May 30, 1933. C. L. CALHOON 1,912,254

GAS BURNER

Filed Dec. 23, 1929 3 Sheets-Sheet 1

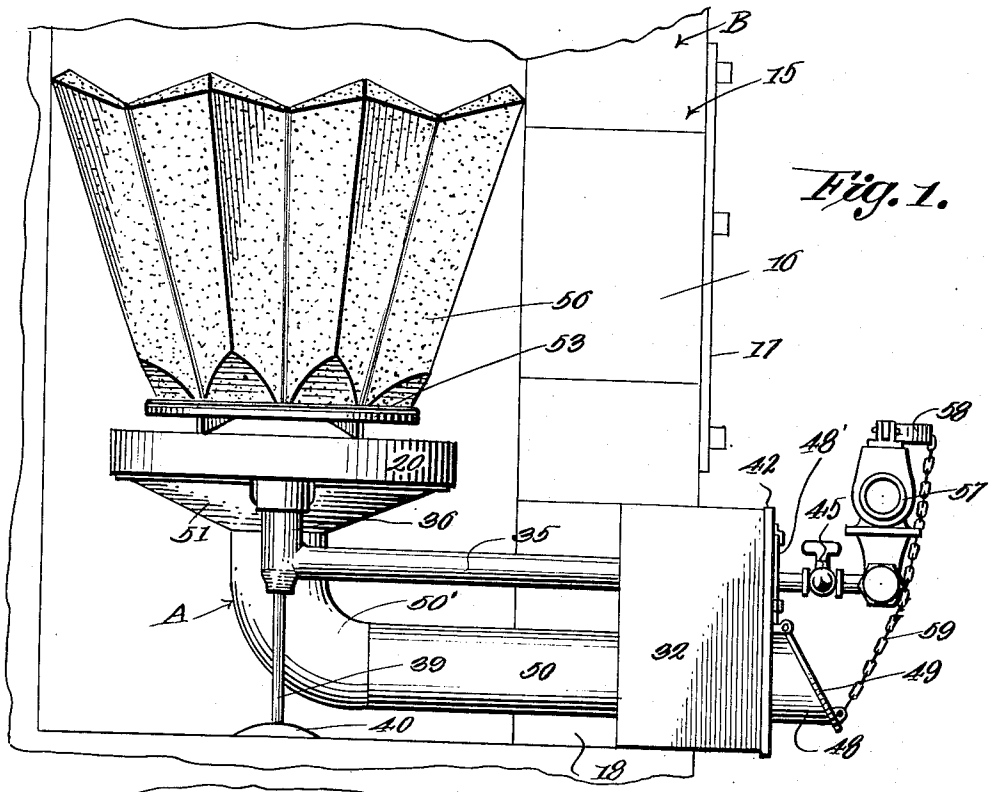


Fig. 1.

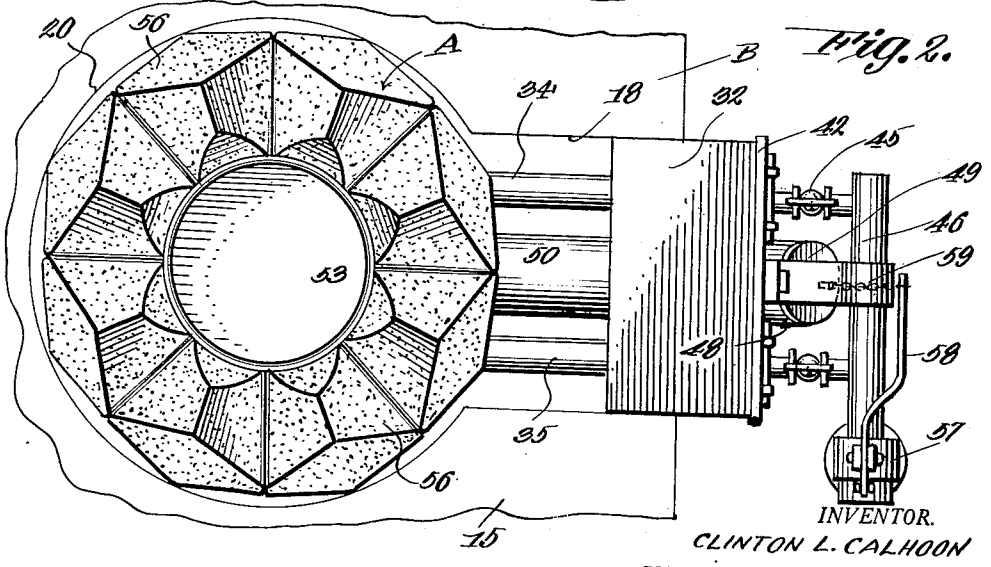


Fig. 2.

INVENTOR.
CLINTON L. CALHOON
BY
Irving L. McCathran
ATTORNEYS.

May 30, 1933. C. L. CALHOON 1,912,254

GAS BURNER

Filed Dec. 23, 1929 3 Sheets-Sheet 2

Fig. 3.

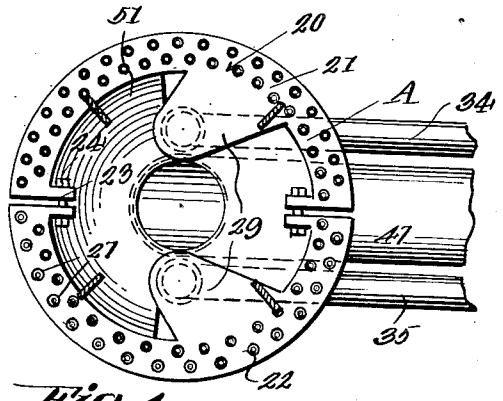


Fig. 5.

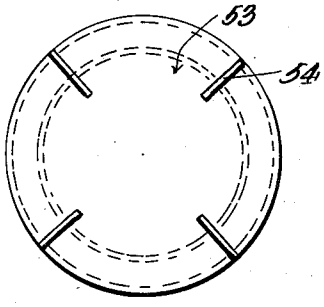


Fig. 4.

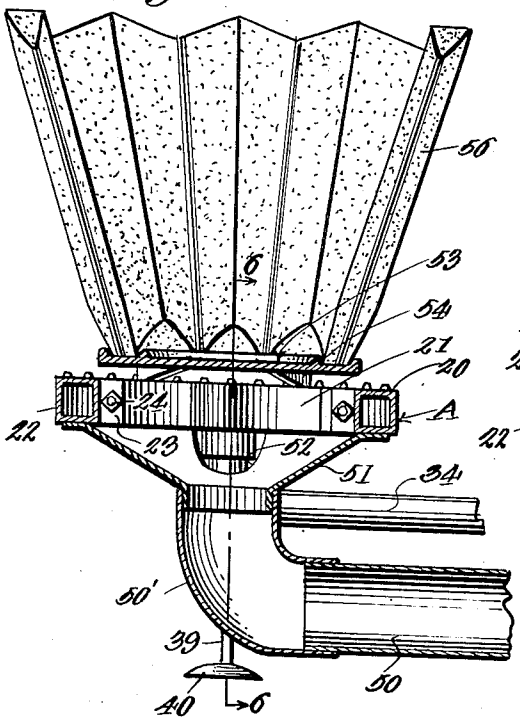


Fig. 7.

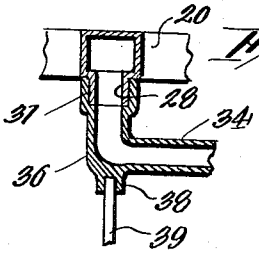
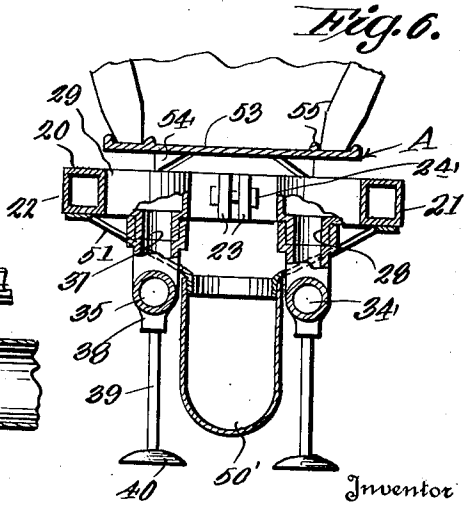


Fig. 6.



Inventor
CLINTON L. CALHOON

By Irving L. McCathran
Attorney

May 30, 1933. C. L. CALHOON 1,912,254

GAS BURNER

Filed Dec. 23, 1929 3 Sheets-Sheet 3

Fig. 8.

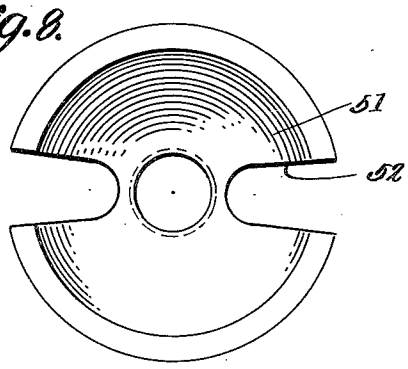


Fig. 11.

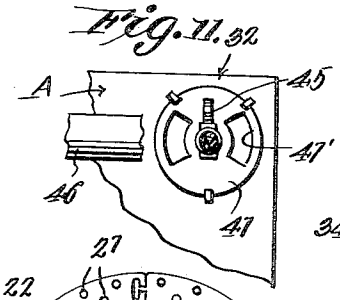


Fig. 9.

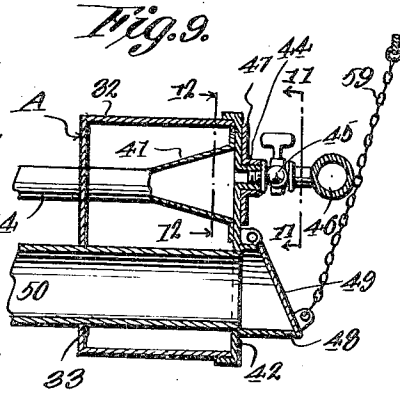
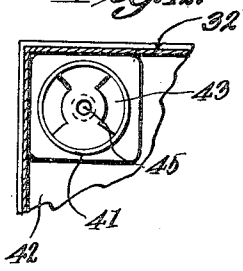


Fig. 12.



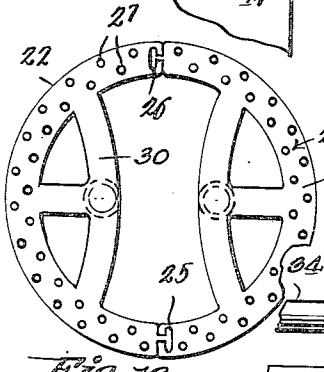
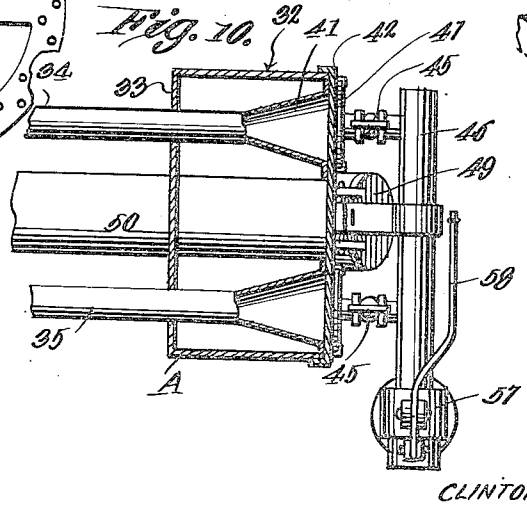


Fig. 13.

Fig. 10.



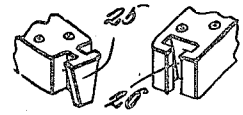


Fig. 14.

INVENTOR.
CLINTON L. CALHOON

BY Irving L. McCathran
ATTORNEYS.

Patented May 30, 1933

1,912,254

UNITED STATES PATENT OFFICE

CLINTON L. CALHOON, OF SALINA, KANSAS

GAS BURNER

Application filed December 23, 1929. Serial No. 416,048.

This invention appertains to furnaces and more particularly to a novel gas burner therefor.

One of the primary objects of my invention is to provide a gas burner which can be utilized with an ordinary type of coal burning furnace whereby such furnace can be converted into a gas burning furnace, the burner being of such a type, however, as to permit the same to be susceptible for coal burning furnaces already installed or with new heating plants in the course of installation.

Another prime object of my invention is to provide a novel gas burner for furnaces embodying a novel burner structure per se and novel means for distributing the mixed air and gas to the burner sections so that a uniform distribution of mixed gas and air will be had around the burner.

A further important object of my invention is to provide a sectional gas burner with novel means for connecting the sections together whereby parts will be drawn into intimate contact, said means being of such a type that the sections of the burner can be readily connected or disconnected.

A further object of my invention is the provision of novel means for leading an additional supply of air under the furnace and thence over the upper surface thereof, whereby the air will be thoroughly heated by the burner and gas flame, the air then being used for heating purposes.

A further object of my invention is the provision of a novel deflector plate arranged above and in slightly spaced relation to the top of the burner, the deflector plate forming means for supporting radiant clay baffle members which are adapted to be heated from the burner, the baffle plates serving as a means for deflecting the additional air over the upper surface of the burner and toward the walls of the furnace.

A further important object of my invention is the provision of novel means for controlling the flow of air through said additional air means from the main gas valve of the heating device whereby the supply of air to be heated will be in proportion to the intensity of the flame of the burner.

A further object of my invention is the provision of a casing through which the air and gas mixing pipes extend for the sections of the burner and through which the additional air supply pipes extend, the box being adapted to fit into the usual ash pit door of the furnace, said box being preferably sealed in this opening to prevent the flow of extraneous air around the same.

A still further object of my invention is to provide an improved gas burner attachment for furnaces of the above character, which will be durable and efficient in use, one that will be simple and easy to manufacture, and one which can be placed upon the market at a reasonable cost.

With these and other objects in view, the invention consists in the novel construction, arrangement and formation of parts, as will be hereinafter more specifically described, claimed, and illustrated in the accompanying drawings, in which drawings:

Figure 1 is a fragmentary vertical section through a conventional furnace showing my improved gas burner incorporated therewith, the gas burner attachment being shown in side elevation;

Figure 2 is a fragmentary horizontal section through a furnace showing my improved gas burner attachment incorporated therewith, said attachment being shown in top plan;

Figure 3 is a detail top plan view of the burner per se with certain associate parts connected therewith;

Figure 4 is a vertical section through my improved attachment illustrating the means of connecting the additional air supply pipe

with the distributing cone therefor to the burner;

Figure 5 is a bottom plan view of the novel baffle plate employed in connection with my attachment;

Figure 6 is a detail vertical section taken on the line 6—6 of Figure 4;

Figure 7 is a detail vertical sectional view illustrating the means for connecting one of the air and gas mixing pipes with one section of the burner;

Figure 8 is a detail plan view of the auxiliary air distributing cone;

Figure 9 is a central vertical section through the front box employed for supporting the air and gas mixing pipes for the burner and the auxiliary air supply pipe;

Figure 10 is a horizontal section through the box or casing employed for supporting the air and gas mixing pipes and the additional air supply pipe;

Figure 11 is a detail vertical section taken on the line 11—11 of Figure 9 looking in the direction of the arrows showing the air and gas mixing shutter carried by said box or casing;

Figure 12 is a detail vertical section taken on the line 12—12 of Figure 9 looking in the direction of the arrows illustrating the opposite side of the air and gas mixing shutter;

Figure 13 is a plan view of the modified form of burner per se, and

Figure 14 is a detail view illustrating the means employed for connecting the sections of the burner together in the modified form.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter A generally indicates my improved gas burner attachment and B a conventional coal burning furnace with which the same can be associated.

Only sufficient parts of the furnace have been shown to illustrate the use of my invention, but as illustrated, the furnace includes the usual casing or body 15 having the usual opening 16 for permitting the introduction of coal therein and closed by the door 17, and the usual ash pit opening 18.

In accordance with my invention, the door 17 is normally left closed and the grate structure is removed from the furnace as well as the door for the ash pit.

My improved attachment A comprises a novel gas burner per se 20 which includes a pair of semi-circular burner sections 21 and 22. These sections, as shown in Figure 3, can be provided with inwardly directed radial lugs 23 for the reception of a connecting bolt 24 and it is obvious that the sections can be drawn into intimate contact with one another by said bolt. If desired, the meeting ends of the sections 21 and 22 can be provided respectively with wedge shaped lugs 25 and wedge shaped sockets 26 in the nature of tongues and grooves, whereby the sections can be connected together by the mere sliding of the tongues into the sockets. The wedge shape of the tongues and sockets forms means for drawing the sections into intimate contact with one another. Each of the burner sections is provided with inner and outer rows of burner openings 27, as clearly shown in Figure 3.

Connected with each burner section is a depending nipple 28 which is preferably ground for a purpose which will be later described. As shown in Figures 3, 6 and 7, the nipples may be casted on a wide flaring air and gas distributing body 29, which is in turn casted directly on the semi-circular burner sections. This provides means for efficiently distributing the air and gas to the burner sections, but if desired, the nipples 28 can have communication with a plurality of air and gas distributing pipes 30 leading to different points of each burner section so that an equal distributing of the air and gas will be insured. This is shown in Figure 13 of the drawings.

Forwardly and below the burner proper 21 I provide a casing or box-like structure 32 which is made of such a size as to be snugly received within the ash pit opening 18. If desired, the box or casing 32 can be sealed in place, so as to prevent the leakage of extraneous air around the box and into the casing.

Extending into the box or casing 32 through the rear wall 33 thereof are air and gas mixing pipes 34 and 35, one being provided for each burner section. The rear ends of the air and gas distributing pipes 34 and 35 are bent upwardly at right angles as at 36 and provided with a ground seat 37 for receiving the depending nipples of the burners. The provision of the ground nipples and ground seats therefor insures a gas-tight joint. Directly below the angular ends 36 of the air and gas pipes 34 and 35 the same can be provided with sockets 38 for the reception of depending supporting legs 39 and these legs act as means for supporting the burner and associate parts in the furnace. The lower ends of the legs 39 can be provided with wide bearing seats 40 for engaging the lower wall of the ash pit. The forward end of the air and gas pipes 34 and 35 are provided with bell-shaped mouths 41 which are connected to the inner surface of the front wall 42 of the box or casing 32. The front wall of the box or casing at the point of connection of the flaring mouths or bells 41 of the air and gas pipes 34 and 35 are provided with arcuate slots 43 which constitute means for permitting the entrance of air into the mouths or bells 41. The front wall 42 of the box or casing is provided with nipples 44,

which nipples receive the manual controlled gas cocks 45 which lead from the gas manifold pipe 46. In accordance with the usual practice, the nipples 44 rotatably support shutter or valve plates 47 having arcuate slots 47′ therein and it is obvious that by rotating the shutter plates 47, the active size of the slots 43 can be controlled and thereby control the amount of air entering the bells or mouths 41 of the air and gas pipes. This forms a conventional air and gas mixing device.

Extending into the box or casing 32 adjacent to the central lower end thereof is an air conduit feed pipe 50, which pipe communicates at its inner end with a damper frame 48 carried by the front wall 42 of said box. The damper frame supports a pivoted door or damper 49 whereby the entrance of air into said air conduit pipe 50 may be regulated. The rear end of the pipe has connected therewith an elbow 50′, which elbow terminates below and at the axial center of the burner proper 20. This elbow 50′ has connected therewith the flaring air distributing head 51 which is bolted or otherwise secured to the burner proper 20 adjacent to the periphery thereof. If desired, the opposite sides of the head 51 can be provided with air openings 52.

Forming an essential part of my invention is the flat disk shaped deflector plate 53 which is of the same or a slightly greater diameter than the interior diameter of the gas burner proper 20, and the lower face of the deflector plate 53 is provided with depending legs 54 which rest on the upper face of the burner and hold the deflector plate in spaced relation to the upper face of the burner. The upper face of the disk shaped deflector 53 is provided with inner and outer spaced annular ribs 55 which receive therebetween the lower ends of the radiant clay baffles 56, which preferably flare outwardly toward their upper ends and over the burner opening. The upper ends of the radiant heat baffles can be held in place in any desired way, either by a suitable band or by contact of the baffles with the sides of the furnace.

From the construction so far it can be seen that when the burner proper 20 is lighted, heat rising therefrom will heat the radiant heat baffles 56 which will radiate the heat upwardly and toward the walls of the furnace. The air flowing in through the air conduit pipe 50 will be led into the central portion of the burner by the conical deflector 51 and the air will strike the lower surface of the disk shaped deflector 53 and will thus be forced outwardly in an annular path directly over the flame where the same will become heated and the air will rise around the radiant baffles and against the walls of the furnace.

The arrangement of the burner, the auxiliary air inlet and the baffle plate 53 constitute important parts of my invention and therefore particular stress is laid upon the construction and arrangement thereof.

The gas enters the manifold gas pipe 46 through a main gas valve indicated by the reference character 57, and this valve can be of the motor type placed upon the market by the Minneapolis-Honeywell Co. and known as serial type B22 or B2210. This valve is provided with a pivoted lever 58, and as the valve is opened, a plunger in the valve raises the lever 58, which is connected by means of a chain 59 with the lower end of the damper 49. Thus the entrance of air through the air conduit pipe is automatically controlled from the main gas valve of the furnace. This forms another important feature of my invention.

Changes in details may be made without departing from the spirit or the scope of the invention, but:

What I claim as new is:

1. The combination with a conventional furnace including a body having an ash-pit opening, of a gas burner attachment therefor comprising a burner proper removably arranged in the body, a casing disposed in the ash-pit opening and snugly fitting and sealing the same, a gas manifold pipe, means for supplying gas to said pipe, air and gas mixing pipes extending through the casing near the top thereof and connected with the burner, supporting standards engaging the inner ends of said air and gas mixing pipes and arranged in spaced relation, said standards provided with enlarged flattened bearing seats at their lower end to constitute supporting feet, an air supply pipe extending through said casing near the bottom thereof and having an upturned end communicating with said burner proper, said air supply pipe being hung below the burner and below the air and gas mixing pipes and also being hung between said supporting standards for facilitating the proper support of the burner, and means for simultaneously controlling the opening and closing of said air supply pipe with the opening and closing of said gas manifold pipe.

2. The combination with a conventional furnace including a body having a rectangular ash-pit opening, of a gas burner attachment therefor comprising a burner proper arranged within said body, a substantially rectangular casing snugly fitting within the ash-pit opening and sealing the same, a gas manifold pipe, means for supplying gas to said pipe, air and gas mixing pipes extending through said casing and connected with said burner and also being snugly anchored against the front wall of said casing, an enlarged air supply pipe extending transversely through said casing near the bottom

thereof and between said air and gas mixing pipes and hung below said air and gas mixing pipes, said air supply pipe provided with an upturned end communicating directly with the bottom of said burner proper, and supporting standards engaging said air and gas mixing pipes upon opposite sides of said upturned end of said air mixing pipe.

In testimony whereof I affix my signature.

CLINTON L. CALHOON.