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G. PIRICH
FURNACE

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Fig. 1

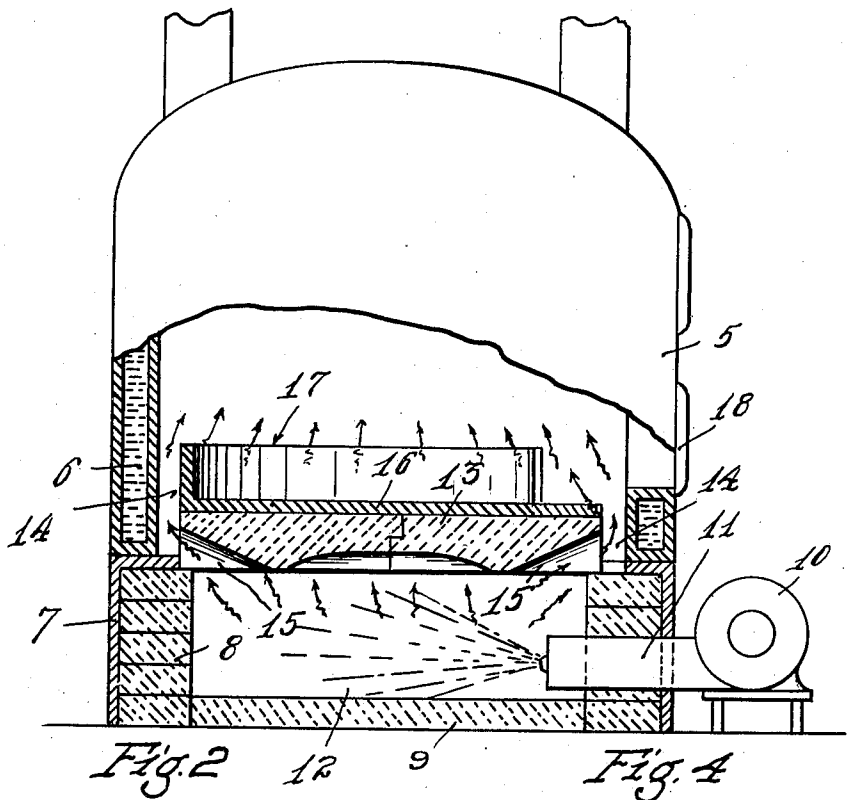


Fig. 2

Fig. 4

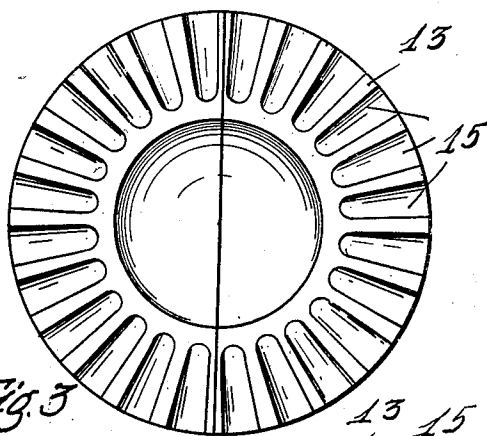
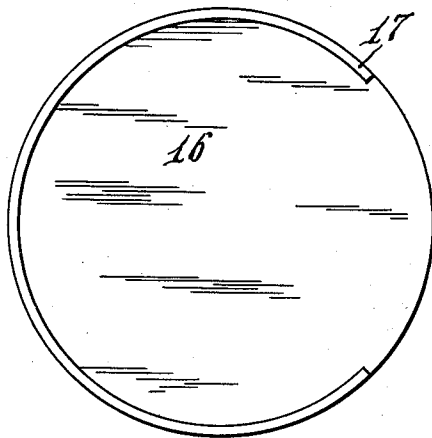


Fig. 3



INVENTOR
George Pirich
By his Attorneys
Meredith & Faxon

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FURNACE

George Pirich, Minneapolis, Minn.

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3 Claims. (Cl. 110—97)

My present invention relates to furnaces, the term "furnace" being used in a generic sense to include not only hot air furnaces but hot water and steam boilers; and, generally stated, the invention consists of the novel devices, combinations of devices and arrangement of parts hereinafter described and defined in the claims.

Particularly the invention is directed to a simple and highly efficient arch or baffle arranged to divide the flame into a plurality of jets and spread and direct the same against the inner or heat transfer walls of the furnace.

The invention is illustrated in the accompanying drawing wherein like characters indicate like parts throughout the several views.

Referring to the drawing:

Fig. 1 is a view partly in side elevation and partly in vertical axial section illustrating the invention applied to a hot water boiler;

Fig. 2 is a bottom plan view of the arch removed from the boiler or furnace;

Fig. 3 is an edge elevation of the arch or baffle illustrated in Fig. 2; and

Fig. 4 is a plan view of the crown plate as preferably placed on top of the arch proper.

The furnace, in the nature of a hot water boiler, is indicated as an entirety by the numeral 5. This furnace proper has the customary surrounding water leg 6, the inner wall of which is exposed to the interior of the furnace and acts as a heat transfer wall.

The boiler 5 rests upon the customary shell or base 7 which, as shown, is lined by fire brick 8 to form a combustion chamber. The combustion chamber is formed within the base 7 and is preferably provided with a fire brick floor 9. The source of heat, as shown, is and preferably will be an oil burner 10, the discharge tube 11 of which is projected through the wall of the base 7 and into the primary combustion chamber 12. The space within the furnace or boiler above the combustion chamber may properly be referred to as the heat transfer chamber, since it is surrounded by heat transfer walls. In carrying out the instant invention it is important that the heat transfer chamber is of greater diameter than the combustion chamber, and to accomplish this in standard furnaces or boilers it is often necessary to reduce the diameter of the combustion chamber to the desired diameter by bricking up the combustion chamber to the desired diameter.

The arch or baffle is of disc-like form and is preferably made of two semi-circular sections 13, which sections separately may be readily in-

serted into the boiler through the customary door opening. The assembled arch is, as shown, placed on the fire brick lining 8 and supported thereby with the margin of the arch spaced from the inner wall of the water leg 6 so as to afford an annular flame passage 14. On its under side the arch is formed with closely circumferentially spaced radially extended flame channels 15.

Preferably, the crown plate 16, of disc-like form, is placed on top of the arch and is provided with an upstanding marginal flange 17 that assists in directing the flames against the heat transfer wall of the furnace or boiler. The flange 17, in the vicinity of the door 18, is shown as cut away or omitted. This crown plate and its flange may be of cast iron or any other suitable material. The fire arch or baffle, however, should be of a high refractory baked clay or ceramic material. However, the arch might in some instances be made of cast metal or like material.

In action the flame from the oil burner will produce the initial combustion in the chamber 12 below the fire arch. This flame will, as stated, be divided into a multiplicity of jets or streams and directed against the inner or heat transfer walls of the furnace, thus preventing the flames from centralizing at the axis of the furnace. Moreover, the arch will be heated to a very high temperature so that the somewhat incompletely burned fuel from the chamber 12 will be brought against the very hot surfaces of the arch and the completion of combustion of the fuel will be insured. Preferably, the central portion of the under surface of the arch is made slightly concave so that flames striking the same will be given more or less of a turning or whirling motion radially outward toward the channels 15.

From the foregoing, it is evident that the flame initiated in the chamber 12 will be converted into a complete annular flame directed against the inner or heat transfer walls of the furnace and caused to make the major portion of its upward travel directly in contact with said walls. In this way maximum heating efficiency, complete combustion of the fuel, and elimination of smoke is insured, with resulting economy.

A preferred form of the device has been illustrated in the drawing, but it will be understood that the same is capable of various modifications within the scope of the invention herein disclosed and claimed.

The device above described has been put into

actual use, thoroughly tested, and found highly efficient for the purposes had in view.

The invention herein described is illustrated as applied to a cylindrical furnace or boiler and has been found in practice to be highly efficient in that connection, but it will, of course, be understood that the arch or baffle may be applied in square or angular furnaces or boilers and will be efficient also in such use.

10 What I claim is:

1. In a furnace, a heat transfer chamber surrounded by heat transfer walls, a combustion chamber below the heat transfer chamber and having surrounding refractory walls, said combustion chamber being of less internal area than that of the heat transfer chamber and providing a marginal ledge adjacent the lower edge of the heat transfer walls, and a horizontally disposed plate-like refractory baffle member of slightly greater area than that of the combustion chamber and seated adjacent its outer edge upon said ledge to completely cover said combustion chamber, said baffle member being of materially less area than the space between the walls of the heat transfer chamber surrounding the margin of said baffle in spaced relation there-

to, and said baffle having on its underside a marginal series of outwardly extending and upwardly flaring combustion channels leading from the combustion chamber over said ledge and into the surrounding space thereabove defined by the outer edge of the baffle and walls of the heat transfer chamber.

2. The structure defined in claim 1, in which the plate-like baffle member is further provided with a marginal flange upstanding therefrom in spaced relation to the walls of the heat transfer chamber, whereby to confine and direct the gases expanding through the combustion channels of the baffle member for a material distance above the upper surface of said baffle.

3. The structure defined in claim 1, in which the under-central portion of said plate-like baffle member is concaved to points adjacent the inner ends of said marginal series of radially extending, outwardly and upwardly flaring combustion channels, whereby to effect uniform distribution of the burning gases from the combustion chamber to said channels.

GEORGE FIRICH. 25