

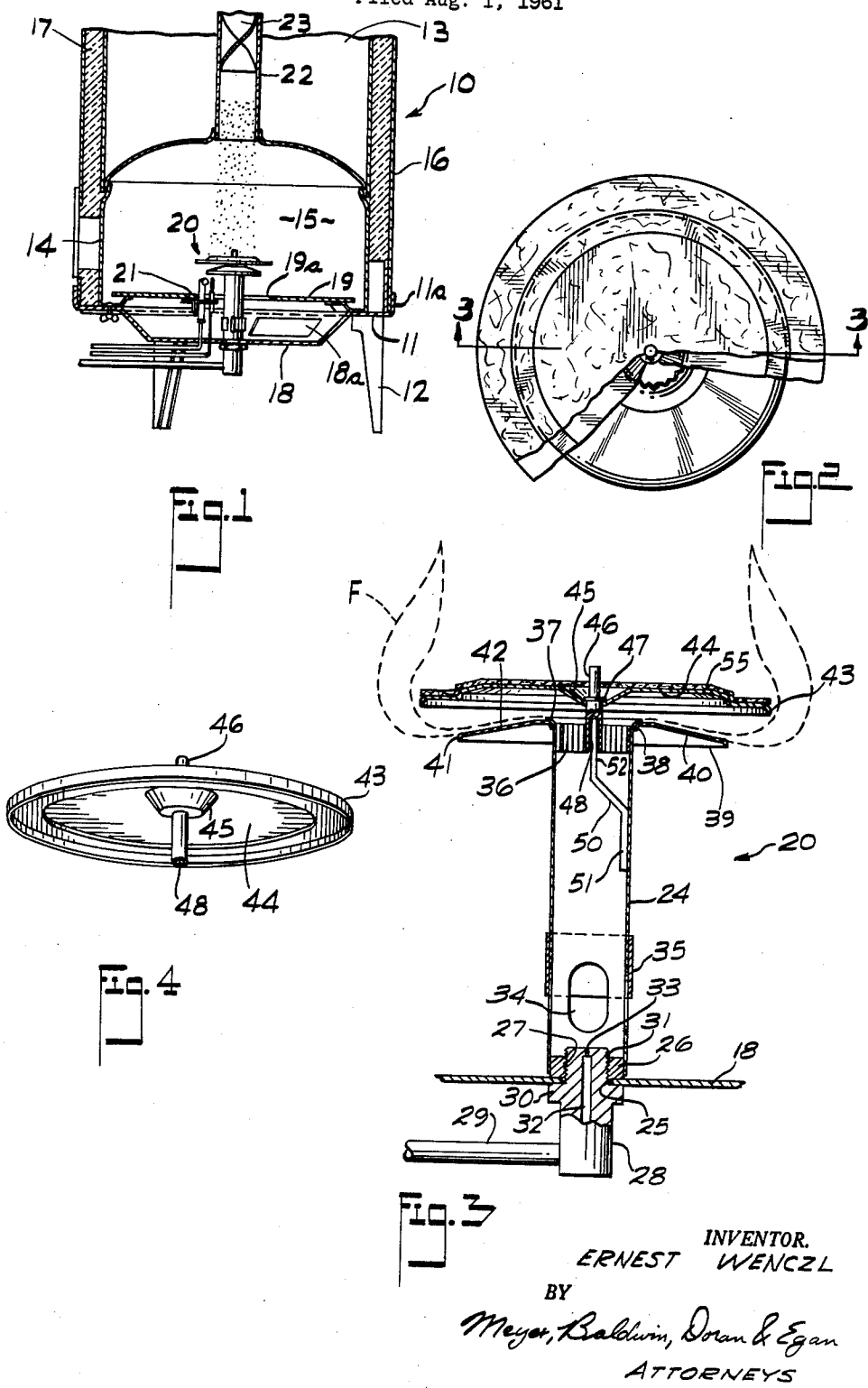
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E. WENCZL

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WATER HEATER WITH GAS BURNER MOUNTED BENEATH FLUE

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WATER HEATER WITH GAS BURNER MOUNTED BENEATH FLUE

Ernest Wenczl, Parma, Ohio, assignor to Mor-Flo Industries, Inc., a corporation of Ohio
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This invention relates to gas burners and more particularly to gas burners of the type used in water heaters or having analogous uses.

The invention has for its primary object the provision of a device of the aforesaid nature which is characterized by its structural simplicity, its inexpensive manufacturing and operating costs, the ease of assembly of its parts, the attractive forms in which the device may be made, and the particularly effective manner in which it performs its function.

A general object of the invention is to provide a gas burner having means for silencing the jet of burning gas as it issues from the burner.

Another general object of the invention is to provide a gas burner which is particularly adapted for use in a water heater having a central flue wherein condensation from the flue tends to fall upon the hot burner causing undesired noise. Such a gas burner includes means for silencing the sound of the dropping fluid and the fluid's rapid evaporation upon the burner.

A further and more specific object of the invention is to provide a burner affording an incombustible and absorbent surface for silencing fluid dropped thereon which particularly adapts the burner for use in a water heater having a central flue.

Another more specific object of the invention is to provide a burner having a flame silencing flange surrounding the open end thereof and a cooperant canopy superposed above and covering the flange thereby causing the burner flame to spread radially outwardly contiguous the upper surface of the flange.

Still another more specific object is to provide a burner having a canopy covering the flame silencing means and including an asbestine shield covering the canopy for silencing fluid dropped thereon.

Further objects of the present invention and a number of its advantages will be referred to in or will be evident from the following description of one embodiment of the invention, illustrated in the accompanying drawings, in which

FIG. 1 is a vertical section through the lower end portion of a water heater showing the gas burner of this invention operatively mounted in association therewith;

FIG. 2 is an enlarged, top plan view of the burner of FIG. 1 showing certain parts thereof cut away;

FIG. 3 is a vertical section of the gas burner taken along the line 3-3 of FIG. 2; and

FIG. 4 is a perspective view of the burner canopy.

Before the gas burner illustrated in the drawings is specifically described, it is to be understood that the invention here involved is not limited to the structural details or arrangement of parts here shown since gas burners embodying the present invention may take various forms. It is also to be understood that the phraseology or terminology herein employed is for purposes of description and not of limitation since the scope of the present invention is denoted by the appended claims.

Referring now to the drawings in which like parts are designated by like reference numerals, FIG. 1 shows the lower portion of a water heater, said water heater being generally indicated by the numeral 10. Said water heater comprises a base 11 having downwardly projecting legs 12 and providing means for supporting a water tank 13.

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The tank 13 rests upon a cylindrical support member 14 which is mounted upon the base 11 and spaces the tank 13 upwardly above said base thereby affording a combustion chamber 15 beneath said tank. The base 11 has an upwardly directed, circumferentially continuous flange 11a into which is telescopically fitted the lower end of a casing 16. The casing 16 is diametrically larger than the water tank 13 or its support member 14 thereby providing an annular space surrounding the tank and support within which there is provided a suitable insulating material 17.

The base 11 has a central, downwardly stepped recess portion 18 having slots or openings 18a in the side walls thereof to allow air to enter the combustion chamber 15. A disklike shield 19 having an enlarged central aperture 19a is mounted upon the base 11 within the peripheral wall of the support member 14 in slightly upwardly spaced relation to said base. The burner of this invention, generally indicated at 20, is mounted centrally in the recess portion 18 and projects vertically upwardly through the aperture 19a in the shield 19. Suitable pilot light means 21 is mounted closely adjacent the burner 20 to intermittently light said burner in response to changes in the temperature of water within the tank 13 in a conventional and well-known manner.

The water tank 13 is provided with a centrally disposed, vertically directed flue pipe 22 having, as herein illustrated, a twisted metal baffle 23 therein for controlling the flow of gases upwardly therethrough.

As best shown in FIG. 3, the burner 20 comprises a burner tube 24 mounted concentrically over a centrally disposed aperture 25 in the recess portion 18. A fitting 26 is rigidly secured within the lower end of the burner tube 24, said fitting having a threaded aperture 27 extending vertically therethrough. A connector 28 is disposed beneath the recess portion 18 for directing a combustible gas through a gas line 29 upwardly into the burner tube 24. The connector 28 has a hexagonal flange 30 in the medial region thereof and an upwardly directed, diametrically reduced threaded portion 31 which is thread fitted upwardly into the threaded aperture 27 of the fitting 26. The connector 28 is drawn tightly upwardly into the fitting 26 whereby the flange 30 bears solidly against the lower surface of the recess portion 18 thereby firmly mounting the burner tube 24 in place.

The connector 28 has a bore 32 therein for carrying the combustible gas from the gas line 29, and the uppermost end of the threaded portion 31 provides a reduced orifice 33 through which the gas issues into the burner tube 24.

Said burner tube is provided with vertically elongated slots 34 in the wall thereof to allow primary air to enter the burner tube 24 to mix with the gas issuing from the orifice 33. A sleeve-like shutter 35 is telescoped over the burner tube 24 and is slidable vertically in the direction of the tube axis to partially close or open the slots 34 whereby the amount of primary air introduced into said burner tube may be regulated.

The burner tube 24 projects upwardly through the aperture 19a a substantial distance above the shield 19 and is positioned coaxial with the flue pipe 22. A circular, corrugated band of sheet metal or the like shown at 36 is provided adjacent the inner peripheral surface of the burner tube adjacent the uppermost end thereof to provide a partial restriction and to effect an even distribution of the combustible mixture which issues from the upper end of said burner tube. The extreme upper end of said burner tube is provided with an outwardly rolled peripheral edge 37 adapted to fit over an inwardly and downwardly rolled edge 38 of a circular, flame silencing flange member 39. Said flange member has a uniformly downwardly angle, circumferentially continuous wall 40 which terminates at the outer periphery of said member

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in a downwardly turned annular lip 41. The flange member 39 is welded or otherwise suitably secured to the rolled edge 37 of the burner tube 24 and provides a generally frusto-conical upper surface surrounding the upper open end of the burner tube, said frusto-conical surface being indicated at 42.

The flange member 39 is surmounted by an upwardly spaced canopy 43 which comprises a disk of sheet metal or the like of relatively larger diameter than the flange member 39 and which is upwardly recessed at 44 radially inwardly from the peripheral edge thereof. The center of the canopy 43 in the area of the upwardly directed recess 44 has a downwardly directed, frusto-conical recess 45 in the center of which is rigidly mounted a socket member 46. The socket member 46 extends above and below the canopy 43 and has an integral flange portion 47 in the medial region thereof which abuts the upper surface of said canopy in the area of the frusto-conical recess 45. The lower end of the socket member 46 affords a downwardly open socket 48 which extends upwardly into the lower portion of the socket member 46 a substantial distance.

A canopy holder pin 50 is provided inside the burner tube 24, said holder pin being so bent and shaped as to provide a straight mounting portion 51 welded or otherwise suitably secured to the inner surface of said burner tube and a parallel, inwardly offset portion 52 which is disposed coaxial with the burner tube 24 and extends upwardly to substantially the level of the open end of said burner tube. The offset portion 52 is adapted to loosely and slidably interfit the socket 48 of the socket member 46 whereby the canopy 43 is mounted above the open end of the burner tube in a predetermined spaced relation thereto.

The upper surface of the canopy 43 is completely covered by a layer of incombustible and absorbent material which forms a shield 55 for said canopy. The shield 55 may be made of asbestos or other asbestine material which is unaffected by heat and which will present an upwardly directed absorbent surface.

Gas burners of conventional construction commonly emit an objectionable noise caused by the jet of gas issuing from the burner opening or openings. In the present instance, the gas is burned at the open end of the burner tube 24, and the canopy 43 provides cover means spaced above the open end whereby the burner flame is caused to spread radially outwardly and upwardly around the peripheral edge of said canopy. To attain rapid heating of the water, the combustible mixture is caused to issue from the open end of the burner tube at a relatively high rate and this results in an objectionable roaring of the burning gas. The problem is particularly pronounced in domestic type water heaters which are located on the same floor level with or otherwise closely adjacent living quarters.

The gas burner of this invention as herein illustrated and described is characterized by its quiet operation. The silencing of the jet of burning gas is effected by means of the flange member 39 which surrounds the open end of the burner tube. As shown in dotted line in FIG. 3, the radiating flame pattern follows the contour of the upper surface 42 of the flange member and this has the effect of silencing the usual roaring sound of a jet of burning gas. It has been found that the flame remains contiguous the frusto-conical surface 42 of the flange member 39 until it reaches the peripheral edge of said flange member after which it curls upwardly around the periphery of the canopy in the general flame pattern as indicated at F. It is preferred that the cover means or canopy 43 be as large as or larger than the flange member 39 for most efficient operation of the invention.

Another problem which arises when the water heater 10

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is provided with a central flue pipe as indicated at 22 is that of condensation within the flue pipe which causes moisture to drip downwardly upon the heated canopy 43. This condition arises when the central flue pipe has been cooled by the water in the tank 13 and the burner 29 comes on or ignites thereby sending hot exhaust gases upwardly through said flue pipe. The condensation drips downwardly upon the canopy thereby causing a series of annoying pings until such time as the flue pipe becomes heated. The asbestine shield 55, being absorbent as well as incombustible, deadens the sound of the dripping condensation and absorbs the moisture which rapidly evaporates from the shield as the burner heats up.

The gas burner of this invention affords a quietly operating heating means for a water heater or other device which effectively silences the roar of the jet of gas and which, when used with a water heater having a central flue, also silences the sound of condensation which collects and drips downwardly upon the burner from the flue.

It is anticipated that many changes in the details of the invention as herein illustrated and described may be made without, however, departing from the spirit thereof or the scope of the appended claims. The invention as herein disclosed is given by way of an example of one embodiment of the invention and is not intended as a limitation thereof.

What is claimed is:

1. In a water heater having a water tank, a heating chamber beneath the tank, and a central flue tending to collect condensation in use of the heater, a gas burner mounted beneath said flue pipe; said burner having means defining an upwardly directed opening through which a combustible gas is directed to be burned in use of the burner; means defining a flame-spreading surface surrounding said opening; cover means mounted in spaced relation above said opening and causing the flame to spread outwardly contiguous said flame-spreading surface in such manner as to silence the jet of gas; and a shield of incombustible, moisture absorbent material superposed above and covering said cover means and silencing condensation dripping from the central flue pipe and striking said cover means.

2. In a water heater having a water tank, a heating chamber beneath the tank, and a central flue tending to collect condensation in use of the heater, a gas burner mounted beneath the flue pipe; said burner comprising a vertically disposed burner tube having an upwardly directed open end; means delivering a combustible gas into the lower end of said tube to be burned at said open end; an upwardly converging, frusto-conical flange surrounding said open end; a canopy mounted in spaced relation above said open end in such manner as to cause the flame to spread radially outwardly and downwardly contiguous the upper surface of said flange; said canopy being larger than and completely covering said flange; and a moisture absorbent asbestine shield mounted upon and covering said canopy and silencing condensation dripping from the central flue pipe and striking said canopy.

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