

April 4, 1933.

G. B. TIBBOT

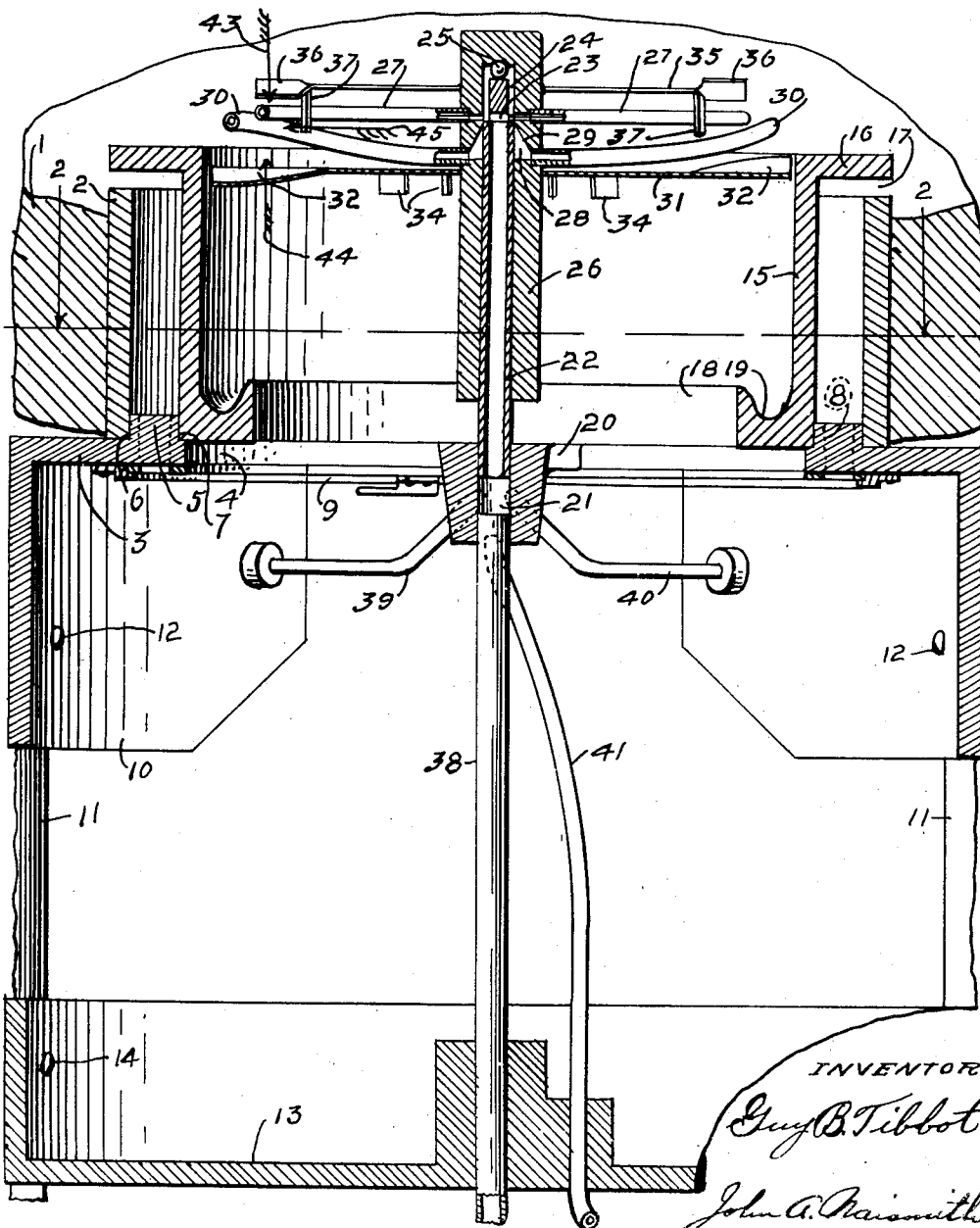
1,903,317

BURNER

Filed March 15, 1932

2 Sheets-Sheet 1

FIGURE 1



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2 Sheets-Sheet 2

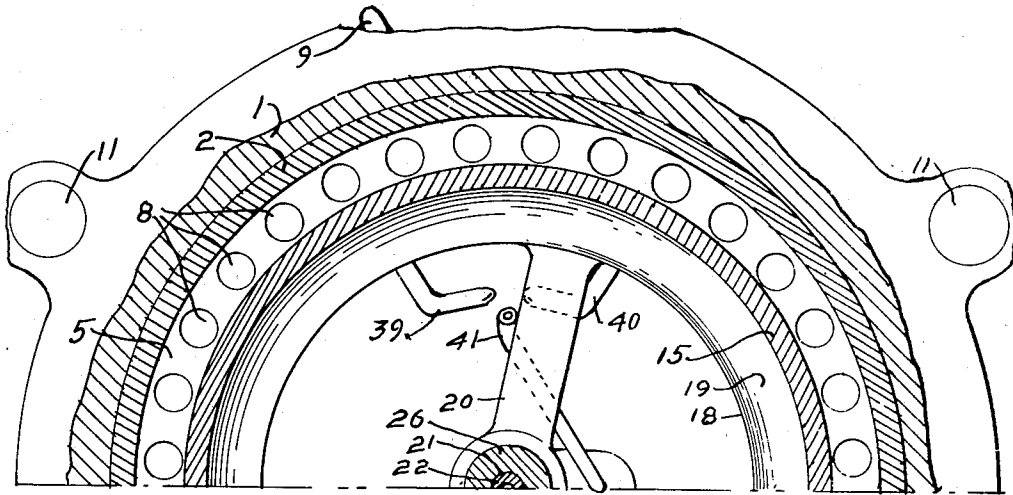


FIGURE 2

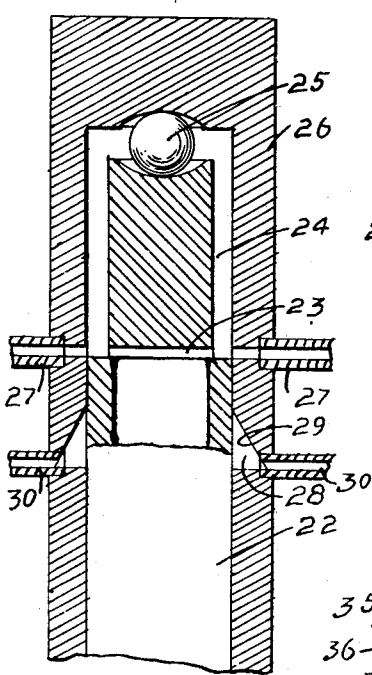


FIGURE 5

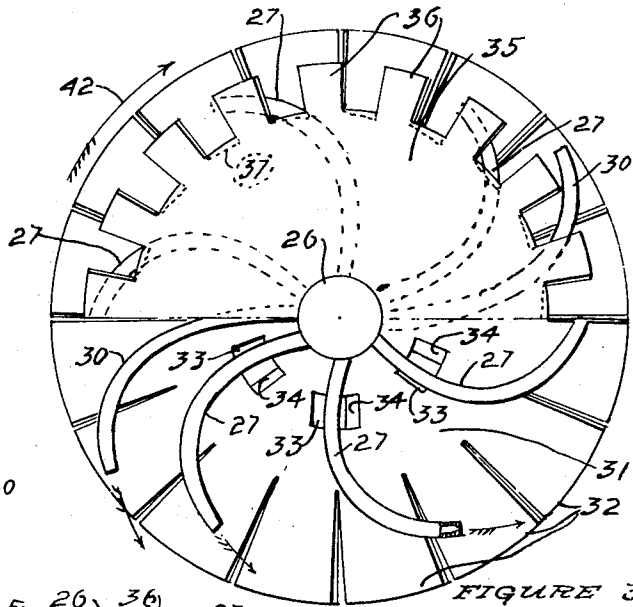


FIGURE 3

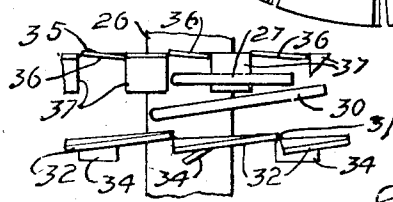


FIGURE 4

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BURNER

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The present invention relates particularly to that type of burner used for burning atomized liquid fuel under furnaces and the like.

It is one object of the invention to provide a burner of the character indicated that is so constructed and assembled that the reaction of the fuel discharged from the burner nozzles will actuate means for securing the desired distribution of the burning fuel as well as to effect the intimate mixture of the desired quantity of air therewith.

It is another object of the invention to provide a burner of the character indicated provided with automatically operated means for preventing over-heating of the working parts.

It is also an object to provide a burner of the character indicated provided with automatic ignition means disposed in operative relation thereto.

It is still another object to provide a burner that will be economical to manufacture, of few parts, simple in form and construction, quickly and easily assembled or disassembled, automatic in operation, strong, durable, and highly efficient in its practical application.

In the drawings:

Figure 1 is a vertical transverse section through a burner embodying my invention, parts being broken away.

Figure 2 is a half section on line 2—2 of Figure 1.

Figure 3 is a plan view of the dispersion rotor with part of the top removed.

Figure 4 is a side elevation of a portion of the dispersion rotor.

Figure 5 is an enlarged sectional view through a portion of the dispersion rotor and its support.

In the embodiment of the invention as herein disclosed I show at 1 a portion of the floor of a fire-box having an annulus 2 seated in the center thereof as an integral part thereof, and forming a passage therethrough.

At 3 is shown a plate having a large central opening 4 therein and having an upstanding annular boss 5 formed thereon to form shoulders at 6 and 7. Passages as 8 are formed through the part 5 and controlled by a damper 9 whereby to permit air to pass there-

through as desired. The plate 3 is provided with a skirt 10 by means of which it is mounted upon legs 11 as at 12. A pan 13 is also mounted between and upon legs 11 as at 14. In assembling it is only necessary to place the base part 3-14 in position with the annulus 2 seated snugly on shoulder 6.

At 15 is a tubular member seated snugly on shoulder 7 in parallel relation to annulus 2 and spaced therefrom a distance equal to the width of the boss 5. This member is provided with an outwardly directed flange 16 on its upper edge, the said flange overlying the annulus 2 and spaced a distance therefrom as at 17. On the lower edge of member 15 is an inwardly and upwardly turned flange 18 forming an annular groove 19. Extending diametrically across the bottom of member 15 and forming a part thereof is a bar 20 having an axially disposed passage 21 formed therethrough. Mounted in the passage 21 is an upstanding tube 22 drilled crosswise as at 23 a distance above the plane of flange 16, and having a portion of reduced diameter extending above the passage 23 as at 24, and upon the upper end of which is seated a ball 25.

A tubular member 26, closed at its top, is seated snugly on tube 22 and rests on ball 25 so as to rotate freely thereon. Mounted on member 26 and extending laterally therefrom are a plurality of ejector tubes 27, the several tubes lying in the same horizontal plane and curving in the same direction with their nozzles directed oppositely to the direction of rotation of the member, the several tubes communicating with the interior of member 26 opposite the passage 23. Member 26 has an annular channel 28 formed therein below tubes 27, its upper wall sloping outwardly and downwardly as at 29 and communicating with tubes 30 curving outwardly therefrom similarly to tubes 27.

Mounted on the member 26 immediately below tubes 30 is a horizontally disposed plate 31 terminating in vanes 32 disposed at an angle whereby to move air upwardly through member 15 to the discharge ends of the tubes 27 and 30, this plate being disposed below the plane of the flange 16, and the

tubes being disposed in such a manner that their discharge nozzles are above said plane. This plate also has a number of openings as 33 formed therein adjacent member 26, being formed by striking lips as 34 downwardly therefrom to lie at an angle directed forwardly in the direction of rotation of the plate whereby to move air upwardly from the member 15 to the space immediately surrounding member 26.

At 35 is a second plate mounted on member 26 in parallel relation to plate 31 and above tubes 27 and terminating in vanes 36 disposed at an angle whereby to move air from above the plate downwardly to the discharge nozzles of the tubes, these vanes alternating with downwardly directed and angularly disposed vanes 37 adapted to move air from between plates 31 and 35 outwardly toward the discharge nozzles of the several tubes. The plate 35 is of less diameter than plate 31 to secure the free movement of the air stream over flange 16 and the proper diffusion of the air and fuel mixture through the fire-box.

The mixture to be burned is fed to the tube 22 through passage 21 and a conduit 38 from a source of supply not shown.

Through the wall or apron 10 are passed the electrodes 39 and 40, these electrodes being connected to a source of electrical energy not shown and terminating at a point immediately below the plane of the plate 3 and below the opening 4. At 41 is a tube leading from a source of supply of combustible mixture, not shown, to a point immediately below the terminals of the electrodes 39-40 and directed upwardly between the same whereby material discharged from the tube 41 will pass upwardly between the electrodes and be ignited by the electrical current passing from one to the other, and in turn ignite the combustible mixture discharged from the tubes 27-30.

When the device has been assembled as described and is in full operation, a fluid mixture of atomized fuel oil and air is fed to the tube 22 under pressure. From the tube it passes through the passage 23 to the small chamber 24 and thence into the tubes 27. The discharge of the fluid mixture under pressure from the several tubes causes the member 26, and all of the parts mounted thereon, to spin in the direction indicated by the arrow at 42. This spinning movement in turn creates air currents flowing in the directions indicated by arrows 43, 44 and 45, which air is intimately mixed with the mixture discharged from the tubes and the whole thrown out to the limits of the fire-box in an unbroken, circular sheet of flame.

The additional amount of air that is required to secure complete combustion is introduced into the burning mass through the annular space 17, the air being fed through

as desired by controlling the openings 8 through the medium of damper 9.

The air flow at 43, 44, 45 is such that the parts in the center of the device are always kept cool, with obvious advantages.

Another advantage of the construction and arrangement shown is that by using suitable automatic devices an initial charge of combustible mixture may be discharged through tube 41 and ignited electrically, and this charge is so placed and directed that it will immediately ignite the main fuel charge and be automatically cut off after the lapse of a predetermined period of time.

The structure at 28, 29, 30 is provided to catch any leakage of fuel downwardly below the tubes 27 on the inside of member 26 and throw it out into the burning mixture. This is readily accomplished because any material flowing down on the inner side of member 26 will be carried outwardly to the tubes 30 and thence to the discharge ends of the tubes by the centrifugal force developed by the spinning of the member and parts mounted thereon.

It is to be understood, of course, that while I have herein shown and described but one specific embodiment of the invention, changes in form, construction, and method of assembly and operation may be made within the scope of the appended claims.

I claim:

1. A burner of the character described comprising, a tubular member and supporting means therefor, a reaction wheel axially mounted to rotate freely therein, means for discharging fluid under pressure through the wheel to effect the rotation thereof, the wheel having vanes mounted thereon and disposed to move air toward the points of discharge of fluid from the wheel.

2. A burner of the character described comprising, a tubular member and supporting means therefor, a reaction wheel axially mounted to rotate freely therein with its points of discharge lying in planes parallel with the plane of one end of the tubular member and spaced therefrom, means for discharging fluid under pressure through the wheel to effect rotation thereof, and means actuated by rotation of the wheel to move air through the tubular member toward the points of discharge of fluid from the wheel.

3. A burner of the character described comprising, tubular member and supporting means therefor, a reaction wheel mounted to rotate freely therein on its vertical axis, the discharge points of the wheel being spaced beyond one end of the member, vanes mounted on the wheel on both sides of the discharge points of the wheel to move air from opposite directions toward said points of discharge, and means for discharging fluid under pressure through the wheel to effect rotation thereof.

4. A reaction wheel for a burner of the character described having means cooperating therewith to move air from both sides toward the points of discharge of combustible material from the wheel.

5. A reaction wheel of the character described including a fixed support, a tubular member mounted to rotate freely thereon, laterally directed and similarly curved discharge tubes mounted on the member, the support having a conduit therethrough communicating with the said tubes, a plate mounted on the member on each side of said tubes, each plate terminating in vanes disposed to direct a flow of air toward the discharge ends of said tubes.

6. A reaction wheel of the character described comprising a fixed support, a tubular member mounted to rotate freely thereon, laterally directed and similarly curved discharge tubes mounted on the member, the support having a conduit therethrough communicating with the said tubes, means mounted on the member to direct currents of air toward the discharge ends of the tubes from opposite sides thereof, and radially outwardly between the opposed currents.

7. A reaction wheel of the character described comprising, a fixed vertical support, a tubular member mounted to rotate freely thereon, laterally directed and similarly curved discharge tubes mounted on the member, the support having a conduit therethrough communicating with the tubes, an annular plate mounted thereon below the tubes and terminating in vanes disposed to create an upward flow of air, and an annular plate mounted thereon above the tubes and terminating in vanes disposed to create a downward flow of air.

8. A reaction wheel of the character described comprising, a fixed vertical support having a conduit therethrough, a tubular member mounted to rotate freely thereon, laterally directed and similarly curved discharge tubes mounted on the member and communicating with said conduit, an annular plate mounted thereon and underlying said tubes and provided with terminal vanes disposed to create an upward flow of air to the discharge ends of the tubes, and an annular plate mounted thereon and overlying said tubes and provided with vanes disposed to create a downward flow of air to the discharge ends of the tubes and means cooperating with said plates to create a flow of air through the central portion thereof and outwardly past the discharge ends of the tubes.

9. A reaction wheel of the character described comprising, a vertical tubular support, a tubular member mounted to rotate freely thereon, laterally directed and similarly curved tubes mounted on the member to communicate with the tubular support, said member having an annular groove

formed therein encompassing the support below said tubes, and outwardly directed tubes mounted thereon communicating with said groove and curved similarly to the first mentioned tubes.

10. A structure of the character described comprising, the combination with a fire-box of an annulus seated therein, a base member engaging the annulus from below and forming a seat, a tubular member disposed upon the seat in spaced relation to the annulus and carrying a flange overlying the annulus in spaced relation thereto, an air passage communicating with the space between the tubular member and annulus, and a reaction wheel operatively mounted in the tubular member to discharge over said flange.

11. In a structure of the character described, the combination of a base member, a tubular member seated thereon axially and vertically disposed supporting tube mounted in the tubular member, a reaction wheel operatively mounted on the supporting tube and communicating therewith and disposed to discharge over the upper end of the tubular member, a pair of electrodes mounted in the base member and approaching each other immediately below the tubular member, and means for introducing a quantity of atomized fuel oil between the electrodes and directing the same toward the discharge ends of the reaction wheel.

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