

April 14, 1925.

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G. WIRRER

COMBUSTION CHAMBER FOR OIL BURNING FURNACES

Filed June 6, 1922

Fig. 1.

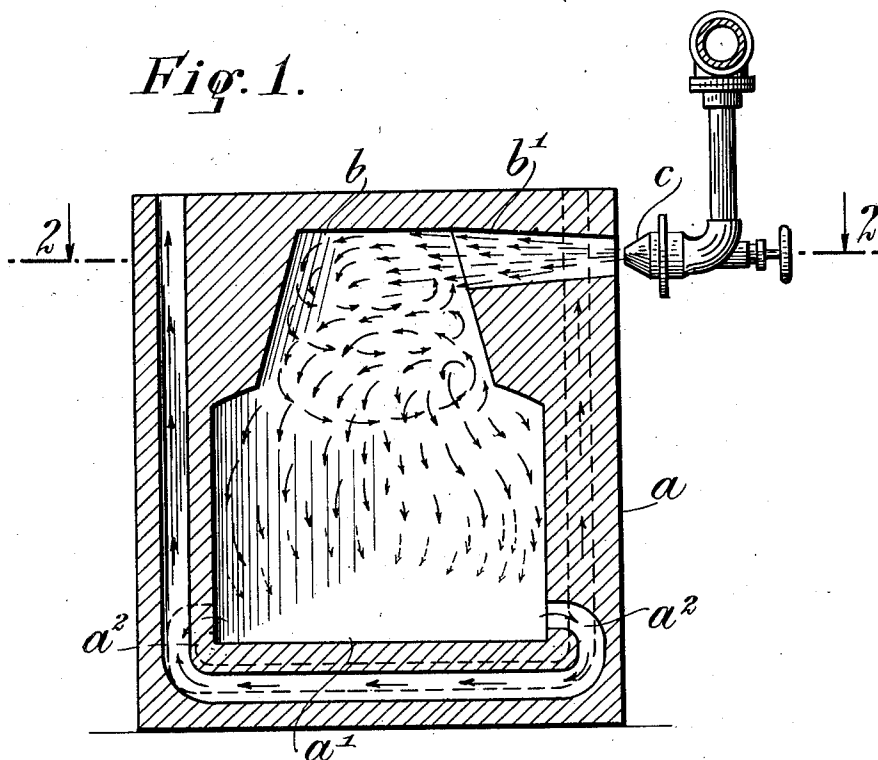
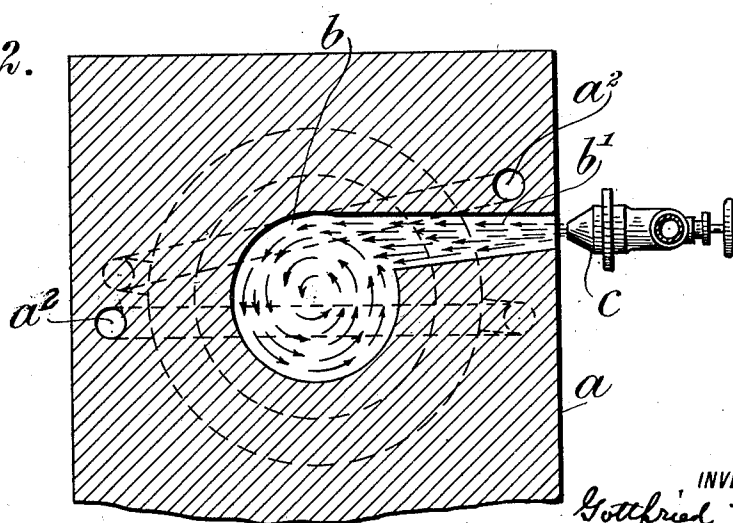


Fig. 2.



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UNITED STATES PATENT OFFICE.

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COMBUSTION CHAMBER FOR OIL-BURNING FURNACES.

Application filed June 6, 1922. Serial No. 566,238.

To all whom it may concern:

Be it known that I, GOTTFRIED WIRRER, a citizen of the Swiss Republic, residing in Plainfield, in the State of New Jersey, have
5 invented certain new and useful Improvements in Combustion Chambers for Oil-Burning Furnaces, of which the following is a specification, reference being had to the accompanying drawings, formed a part
10 hereof.

This invention relates to oil or gas burning furnaces and more particularly, to an improved combustion chamber therefor. Such furnaces as now constructed are inefficient and unsatisfactory by reason of incomplete combustion of the fuel and heat losses due to the impinging of the flame on walls or the work and injury to material occasioned by such impinging. For instance,
20 in under-fired furnaces the flame impinges on the hearth and is apt to so burn it as to shorten its life materially and require expensive repairs. The side-fired furnace, as now constructed requires considerably more
25 floor space than any other type and does not give uniform heat distribution. The over-fired furnace is compact and, generally speaking, does not have the disadvantages of the other two types but no practical means have been provided for securing complete
30 combustion and for eliminating the employment of baffles of some form which cause heat losses. In accordance with the present invention the improved combustion chamber is adaptable for use with one of
35 the above named types and provides material advantages although, in one of the most practical forms, now in use, the improved combustion chamber is incorporated in an
40 over-fired furnace. The accompanying drawings illustrate such an embodiment and the detailed description will be given with reference to it, although it is to be understood that the invention is not to be limited
45 to such use and many of the advantages of it may be realized when the chamber is associated with either one of the other two types of furnaces. More particularly, the present construction provides a combustion
50 chamber in which provision is made for burning fuel in suspension and for assuring complete combustion thereof. It further provides, to this end, for the recirculation of the burning gases in a whirling motion
55 for a sufficient time for such complete com-

bustion to occur without the addition of excess air. The improved chamber also provides for the projection of hot gases at low velocity onto the work or hearth without the
60 impinging of any flame thereon.

The invention will be described in greater detail with reference to the accompanying drawings in which:

Figure 1 is a view in vertical section showing a furnace of the over-fired type having
65 the improved combustion chamber incorporated therein.

Figure 2 is a view in horizontal section through the combustion chamber shown in Figure 1 and taken along the plane of the
70 line 2-2 and looking in the direction of the arrows.

As indicated hereinbefore, many of the advantages of the improved combustion chamber may be realized in furnaces of either the
75 under-fired or the side-fired type although this description is given with reference to its incorporation in a furnace of the over-fired type wherein the advantages are of great importance. As shown in Figure 1
80 the furnace *a* which may be of any form and dimensions may have the work placed on the hearth *a'* thereof and have built in its top a combustion chamber *b* of improved form. This combustion chamber, generally
85 speaking, is of frusto-conical form, with its walls flaring downwardly and outwardly. In cross sectional form the combustion chamber may be cylindrical or elliptical. Near the top thereof is formed an extended lateral opening
90 *b'* in the mouth of which is introduced the fuel burner *c*. This elongated opening *b'* as appears most clearly from Figure 2 is disposed tangentially with respect to the wall of the combustion chamber and, itself, may
95 be of tapered form and widest at its inner end. It has been found in practice that where the flame from the nozzle *c* is thus projected along an elongated opening before
100 introduction into the combustion space proper that the fuel particles may be burned in suspension. After issuing from the inner end of the opening *b'* into the combustion space proper the gases, following the path
105 of the curved wall of the chamber *b* have impressed thereon a whirling motion so that they are recirculated around the chamber and possibly across the mouth of the opening
110 *b'*. This recirculation in this space insures their course over a long path and allows

ample time for complete combustion without the use of excess air. The frusto-conical form of the combustion chamber meanwhile causes the projection of the completely
5 burned gases from the mouth of the combustion chamber in the manner indicated by arrows in Figure 1 and it has been found that these gases travel to the hearth at a
10 relatively low velocity and subject the work to the maximum heat. No flame actually impinges upon the work and no baffles or plates of any kind are employed for the flame to impinge upon. Reliance for the heating is placed solely upon the gases which are
15 projected from the combustion chamber onto the work or hearth. Efficiency is further assured by bringing about the complete combustion of such gases prior to their projection in the manner described. Suitable flues
20 a^2 permit the escape of the used gases in accordance with common practice.

It will be evident that in the actual designing of a furnace matters of dimension and distances will be taken into account. For instance, where a long furnace is employed
25 it might be desirable to make the mouth of each combustion chamber of such width with respect to the width of the hearth that the gases when projected downwardly will be dispersed over the entire width of the hearth
30 as indicated in Figure 1. The combustion chamber will be made of a suitable corresponding shape. Any number of the units might be thus employed to afford a heating
35 area over the entire hearth. Further, in view of the spreading course taken by the projected gases the distance between the hearth and the combustion chamber might

be also regulated so as to use all of the gases in the most effective manner.

What I claim is:

1. An over-fired oil or gas burning furnace having a hearth, a combustion chamber in the upper wall of the furnace of generally
45 frusto-conical form and having its walls flaring downwardly and outwardly with respect to the hearth, an elongated fuel inlet opening frusto-conical in form and having its widest portion extending through the wall of the combustion chamber and discharging
50 thereinto adjacent the upper end thereto and tangential thereto.

2. A combustion chamber for an oil or gas burning furnace, comprising a chamber which is narrower at one end than at the
55 other, the wall of the chamber at the narrow end being provided with a tapering passage for the incoming fuel that opens at its widest portion tangentially into the chamber, and means for leading the burnt gases from
60 the larger end of the chamber.

3. A combustion chamber for an oil or gas burning furnace, comprising a hearth at the bottom of the chamber on which the work is placed, walls extending upwardly therefrom
65 to define a combustion chamber that narrows toward the top thereof, one of the walls being provided with a passage of frusto-conical outline for the incoming fuel that opens with an elongated opening into the
70 upper, narrowed portion of the combustion chamber at one side thereof.

This specification signed this 23 day of May, A. D. 1922.

GOTTFRIED WIRRER.