June 7, 1932. R. E. FRASER 1,862,182

BURNER ASSEMBLY FOR GAS FURNACES

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Fig. 1

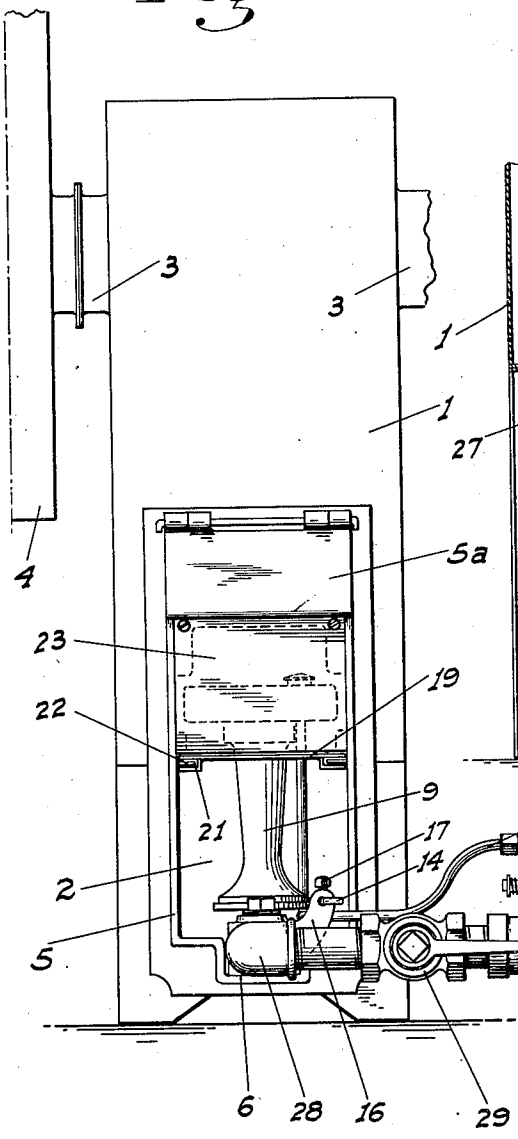
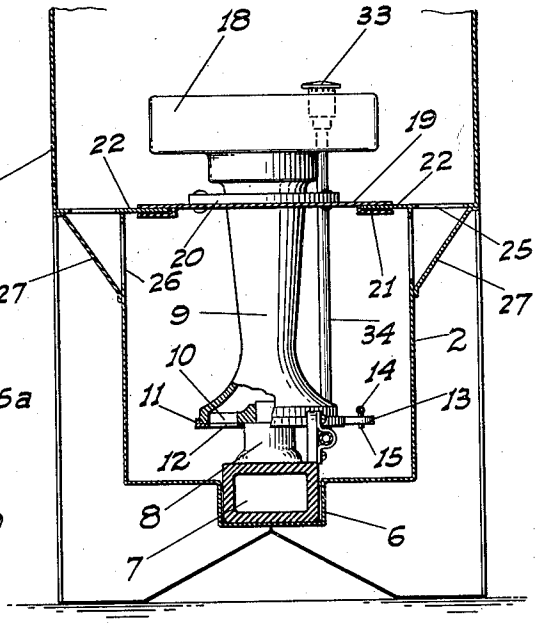


Fig. 2



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Fig. 3

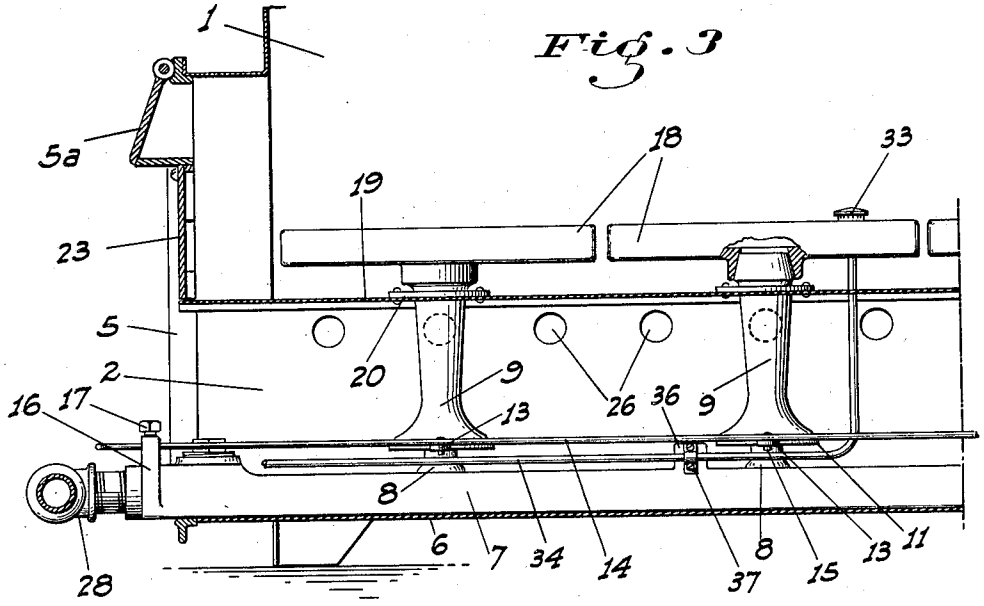
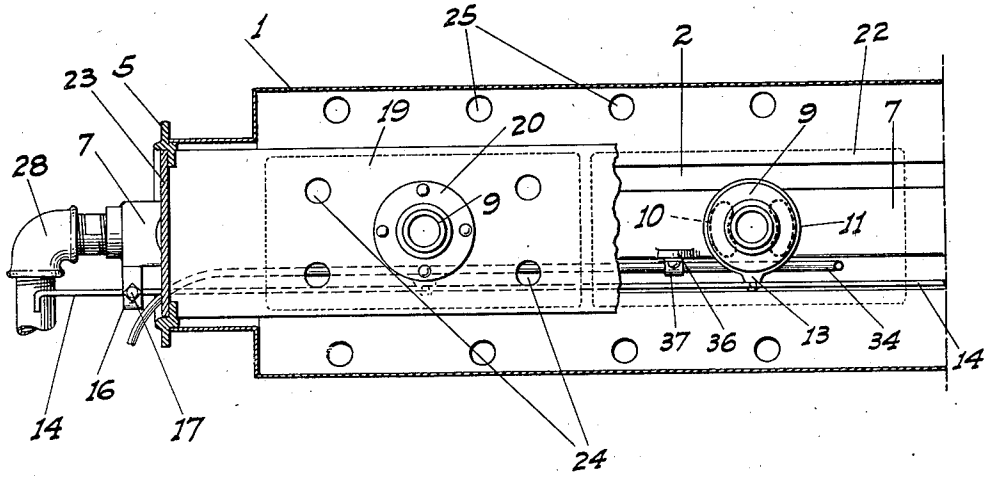


Fig. 4



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BURNER ASSEMBLY FOR GAS FURNACES

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Fig. 5

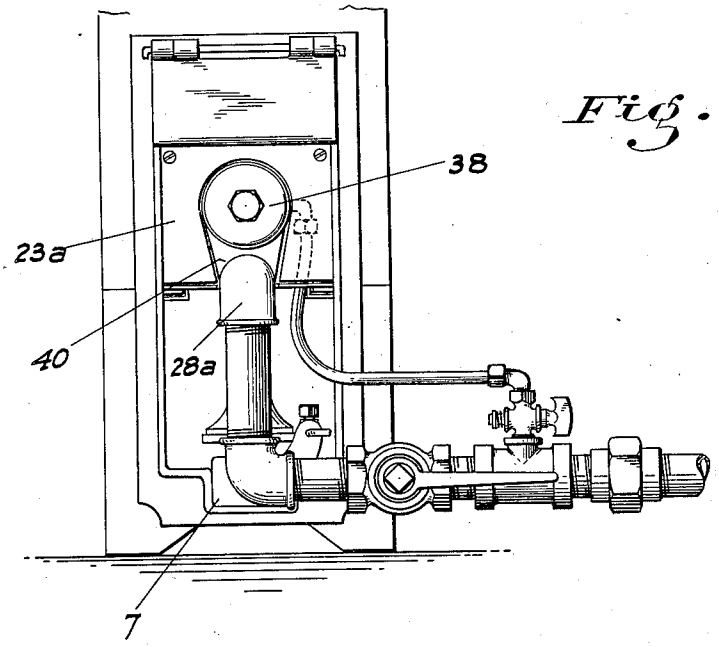
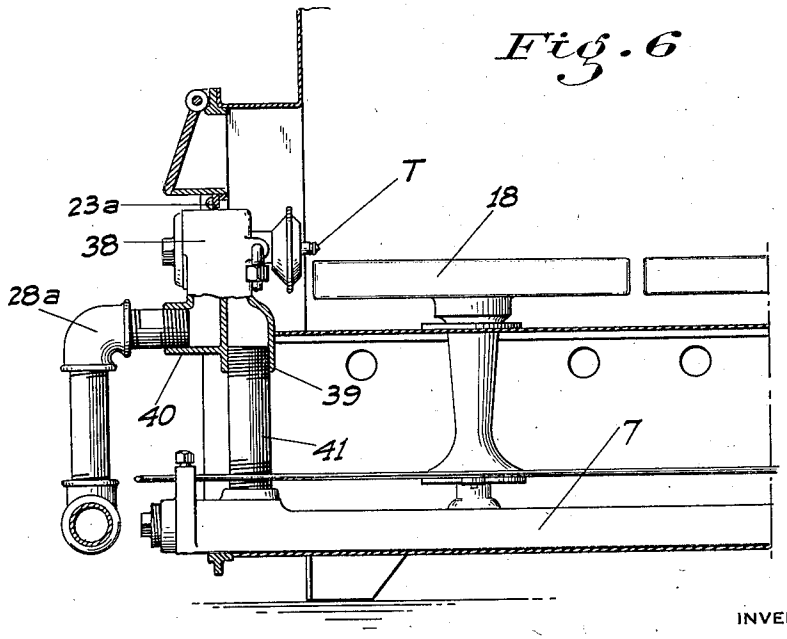


Fig. 6



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UNITED STATES PATENT OFFICE

RICHARD E. FRASER, OF STOCKTON, CALIFORNIA, ASSIGNOR OF ONE-HALF TO FRASER FURNACE COMPANY, OF STOCKTON, CALIFORNIA, A CORPORATION

BURNER ASSEMBLY FOR GAS FURNACES

Application filed March 8, 1930. Serial No. 434,337.

This invention relates to gas furnaces such as are used for house heating furnaces, and particularly to the larger furnaces of that type shown in my copending application for patent, Serial No. 320,332, filed November 19, 1928, which has resulted in Patent No. 1,762,683, issued June 10, 1930.

The firing-box of a furnace of this type is quite deep compared to its width and it is customary to use a number of burners arranged in a row and extending substantially the full depth of the firebox. If the burner assembly is a fixed and non-removable unit it is a hard matter to make the sometimes necessary adjustments or replacements to the innermost burners without practically dismantling the entire assembly. This of course is very inconvenient and is a time taking procedure, and as a result, said innermost burners are frequently left in a state of poor adjustment or disrepair, which of course does not give the furnace as a whole the proper efficiency.

The principal object of my invention is to provide a burner assembly and firebox arrangement so constructed that all the burners may be withdrawn from or inserted in the firebox at one operation and with only the uncoupling of a single pipe union being necessary; and so that any burner may then be removed from the assembly without disturbing the others.

Another object of the invention is to provide a means, arranged as a unit with the assembly, for enabling the air supply to all the burners to be adjusted simultaneously and to the same extent, so that flames of equal volume and intensity will be created at all the burners. I have also arranged a pilot light device as a unit and removable with a burner assembly, so that this pilot will retain its desired position relative to the burners at all times. The burner supporting element of the assembly is so constructed that it may be easily made in different lengths, to accommodate a different number of burners as the depth of the firebox may require, without otherwise altering the design of said element or any of the cooperating parts.

As a further object I have provided a means for enabling a certain type of safety pilot (through the body of which all the gas passes before reaching the burner, and whose passage is controlled by the heat generated by the pilot) to be used with my improved burner assembly or with any gas burners of the Venturi air mixing type—something which has not been so far successfully or practically accomplished, to my knowledge.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a front end view of the firebox of the furnace, showing my improved burner assembly installed in connection therewith.

Fig. 2 is an enlarged cross section of the firebox and burner assembly.

Fig. 3 is a fragmentary longitudinal section of the firebox showing the burner assembly therein.

Fig. 4 is a fragmentary top plan view of the same, with the burners removed and with other parts broken away.

Fig. 5 is a front end of the firebox and burner assembly showing a modified form of pilot.

Fig. 6 is a fragmentary longitudinal section of the firebox showing the modified burner and pilot assembly.

Referring now more particularly to the characters of reference on the drawings, and particularly at present to Figs. 1 to 4 the furnace includes a rectangular relatively long or deep firebox, which is divided into an upper main fire chamber 1 and a lower and relatively narrow air chamber 2. From the sides of the main chamber 1, some distance above the bottom of the same, outlets 3 communicate with drums 4 as shown in said copending application.

The front of the firebox is provided with a rectangular opening of th same width as

the chamber 2 and extending upwardly from the bottom of the same to a point some distance above the top of said chamber. This opening is surrounded by a cast frame 5, on the upper portion of which a flap door 5*a* is hinged for upward swinging movement. The bottom of the frame and the bottom of the firebox chamber 2 are provided from end to end with a rectangular trough 6 to slidably guide and support the gas manifold 7 which is of similar cross-sectional shape to said trough and which projects outwardly of the frame 5 a short distance.

Projecting upwardly from and secured in the manifold at equally spaced points along the length of the same are gas jet nipples 8 which removably fit in and support the lower ends of Venturi pipes 9 of common form. These pipes as usual swell outwardly at their bases where they surround the jets and are there provided with curved air slots 10. Shutters 11 provided with similar curved slots 12 to register with the slots 10 are turnably mounted in connection with the pipes. This is common construction, as will be evident, and permits air in varying quantities to be drawn into the Venturi pipes to be mixed with the gas entering the same through the jets.

To enable all the shutters to be adjusted simultaneously and from the exterior of the firebox, said shutters are provided with radially extending ears 13 projecting laterally of the manifold and over which a rod 14, extending lengthwise of the firebox and manifold, extends. This rod has depending pins 15 detachably engaging holes in the ears, and at its outer end slidably projects through a boss 16 on the outer end of the manifold, and which as previously stated is outside the firebox. A set screw 17 in the boss enables said rod to be easily clamped in any position to which it may be moved.

The boss is the only definitely fixed support or connection between the rod and manifold, since toward its inner end the rod is supported by resting on the shutter ears. This permits any shutter to be readily disengaged from the rod, when it is desired to remove the corresponding Venturi pipe, by merely flexing the rod upwardly and the rod-pin clears the corresponding ear.

The Venturi pipes project upwardly a short distance above the top of the chamber 2 and removably support burners 18 on their upper ends. These burners are of rectangular form, their width being somewhat less than that of the firebox 2 and frame 5 so that they may pass through the same. The length of the burners is such that while the various burners are separated from each other they are so close as to form in effect a continuous burner unit. The burners are below the level of the door 5*a* so that the latter is not disturbed in removing or inserting the burners and is merely for inspection purposes to enable the flame to be viewed.

The primary and main air for the burners is taken in through the openings in the bottom of the Venturi pipes, to which air has free access from the front of the firebox through the lower portion of the opening at the outer end of the same. It is not desired that a large amount of secondary air should have access to the flame itself, so that an air restricting structure is employed to limit the passage of air to the burners from around the same. This structure comprises a horizontal plate 19, substantially the same width and length as the chamber 2 and secured in connection with the different Venturi pipes, which project through said plate, by suitably arranged collars 20. Along its sides the plate is provided with longitudinal and outwardly facing grooves 21.

The plate is disposed on the same level as the bottom of the main fire chamber 1, the bottom plate of which projects inwardly of the sides of the lower chamber 2 to form overhanging ledges 22 which project into the grooves 21, thus slidably guiding the plate 19 and forming an additional support for the burner assembly against possible lateral deflection. The plate 19 projects to the front frame 5 which is provided with a removable cover plate 23 extending from the plate 19 to the bottom of the door 5*a*. The portion of the lower chamber 2 above the plate 19 is therefore shut off from air from the outside, except for such restricted air passages as will be shown later. At the same time there is nothing to interfere with the ready removal of the burner assembly since the plate 23 may be readily removed and the entire front opening is then unobstructed so as to permit of the outward movement of the manifold burners and plate 19.

The plate 19 is provided with widely spaced holes 24 to admit air to the fire chamber of the firebox from below. I may also provide additional holes 25 through the bottom plate of the chamber 1 outwardly of the lower chamber 2, which communicate with said lower chamber by holes 26 in the sides of the latter; diagonal walls 27 between the sides of the chamber 2 and the bottom of the chamber 1 keeping the air outside the furnace from passing through said holes.

At its outer end the manifold is connected by an L 28 with various pipe fittings forming the main horizontal gas line. This line extends at right angles to the furnace and manifold and includes a main gas-cock 29, a T 30 beyond the same, and a union 31 beyond the T detachably connecting the same with the remaining and permanently fixed pipe line 32.

To ignite the gas flowing from the burner when the cock is opened a pilot 33 of suitable character is positioned adjacent one of the

burners. From this pilot a supply tube 34 extends downwardly to the manifold and then along the same to and beyond its outer end, where it is connected by a control cock 35 to the T 30. Where it extends along the manifold, above the trough 6 of the chamber 2, said tube 34 is secured in place by one or more upstanding lugs 36 formed on the manifold and against which said tube is secured by clips 37. By reason of this construction it will be seen that the pilot assembly is a unit with the burner assembly, and when it is desired to remove the entire structure it is only necessary to disconnect the union, remove the plate 23 and withdraw said structure lengthwise or horizontally from the firebox.

In Figs. 5 and 6 I have shown an arrangement of parts which enables me to use the special form of safety pilot 38 instead of the ordinary type previously described. The body of this pilot as constructed for my purpose is provided with a downwardly projecting tapped outlet passage 39 and a horizontal outwardly projecting intake passage 40, disposed in front of said passage 39. The main gas line L, 28*a*, instead of being connected to the outer end of the manifold 7 as was previously the case, is now connected to the passage 40; while a vertical pipe 41 is connected to and extends downwardly from the passage 39 and is connected to the top of the manifold adjacent its outer end. The manifold is not changed for either type of connection, being initially tapped both on top and at its outer end to receive the pipe fittings; the opening not being used at the time being closed by a plug, as plainly shown. The jet tip T of the pilot is positioned so as to be adjacent the forward end of the forward burner 18, the plate 23*a* of the front frame being cut away to allow the body of the pilot to project partly through the same. Otherwise the construction and arrangement of the assembly is the same as before and said assembly may be removed as a unit from the firebox without disturbing the pilot. The particular passage arrangement of the pilot however enables said pilot to be positioned the necessary distance above the main gas manifold so that it is practicable to use the same with burners of this character.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. A gas burner assembly for a furnace firebox comprising a gas supply manifold, a plurality of burners separately mounted on and along said manifold, means for slidably and removably supporting the manifold in the firebox, and a gas supply line extending in a plane at right angles to the plane of sliding movement of the manifold outside the firebox and connected to the outer end of the manifold, said line including a union fitting.

2. A structure as in claim 1, with a pilot adjacent one burner, a supply pipe from said pilot connected to the main gas line between the union and manifold and outside the firebox whereby said pilot and its pipe are removable as a unit with the manifold and a control valve in said pipe adjacent its outer end.

3. In combination with a firebox having an opening at one end, a trough in the bottom of the firebox extending into the same from the opening, a gas supply manifold slidable in and supported by said trough, and a plurality of burners mounted on said manifold in spaced relation along the same; said burners having a width and being positioned so as to enable them to be removed as a unit with the manifold through the front end opening of the firebox.

4. In combination with a firebox having an opening at one end, a gas supply manifold slidably supported on the bottom of the firebox and projecting inwardly from the opening, and a burner above and spaced from the manifold, but below the top of the opening, air and gas mixing pipes connecting the burner with the manifold, a horizontal plate fixed in connection with all said pipes on a level intermediate the burner and manifold, said plate extending the full width and length of the firebox and to the opening, and a vertical cover member removably secured over the opening from the plate to the top of said opening.

5. A structure as in claim 4, in which said plate is provided with air openings at intervals.

6. A structure as in claim 4, in which said plate and firebox are provided with cooperating guide and slide means along the sides of the plate.

7. A structure as in claim 4, in which the firebox, above said plate, is wider than the portion below the plate, and air passages are provided between the upper and lower portion of the firebox to the sides of the plate.

8. In combination, a gas manifold, an air and gas mixing pipe projecting upwardly from the manifold intermediate its ends, a burner supported on said pipe, a safety pilot device disposed at the front end of the burner on a level to ignite the gas issuing therefrom, a vertical gas pipe depending from the pilot to the manifold adjacent its forward end and supporting said pilot, and a horizontal gas

intake pipe connected to the pilot in front of said vertical pipe.

9. In combination with a firebox having an opening in one end, a trough in the bottom of the firebox extending into the same from the opening, the bottom of the trough at its outer end forming the bottom of the opening, and a gas supply manifold having an upstanding burner thereon, slidably supported on the trough.

10. In combination with a firebox, a gas burner therein above the bottom of the same, a mixing pipe depending from and supporting the burner, and a horizontal plate extending the full width and length of the firebox and disposed about the pipe intermediate the ends of the same, said plate having air openings therethrough, and the firebox below the plate having openings to the atmosphere.

11. A structure as in claim 10, in which additional air openings, to the sides of the plate, are provided in the firebox to provide for the passage of air from the firebox area below the plate to the firebox area above and to the sides of the plate.

In testimony whereof I affix my signature.

RICHARD E. FRASER.