Jan. 15, 1929. 1,699,067

P. F. HOLMGREN

ROTARY BURNER

Filed April 15, 1927

Fig. 1,

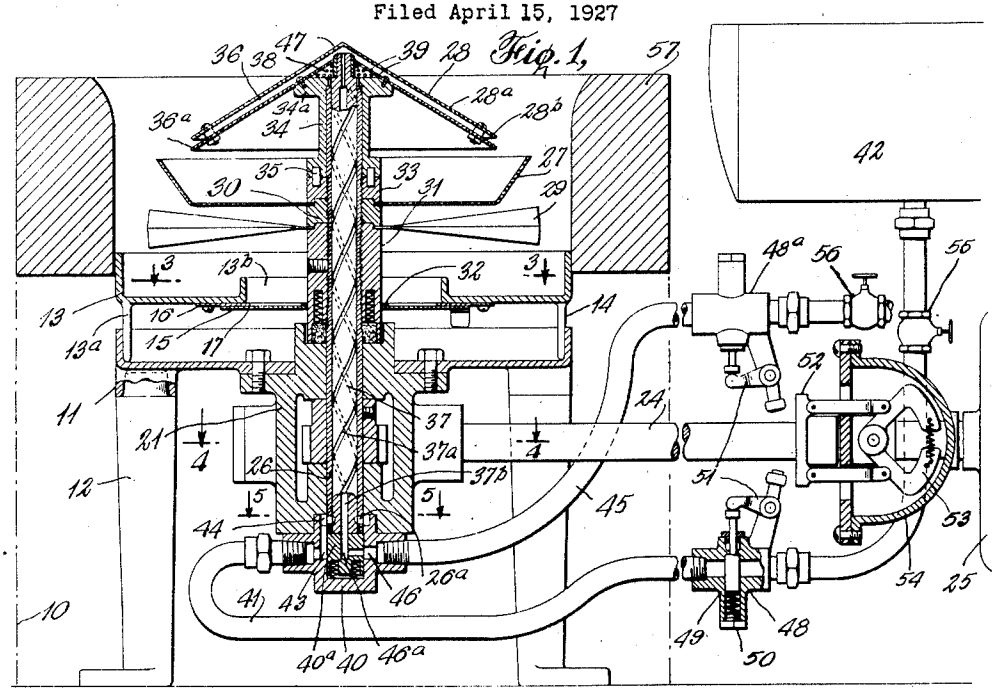


Fig. 2,

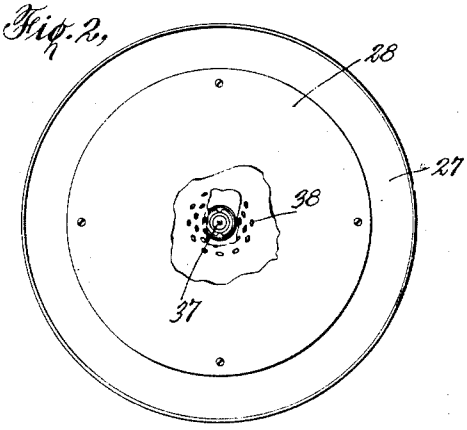


Fig. 3,

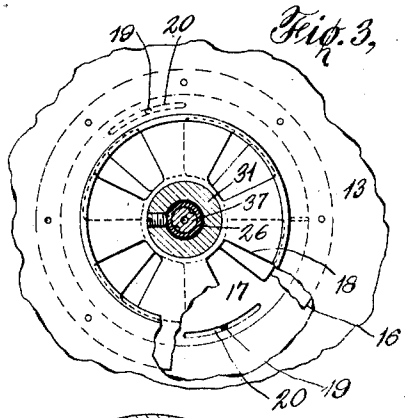


Fig. 4,

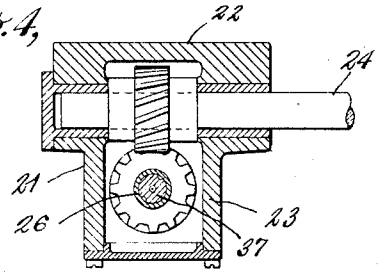
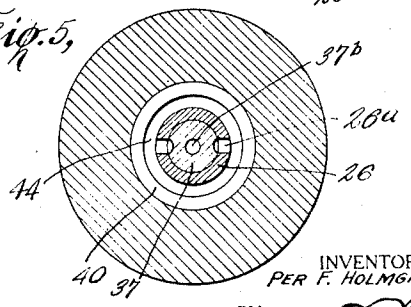


Fig. 5,



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UNITED STATES PATENT OFFICE.

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ROTARY BURNER.

Application filed April 15, 1927. Serial No. 184,036.

This invention relates to oil burners and particularly to apparatus of this class of rotary type for use in connection with or as part of heating apparatus of any kind or class, and particularly furnaces, and the object of the invention is to provide an apparatus of the class specified which may be built into and made part of a furnace or other apparatus, or which may be placed in a furnace after removing grate bars and other parts of the furnace. A further object is to provide a burner of the class described with a rotatable burner head comprising a dish-shaped baffle member and an inverted conical member and steam generator disposed above and in spaced relation to said baffle member; and further to the provision of a fan rotatable with said burner head and arranged below the baffle thereof and employed to produce a forced circulation of air into and through the burner. A further object is to provide a combined oil and water feed tube for directing oil and water to the upper end of said conical member and generator whereby when the burner is in operation, the spray of water into said generator, or the chamber formed therein, will generate steam which together with the fuel discharged into said chamber will form a combustible gas having a high degree of heat units. A further object is to provide means for transmitting oil and water from a suitable supply to the lower end of said feed tube and the independent passages formed therein, and automatically actuated means driven from the motor shaft for operating the fan and rotatable burner head for controlling feed or transmission of fuel and water to the burner. A still further object is to provide the oil feed tube with spirally arranged grooves or passages for effecting transmission of fuel to the burner head and still further to the provision of an air regulating valve controlling the passage of air into burner apparatus centrally of and below the axial portion of the fan of the apparatus. With these and other objects in view the invention consists of a burner of the class and for the purpose specified which is simple in construction and operation, efficient in use and which is constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Fig. 1 is a diagrammatic sectional view showing one method of carrying my apparatus into effect;

Fig. 2 is a plan view of part of the construction shown in Fig. 1, with part broken away;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 1; and,

Fig. 5 is a section on the line 5—5 of Fig. 1.

In the drawing I have represented at 10 the boundary lines of the inner lower compartment or compartments of a furnace, that is to say the usual ash-pit and fire-box compartments thereof, in which I have shown my improved burner. In the construction shown, the burner is made up of a horizontal frame plate 11 supported upon a plurality of legs 12, and above the plate 11 is a supplemental plate 13 spaced from the plate 11 by a number of leg portions 13^a to form an air space or air admission passage 14 between the plates 11 and 13. The plate 13 is provided with a large central opening 13^b which is controlled by an air shutter or regulator 15, consisting of two plates 16 and 17 both having apertures 18 adapted to be brought into registering position in the manner of other devices of this class. The plate 16 is secured to the frame plate 13 while the plate 17 is guided in its movement on the plate 16 by screws 19 operating in elongated arc-shaped apertures 20 (note Fig. 3).

Secured to the lower face of the frame plate 11 is a casing 21 in which is mounted two helical gears 22 and 23 (note Fig. 4) the gear 22 being secured to the inner end of an electric motor shaft 24 which extends out to the motor 25, partially indicated in Fig. 1 of the drawing. The gear 23 is secured to a tubular shaft 26 mounted in the casing and projecting through the upper end thereof and in connection with the upper end of which the burner head is mounted, said head comprising a dish-shaped or baffle pan 27 and an inverted cone-shaped member 28 forming a fuel generator and discharge member. A fan 29 is also secured to said shaft below the pan 27 which is spaced therefrom by a spacing ring 30 mounted on the shaft, and a similar ring or sleeve 31 spaces the pan

above the supplemental frame plate 13 and the casing 21, a suitable packing ring 32 being employed between the lower end of the sleeve 31 and the casing 21. The upper end of the shaft 26 is split and the ring 30 and sleeve 31 are in threaded engagement with said shaft as is also a retaining ring or nut 33 which secures the pan 27 in position. A sleeve member 34 is detachably mounted on the shaft 26 but is pinned to the nut 33, as seen at 35 to rotate therewith, and the member 28 is secured to the upper enlarged end 34[a] of said sleeve member.

The member 28 consists of inner and outer parts 28[a] and 28[b] mounted in spaced relation to form a chamber 36 therebetween, into which the oil and water are discharged for the generation of steam and ultimate production of a gas which is discharged through the open annular discharge 36[a] of said chamber 36 adjacent the pan 27.

Mounted within the shaft 26 is an oil and water feed tube 37, said tube being provided on the periphery thereof with spiral oil feed grooves 37[a], the lower ends of which communicate with ports 26[a] formed in the lower end of the shaft 26, and the upper ends of said grooves open into a small chamber 38 formed between the part 28[a] and the sleeve member 34, and the part 28[a] is provided with a plurality of small apertures 39 for placing the chamber 38 in communication with the chamber 36.

A supplemental casing 40 is mounted at the lower end of the casing 21 and coupled with one side of this casing is an oil supply pipe 41 in communication with a suitable source of supply as at 42, and the oil in the pipe 41 passes into a port 43 in the casing 40 and upwardly into an annular chamber 44 formed between the main and supplemental casings, and the apertures 26[a] in the shaft 26 are adapted to register with the annular chamber 44 so that the oil will be directed into the spiral feed grooves 37[a] in the rotation of said shaft and feed tube 37, the latter being pressed or otherwise secured in and to the shaft 26. The water supply pipe 45 also couples with the supplemental casing 40 and communicates, through a port 46, with the bore 37[b] of the tube 37, the upper end of which is contracted as seen at 47 and opens into the chamber 36 at the peak of the member 28. The shaft 26 and the tube 37 rest upon a packing block 40[a] mounted within the casing 40, and this block has ports 46[a] which register with the port 46 and the bore 37[b] of the tube 37.

Mounted in the pipes 41 and 45 are governor controlled valves 48 and 48[a] respectively, both of which are of similar construction and are provided with plunger valves 49 moved into closed position by springs 50, and into open position by levers 51 actuated by means of a sleeve 52 mounted on the motor shaft 24, and actuated by the weights of a governor device 54, and other valves 55 and 56 are mounted in the pipes 41 and 45 to shut off and turn on, at will, the supply of water or oil to the burner.

The operation of my improved burner will be readily understood from the foregoing description when taken in connection with the accompanying drawing and the following statement. In starting the burner for operation, the burner head may be heated in any desired manner, for example, in burning a small amount of fuel discharged through the annular discharge 36[a] of the conical member 28, and when said member 28 has been heated to the desired degree, it being understood that the motor has been put in operation, the fan 29 as well as the pan 27 and member 28 are rotating, a small amount of water is allowed to pass into the burner and be discharged into the chamber 36 and the heat of the member 28 will cause the generation of steam which when mingled with the spray of oil discharged into said chamber through the aperture 39 will produce a gas which is discharged at 36[a], the combustion of which will produce a high degree of heat units. The air supplied to the burner is drawn through the doors at the lower portion of the furnace in which the burner is mounted, up through the air regulator which is adjusted to the desired opening and is passed around the baffle 27 and mixes with the gas just above the peripheral edge thereof, and as it is discharged from the discharge passage 36[a]. It will also be noted that a wall 57 of fire-brick or any other suitable material is built up around the burner head to confine the air to a definite passage upwardly through the burner and the flame will extend from the burner head approximately at the discharge 36[a]. As the burner continues to operate the heat of the member 28 is maintained for the generation of steam and it will also be understood that after the burner has been put into operation, the motor speed may be increased or decreased by manual or automatic thermostatic control to regulate the operation of the flame governing the required amount that may be desired, at any time, and the increase or decrease of the speed of the motor will correspondingly and proportionally increase and decrease the transmission of fuel and water to the burner as well as the supply of air thereto, in the operation of the fan 29 which causes a forced draft or circulation of air through the burner.

It will also be noted that whenever desired the member 28 together with the sleeve 34 may be readily detached, by simply lifting the same off the shaft 26 for cleaning or other purposes, and when removed the pan 27 may also be cleaned. It will also be understood that in the rotation of the shaft 26 and tube 37, the oil which will be maintained at a level some point below the burner head or the member 28 thereof, will be forced up-

wardly and discharged into the chamber 36 by centrifugal action and the spiral arrangement of the grooves, while water is preferably supplied to said chamber under a like pressure, and it will also be understood that in addition to the generation of steam from the water passed into said chamber, the oil is vaporized to facilitate the production of a combustible gas as hereinbefore stated.

It will be understood that my invention is not necessarily limited to the specific details of construction herein shown and described, nor to any specific use of the burner, and various other changes in and modifications of the construction herein set out may be made, within the scope of the appended claims, without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a burner of the class described, a rotatable burner unit comprising a head member from which a combustible product is discharged, a pan adjacent the discharge end of said head member, a fan at the opposite side of said pan, a tubular shaft on which said head, pan and fan are mounted, means involving a casing in said burner for supporting said shaft, a motor driven shaft extending into said casing, a gear on said motor shaft meshing with a gear on said first named shaft for rotating the same and said burner unit, an oil feed tube mounted in said first named shaft, the periphery of which is provided with spiral grooves for transmitting oil from a suitable source longitudinally of the shaft and into said head member in the rotation of said burner unit, and the bore of said tube forming a water passage for transmitting water from a source of supply to said head member.

2. In a burner of the class described, a rotatable burner head having a mixing chamber therein discharging through the periphery thereof, said burner head being heated in the operation of the burner, means for passing independent sprays of fuel and water into said mixing chamber to generate a gas which is discharged from said chamber, an annular chamber formed around the periphery of the discharge of said burner head, means providing a forced circulation of air through said annular chamber, and a baffle member interposed between said last named means and burner head, the diameter of said baffle member being greater than that of the burner head.

3. A burner of the class described including a burner head consisting of a conical member, said member being composed of separate sheet metal parts mounted in spaced relation to form a chamber within and between said parts, opening outwardly through the periphery thereof in an annular discharge, means for directing separate discharges of oil and water into the central portion of said chamber, the inner part of said head at the central portion thereof having a plurality of apertures through which oil discharged into said chamber is adapted to pass in spray-like fashion, and said oil and water discharging means comprising a feed tube through which the water is passed, said member having spiral grooves on the periphery thereof forming oil feed grooves which open into the chamber of said head.

4. A burner of the class described including a burner head consisting of a conical member, said member being composed of separate sheet metal parts mounted in spaced relation to form a chamber within and between said parts, opening outwardly through the periphery thereof in an annular discharge, means for directing separate discharges of oil and water into the central portion of said chamber, the inner part of said head at the central portion thereof having a plurality of apertures through which oil discharged into said chamber is adapted to pass in spray-like fashion, said oil and water discharging means comprising a feed tube through which the water is passed, said member having spiral grooves on the periphery thereof forming oil feed grooves which open into the chamber of said head, a tubular shaft mounted on said feed tube, and means for rotating said shaft and feed tube.

5. A burner of the class described including a burner head consisting of a conical member, said member being composed of separate sheet metal parts mounted in spaced relation to form a chamber within and between said parts, opening outwardly through the periphery thereof in an annular discharge, means for directing separate discharges of oil and water into the central portion of said chamber, the inner part of said head at the central portion thereof having a plurality of apertures through which oil discharged into said chamber is adapted to pass in spray-like fashion, said oil and water discharging means comprising a feed tube through which the water is passed, said member having spiral grooves on the periphery thereof forming oil feed grooves which open into the chamber of said head, a tubular shaft mounted on said feed tube, and means for rotating said shaft and feed tube, and said head being coupled with said shaft and rotated thereby.

6. A burner of the class described including a burner head consisting of a conical member, said member being composed of separate sheet metal parts mounted in spaced relation to form a chamber within and between said parts, opening outwardly through the periphery thereof in an annular discharge, means for directing separate discharges of oil and water into the central por-

tion of said chamber, the inner part of said head at the central portion thereof having a plurality of apertures through which oil discharged into said chamber is adapted to pass in spray-like fashion, said oil and water discharging means comprising a feed tube through which the water is passed, said member having spiral grooves on the periphery thereof forming oil feed grooves which open into the chamber of said head, a tubular shaft mounted on said feed tube and means for rotating said shaft and feed tube, said head being coupled with said shaft and rotated thereby, and a pan supported on said shaft and arranged adjacent the discharge end of said head, the diameter of said pan being greater than the diameter of said head.

7. A burner of the class described including a burner head consisting of a conical member, said member being composed of separate sheet metal parts mounted in spaced relation to form a chamber within and between said parts opening outwardly through the periphery thereof in an annular discharge, means for directing separate discharges of oil and water into the central portion of said chamber, the inner part of said head at the central portion thereof having a plurality of apertures through which oil discharged into said chamber is adapted to pass in spray-like fashion, said oil and water discharging means comprising a feed tube through which the water is passed, said member having spiral grooves on the periphery thereof forming oil feed grooves which open into the chamber of said head, a tubular shaft mounted on said feed tube and means for rotating said shaft and feed tube, said head being coupled with said shaft and rotated thereby, a pan supported on said shaft and arranged adjacent the discharge end of said head, the diameter of said pan being greater than the diameter of said head, and a fan supported on said shaft on the opposite side of the pan to direct currents of air for supply to the burner around the periphery of said pan.

8. A burner of the class described comprising a casing adapted to be arranged and positioned within the lower end portion of a furnace, a tubular shaft supported in said casing in a vertical plane, a feed tube within said shaft and having between the periphery thereof and the wall of the shaft spirally arranged oil feed grooves, means coupled with the lower end of the casing for supplying oil to the lower ends of said feed grooves, means coupled with the lower end of the casing and independent of said first named means for supplying water to the lower end of the bore of the feed tube, and a burner head supported in connection with the upper end of said shaft and tube and provided with a conical mixing and discharge chamber which opens downwardly into the furnace in an annular discharge whereby oil and water may be passed into the mixing chamber of said head and converted into a gas by the heat of the head, which gas is discharged through the annular discharge of said head.

9. A burner of the class described comprising a casing adapted to be arranged and positioned within the lower end portion of a furnace, a tubular shaft supported in said casing in a vertical plane, a feed tube within said shaft and having between the periphery thereof and the wall of the shaft spirally arranged oil feed grooves, means coupled with the lower end of the casing for supplying oil to the lower ends of said feed grooves, means coupled with the lower end of the casing and independent of said first named means for supplying water to the lower end of the bore of the feed tube, a burner head supported in connection with the upper end of said shaft and tube and provided with a conical mixing and discharge chamber which opens downwardly into the furnace in an annular discharge whereby oil and water may be passed into the mixing chamber of said head and converted into a gas by the heat of the head, which gas is discharged through the annular discharge of said head, and means associated with said head for confining the air supply to the burner to a comparatively narrow passage about the periphery of the burner head.

10. A burner of the class described comprising a casing adapted to be arranged and positioned within the lower end portion of a furnace, a tubular shaft supported in said casing in a vertical plane, a feed tube within said shaft and having between the periphery thereof and the wall of the shaft spirally arranged oil feed grooves, means coupled with the lower end of the casing for supplying oil to the lower ends of said feed grooves, means coupled with the lower end of the casing and independent of said first named means for supplying water to the lower end of the bore of the feed tube, a burner head supported in connection with the upper end of said shaft and tube and provided with a conical mixing and discharge chamber which opens downwardly into the furnace in an annular discharge whereby oil and water may be passed into the mixing chamber of said head and converted into a gas by the heat of the head, which gas is discharged through the annular discharge of said head, and means associated with said head for confining the air supply to the burner to a comparatively narrow passage about the periphery of the burner head, said last named means involving a pan arranged adjacent and beneath the burner head.

11. A burner of the class described comprising a casing adapted to be arranged and positioned within the lower end portion of a furnace, a tubular shaft supported in said

casing in a vertical plane, a feed tube within said shaft and having between the periphery thereof and the wall of the shaft spirally arranged oil feed grooves, means coupled with the lower end of the casing for supplying oil to the lower ends of said feed grooves, means coupled with the lower end of the casing and independent of said first named means for supplying water to the lower end of the bore of the feed tube, a burner head supported in connection with the upper end of said shaft and tube and provided with a conical mixing and discharge chamber which opens downwardly into the furnace in an annular discharge whereby oil and water may be passed into the mixing chamber of said head and converted into a gas by the heat of the head, which gas is discharged through the annular discharge of said head, means associated with said head for confining the air supply to the burner to a comparatively narrow passage about the periphery of the burner head, said last named means involving a pan arranged adjacent and beneath the burner head, and a fan arranged beneath the pan and coupled with said shaft.

12. A burner of the class described comprising a casing adapted to be arranged and positioned within the lower end portion of a furnace, a tubular shaft supported in said casing in a vertical plane, a feed tube within said shaft and having between the periphery thereof and the wall of the shaft spirally arranged oil feed grooves, means coupled with the lower end of the casing for supplying oil to the lower ends of said feed grooves, means coupled with the lower end of the casing and independent of said first named means for supplying water to the lower end of the bore of the feed tube, a burner head supported in connection with the upper end of said shaft and tube and provided with a conical mixing and discharge chamber which opens downwardly into the furnace in an annular discharge whereby oil and water may be passed into the mixing chamber of said head and converted into a gas by the heat of the head, which gas is discharged through the annular discharge of said head, means associated with said head for confining the air supply to the burner to a comparatively narrow passage about the periphery of the burner head, said last named means involving a pan arranged adjacent and beneath the burner head, a fan arranged beneath the pan and coupled with said shaft, said casing including an air supply passage arranged beneath the fan and encircling said shaft, and a shutter device for controlling the area of said passage.

13. A burner of the class described comprising a casing adapted to be arranged and positioned within the lower end portion of a furnace, a tubular shaft supported in said casing in a vertical plane, a feed tube within said shaft and having between the periphery thereof and the wall of the shaft spirally arranged oil feed grooves, means coupled with the lower end of the casing for supplying oil to the lower ends of said feed grooves, means coupled with the lower end of the casing and independent of said first named means for supplying water to the lower end of the bore of the feed tube, a burner head supported in connection with the upper end of said shaft and tube and provided with a conical mixing and discharge chamber which opens downwardly into the furnace in an annular discharge whereby oil and water may be passed into the mixing chamber of said head and converted into a gas by the heat of the head, which gas is discharged through the annular discharge of said head means associated with said head for confining the air supply to the burner to a comparatively narrow passage about the periphery of the burner head, said last named means involving a pan arranged adjacent and beneath the burner head, a fan arranged beneath the pan and coupled with said shaft, said casing including an air supply passage arranged beneath the fan and encircling said shaft, a shutter device for controlling the area of said pasasge, and a power driven shaft coupled with the casing and arranged at right angles to and at one side of said vertical shaft, and means for gearing said shafts together.

14. A burner of the class described comprising a casing adapted to be arranged and positioned within the lower end portion of a furnace, a tubular shaft supported in said casing in a vertical plane, a feed tube within said shaft and having between the periphery thereof and the wall of the shaft, spirally arranged oil feed grooves, means coupled with the lower end of the casing for supplying oil to the lower ends of said feed grooves, means coupled with the lower end of the casing and independent of said first named means for supplying water to the lower end of the bore of the feed tube, a burner head supported in connection with the upper end of said shaft and tube and provided with a conical mixing and discharge chamber which opens downwardly into the furnace in an annular discharge whereby oil and water may be passed into the mixing chamber of said head and converted into a gas by the heat of the head, which gas is discharged through the annular discharge of said head, means associated with said head for confining the air supply to the burner to a compartively narrow passage about the periphery of the burner head, said last named means involving a pan arranged adjacent and beneath the burner head, a fan arranged beneath the pan and coupled with said shaft, said casing including an air supply passage arranged beneath the fan and encircling said shaft, a shutter device for controlling the area of said passage, a power driven shaft

coupled with the casing and arranged at right angles to and at one side of said vertical shaft and means for gearing said shafts together, independent valves for controlling the supply of water and gas to the burner and a governor device on said power driven shaft and in operative connection with both of said valves for automatically controlling and regulating the oil and water supply to the burner.

15. A burner of the class described comprising a casing adapted to be arranged and positioned within the lower end portion of a furnace, a tubular shaft supported in said casing in a vertical plane, a feed tube within said shaft and having between the periphery thereof and the wall of the shaft, spirally arranged oil feed grooves, means coupled with the lower end of the casing for supplying oil to the lower ends of said feed grooves, means coupled with the lower end of the casing and independent of said first named means for supplying water to the lower end of the bore of the feed tube, a burner head supported in connection with the upper end of said shaft and tube and provided with a conical mixing and discharge chamber which opens downwardly into the furnace in an annular discharge whereby oil and water may be passed into the mixing chamber of said head and converted into a gas by the heat of the head, which gas is discharged through the annular discharge of said head, means associated with said head for confining the air supply to the burner to a comparatively narrow passage about the periphery of the burner head, said last named means involving a pan arranged adjacent and beneath the burner head, a fan arranged beneath the pan and coupled with said shaft, said casing including an air supply passage arranged beneath the fan and encircling said shaft, a shutter device for controlling the area of said passage, a power driven shaft coupled with the casing and arranged at right angles to and at one side of said vertical shaft and means for gearing said shafts together, independent valves for controlling the supply of water and gas to the burner and a governor device on said power driven shaft and in operative connection with both of said valves for automatically controlling and regulating the oil and water supply to the burner, an oil chamber interposed between the mixing chamber of said head and the upper end of the grooves in said feed tube, and a plurality of apertures through which the oil is discharged from said last named chamber into the mixing chamber.

16. In a burner of the class described, a rotatable burner unit comprising a conical head provided with a conical mixing chamber having an annular discharge at the periphery of said head, a pan adjacent the discharge of said head, the diameter of which is greater than the diameter of said head, a fan at the opposite side of said pan, a tubular shaft on which said head, pan and fan are mounted and by means of which the same are rotated, means for rotating said shaft and a feed tube in said shaft and having independent oil and water feed passages extending longitudinally thereof and opening into the mixing chamber of said head whereby in the rotation of said unit, oil and water will be discharged into said mixing chamber to produce by reason of the heat of said head, a gas which is discharged through said annular discharge.

17. In a burner of the class described, a rotatable burner unit comprising a conical head provided with a conical mixing chamber having an annular discharge at the periphery of said head, a pan adjacent the discharge of said head, the diameter of which is greater than the diameter of said head, a fan at the opposite side of said pan, a tubular shaft on which said head, pan and fan are mounted and by means of which the same are rotated, means for rotating said shaft, a feed tube in said shaft and having independent oil and water feed passages extending longitudinally thereof and opening into the mixing chamber of said head whereby in the rotation of said unit, oil and water will be discharged into said mixing chamber to produce by reason of the heat of said head, a gas which is discharged through said annular discharge, a casing for supporting said unit and the means for actuating said shaft, and independent oil and water pipes coupled with said casing and in communication with the oil and water passages of said feed tube.

18. In a burner of the class described, a rotatable burner unit comprising a conical head provided with a conical mixing chamber having an annular discharge at the periphery of said head, a pan adjacent the discharge of said head, the diameter of which is greater than the diameter of said head, a fan at the opposite side of said pan, a tubular shaft on which said head, pan and fan are mounted and by means of which the same are rotated, means for rotating said shaft, a feed tube in said shaft and having independent oil and water feed passages extending longitudinally thereof and opening into the mixing chamber of said head whereby in the rotation of said unit, oil and water will be discharged into said mixing chamber to produce by reason of the heat of said head, a gas which is discharged through said annular discharge, a casing for supporting said unit and the means for actuating said shaft, independent oil and water pipes coupled with said casing and in communication with the oil and water passages of said feed tube, and said casing having an air admission passage encircling said shaft adjacent the fan, and adjustable means for controlling the area of said passage.

19. A burner of the class described includ-

ing a burner head consisting of a conical member, said member being composed of separate sheet metal parts mounted in spaced relation to form a chamber of substantially the same width throughout and within and between said parts, said chamber opening outwardly through the periphery of said member in an annular discharge, and means for directing separate discharges of oil and water directly into the central portion of said chamber.

20. A burner of the class described including a burner head consisting of a conical member, said member being composed of separate sheet metal parts mounted in spaced relation to form a chamber of substantially the same width throughout and within and between said parts, said chamber opening outwardly through the periphery of said member in an annular discharge, means for directing separate discharges of oil and water directly into the central portion of said chamber, and the inner part of said head at the central portion thereof having a plurality of apertures through which oil discharged into said chamber is adapted to pass in spray-like fashion.

In testimony that I claim the foregoing as my invention I have signed my name this 8th day of April, 1927.

PER F. HOLMGREN.