Jan. 2, 1923.

B. A. GEURINK ET AL.
OIL BURNER.
FILED MAR. 24, 1922.

1,440,871

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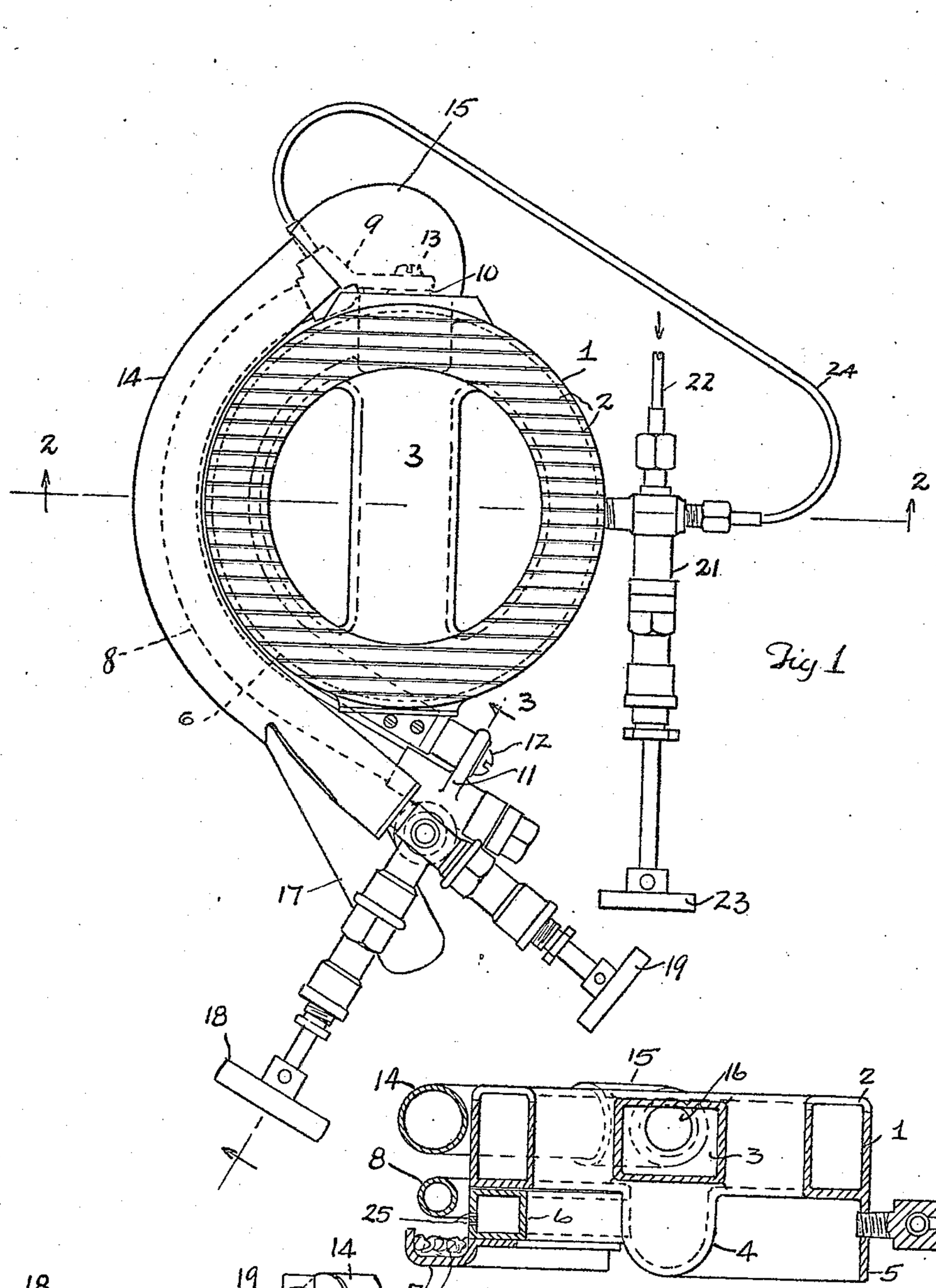

Fig 1

Fig. 2

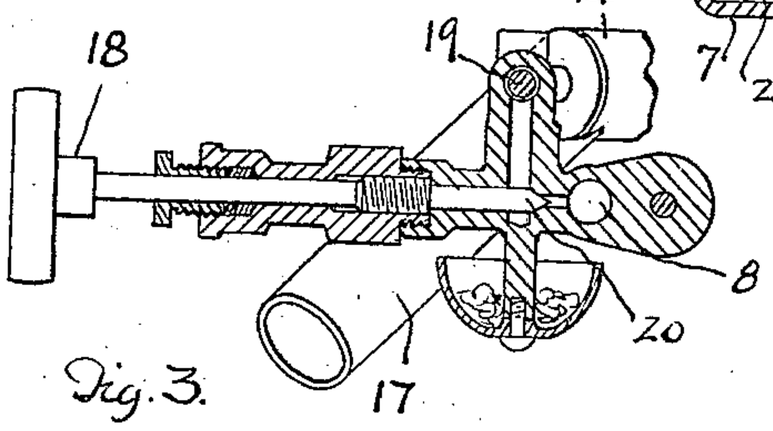

Fig. 3.

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2 SHEETS-SHEET 2

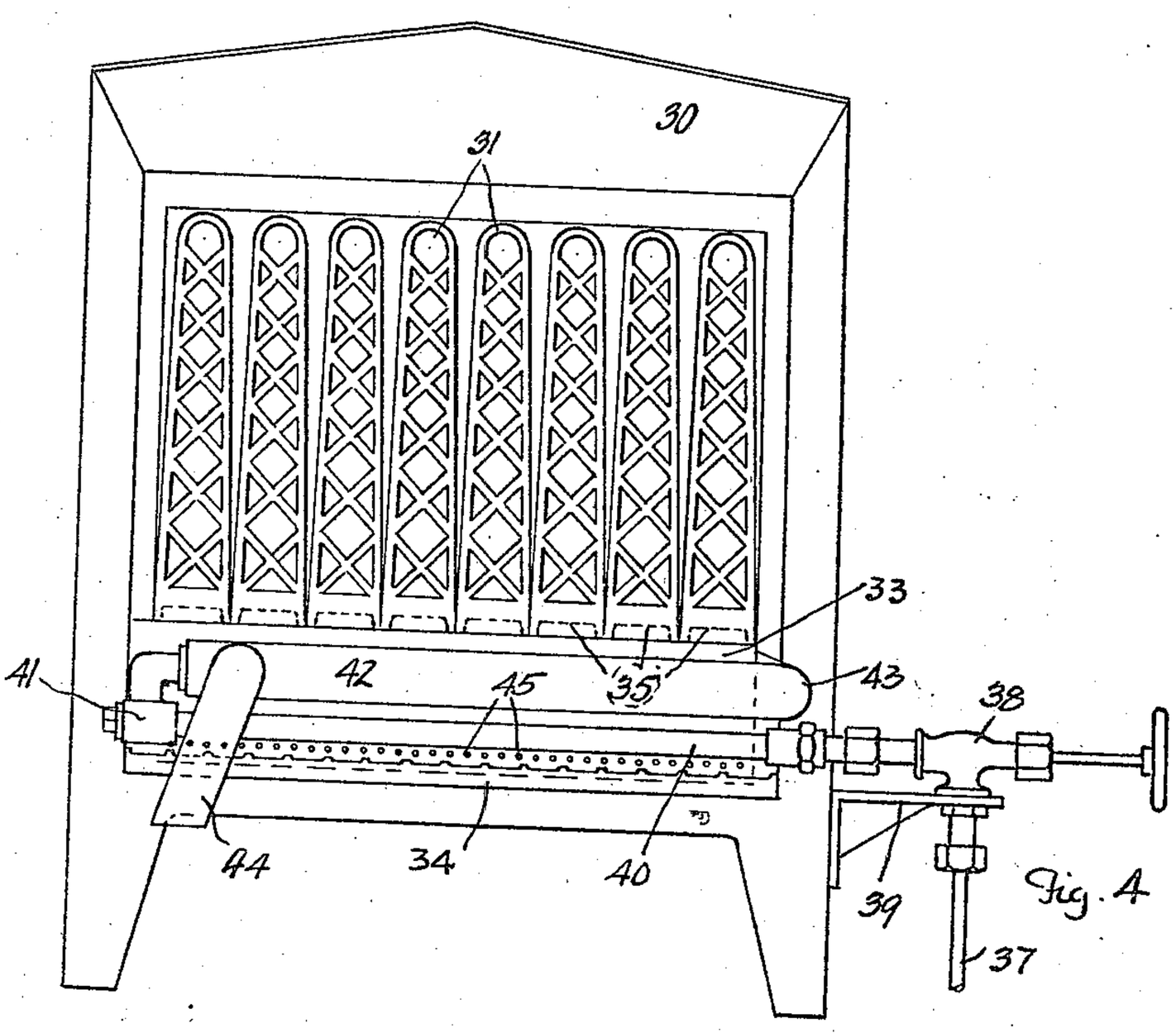

Fig. 4

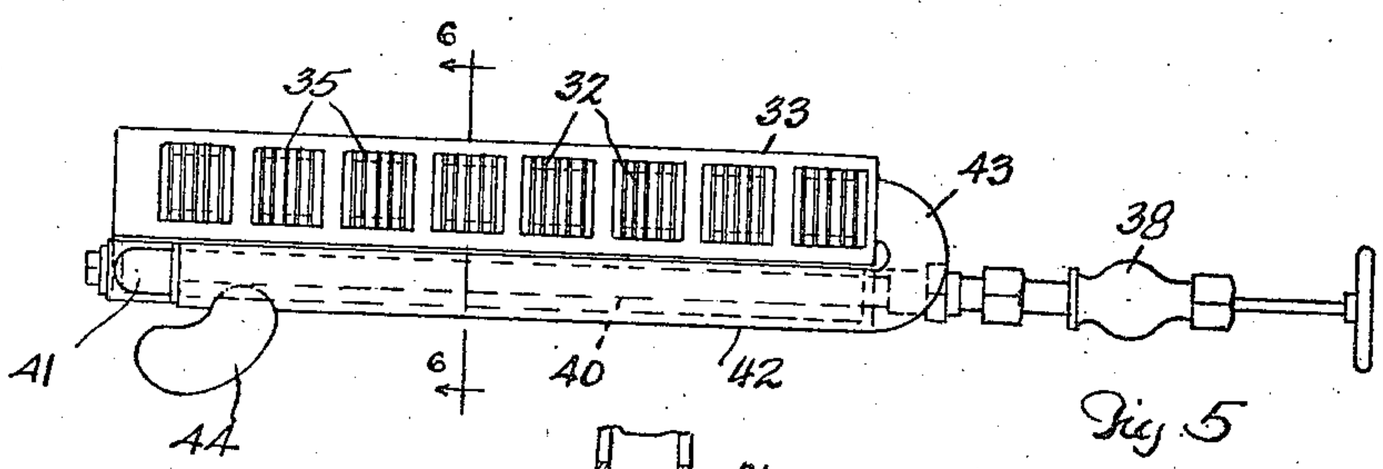

Fig. 5

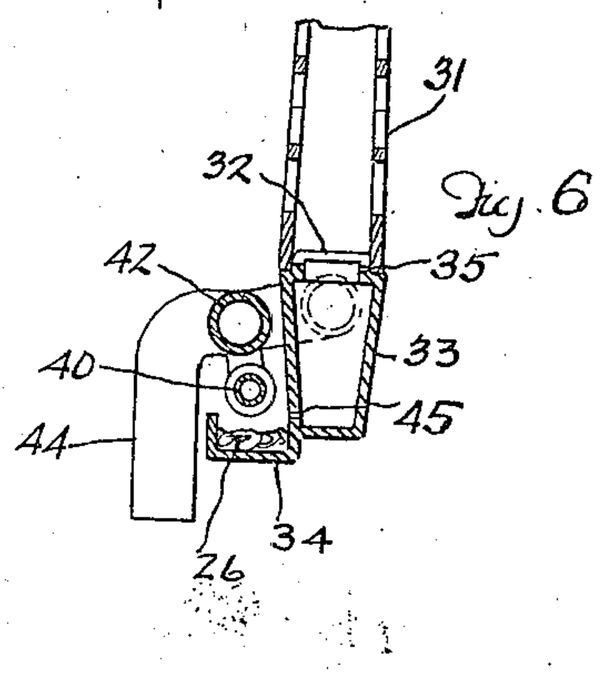

Fig. 6

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Patented Jan. 2, 1923. 1,440,871

UNITED STATES PATENT OFFICE.

BERNARD A. GEURINK AND LOUIS H. GEURINK, OF EAST CLEVELAND, OHIO.

OIL BURNER.

Application filed March 24, 1922. Serial No. 546,263.

To all whom it may concern:

Be it known that we, BERNARD A. GEURINK and LOUIS H. GEURINK, citizens of the United States, and residents of East Cleveland, county of Cuyahoga, State of Ohio, have jointly invented a new and useful Improvement in Oil Burners, of which the following is a specification, the principle of the invention being herein explained and the best mode in which we have contemplated applying that principle so as to distinguish it from other inventions.

The present invention relates to an oil burner in which provision is made for preheating and vaporizing the fuel and then passing it through a superheater, at which time, it is mixed with air to form the combustible mixture. In particular, the invention relates to the construction of the heating pipes and burner, whereby the pre-heating and superheating is obtained. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—

Fig. 1 is a top plan view of one form of burner; Fig. 2 is a second view on the line 2—2 of Fig. 1; Fig. 3 is a section on the line 3—3 of Fig. 1; Fig. 4 is an elevational view in a modified form of burner adapted for use with "radiant" burners; Fig. 5 is a top plan view of the device shown in Fig. 4 without the enclosed casing; and Fig. 6 is a sectional view on the line 6—6 of Fig. 5.

The form of burner shown in Figs. 1 to 3 consists of a burner plate comprising a hollow burner ring or pipe 1, with slots or burner openings 2 at the top for the combustible gas, and this ring is provided across the center with a substantially rectangular chamber 3 which is depressed slightly below the level of the ring, and this chamber, as best shown in Fig. 2, is provided with a depending pocket 4 at the rear. Around the right hand half, as shown in Fig. 1, the burner is provided with a downwardly depending flange 5 of approximately the same depth as the pocket, and on the other side the burner ring is provided with a semicircular rectangular tube 6 curved to conform to the burner ring and in alignment underneath the same. This tube 6 is provided with a continuous wick cup 7 extending outside of the tube and beyond the edge of the tube and burner ring. This tube at the back of the burner extends into the depending pocket 4 and communicates therewith. Above this wick cup is mounted a fuel heating tube 8 which extends approximately one-half way around the burner and is mounted at the back in a bracket 9 which is secured by means of a screw 13 or the like, to a boss 10 formed on the burner casting, and at the front end the tube communicates with a valve housing member 11 to which it is attached by means of a screw 12. Above this fuel heating tube 8 is mounted a second larger heating tube 14 which is also carried in the valve casing at the front, and this larger tube is provided with a bulging portion 15 at the rear which communicates with the central chamber of the burner above the pocket by means of an aperture 16 in the end of the burner ring. At the front end of the burner this second heating tube is provided with an air inlet conduit 17.

In the valve casing at the front of the burner are mounted two valves 18 and 19, one of which seats in the valve seat 20 which controls the flow of the fuel vapor from the lower or fuel heating tube 8 into the passage-way through the valve chamber and the other valve controls the flow of such gas into the upper large tube as best shown in Fig. 3.

At the right side of the burner there is mounted a valve casing 21 to which is connected the fuel supply pipe 22 and this valve casing is provided with a hand controlled valve 23 which controls the flow of oil through the casing to the fuel outlet pipe 24 which communicates with the fuel heating tube 8 at the back of the burner. The oil which enters this tube will be heated and will pass around and through the fuel heating tube to the valve casing at the front of the burner and then up and into the second or air heating tube where it will be superheated and also mixed with air from which

it will flow into the burner casting at the back, and thus around the burner ring and through the rectangular transverse tube. A certain portion of the combustible gas will flow into the pocket at the rear of the burner and then out through the rectangular tube 6 which is shown in Fig. 2 and is provided with a series of burner holes or apertures 25 in the outer vertical face of the tube and the combustible mixture will be ignited at the outside of this tube above the wick cup and thus directly below the oil heating tube and the air heating or super-heating tube.

In originally starting the burner, the wick cup which is directly below the two heating tubes and which is partially filled with shredded asbestos 26 or the like to form a wick, will be partially filled with alcohol or similar fuel which will be lighted in order to originally heat up the fuel heating tube 8 and the air heating or super-heating tube 14. As soon as these two tubes 8 and 14 have become sufficiently heated, fuel can be admitted to tube 8 by opening the valve 13 and then oil will become vaporized, and by opening the valves at the front of the casing, the vaporized oil will pass to the super-heating tube 14 where it will be mixed with air and super-heated before passing to the burner proper.

In Figs. 4 to 6 we have shown a modified form of burner construction which is particularly adapted to be used with a so-called "radiant" heater which, as shown, comprises a hooded stand 30 carrying the entire burner mechanism and also a series of "radiant" heaters 31 of fire clay or the like which are mounted directly above small individual burners 35, having a series of apertures or slots 32. In this form the burner consists of a straight burner pipe 33 of general rectangular cross section but here shown as being slightly narrower at the base than at the top, and this burner pipe is provided at one side with a cup-shaped flange 34 extending the entire length of the pipe and acting as the wick cup which is partially filled with shredded asbestos 26 or other suitable wick material. This burner pipe is provided with a series of upwardly extending burner tubes 35 which are the slots or apertures 32 to furnish outlet for the fuel and the "radiant" members fit snugly over these burner tubes as best shown in Fig. 6.

In this construction there is an oil supply pipe 37 which communicates with a single control valve 38 mounted on a bracket 39 on the heater stand 30, this valve in turn communicating with a fuel heating tube 40 extending longitudinally along the side of the burner pipe 33 and above the wick cup 34, and this oil heater pipe carries at the back a coupling 41 also connected to an air heating tube or super-heating tube 42 which extends directly over the fuel heating tube 40 to the front end of the burner into which it opens through a curved end 43. This super-heating tube 42 is provided with a downwardly extending air inlet conduit 44.

The action of this form of burner is exactly similar to the previous form, the burner pipe 33 being here provided with a series of small apertures 45 in the side adjacent the wick cup so that gas may be ignited to furnish a heating flame directly under the fuel heating tube 40 and the air or super-heating tube 42. The fuel oil is supplied to the fuel heating tube 40 where it is vaporized and it then passes into the air heating tube 42 where it is mixed with air and super-heated before passing into the burner pipe from which it passes to the burner tube slots or apertures to heat the "radiant" members and it also passes out of the small apertures 45 to heat the two tubes.

The present burner is very satisfactory from the standpoint of burning without odor, and thus can be used as an open burner, the first form illustrating a typical type of burner such as would be employed for stoves, water heaters or the like, while the second form shows the present device in combination with the "radiant" heater such as is commonly used for heating with fuel gas. The burner is easy to start as the long wick cup allows the entire fuel heating tube to be quickly heated to the desired temperature and then as soon as oil is admitted to this tube, it will become thoroughly vaporized before passing to the super-heating tube where it is mixed with air and then super-heated to form a combustible mixture before passing into the burner pipes proper. The entire burner is compact and easily controlled and the heating action is such that perfect vaporization and combustion is obtained. The parts are easily formed and readily assembled, the burner whether in ring form or straight, being preferably a casting and the heating tubes can be readily attached hereto by using standard fittings which decreases the cost of manufacture and assembly and allows the present burner to be economically manufactured.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

We therefore particularly point out and distinctly claim as our invention:—

1. In an oil burner, the combination of a burner pipe having burner openings, a fuel heating tube arranged adjacent said

burner pipe, an air inlet and superheater tube mounted above said fuel heating tube and in communication therewith, and with said burner pipe, and heating burners in communication with said burner pipe and arranged under said two heating tubes to heat the same, and valve control means for said tubes and burner.

2. In an oil burner, the combination of a burner pipe having burner openings, a fuel heating tube arranged adjacent said burner pipe, an air inlet and superheater tube mounted above said fuel heating tube and in communication therewith, and with said burner pipe, a wick cup carried by said burner and mounted under said two tubes, burner means carried by said burner pipe and supplied therefrom and adapted to furnish a heating flame over said wick cup for said two heating tubes, and a valve control means for the passage of fuel through said tubes and burner pipe.

3. In an oil burner, the combination of a burner pipe having burner openings and provided along one side with a wick cup and supplementary burner openings above said cup, a fuel heating tube adapted to be connected to a source of fuel supply mounted above said wick cup adjacent said burner pipe, an air inlet and superheating tube connected at one end to said fuel heating tube and at the other end to said burner pipe mounted above and in alignment with said fuel heating tube, and valve means for controlling the fuel supply to said fuel heating tube.

4. In an oil burner, the combination of a burner pipe having burner openings and provided along one side at the bottom with a wick cup and having supplementary burner openings above and adjacent to said cup, a fuel heating tube carried by said burner pipe and connected with a source of fuel supply, said tube being mounted above said wick cup and adjacent along said burner pipe, a super-heating tube connected at one end to said burner pipe and at the other end to said fuel heating tube, said super-heating tube being mounted in alignment with and above said fuel heating tube and said superheating tube being provided with an air inlet opening near the connection with said fuel heating tube and valve means for controlling the fuel supply to said fuel heating tube.

5. In an oil burner, the combination of a circular burner pipe having burner openings, a transverse chamber across said pipe, a supplementary burner pipe mounted under said burner pipe and communicating therewith, burner openings in the outside of said supplementary pipe, a wick cup attached to said supplementary pipe, a fuel heating tube mounted adjacent and along said burner pipe above said wick cup, said tube being connected to a source of fuel supply, a superheating tube mounted above said fuel heating tube and in alignment therewith, and connected at one end to said fuel heating tube and at the other end to said burner pipe, an air inlet conduit connected to said superheating tube, and valve means for controlling the fuel supply.

6. In an oil burner, the combination of a circular burner pipe having burner openings, a transverse chamber across said pipe, a supplementary burner pipe mounted under said burner pipe and communicating therewith, burner openings in the outside of said supplementary pipe, a wick cup attached to said supplementary pipe, a fuel heating tube mounted adjacent and along said burner pipe above said wick cup, said tube being connected to a source of fuel supply, a super-heating tube mounted above said fuel heating tube and in alignment therewith and connected at one end to said fuel heating tube and at the other end to said burner pipe, an air inlet conduit connected to said super-heating tube, adjustable valve means in said fuel heating pipe to control the admission of fuel thereto.

7. In an oil burner, the combination of a circular burner pipe having burner openings, a transverse chamber across said pipe, a supplementary burner pipe mounted under said burner pipe and communicating therewith, burner openings in the outside of said supplementary pipe, a wick cup attached to said supplementary pipe, a fuel heating tube mounted adjacent and along said burner pipe above said wick cup, said tube being connected to a source of fuel supply, a superheating tube mounted above said fuel heating tube and in alignment therewith, and connected at one end to said fuel heating tube and at the other end to said burner pipe, an air inlet conduit connected to said superheating tube, adjustable valve means in said fuel heating pipe to control the admission of fuel thereto, and other valve means mounted between said two tubes for controlling the flow of vaporized fuel to said super-heating tube.

8. In an oil burner, the combination of a circular burner pipe having burner openings, a transverse chamber across said pipe, a supplementary burner pipe mounted under said burner pipe and communicating therewith, burner openings in the outside of said supplementary pipe, a wick cup attached to said supplementary pipe, a fuel heating tube mounted adjacent and along said burner pipe above said wick cup, said tube being connected to a source of fuel supply, a super-heating tube mounted above said fuel heating tube and in alignment therewith, and connected at one end to said fuel heating tube and at the other end to said burner pipe, an air inlet conduit con-

nected to said super-heating tube, adjustable valve means in said fuel heating pipe to control the admission of fuel thereto, and other valve means mounted between said two tubes for controlling the flow of vaporized fuel to said super-heating tube, and a third valve means mounted in said super-heating tube to control the opening in said air inlet conduit.

Signed by us, this 22nd day of March, 1922.

BERNARD A. GEURINK.
LOUIS H. GEURINK.