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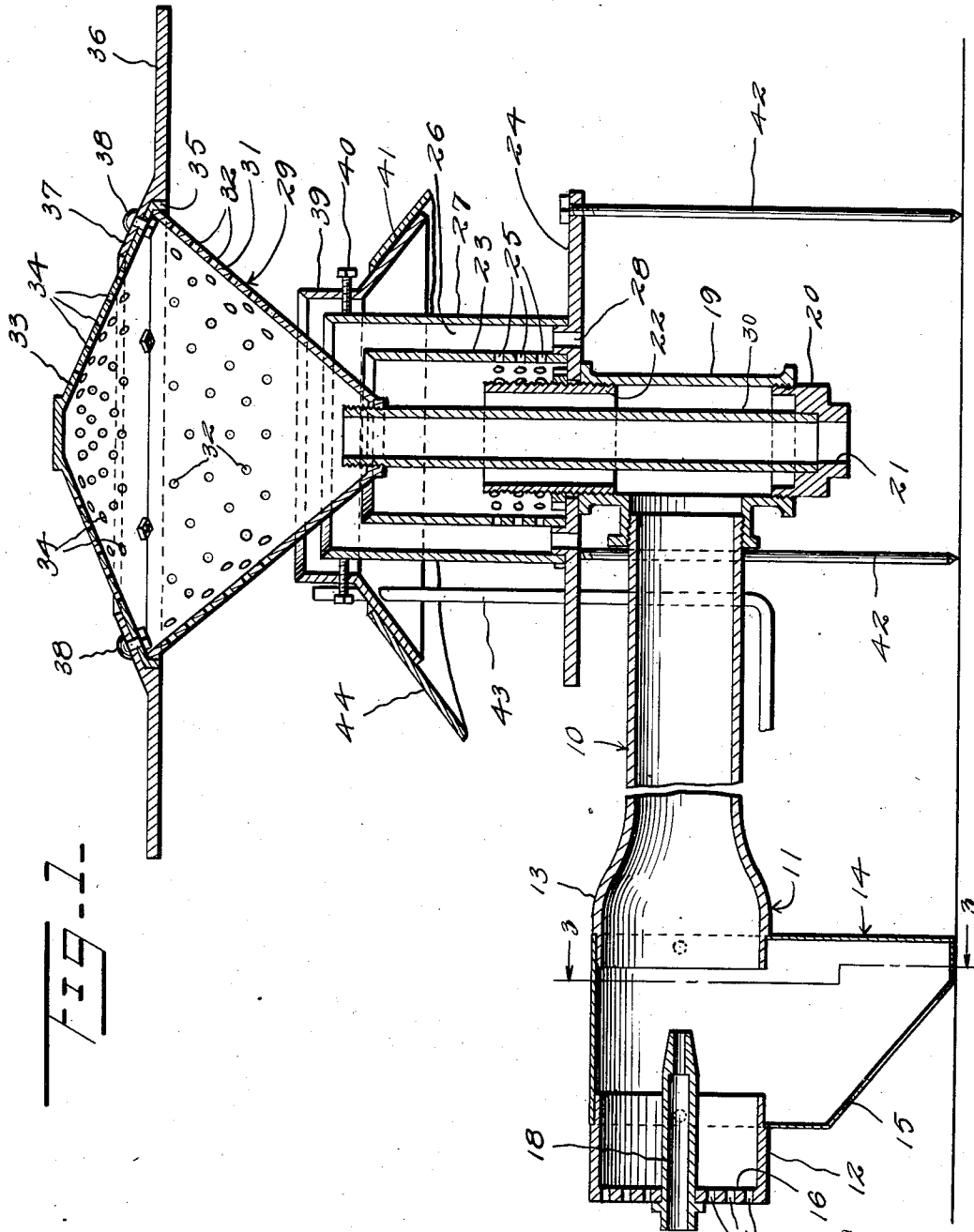
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2,012,580

GAS BURNER

Filed Dec. 14, 1933

2 Sheets-Sheet 1



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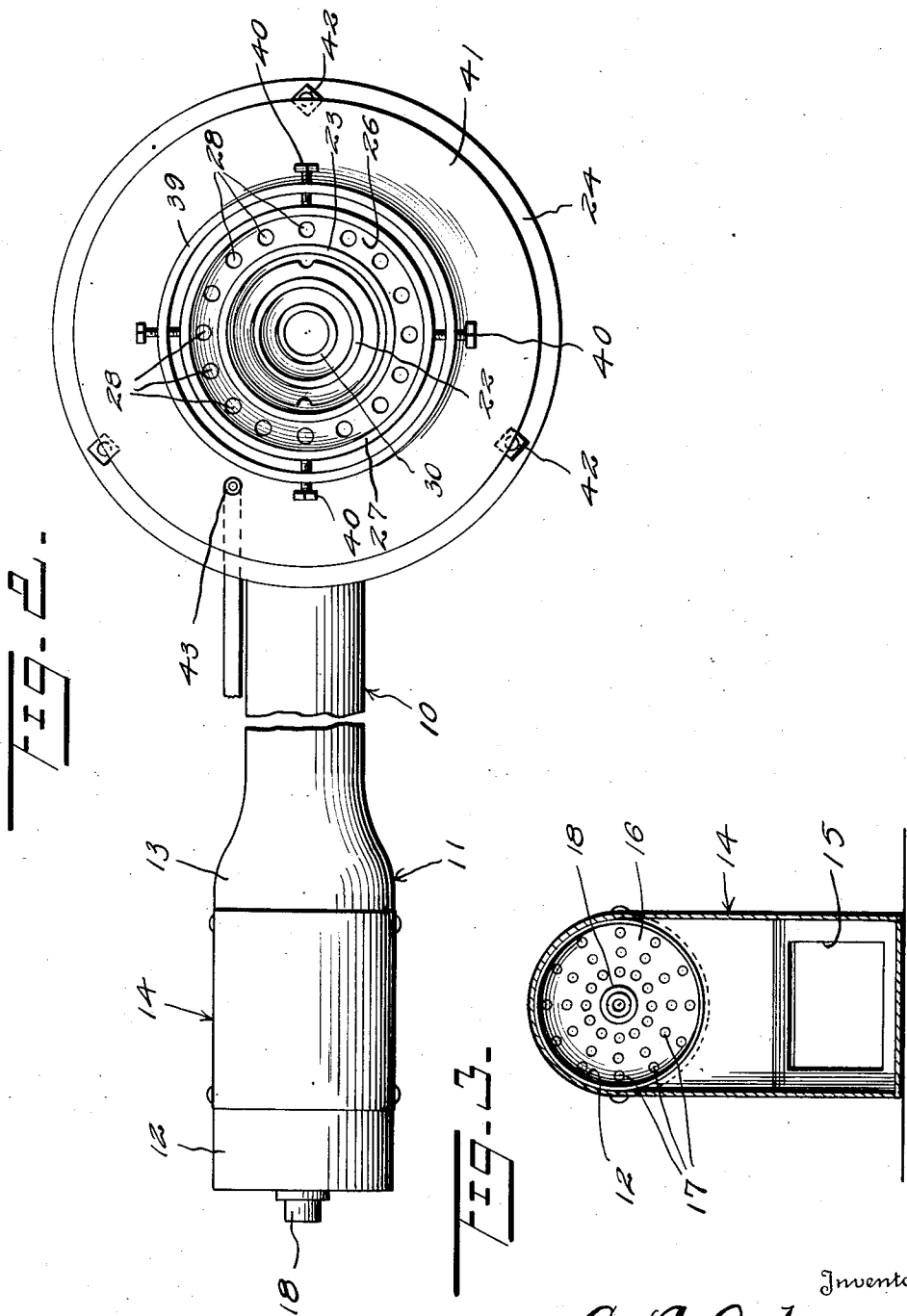
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GAS BURNER

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4 Claims. (Cl. 158—110)

This invention relates to burning devices and more particularly to an improved gas burner.

An object of this invention is to provide a burner which is constructed for use in heating plants of various types and which is adapted to be used as a conversion for converting a conventional heater using coal or wood as a fuel to a gas burning heater.

Another object of this invention is to provide a burner of this type which is so constructed that the maximum amount of air is mixed with the gas prior to and at the time of ignition of the gas.

A further object of this invention is to provide in a burner of this type means for progressively mixing air with the moving gas so that when the mixture reaches the point of ignition, the gas will have the maximum amount of air mixed therewith consistent with the combustible properties of the mixed air and gas.

The above and various other objects and advantages of this invention will in part be described and in part be understood from the following detailed description of the present preferred embodiment, the same being illustrated in the accompanying drawings wherein:—

Figure 1 is a longitudinal section partly broken away of a device constructed according to this invention.

Figure 2 is a top plan of the device with the burner head removed.

Figure 3 is a sectional view taken on the line 3—3 of Figure 1.

Referring to the drawings wherein like numerals of reference designate corresponding parts throughout the several views, the numeral 10 designates generally a casing or tubular member which is provided at one end with a mixing valve or chamber, generally designated as 11. This mixing member 11 comprises an inner member 12 and an outer member 13. These mixing members 12 and 13 are preferably of a larger size or diameter than the tubular member 10, and these members 12 and 13 are held in spaced relation to each other by a housing 14, which engages about the confronting ends of the members 12 and 13, and which has an air intake port 15 disposed below the mixing members 12 and 13.

An end plate 16 provided with perforations or air inlet ports 17 is carried by the inner end of the housing member 12, and a nozzle 18 extends through the center of the plate 16 and projects into the interior of the mixing chamber 11. This nozzle 18 is adapted to be connected to a suitable source of fuel supply preferably gas or other fluid

fuel, and the gases ejected from the nozzle 18 are forced longitudinally through the casing 10. As the gas or gases move longitudinally of the casing 10, air is adapted to enter the intake port 15 and also the intake ports 17 and to mix with the gas in its passage through the casing 10. The casing 10 at the end opposite from the mixing valve 11 is provided with a T 19, which is in the present instance, threaded onto the outer end of the pipe or casing 10. A plug 20 is secured to the lower end of the T 19 and is provided with an air intake port 21. A sleeve 22 is threaded into the T 19 opposite from the plug 20 and extends in a vertical direction. The lower open end of the sleeve 22 communicates with the interior of the T 19 which also communicates with the pipe or casing 10. The gas which already has a quantity of air mixed therewith is adapted to pass horizontally through the casing 10 and then vertically in the T 19 and through the sleeve 22.

A second sleeve 23 is disposed concentrically about the inner sleeve 22 and the lower end of this second or intermediate sleeve 23 rests on a plate 24 which engages the upper end of the T 19 and is disposed about the sleeve 22. The intermediate sleeve 23 has a plurality of ports or openings 25 therethrough so as to permit the gas discharged from the sleeve 22 to pass through the sleeve 23 adjacent the lower end thereof and into the mixing chamber 26 disposed between the intermediate sleeve 23 and an outer sleeve 27. The outer sleeve 27 is imperforate and engages at its lower end the plate 24, and is disposed concentrically of the intermediate sleeve 23 and the inner sleeve 22. Preferably, the top of the inner sleeve 22 terminates at a point adjacent the uppermost of the ports or openings 25 and at a point intermediate the upper and lower ends of the intermediate sleeve 23. The plate 24 is provided with a plurality of circumferentially spaced openings 28 which permit air to pass upwardly in the mixing chamber 26 for mixture with gas passing through the openings 25. The gas which does not pass through the openings 25 but rises in the intermediate sleeve 23, passes out of the top of the sleeve 23 and then commingles with the gas rising in the mixing chamber 26 at a point above the intermediate sleeve 23. The outer sleeve 27 extends above the top of the intermediate sleeve 23.

A burner head, generally designated as 29, is threaded onto an air pipe 30, which is threaded at its lower end in the plug 20, and receives air through the hole 21 in the plug 20. The upper end of the pipe 30 discharges into the interior

of the hollow head 29. The head 29 comprises an inverted truncated cone 31 which is provided with a plurality of spaced openings 32 and a second truncated cone 33 secured to the inverted base of the cone 31 and also provided with a plurality of spaced openings 34. The truncated cone 33 is provided with a depending annular flange 35 engaging about the inverted base of the cone 31.

An annular plate 36 is secured to the base of the cone 33 and extends outwardly therefrom. This annular plate 36 is provided with an inner rim 37 which engages the base of the truncated cone 33 and is secured thereto as by bolts 38 or the like. The plate 36 acts as a baffle to deflect the burning gas outwardly in a horizontal direction.

A relatively small sleeve or cylindrical member 39 is disposed concentrically of the outer sleeve 27, being secured to the outer sleeve in spaced relation thereto by means of bolts 40 or the like. The lower end of the sleeve 39 is flared, as at 41, so that air may rise between the sleeve 27 and the sleeve 39, which latter sleeve terminates at a point above the top of the outer sleeve 27 so that the air rising in this space between these two sleeves 27 and 39 will commingle with the gas which is rising upwardly about the surface of the inverted truncated cone 31. In practice, the gases are ignited at a point adjacent the top of the outer sleeve 27 and at a point slightly below the top of the short sleeve 39.

In the use and operation of the burner hereinbefore described, the nozzle 18 may be connected to a suitable source of fuel supply and this fuel discharged into the mixing chamber 11 where it is commingled with air entering through the intake port 15 of the air chamber 14. The inner end of the casing 10 is disposed inside the heater or furnace and is supported with the air port 21 above the bottom of the heater by means of leg members 42, which are secured to the plate 24. The gas will rise vertically in the inner sleeve 22 and a portion of the gas will pass upwardly into the intermediate sleeve 23 where it will be discharged against the surface of the burner head 29. A portion of the gas discharged from the sleeve 22 will pass horizontally and outwardly through the openings 25 in the intermediate sleeve 23 and then upwardly in the mixing chamber 26, which is disposed between the intermediate sleeve 23 and the outer sleeve 27. It will be apparent from the foregoing that the gas which is initially discharged from the nozzle 18 is progressively mixed with air as the gas passes through the burner. Through the use of the structure hereinbefore described, it is possible to mix a maximum amount of air with the gas consistent with the degree of heat which it is desired to obtain from the burning gas. After the gas is ignited, the flame will pass upwardly about the surface of the head 29 and the burned gases will be deflected in an outward and horizontal direction by means of the baffle plate 36, while a portion of the burning gas will enter the interior of the head 29 through the openings 32. The burning gas entering the head 29 will be commingled with air which is rising in the tube 30 and will pass out of the head 29 through the openings 34. In order to permit the burner herein disclosed to be readily lighted, a pilot burner 43 is provided which extends through the flaring rim 41 on the short sleeve 39. This pilot may be connected to the same source of fuel supply as the nozzle 18.

A substantially conical baffle 44 is adapted to rest on the truncated cone 41 carried by the sleeve 39 and this baffle 44 is provided so as to prevent any air from entering the chamber 26 or the space between the sleeves 27 and 39 which does not enter from below the head 29. The air delivered to the chamber 26 rises upwardly at a relatively rapid rate so as to provide a relatively hot flame at the point of ignition. Through the provision of a threaded sleeve or pipe 30, the head 29 can be adjusted up or down so as to provide the desired size of flame on the lower side of the head 29.

It is, of course, understood that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:—

1. A gas burner, comprising an elongated casing, a mixing means on one end of the casing, a gas ejecting nozzle carried by said mixing means for discharging unmixed gas thereinto, a T-connection on the other end of the casing, a plug in the lower end of the T, a sleeve carried by the other end of the T communicating with the interior of the T and the casing, an apertured plate secured about said sleeve, supporting legs secured to said plate, a burner head, a supporting member secured to said head and said plug for supporting said head from the T and above said sleeve, and a second mixing means supported from said plate below said head and about the apertures of the plate.

2. A gas burner, comprising a casing, a gas nozzle discharging into the casing, means for mixing air with the gas discharged into the casing from said nozzle, a perforate burner head, a tubular supporting means secured at one end to said casing and at the other end to said burner head, said supporting means having the end opposite from the burner head open to admit air into the burner head, a discharging member secured to the casing, and means for mixing an additional quantity of air with the mixture discharged from said member, said second mixing means comprising a pair of cylindrical members about said discharging member intermediate the burner head and the casing and defining a mixing chamber about said member, the innermost of said cylindrical members having openings therethrough for the passage of a portion of the mixture discharged from said member, said mixing chamber communicating with the atmosphere below said pair of cylindrical members.

3. A gas burner, comprising an elongated casing, a mixing means on one end of the casing, a gas ejecting nozzle carried by the mixing means for discharging unmixed gas thereinto, a mixture discharging member fixed relative to the casing and remote from said nozzle, an apertured plate disposed about said member, supporting means secured to and extending downwardly of said plate, a burner head, a head supporting member secured to said head and fixed relative to the casing, and a second mixing means supported below said head, said second mixing means communicating with the atmosphere through the apertures of said plate and receiving a portion of the mixture discharged from said mixture discharging member whereby to mix an additional quan-

tity of air with a portion of the mixture discharged from said latter member.

4. A gas burner comprising a casing having an inlet, a mixing chamber at said one end of the casing, a gas nozzle discharging into the mixing chamber, a burner head, means for supporting the burner head in spaced relation to the outlet, a sleeve disposed at a right angle to the length of the casing and communicating therewith, a perforate sleeve disposed concentrically of said first sleeve and having a diameter larger than the first sleeve, said perforate sleeve terminating

beyond said first sleeve and in spaced relation to the burner head, and a third sleeve disposed concentrically of the perforate sleeve and spaced thereabout, said third sleeve terminating upwardly of said perforate sleeve and in spaced relation to said burner head and defining a second mixing chamber about said perforate sleeve for mixing additional air with the mixture discharged from said first sleeve and through the perforations of said second sleeve, said latter mixing chamber communicating with the atmosphere below the openings in said perforate sleeve.

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