

July 17, 1928.

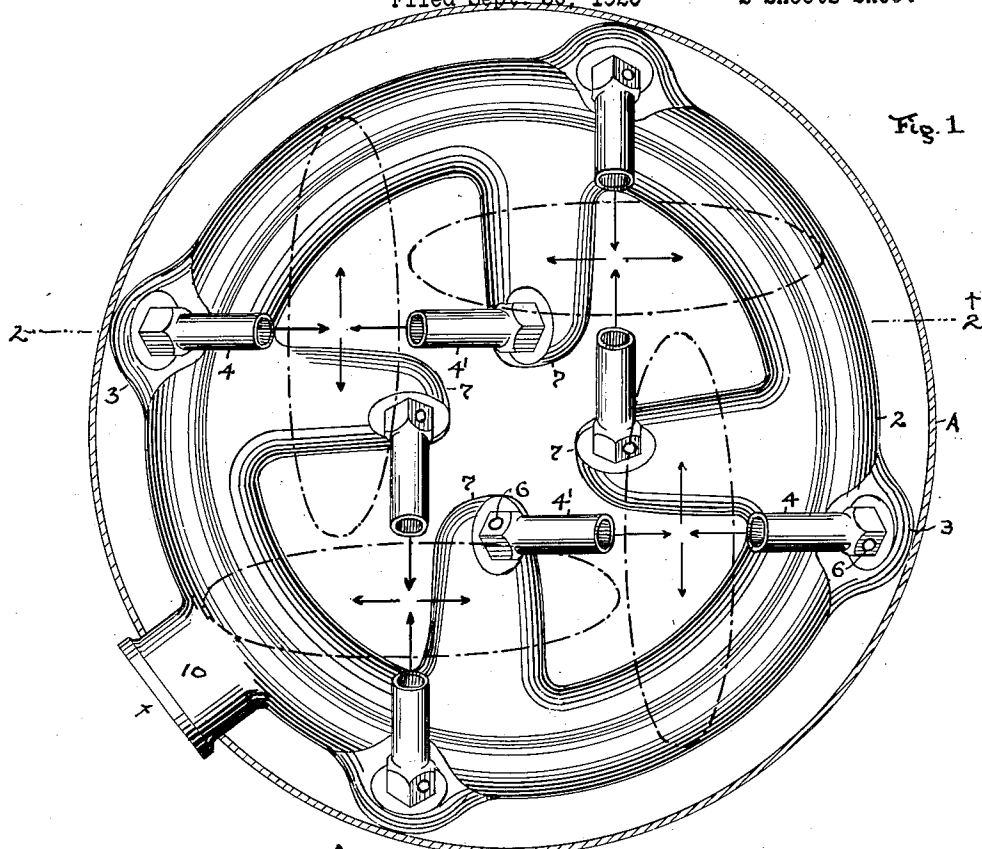
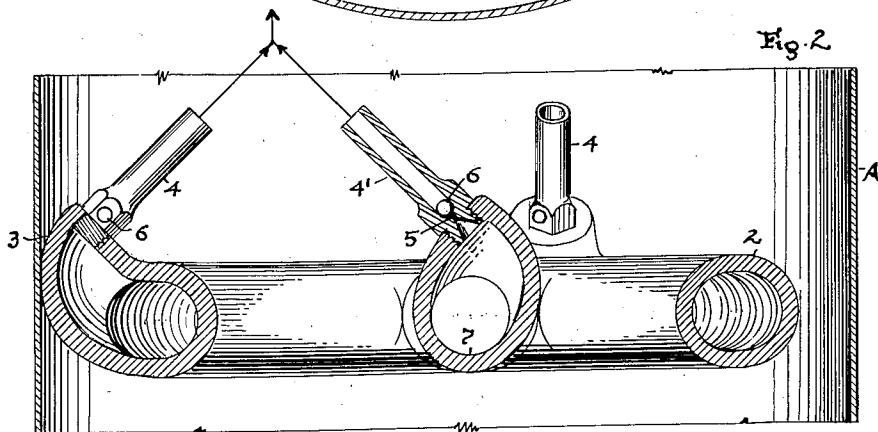
1,677,787

H. E. KERR

GAS BURNER

Filed Sept. 30, 1925

2 Sheets-Sheet 1



Inventor

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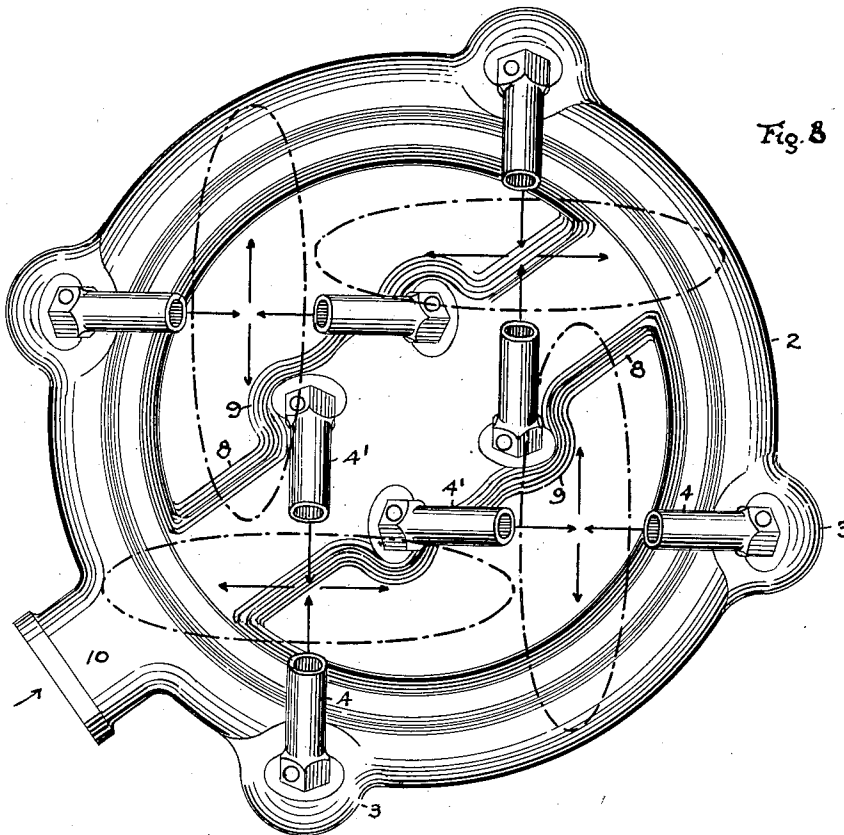
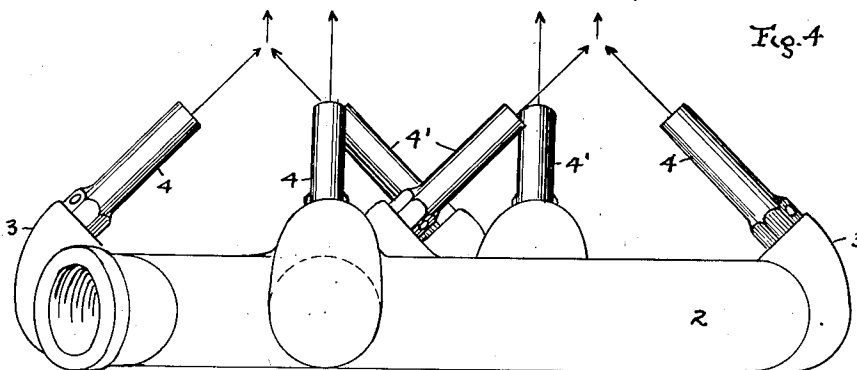
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

HARRY E. KERR, OF CLEVELAND, OHIO, ASSIGNOR TO THE CLEVELAND GAS BURNER AND APPLIANCE COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

GAS BURNER.

Application filed September 30, 1925. Serial No. 59,497.

My invention relates to an improvement in gas burners, particularly gas burners of the jet type disclosed and claimed in my application for patent, Serial No. 720,558, filed, June 17, 1924. In the present burner my object is to mount separate pairs of converging jets in closely grouped relation without causing malfunction in operation or loss in heat generation at any single pair of co-acting jets. The separate pairs of jets produce separate wide-spreading columns of flame, but as arranged and related the jets permit the separate columns of flame to spread without interference within a small space such as defined by the circular gas-distributing manifold which forms part of the burner and also without striking or playing constantly on the surrounding walls of the small chamber within which the burner is confined, thereby permitting a very small burner of intense heating capacity to be used within a combustion chamber of small diameter such as found in certain types of small round water heaters in general use. In the accompanying drawings, Fig. 1 is a plan view of my improved gas burner, and Fig. 2 is a sectional view thereof on line 2-2 of Fig. 1. Fig. 3 is a plan view of a modified form of the burner, and Fig. 4 a side view thereof.

The burner chamber in some forms of heating apparatus is of limited size, and frequently circular, as exemplified by the round casing A shown in the drawings. The flame generated in this chamber is not intended to strike and heat the wall of casing A but is designed to pass upwardly against and around the bottom of a water tank or reservoir confined within the casing; or upwardly around or through water heating sections, coils, or other elements in the chamber or line of passage of the products of combustion. Thus, the present burner comprises a circular hollow manifold or ring 2 which may be of slightly smaller diameter than the combustion chamber in which it is to be confined, and which may be formed with a series of flattened projections or protuberances 3 extending outwardly and upwardly at equally spaced intervals around the top of the ring to permit a tubular jet 4 to be secured to each at an angle of approximately forty-five degrees relatively to a horizontal plane. As shown, four such projections 3 and jets 4 are placed on the

body of the ring itself and each jet projects inwardly of the ring but tangentially in respect to a small circle within the ring. Directly opposite each jet 4 and in the same axial plane is a second jet 4' which is inclined reversely at right angles in respect thereto to permit two fine streams or jets of gas to be brought into confluence above and apart from the mouth of each jet, the gas being discharged with considerable velocity from manifold 2 through very small orifices 5 at the base of the jet or tube. Lateral air openings 6 in the sides of the tube admit air which intermingles with the gas stream or is discharged from the mouth of the tube with the gas into confluence with a similar stream from the companion jet, and the two streams strike each other with spreading effect so that the gas will mix with air and a sheet of blue flame will result when the mixture is ignited. Each sheet of flame spreads laterally at right angles to the pair of jets producing the flame, and under full pressure operations the sheet of flame is distended laterally a considerable distance. Consequently in using such jets in direct alignment in a round burner of small diameter it is highly desirable that the edge of this sheet of flame should not be permitted to project beyond the edge of the manifold itself, or very far beyond its borders especially when used in a chamber of restricted diameter or of substantially the same diameter as the manifold. Accordingly and in order that a series of separate sheets of flame be developed within the borders of a small ring or manifold and maintained apart from a casing wall which limits the working area for the burner and in order that a number of such sheets of flame be maintained closely contiguous to each other without affecting perfect combustion or unduly increasing the height of the column of flame, I mount one set of jets 4 upon the ring and a second set of jets 4' upon the inner ends of a series of inwardly-extending arms or branches 7 of the ring. The companion jets 4-4' are axially aligned and each pair set at right angles to the next pair of jets on the ring, and the inner group of jets 4' being located between the ring and its center, preferably remotely from the ring and relatively near the center, to permit each pair of jets to operate efficiently within the limited space defined by the ring. Defi-

nite spacings and proportions must be observed for each pair of jets to obtain perfect co-action between them, and by grouping the jets in the angular relationship as shown and described each pair of jets will operate at maximum efficiency in the small area or space bounded by the ring and its casing without having the flame come into direct contact with the wall of the casing. Except for the arms or branches 7 the ring is open to permit the passage of air upwardly through the ring to all the jets spanning the opening, and the inner jets 4' are grouped in squared relationship around a central opening. In Fig. 3, I show four pairs of jets 4—4' grouped together in identically the same angular relationship as in Fig. 1, but in lieu of the separate arms or branches 7 I use a single hollow branch or spoke 8 centrally across the ring, which branch 8 is enlarged at its center and formed with four flattened projections 9 to support

the inner jets 4' at right angles to each other and in parallel alignment with their companion jets 4 on ring 2, viewing this burner from the top. Any suitable gas connection may be provided for the burner, either with the side or bottom thereof, and in the present instance a lateral connection 10 is shown.

What I claim, is:

A gas burner, comprising a circular gas distributing manifold having gas and air commingling tubes extending inwardly from its circumference and companion gas and air commingling tubes extending outwardly from its center portion, said tubes forming pairs of cooperating gas and air commingling tubes, the axes of each pair of said tubes lying in a single plane tangential to a small circle centrally of the manifold.

In testimony whereof I affix my signature.

HARRY E. KERR.