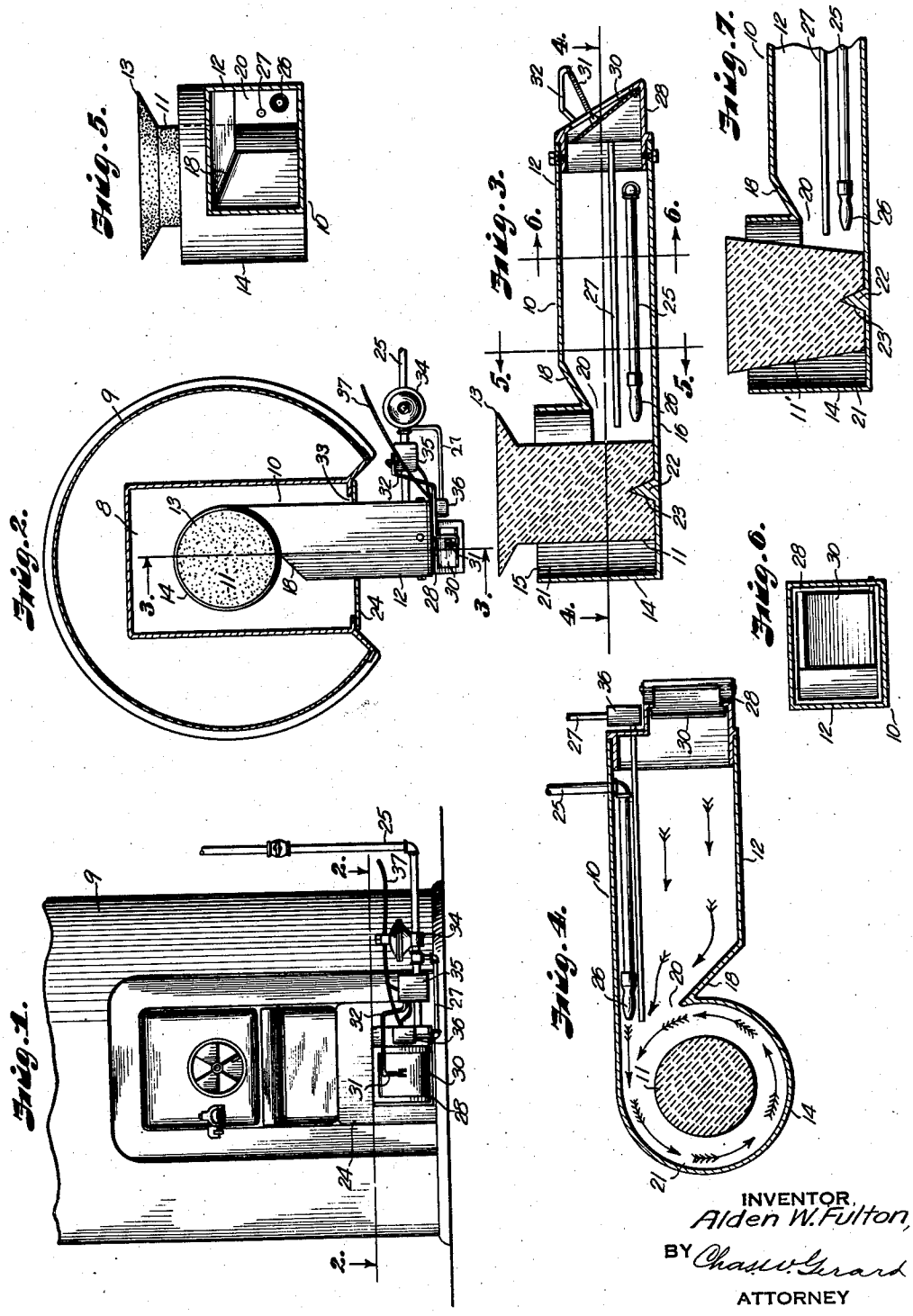
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GAS BURNER CONSTRUCTION

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## GAS BURNER CONSTRUCTION

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4 Claims. (Cl. 158—7)

The present invention relates to combustion appliances, and particularly to furnace apparatus designed for the combustion of gaseous fuel, and aims to devise an improved construction for the more efficient combustion of such fuel by improving the method of supply of the combustible mixture to the burner zone.

Accordingly, I have devised a construction and arrangement whereby the gas and air flow is supplied to the burner zone in such a manner as to produce a turbulent movement of the combustible mixture about the axis of the burner proper, for insuring thorough intermingling of the fuel ingredients as well as an effective distribution of the combustion action around the fire chamber.

To this end I provide a burner construction comprising a cylindrical housing member to which the combustible mixture is fed in a tangential relation for producing a circular movement of the fuel about a cylindrical block of refractory material located centrally of said housing member, the structure of said block being designed to promote the most effective distribution of the flame action throughout the combustion zone at the top of the block and housing member.

With the foregoing general objects in view, the invention will now be described by reference to the accompanying drawing, illustrating a suitable and practical construction for the efficient practice of the invention, after which those features and combinations deemed to be novel will be particularly set forth and claimed.

In the drawing—

Figure 1 is a front elevation illustrating a furnace equipped with a burner embodying the present invention;

Figure 2 is a horizontal sectional view, representing a section taken on the line 2—2 of Figure 1;

Figure 3 is an enlarged vertical sectional view as indicated by the section line 3—3 of Figure 2;

Figures 4, 5 and 6 are sectional views as indicated by the section lines 4—4, 5—5 and 6—6, respectively, of Figure 3; and

Figure 7 is a detail section illustrating a modified form of refractory block member.

Referring now to the drawing in detail, this shows the improved burner appliance as installed in the ash pit 8 of an ordinary type of warm air furnace 9, the two principal elements of my construction comprising a metal boxing member designated generally by the reference numeral 10, and a refractory block 11. The boxing member comprises a rectangular portion 12 projecting through the front opening 33 of the ash pit 8, and a cylindrical burner housing portion 14 which is open at the top as indicated at 15, while both portions 12 and 14 of the boxing are provided with a continuous bottom 16 designed to rest upon the floor of the ash pit. The boxing portion 12 communicates with the burner housing 14 by way of a reduced neck portion 18 so arranged as to provide an outlet passage 20 from the boxing 12, communicating approximately tangentially with the housing 14, thereby correspondingly directing the flow of air and gas into the annular space 21 surrounding the block 11, as indicated by the arrows in Figure 4. Preferably, the bottom 16 is formed with a spur 22 or the like, engaging in a corresponding recess 23 of the block 11, in position for locating the latter in correct central relation to the space enclosed by the housing 14.

In assembling the appliance in operating relation, the fire grate and ash pit door of the furnace are removed, and the opening 33 sealed by means of a suitable cover plate 24 having an opening accommodating the projecting portion of the boxing 10, so that the fuel supply is admitted entirely by way of the passage through said boxing. The main flow of gas is admitted through the pipe line 25 extending through the side of the boxing and terminating in a suitable nozzle 26 at the passage 20. A similar gas pipe 27 is also connected with the pipe 25 and terminates adjacent to said nozzle 26 for maintaining a pilot flame adjacent to the tip of the nozzle 26. The outer end of the boxing is equipped with a casting 28 fitted with a swinging damper plate 30 having a spring connection 21 with an operating arm 32, as illustrated in Figures 1 to 3.

A pressure controlled valve 34 is provided in the gas line 25, and the usual control devices for thermostatic operation of the furnace are also provided, such as the combination gas-valve and damper operating motor 35 and safety-pilot switch 36, having the electric connections 37 with a thermostat (not shown), the operating features of which are all common and well known.

The upper portion of the burner housing 14 and top of the block 11 project into the lower portion of the fire bowl of the furnace from which the grating has been removed, and preferably the upper end of the block 11 is formed with an outwardly projecting margin 13 overlying the space 21, the outer face of which margin 13 slopes upwardly as represented in Figures 3 and 5, thus providing a baffle for deflecting the flame

outwardly and at the same time permitting upward movement thereof in the direction of the interior surface of the walls of the fire bowl.

A slight modification of this feature of the construction is shown in Figure 7, where the top marginal flange of the refractory block is omitted, while the block 11' itself is made of downwardly tapered or sloping design, tending to direct the flame both outwardly and upwardly in the direction of the interior face of the fire bowl.

In the operation of the apparatus it will be understood that the pilot flame is of course intended to burn constantly, and the control devices produce intermittent operation of the damper and of the gas flow through the pipe 25 to the nozzle 26, in the usual manner, in response to the thermostat-control device. The flow of air through the boxing 12 and thence through the restricted passage 20, where it is combined with a flow of gas from the nozzle 26, and the later combined flow of gas and air through the space 21 around the block 11, are indicated by the series of arrows in Figure 4. The combustible mixture is ignited by the pilot flame adjacent to the nozzle 26, and the energy of the gas flow is sufficient to produce a circular movement of the combustible mixture around the block 11, which action is of course further promoted as soon as the conditions of proper draft are established by the heating up of the burner. This produces a vigorous turbulent condition within the space 21, resulting in an intimate intermingling of the gas and air, as well as uniform distribution of the fuel supply all around the burner, and also an even flame distribution around the base of the fire chamber. A state of combustion is established which is of maximum efficiency, as regards developing an intense heat-producing action which operates uniformly within and all around the fire bowl.

It will therefore be apparent that I have produced a thoroughly practical as well highly efficient construction for carrying out the aforesaid objects of my invention, and while I have illustrated and described what I now regard as the preferred form of construction for this purpose, it will of course be obvious that minor changes and modifications may be made without departing from the spirit and principle of the invention, such as variations in the size or contour of the refractory block, or in the number of the gas nozzles 26; I therefore desire to be understood as reserving the right to make whatever changes or modifications may fairly fall within the scope of the appended claims.

Having thus described the invention, what I claim and desire to secure by Letters Patent is:

1. A burner construction comprising a cylindrical housing member entirely open at its upper end, a solid cylindrical refractory block mounted centrally within said housing member in spaced relation to the interior wall thereof, said block projecting above said housing member and having a top flange margin overlying the space between said block and housing member, and means for supplying a combustible gas mixture to the space between said block and housing member and directing the flow of said mixture, as it enters said space, in a course substantially tangential to the curved outer face of the block.

2. A burner construction comprising a cylindrical housing member open at its upper end, a cylindrical refractory block mounted centrally within said housing member in spaced relation to the interior wall thereof, said block projecting above said housing member and having a marginal flange overlying the space between said block and housing member and the underface of said flange sloping upwardly and outwardly from the cylindrical face of the block, and means for supplying a combustible gas mixture to the space between said block and housing member and directing the flow of said mixture, as it enters said space, in a course substantially tangential to the curved outer face of the block.

3. A burner construction comprising a boxing structure formed with a rectangular box portion and a cylindrical burner housing member open at its upper end, said boxing structure having a passage between said rectangular portion and burner housing in tangential relation with the interior wall of the latter, a cylindrical refractory block mounted centrally within said housing member in spaced relation to the interior wall thereof, damper-controlled means admitting air to said rectangular portion, and a gas supply nozzle positioned at said passage in tangential relation to the interior wall of said burner housing.

4. A burner construction comprising a boxing structure formed with a rectangular box portion and a cylindrical burner housing member open at its upper end, said boxing structure having a reduced neck portion connecting said boxing structure and housing member and providing a passage therebetween in tangential relation to the interior wall of the housing, a cylindrical refractory block mounted centrally within said housing member in spaced relation to the interior wall thereof, damper-controlled means admitting air to said rectangular portion, and a gas supply nozzle positioned at said passage in tangential relation to the interior wall of said burner housing.

ALDEN W. FULTON.