May 4, 1926. 1,583,362

H. J. OSTENDORF

HEATING BURNER

Filed Nov. 17, 1925 3 Sheets-Sheet 1

Fig. 1

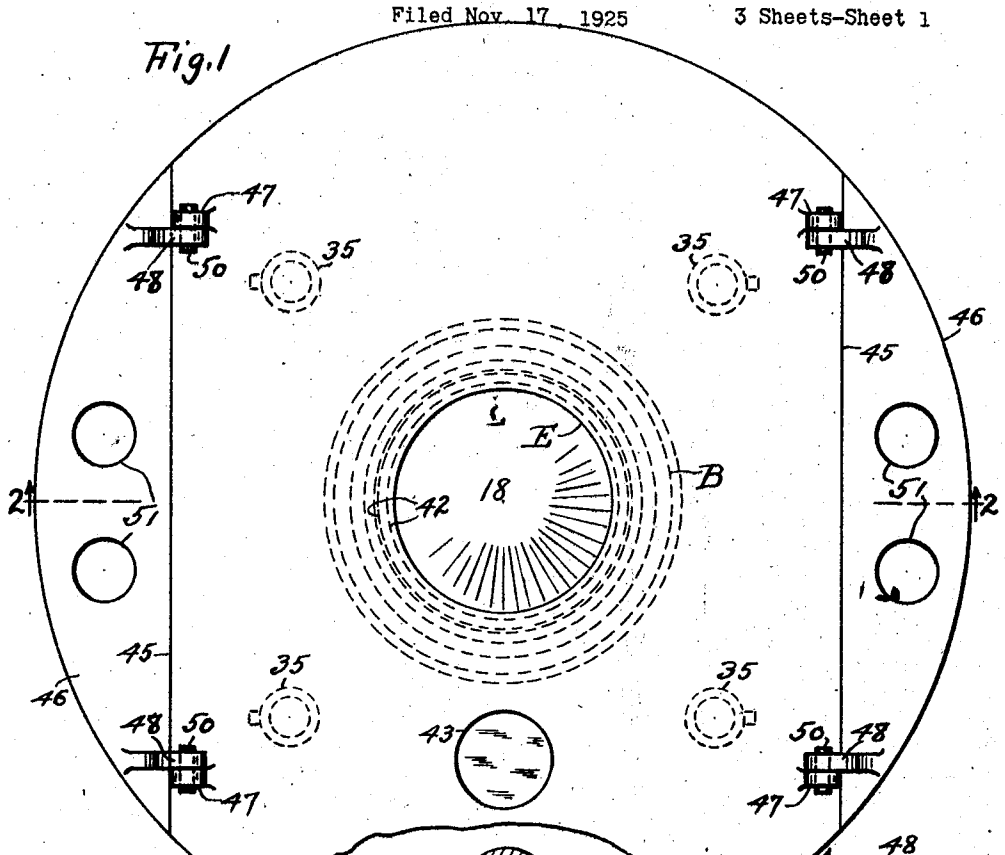
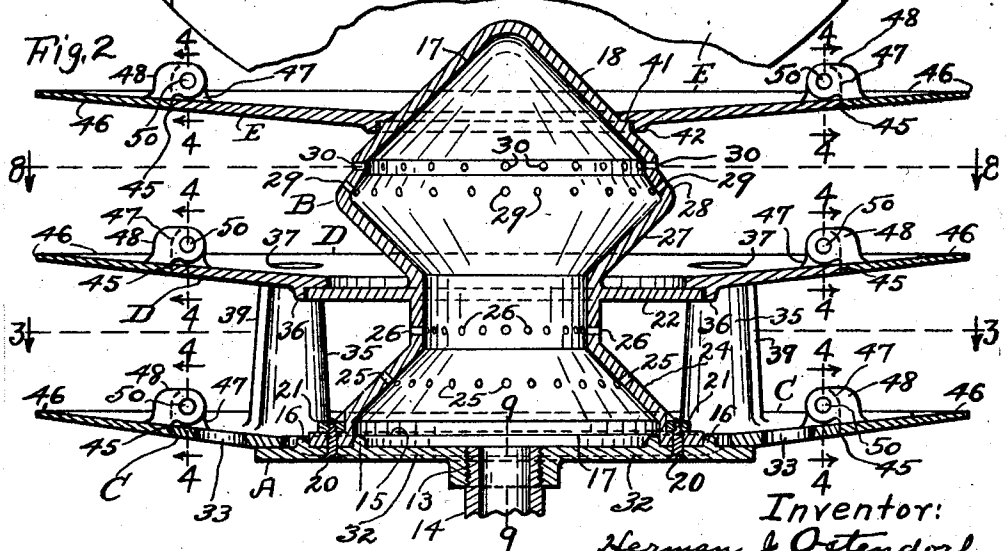


Fig. 2



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Fig. 3

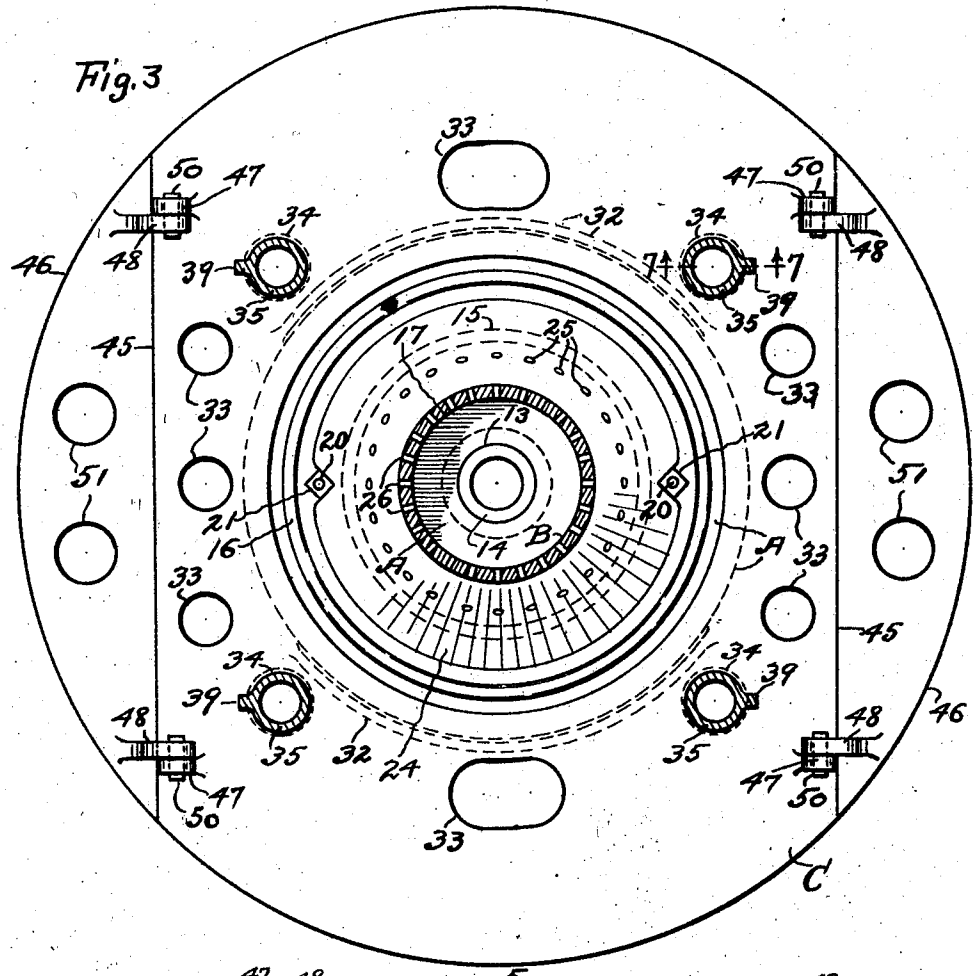


Fig. 4

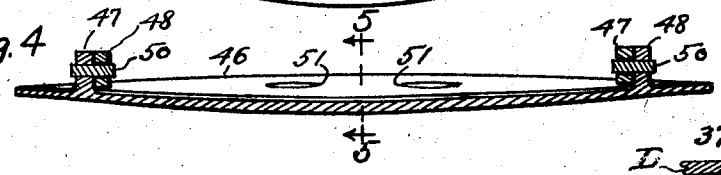


Fig. 5

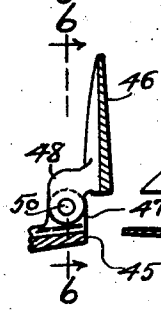


Fig. 6

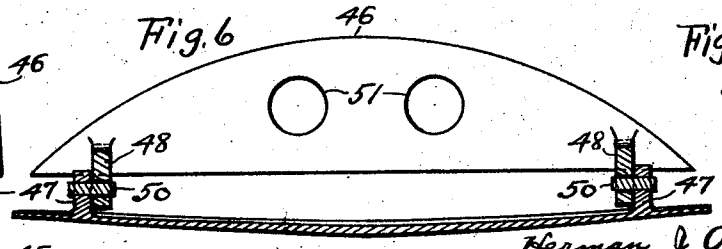
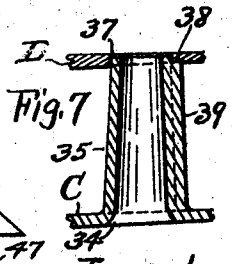


Fig. 7



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Fig. 8

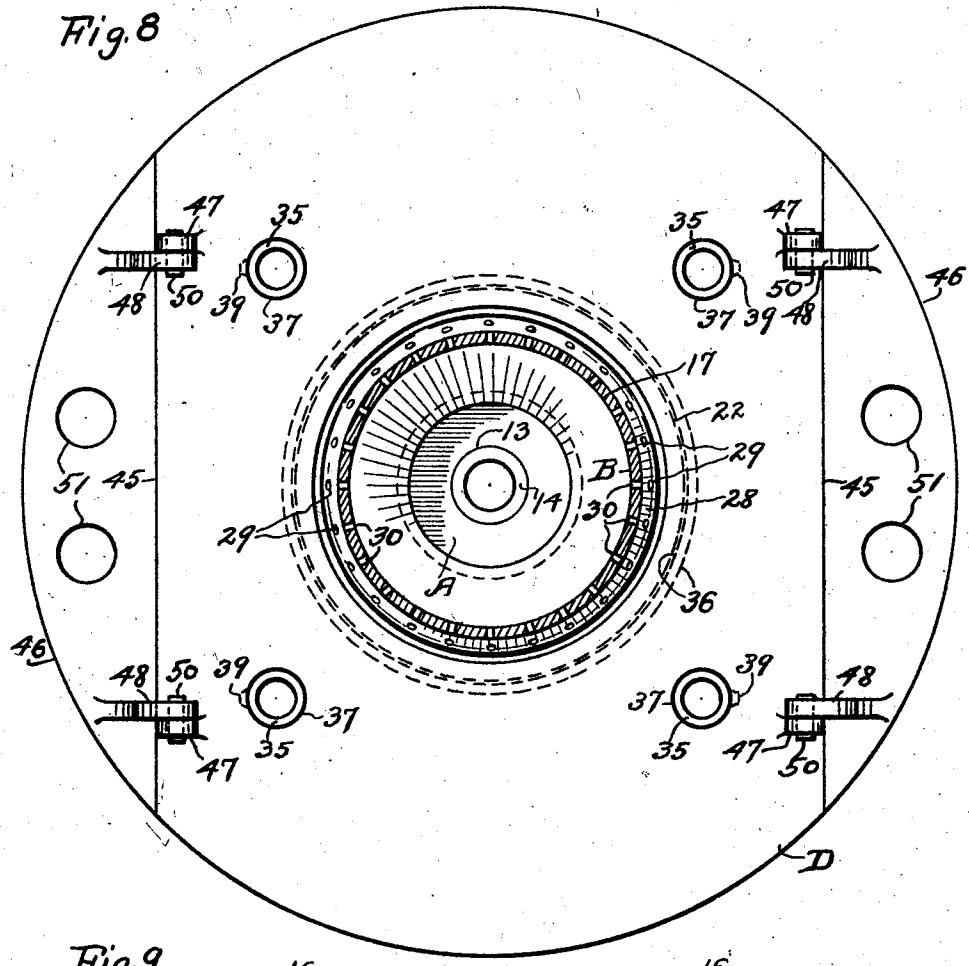
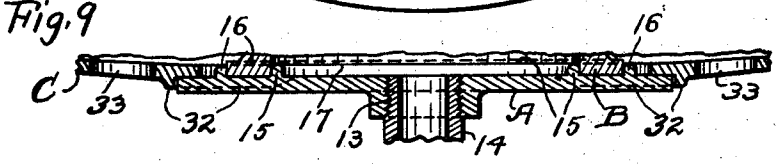


Fig. 9



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Herman J. Ostendorf

By [signature]
his Attorney.

Patented May 4, 1926. 1,583,362

UNITED STATES PATENT OFFICE.

HERMAN J. OSTENDORF, OF CLEVELAND, OHIO.

HEATING BURNER.

Application filed November 17, 1925. Serial No. 69,597.

To all whom it may concern:

Be it known that I, HERMAN J. OSTENDORF, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Heating Burner, of which the following is a specification.

This invention relates to improvements in heating burners suitable for a fuel consisting of a mixture of air and natural or artificial gas, or a mixture of air and hydrocarbon vapor.

One object of this invention is to produce an improved burner of the character indicated which is remarkable for its great heating efficiency and also for its economy in the consumption of fuel in the attainment of said heating efficiency.

Another object is to prevent quivering or unsteadiness of the flames issuing from the burner during the operation of the burner.

Another object is to produce a highly practical burner of the character indicated which is simple and durable in construction, conveniently installable within and removable from a furnace and comprises simple improved means materially participating in effecting more complete combustion.

With these objects in view, and to attain other objects hereinafter appearing, this invention consists in certain meritorious features of construction, and highly important combinations and relative arrangements of parts, hereinafter described in this specification, pointed out in the claims, and illustrated in the accompanying drawings.

In said drawings, Figure 1 is a top plan of a heating burner embodying my invention. Fig. 2 is a vertical section taken along line 2—2 in Fig. 1. Fig. 3 is a horizontal section taken along line 3—3 in Fig. 2. Fig. 4 is a vertical section taken along any one of lines 4—4 in Fig. 2. Fig. 5 is a vertical section taken along line 5—5 in Fig. 4, except that in Fig. 5 the handle-forming member illustrated in Fig. 4 is shown as having been swung upwardly. Fig. 6 is a vertical section taken along line 6—6 in Fig. 5. Fig. 7 is a vertical section taken along line 7—7 in Fig. 3. Fig. 8 is a horizontal section taken along line 8—8 in Fig. 2. Fig. 9 is a vertical section taken along line 9—9 in Fig. 2. Portions are broken away in the drawings to reduce their size.

My improved burner (see Figs. 2, 3 and 9) comprises a substantially horizontal metal base A composed preferably of cast iron and preferably circular externally as shown in dotted lines in Fig. 3. Said base has a screw-threaded hole 13 formed centrally of and extending vertically through the base, and the discharging end portion 14 of a fuel-feeding pipe is threaded, at said hole, into said base.

The base A (see Figs. 2, 3 and 8) is provided, at its top and substantially centrally between the hole 13 and the circumferential edge of the base, with an upwardly projecting annular rib 15 which is substantially concentric in relation to said hole. Said base is provided, at its top and about centrally between the rib 15 and the circumferential edge of the base, with an upwardly projecting annular rib 16 which is substantially concentric in relation to and spaced from and surrounds the inner rib 15. By the hereinbefore described construction it will be observed that the base A extends laterally of and outwardly from the outer rib 16 of the base all round said rib.

My improved burner (see Figs. 2 and 3) comprises a substantially vertical hollow metal body B which is preferably composed of cast iron and has an interior chamber 17 extending from the base A upwardly into the upper and dome-shaped end portion 18 of said body. Said base constitutes the bottom of said chamber, and the discharging end of the fuel-feeding pipe 14 constitutes the fuel-inlet of said chamber. The body B is mounted on the base A between the ribs 15 and 16, and the joint formed between said base and said body is rendered fluid-tight in any approved manner. Preferably the base A and the burner-body B are secured together, between the ribs 15 and 16 at each of a plurality of points spaced circumferentially of the fuel-receiving chamber 17, by a bolt 20 and a nut 21 which are applied in any approved manner. The burner-body B (see Figs. 2 and 8) is provided, externally of the chamber 17, with a substantialy horizontal circumferential flange 22 spaced upwardly from the base A and projecting laterally of and extending all round said body. Said flange is preferably circular as shown in dotted lines in Fig. 8, and the body B extends above said flange preferably considerably farther than the distance between said flange and the base A. Said body measures considerably less in external diameter next above and next below said flange than

said body measures in external diameter at its lower extremity, and preferably said flange measures less in external diameter than the outer rib 16 of the base A.

The burner-body B (see Fig. 2) comprises a downwardly flaring portion 24 which is arranged under and spaced downwardly from the flange 22, and preferably said flaring portion of said body is spaced, at its upper end, considerably farther from the base A than from said flange and forms the greater portion of the body below said flange. The relative dimensions of the flange 22 and the downwardly flaring portion 24 of the body B are preferably such that said flaring portion is arranged substantially wholly under said flange.

The downwardly flaring portion 24 of the burner-body B (see Figs. 2 and 3) has an annularly arranged series of lateral apertures 25 which are spaced circumferentially of said body and formed preferably under the inner portion of the flange 22 and preferably spaced farther from the base A than from the upper end of said portion of said body. It will be observed that the lower portion of the burner-chamber 17 is reduced in size transversely from the apertures 25 to a point about midway between the flange 22 and said apertures, that said apertures each extend from the chamber 17 laterally and upwardly substantially in a straight line from the internal surface to the external surface of the downwardly flaring portion 24 of the burner-body, and that said apertures therefore communicate at their inner and lower ends with said chamber and are adapted to discharge laterally outwardly and upwardly at their outer and upper ends and constitute lateral outlets of the chamber below the flange 22.

The burner-body B (see Figs. 2 and 3) is substantially uniform in diameter between the flange 22 and the upper end of the downwardly flaring portion 24 of said body, and the chamber 17 extends from within said flaring portion of said body upwardly above said flange.

The burner-body B (see Figs. 2 and 3) is provided, between the flange 22 and the downwardly flaring portion 24 of said body, with an annularly arranged series of lateral apertures 26 which are spaced downwardly from said flange and communicate at their inner ends with and are spaced circumferentially of the burner-chamber 17 and extend radially of said body and substantially horizontally from said chamber to the circumference of the body. It will be observed, therefore, that the apertures 26 constitute lateral outlets of the chamber 17, and that said outlets are formed below the flange 22 and spaced upwardly from the outlets 25 of said chamber. The outlets 25 are in such spaced relationship to the flange 22 and to the outlets 26 that the outlets 25 are arranged to discharge toward the discharge from the outlets 26 and that, during the operation of the burner, the flames issuing from the outlets 26 shall be intersecting relation, under said flange, to the flames issuing from the outlets 25, so that said flange shall serve as a baffle arranged to limit the ascent of said flames between the circumferential edge of said flange and the burner-body and so that said body shall not have the portion thereof which extends upwardly from said flange impinged against by said flames.

The burner-body B (see Fig. 2) comprises an upwardly flaring portion 27 arranged over the flange 22 and also comprises a short downwardly flaring portion 28, arranged next above said upwardly flaring portion. It will be observed, therefore, that the downwardly flaring portion 28 of said body is spaced upwardly from the flange 22, and that said flange measures more in external diameter than any portion of the body above said flange. The downwardly flaring portion 28 of the burner-body (see Figs. 2 and 8) has an annularly arranged series of lateral apertures 29 which are spaced circumferentially of and communicate with the chamber 17, and said apertures each extend substantially in a straight line from said chamber laterally and upwardly to the external surface of said flaring portion of said body. It will be observed, therefore, that the apertures 29 are adapted to discharge laterally outwardly and upwardly at their outer and upper ends and form lateral outlets of the chamber 17.

The burner-body B (see Figs. 2 and 8) is provided, next above its downwardly flaring portion 28, with an annularly arranged series of lateral apertures 30 which are spaced upwardly from the outlets 29 of the chamber 17 and communicate at their inner ends with and are spaced circumferentially of said chamber and extend radially of said body and substantially horizontally from said chamber to the circumference of the body. It will be observed, therefore, that the apertures 30 constitute lateral outlets of the chamber 17, and the outlets 29 are in such spaced relationship to the outlets 30 that the outlets 29 are arranged to discharge toward the discharge from the outlets 30 so that, during the operation from the burner, the flames issuing from the outlets 30 shall be in intersection relation to the flames issuing from the outlets 29. The burner-body B extends above the outlets 30 of the chamber 17 and is reduced in size transversely toward its upper extremity.

On the base A, adjacent its outer circumferential edge (see Figs. 2, 3 and 9), is removably mounted or seated a plate C preferably composed of cast iron and surrounding the outer rib 16 of said base and spaced

from said rib all round the rib. The plate C therefore measures more in internal diameter than the flange 22 and said rib 16 measure in external diameter to permit lowering of said plate into place from above said flange. The plate C extends laterally outwardly from the base A and surrounds the burner-body B. The plate C (see Figs. 2, 3 and 9) is provided, at its bottom, with two downwardly projecting segmental ribs 32 spaced circumferentially of the burner-body B and arranged opposite and extending circumferentially of the rear portion and forward portion respectively of and spaced somewhat from the circumferential edge of the base A and serving to prevent material horizontal displacement of said plate on said base.

The plate C (see Figs. 2, 3 and 9) has holes 33 formed between the circumferential edge of the base A and the outer circumference of said plate, and said holes extend from the bottom to the top of said plate and serve to supply air from under the plate to the space surrounding the burner-body between the flange 22 and the downwardly flaring portion 24 of said body so as to adequately support combustion when flames are issuing from the outlets 25 and 26 of the chamber 17 during the operation of the burner. Obviously the plate C serves as a baffle which, while permitting the passage of air upwardly through the holes 33 from under the plate, does not permit the rush of an excessive supply of air from below the burner to the flames issuing from the outlets 25 and 26 of the chamber 17 during the operation of the burner.

The baffle-plate C also has several apertures 34 spaced from and circumferentially of the burner-body B, as shown in dotted line in Fig. 3, and one of said apertures is shown in solid lines in Fig. 7. Each aperture 34 extends to the bottom of the plate C, as shown in Fig. 7, and communicates with an upwardly projecting and somewhat upwardly tapering tubular member 35 formed on and at the top of said plate, and said aperture serves to supply air from under said plate to said tubular member.

The top surface of the flange 22 of the burner-body B, next the outer circumferential edge of said flange (see Figs. 2 and 8) is overlapped by a metal plate D preferably composed of cast iron. Said plate D surrounds the burner-body B and has an internal diameter which measures less than the external diameter of the flange 22 and more than any portion of said body above said flange. The plate D extends from the flange 22 laterally outwardly and is provided at its bottom with a downwardly projecting annular rib 36 arranged opposite and somewhat spaced from and surrounding the outer circumferential edge of said flange. The plate D constitutes a baffle which retards the ascent of products of combustion from the space between the bottom baffle-plate C and the flange 22, and each tubular member 35 of said bottom baffle-plate (see Figs. 7 and 8) extends into a hole 37 formed in and extending vertically through the plate D. The holes 34 in the baffle-plate D are large enough in diameter to cause said plate D to be loose in relation to the tubular members 35 of the baffle-plate C. Each tubular member 35 (see Fig. 7) is externally provided, below its upper extremity, with an upwardly facing shoulder 38 arranged to form a seat for the baffle-plate D and preferably formed by the top of a flange 39 which is formed on and externally of said member 35 and preferably extends from said plate downwardly to the bottom baffle-plate C and thereby reinforces said member 35. It will be observed, therefore, that the baffle-plate D not only overlaps the flange 22 but is supported from the tubular members 35 and removable upwardly from said flange and tubular members.

The burner-body B measures less in external diameter above the baffle-plate D than said plate measures in internal diameter to permit the application of said plate from above said body during the assemblage of the parts and to permit removal of the plate D upwardly from the flange 22 and tubular members 35.

The burner-body B (see Fig. 2) is externally provided, above the outlets 30 of the burner-chamber 17, with an upwardly facing and substantially horizontal annular shoulder 41 on which is removably mounted or seated a metal plate E preferably composed of cast iron and extending around said body, and said plate measures more in internal diameter than said body measures in external diameter above said shoulder to permit application of said plate to or its removal from said body. The plate E (see Figs. 1 and 2) is preferably provided, at its bottom, with a downwardly projecting annular rib 42 which extends around and is somewhat spaced from the body B. It will be observed, therefore, that the plate E is supported and removable upwardly from the body B.

The apertures 34 in the bottom baffle-plate C and the tubular members 35 of said plate constitute means for supplying air from under said plate to the space extending around the burner-body B at the outlets 29 and 30 of the chamber 17 and from the plate C to the plate D, so that air is supplied by said tubular members to the space between the plates D and E for the purpose of adequately supporting combustion when flames are issuing from said outlets during the operation of the burner. It will be observed therefore that the top plate E constitutes

a baffle which retards the ascent of products of combustion from the space between said plate and the intermediate baffle-plate D during the operation of the burner.

The top baffle-plate E is provided, forward of the burner-body B, as shown in Fig. 1, with an aperture 43 to permit the application of a lighted match at said aperture for the purpose of conveniently lighting the burner, but obviously the burner may be lit in any approved manner.

The relative arrangement of the baffle-plates C, D, and E is preferably such that the space between the bottom baffle-plate C and the intermediate baffle-plate D, and the space between said intermediate baffle-plate and the top baffle-plate E, substantially correspond in size vertically, and said plates C, D and E preferably correspond in external contour and dimensions.

Each of the baffle-plates C, D and E has laterally and outwardly facing straight and parallel side edges 45. Each baffle-plate is provided, at each side edge 45 thereof, with a metal leaf 46 composed preferably of cast iron and extending along and from end to end of said edge and pivotally connected, as will hereinafter appear, to said plate in such a manner as to render said leaf capable of being swung upwardly and toward the burner-body B. Each baffle-plate is provided, at each of two points spaced longitudinally of each side edge 45 of the plate, with an upwardly projecting lug 47, and the leaf 46 extending along said edge is provided, at its top and adjacent said lug, with a member 48 which is pivoted to said lug by a substantially horizontal pivotal pin 50 arranged longitudinally in relation to said edge. The pivotal pins 50 of the connection between each leaf 46 and the baffle-plate provided with said leaf are in line endwise longitudinally of said leaf, and said leaf normally abuts, at its inner longitudinal edge, as shown in Figs. 1, 2, 3 and 8, against the adjacent side edge 45 of said plate. By the hereinbefore described construction it will be observed that each leaf 46 of each baffle-plate is arranged to be swung upwardly from the position shown in Figs. 1, 2, 3, 4 and 8 into or inwardly beyond the upright position shown in Figs. 5 and 6, and that said leaf, when it has been swung upwardly into said upright position, serves as a handle for convenience in manipulating or handling the baffle-plate and to enable the passage of the baffle-plate through a doorway having less width or dimensions than would be required were said leaf not capable of being swung into said upright position. It will be observed therefore that each leaf 46 of each baffle-plate also serves as an extension or enlargement of the baffle formed by said plate, and I would here remark that said leaf preferably has finger-receiving holes 51 for convenience in manipulating the leaf.

In installing my improved burner in the combustion-chamber of a furnace, the base A and the burner-body B secured to said base are first introduced into said chamber and placed in the position required and supported in any approved manner, and the pipe-section 14 may be applied to said base preparatory to or after the placing of said base and attached burner-body in position in the furnace, and thereupon the plate C is passed into said combustion-chamber and over said body and then lowered into place on the base A, whereupon the plate D is passed into said chamber and over the burner-body and lowered into place in relation to the flange 22 and tubular members 35, and after the application of said plate D the plate E is mounted on the burner-body.

Not unimportant to a highly successful operation of my improved burner, and to prevent quivering or unsteadiness of the flames issuing from the burner during its operation, is the extension of the fuel-receiving chamber 17 above the uppermost outlets 30 of said chamber and preferably upwardly into the upper portion of the body B to a point above the top baffle-plate E, and I would here remark that I have attained highly satisfactory results in the operation of a burner embodying my invention and having said chamber gradually reduced in size transversely substantially from said uppermost outlets to the upper extremity of the chamber, as shown in Fig. 2.

What I claim is:

1. A heating burner comprising a body and several vertically spaced baffles arranged externally and extending circumferentially of the body, said body having a fuel-receiving chamber extending from within the lower portion into the upper portion of the body, the space between adjacent baffles being placed in communication with the space under the burner, said body being provided, between said adjacent baffles, with two vertically spaced annularly arranged series of apertures which communicate with the aforesaid chamber and extend to the exterior of the body, and the apertures of each of said series of apertures being arranged to discharge toward the discharge from the apertures of the other of said series of apertures.

2. A heating burner comprising a body and several vertically spaced baffles arranged externally and extending circumferentially of the body, said body having a fuel-receiving chamber extending from within the lower portion into the upper portion of the body, the space between adjacent baffles being placed in communication with the space under the burner, said body being provided, between said adjacent baf-

fles, with circumferentially spaced apertures which communicate with said chamber and extend to the exterior of the body, and the lower of said adjacent baffles comprising a removably mounted plate which is arranged substantially horizontally and extends around said body and has an internal diameter which measures more than the external diameter of any member or portion of said body between said plate and the upper extremity of the body.

3. A heating burner comprising a body and several vertically spaced baffles which are arranged externally and extend circumferentially of the body, said body having a fuel-receiving chamber extending from within the lower portion into the upper portion of the body, the space between adjacent baffles having air-inlets which are formed at the lower portion of said space and spaced circumferentially of said body, said body having a downwardly flaring portion which is arranged between said adjacent baffles and has apertures which communicate with and are spaced circumferentially of said chamber and extend laterally and upwardly from said chamber to the exterior of the body, and said body being provided, above said downwardly flaring portion and below the upper of said adjacent baffles, with apertures which extend substantially horizontally from said chamber to the exterior of the body.

4. In a heating burner, the combination, with a body externally provided with a laterally projecting circumferential flange and extending above and below said flange and having an interior fuel-receiving chamber which has outlets arranged to discharge below said flange and also has outlets arranged to discharge above said flange, of a substantially horizontally arranged and removably mounted plate extending circumferentially of said flange, and a plate arranged externally and extending circumferentially of the aforesaid body below the first-mentioned outlets and having upwardly projecting tubular members which are spaced circumferentially of said body and arranged to be employed in conducting air upwardly from below the second-mentioned plate, said tubular members being in communication, at their upper ends, with the space extending around the body at the second-mentioned outlets.

5. In a heating burner, the combination, with a body having a laterally projecting circumferential flange and extending above and below said flange and also having an interior fuel-receiving chamber which has outlets below said flange and also has outlets above said flange, of a substantially horizontally arranged and removably mounted plate extending circumferentially of said flange, and a plate arranged externally and extending circumferentially of said body below the first-mentioned outlets and having upwardly projecting tubular members which are spaced circumferentially of the body and arranged to be employed in conducting air upwardly from below the second-mentioned plate to and communicate with the space extending circumferentially of the body at the second-mentioned outlets and extend into the first-mentioned plate and have shoulders arranged to form seats for said first-mentioned plate.

6. In a heating burner, the combination, with a body having a laterally projecting circumferential flange and extending above and below said flange and also having an interior fuel-receiving chamber which has outlets below said flange and also has outlets above said flange, of a substantially horizontally arranged plate extending circumferentially of said flange, and a plate arranged substantially horizontally and extending around the aforesaid body below the first-mentioned outlets and having upwardly projecting tubular members which are spaced circumferentially of the body and in communication with the space under the burner and communicate with the space extending around the body at the second-mentioned outlets and have external flanges extending from the second-mentioned plate to the bottom of the first-mentioned plate.

7. In a heating burner, the combination, with a body, and a substantially horizontally arranged baffle extending circumferentially of said body and spaced downwardly from the upper end and upwardly from the lower end of the body, said body having an interior fuel-receiving chamber which has outlets below and outlets above said baffle, of a plate arranged substantially horizontally and externally and extending circumferentially of said body below the first-mentioned outlets and having apertures which extend from the bottom to the top of the plate and are spaced circumferentially of the body, a top baffle mounted on and extending circumferentially of said body above the second-mentioned outlets, and means for supplying air, at points spaced circumferentially of said body and inwardly from the circumference of the first-mentioned baffle, to the space between said first-mentioned baffle and the aforesaid top baffle.

8. A heating burner comprising a base, a body which is rigid with the base and has an external circumferential flange spaced upwardly from said base and extends above said flange and also has an interior fuel-receiving chamber having lateral outlets under and lateral outlets above said flange, a substantially horizontally arranged top plate removably mounted on and extending circumferentially of said body above

the second-mentioned outlets, a removably mounted substantially horizontally arranged plate overlapping the top and extending circumferentially of the aforesaid flange, the external diameter of said flange and the internal diameter of the second-mentioned plate measuring more than said body measures in external diameter above said flange, and a plate arranged substantially horizontally and extending circumferentially of the lower end of said body and removably mounted on the aforesaid base and having an internal diameter which measures more than the external diameter of the aforesaid flange and also having two downwardly projecting spaced ribs arranged opposite the rearward portion and forward portion respectively of the circumferential edge of said base.

In testimony whereof, I sign the foregoing specification.

HERMAN J. OSTENDORF.