

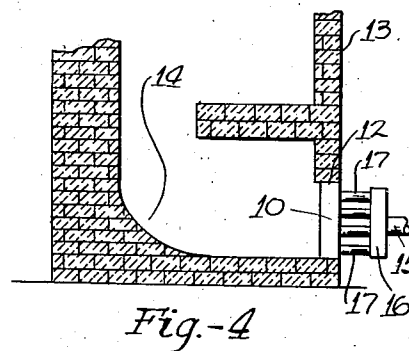
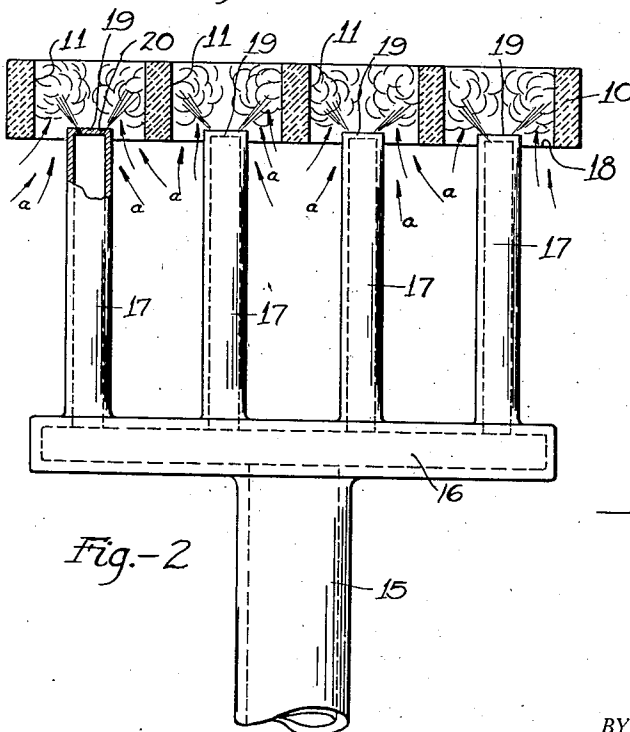
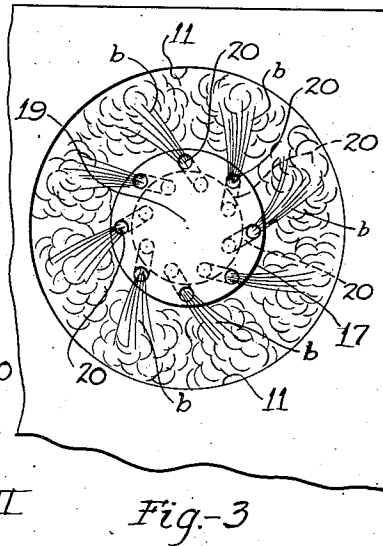
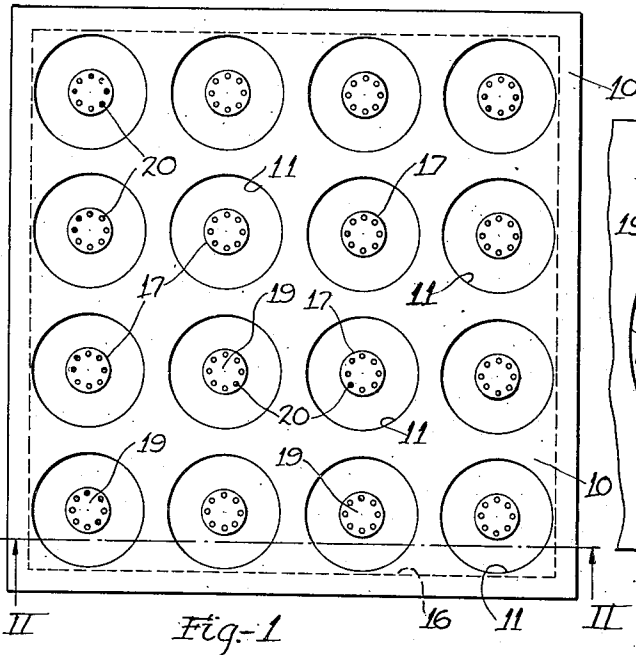
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FUEL BURNER

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FUEL BURNER

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This invention relates to fuel burners and more particularly to means for effecting an intimate mixture of fuel with air, although certain features thereof may be employed with equal advantage for other purposes.

It contemplates more especially the provision of means for directing fuel in the path of air or other oxidizing mediums to intimately diffuse and comingle the particles of fuel therewith to insure the complete combustion thereof.

Known burners are extremely intricate, expensive, and not conducive to the most efficient results obtainable therefrom. Gaseous fuels are, at best, deficient in producing maximum heats of combustion owing to the large percentage of inert ingredients therein. In view thereof, it is highly essential that such fuels be completely oxidized to generate the highest possible heat of combustion both for commercial and domestic purposes.

The difficulty in efficiently burning fuels resides for the most part in the inability of combining the required air therewith to produce a homogeneous mixture conducive to complete and efficient combustion. While certain known contrivances are productive of fair results, these, nevertheless, are extremely intricate, expensive in construction, and entail much labor in the production thereof. In addition to these commercial disadvantages, their results are not uniform nor productive of the highest obtainable efficiencies.

One object of the present invention is to simplify the construction and improve the operation of devices of the character mentioned.

Another object is the provision of means for discharging fuel along predetermined paths to impart a swirl thereto for effective diffusion in the presence of air or other oxidizing mediums.

Still another object is to provide a burner which will discharge the fuel in an arcuate path to effect the intimate combination thereof with the air directed thereagainst.

A further object is the provision of a burner which will discharge fuel along helical paths within an air chamber for effective comingling with the air passing therethrough.

A still further object is to provide means within an air chamber for discharging fuel in a plurality of paths to impart molecular activity thereto in the presence of air for effective comingling prior to combustion.

Still a further object is to provide fuel discharge means having ports therein for directing fuel in oblique paths within an air chamber to effect the passage of air and the comingling thereof with the fuel.

Other objects and advantages will appear from the following description of an illustrative embodiment of the present invention.

In the drawings:

Figure 1 is a plan view of a burner embodying features of the present invention.

Figure 2 is a sectional view in elevation taken substantially along line II—II of Figure 1.

Figure 3 is an enlarged fragmentary view of an individual burner unit constituting the preferred embodiment of the invention.

Figure 4 is a fragmentary view of a combustion chamber showing the manner in which the burner is associated therewith for supplying fuel thereto.

The structure selected for illustration comprises, in this instance, a substantially rectangular refractory block 10 which is provided with a plurality of spaced passages 11 therethrough. The refractory block 10 is placed within a correspondingly shaped orifice 12 provided in a wall of a furnace 13 of any suitable construction. The furnace 13 has a combustion chamber 14 therein to receive the fuel and air issuing through the passages 11 of the refractory block 10 in a manner to be described hereinafter.

Fuel is conducted through a supply conduit 15 which communicates with a header 16 to furnish fuel to a plurality of tubes 17 corresponding in number and arrangement to the air passages 11 provided in the refractory block 10. As shown, the tubes 17 are rigidly secured to and communicate with the header 16 for extension therefrom in parallelism to terminate within the air passages 11 slightly beyond the intake sides 18 thereof. The tubes 17 are arranged for axial alignment with the passages 11 which are, in this in-

stance, of substantially twice the diameter than the tubes 11 to enable the free passage of air from the atmosphere around the tubes 17 and through the passages 11 in a manner designated by the arrows (a).

It is to be noted that the tubes 17 terminate in an end enclosure 19 which is provided with a plurality of circumferentially spaced ports 20 terminating in the face thereof to discharge the fuel particles with accentuated molecular activity for ultimate introduction within the combustion chamber 14 through the medium of the air passages 11. In order to effectively comingle the fuel with air prior to the combustion thereof, the ports 20 are inclined to assume an oblique position so that the intake ends thereof are disposed inwardly to communicate with the interior of the tubes 17.

The port outlets or discharge ends thereof terminate in proximity to the periphery of the end enclosure 19 to direct the fuel in arcuate or more accurately defined helical paths (b) for contact with the walls of the passages 11, thereby creating accentuated molecular activity over an extended area for effective comingling with air (a). Laterally directing the streams of fuel avoids the siphoning of the air within the passages 11, thereby depending almost entirely upon a natural or forced furnace draft which effects the introduction of a uniform supply irrespective of the density or quality of the fuel. This insures a substantially constant intimate mixture which results in efficient fuel consumption and operation. In burners where the fuel is directed longitudinally of the air passages, air is siphoned therein in varying quantities depending more or less upon the velocity of discharge and the quality of the fuel, this being undesirable insofar as non-uniformity of the combustible mixture is inevitable.

The direction of the streams of fuel (b) against the walls of the passage tends to effect the dispersion of the fuel in the form of minute particles so as to substantially fill the entire interior of the passages 11 uniformly. The uniform diffusion of the fuel with the passages 11 insures complete comingling thereof with the air streams (a) prior to the introduction of the mixture within the combustion chamber 14 where any suitable ignitor may be placed.

It will be apparent from the above description that a novel means of effecting intimate comingling of fuel with air has been provided without resorting to complex, intricate, and expensive structures which are not conducive to dependable operation. Intricate castings are entirely dispensed with by resort to the invention herein described, and, further, the twirling movement of the fuel through a series of helical paths effects the complete diffusion of the particles in the path of the air, thereby creating a homoge-

neous, uniform, and highly combustible mixture. Obviously, a forced air draft may be established within the passages 11 should the requirements of an individual installation or commercial practice dictate.

Various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages thereof as defined in the appended claim.

I claim:

In a fuel burner, the combination with a refractory block, there being a plurality of passages extending therethrough, a fuel conducting header, a fuel conduit in axial unobstructed concentric communication with each of said passages, integral end enclosures for said conduits, there being obliquely disposed spirally arranged apertures in said end enclosures to impart twirling motion to the fuel issuing therefrom against the walls of the passages.

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