Sept. 23, 1930. R. F. LEEFELD 1,776,735

FUEL BURNER

Filed April 3, 1928

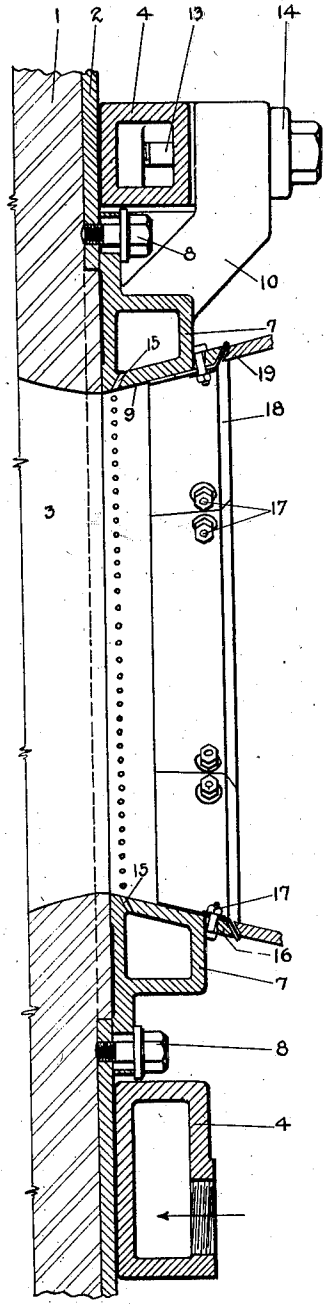


Fig. 1

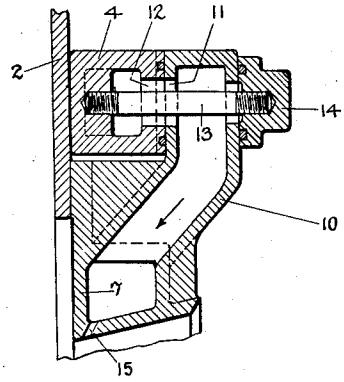


Fig. 3

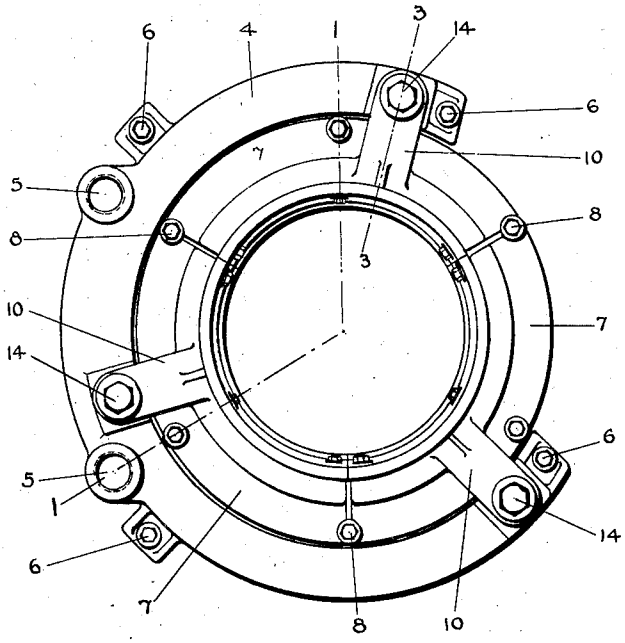


Fig. 2

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Patented Sept. 23, 1930

1,776,735

UNITED STATES PATENT OFFICE

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FUEL BURNER

Application filed April 3, 1928. Serial No. 267,030.

My invention relates to fuel burners and more particularly to that type comprising a box or ring adapted to be secured to a furnace wall surrounding the entrance to the throat of the combustion chamber. Heretofore these rings have been made with a single continuous chamber into which the fuel—gas or pulverized coal—has been admitted and from which it has been discharged through a plurality of openings or through a continuous annular slot.

According to the present invention the fuel box is made up of a plurality of independent and non-communicating sections to which the fuel is delivered from a manifold through independent connections. The invention will be understood by reference to the accompanying drawings in which Fig. 1 is a longitudinal section on the plane of the line 1—1 of Fig. 2; Fig. 2 a front view on a smaller scale than that of Fig. 1; and Fig. 3 a detail section on the plane of the line 3—3, Fig. 2. Similar reference numerals indicate similar parts in the several views.

Referring to the drawings, the numeral 1 designates a portion of a furnace wall and 2 the furnace front plate. An opening 3 in the wall 1 constitutes the throat of the furnace. As shown, the throat is frusto conical with its smaller end at the entrance.

The present construction comprises a manifold 4 in the form of a sector of a circle in vertical section, having two fuel inlet connections 5, to which may be coupled pipes leading from a source of supply. The manifold is secured to the front plate 2 by bolts 6.

Arranged concentrically with the manifold 4 is a fuel box, constituting the burner proper, made up of a plurality of independent similar sections 7, three being shown. These are secured together, and to the front plate 2, by bolts and cap nuts 8 to form an annulus, the inner wall 9 of which is frusto conical with its smaller end at the entrance to the furnace throat. Each of the fuel box sections has a radial extension 10 of such form and length as to embrace the manifold 4. Each extension has an opening 11 in its inner wall which registers with an opening 12 in the abutting wall of the manifold, as shown in Fig. 3. There is thus provided an independent passage for the fuel from the manifold to each of the sections of the fuel box or ring. The latter is secured to the manifold by bolts 13 and cap nuts 14.

The sections 7 are preferably iron castings and in the wall 9 of each section is formed a series of holes 15, the walls of which are inclined at an angle of substantially 45° to the axis of the box. When the several sections are assembled, there is formed a substantially continuous discharge outlet, the fuel issuing through the holes 15 in jets, the jets forming a converging cone. Instead of holes, the inner walls 9 of each of the sections may be formed with a slot so that there will be provided a substantially continuous annular outlet for the fuel.

Each section 7 is also formed with a flange 16 to which are secured, by bolts 17, abutting flanged plates 18. These plates when assembled form a continuous lining for a portion of the inner wall 9 of the fuel box and makes a simple and easily adjusted fit between the sections 7 and the frusto conical back plate 19, a portion of which only is shown in Fig. 1, of an air register such as described in U. S. Patent No. 1,527,214. The sections 7 can be adjusted sufficiently to center them with reference to the back plate 19 after which the plates 18 may be adjusted through bolts 17 in the slots 17'.

In the present burner it is not necessary to uncouple from the fuel piping to remove the sections 7. These sections are the only parts which require replacement. This is an advantage as it is cheaper to replace a part rather than an entire integral ring.

In operation the fuel is delivered to the manifold through the openings 5—5, and from the manifold flows through the several extensions 10 to the corresponding section 7, and discharged therefrom through either holes or slots in a thin stream in the form of a converging cone. The fuel and air for combustion are mingled at substantially the entrance to the throat 3 and, as the fuel is projected into the air from a source outside of and surrounding the air, there results the

necessary turbulence to effect complete combustion of the fuel.

While I have shown only the actual parts of the burner as assembled and in relation to the furnace, it is to be understood that the burner may be used with natural draft or it may be fitted to a furnace using forced draft. I have not illustrated a wind box nor air register, through which the air for combustion passes and is given a whirling motion by the setting of the register doors, as these features are well known and form no part of my invention.

I claim:—

1. A fuel burner comprising a plurality of independent sections secured together, a manifold and means for delivering fuel thereto, independent connections between said manifold and each of said sections, each of said sections having a flange, and plates secured to said flanges and forming a lining for the inner wall of the burner.

2. In combination, a furnace having a wall with an opening therein constituting the throat of the combustion chamber, a manifold having a fuel inlet connection, means for securing said manifold to the furnace wall, a fuel burner comprising a plurality of independent sections each having a discharge outlet, means for securing said sections together in the form of an annulus to provide a free passage therethrough for air for combustion, and connections between the manifold and each of said sections for supplying fuel to the latter.

3. In combination, a furnace having a wall with an opening therein constituting the throat of the combustion chamber, a manifold having a fuel inlet connection, means for securing said manifold to the furnace wall, a fuel burner comprising a plurality of independent sections each having its inner wall inclined, means for securing said sections together in the form of an annulus to provide a free passage therethrough for air for combustion, said inner walls being formed with fuel discharge openings, and connections between the manifold and each of said sections for supplying fuel to the latter.

4. In combination, a furnace having a wall with an opening therein constituting the throat of the combustion chamber, a manifold having a fuel inlet connection, means for securing said manifold to the furnace wall, a fuel burner comprising a plurality of independent sections each having a discharge outlet, means for securing said sections together in the form of an annulus to provide a free passage therethrough for air for combustion, each of said sections having an extension to embrace the manifold and a passage therein to deliver fuel from the manifold to the several box sections.

5. In combination, a furnace having a wall with an opening therein constituting the throat of the combustion chamber, a manifold having a fuel inlet connection, means for supporting said manifold in proximity to said opening, a fuel burner comprising a plurality of independent sections each having a discharge outlet, means for securing said sections together in the form of an annulus to provide a free passage therethrough for air for combustion, and connections between the manifold and each of said sections for supplying fuel to the latter.

6. In combination, a furnace having a wall with an opening therein constituting the throat of the combustion chamber, a manifold having a fuel inlet connection, means for supporting said manifold in proximity to said opening, a fuel burner comprising a plurality of independent sections each having its inner wall inclined, means for securing said sections together in the form of an annulus to provide a free passage therethrough for air for combusiton, said inner walls being formed with fuel discharge openings, and connections between the manifold and each of said sections for supplying fuel to the latter.

Signed at Los Angeles, in the county of Orange and State of California, this 9th day of March, A. D. 1928.

RUFUS F. LEEFELD.