provided with a head 27 and a brake shoe 28. The rod is screwed in a threaded opening in the lever and is loosely mounted on the shoe 28. The shoe bears

against a brake surface 29. The fulcrum for the lever is at 30.

The gas supply is furnished through conduit 31. An offset passage 32 having an inlet opening 33 connects with the conduit 31 through the top of the frame, as illustrated in Figure 1, in order not to reduce the frontal area of the burner. A pipe 34, connecting with passage 32, extends along the top of the sleeve and is bent down, as shown at 35, behind the nozzle passages 37, to provide a header for the nozzles.

Branch pipes 36 extend laterally from the header 35. Individual pipes 41 extend from the lateral branch pipes 36 into the several passages 37. Gas nozzles 42, disposed at the end of the pipes 41, have diverging orifices for ejecting gas.

Notched supports 43 are disposed at opposite sides of frame 44 for the tile. The branch pipes 36 are arranged to fit in the notches of the supports 43 and thereby center the nozzles 42 within the passages 37. Clamping members 45 are bolted to the frame 44 and clamp the lateral pipes 36 in the notched supports 43. By removing nuts 46 from bolts 47, the clamping members may be removed.

A pilot light 48 is provided in one of the secondary air passages at the bottom of the burner. The light is supplied with gas by a pipe 49, extending through the top of the shell 8, as shown in Figure 2. The pipe 49 is connected with the main gas supply separately from the conduit 31, or connected with the conduit 31 ahead of the valve (not shown) that controls same.

The pilot light comprises a nozzle piece 50, triangular in section, as shown in Figure 4. A spacing lip 51 extends from the open end of the triangular body. A refractory tile 52 having a plurality of baffles 53 in staggered arrangement, as best shown in Figure 7, abuts against the lip 51. The baffles are triangular in section, to conform with the passage in which they are inserted. A circuitous passage is provided around the baffles.

This circuitous passage impedes the flow of gas, so as to reduce its velocity to the rate of flame propagation. This feature is especially valuable when there is a sudden increase in the flow of gas, or furnace draft.

In the use of the invention, the conduit 31 and pipe 49 are connected with a suitable source of gas supply. The pilot light is preferably burning all the time. Thus when gas is ejected from the nozzles 42 and enters the furnace, it is ignited by the pilot light. The baffles 53 are helpful in preventing backfire in the furnace from blowing out the pilot light. The air supply is controlled by the shutters or louver 10.

When it is desired to repair or replace parts of the burner, the frame 9, chamber 32, pipe 34, branch pipes 36, burner nozzles, and the pilot light and pipe 49 are removable as a unit when the clamping members 45 are removed. Such ease in disassembling assists materially where the unit is removed several times, which is often necessary during tests to ascertain the correct nozzle for a given job.

In replacing the unit, the flange 11 and back side of the chamber 32 abut against the outer surface of the furnace wall, and the nozzles are centered by the notched supports 43. The clamping members 45 are then placed across a series of the notched supports. The ends of such members embrace the bolts 47. Nuts 46 are then applied to the bolts to hold the clamping members in place.

It is to be understood that changes may be made in the details of construction and arrangement of parts without departing from the spirit and scope of the invention.

What we claim and desire to secure by Letters Patent is:

1. In a gas burner, a nozzle for the emission of gas to be consumed, a conduit supplying gas to the nozzle, overlapping shutters controlling the supply of air to the nozzle, and engaging gear means on the shutters to rotate same simultaneously, one of said means being ahead of the other to move one shutter to a closed position prior to the other.

2. In a gas burner, gas nozzles at opposite sides of the burner, in combination with shutters divergingly arranged, controlling an air supply to the burner and directing air simultaneously towards the nozzles at opposite sides of the burner.

3. In a gas burner, gas nozzles at opposite sides of the burner, in combination with shutters divergingly arranged, controlling an air supply to the burner and directing air simultaneously towards the nozzles at opposite sides of the burner, and engaging gear means on the shutters, effecting simultaneous operation of the shutters.

4. In a gas burner, a shell in an opening in a furnace wall, a series of tile in the shell providing burner passages, nozzles supplying gas to the passages to support combustion therein, shutters controlling an air supply for the shell, and a header for supplying gas to the nozzles, the header having a portion within the shell and having an offset portion to abut against the furnace wall and extending to the side of the shutters, to minimize interference with the air supply.

5. In a gas burner, initial combustion spaces, gas nozzles separately supplying gas to the initial combustion spaces, a conduit supplying gas to the nozzles, and shutters arranged in pairs for controlling a supply of air to the combustion spaces, the shutters of each pair being arranged for rotary movement in opposite directions for their simultaneous operation to admit uniform quantities of air to the initial combustion spaces.

6. In a gas burner, shutters controlling a supply of air to the burner, a frame for the shutters having an opening controlled by the shutters, a rim on the frame providing an abutment for the shutters in their closed position, and abutments on the frame limiting closing movement of the shutters by air-tight engagement therewith.

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