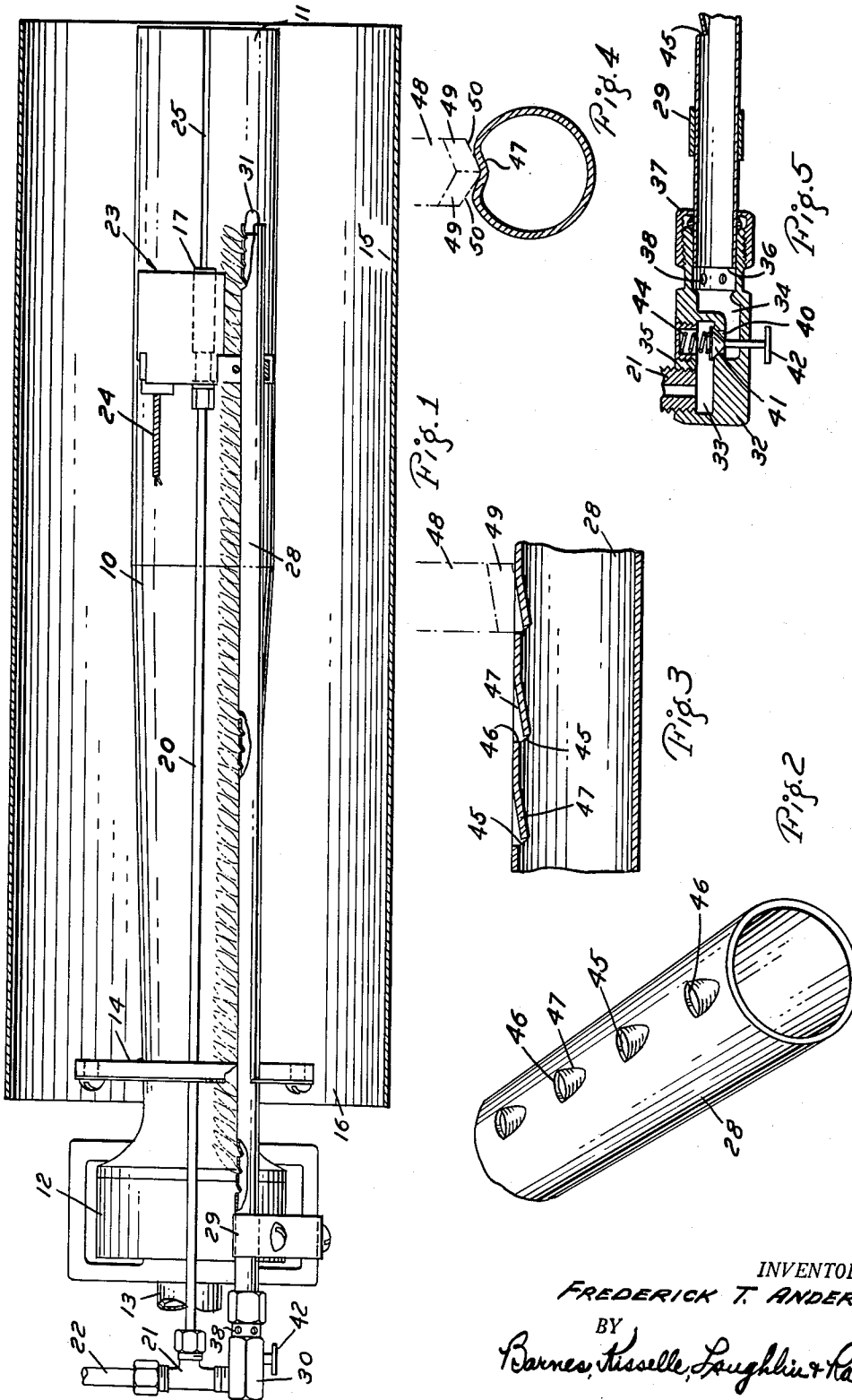


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GAS BURNER CONSTRUCTION

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GAS BURNER CONSTRUCTION

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2 Claims. (Cl. 158—115)

This invention relates to a gas burner construction and more particularly to a lighter tube for igniting the pilot or main burner.

It is an object of the invention to produce a simple lighter tube arrangement for igniting the gas issuing from either the main or pilot burners from a conveniently located point remote from the pilot and main burners, such as from the exterior of the heating device on which the burner is installed.

Lighter tubes are ordinarily made of slotted tubes or formed metal sections such as channels. These have the disadvantages of requiring a large amount of gas to operate, not being readily formed to go around corners, and operable only with the runner flame going from a low to a higher level. The lighter tube of my invention is designed to overcome these disadvantages and at the same time the tube is adapted to be manufactured economically.

In the drawings:

Fig. 1 is a horizontal sectional view through a gas burner provided with a lighter tube of this invention as seen from the bottom.

Fig. 2 is a fragmentary perspective view of the lighter tube.

Fig. 3 is a fragmentary longitudinal sectional view of the lighter tube and showing in broken lines the tool employed for forming the gas ports therein.

Fig. 4 is a transverse sectional view through the lighter tube at one of the gas ports.

Fig. 5 is a horizontal sectional view through the lighter tube valve.

In the drawings there is illustrated a gas burner which includes a main gas tube 10 of venturi shape with a nozzle 11 at one end and with a mixing chamber 12 at the other end. Chamber 12 is connected with a source of combustible gas by an inlet conduit 13. Gas tube 10 is supported as by a support bracket 14 within an outer casing 15 which extends longitudinally of tube 10. Casing 15 has an inlet 16 at the end adjacent chamber 12 for admitting air into the casing, which air flows toward nozzle 11 and serves as the secondary air for combustion of the air-gas mixture at nozzle 11.

Within casing 15 and adjacent the underside of tube 10 there is mounted a pilot burner nozzle 17 which is connected with a source of gaseous fuel by conduit 20, T-fitting 21 and conduit 22. Alongside nozzle 17 there is supported a thermostatic switch mechanism generally indicated 23 which is connected by wires 24 with an electrically operated diaphragm or solenoid valve (not shown) for controlling the admission of gas to inlet conduit 13. The bottom wall of tube 10 is slotted as at 25 from nozzle 11 to a point adjacent pilot nozzle 17. The arrangement thus far described is substantially the same as described in greater detail and specifically claimed in my co-pending application Serial No. 228,298, filed May 25, 1951, now abandoned.

With burners of this construction it is often difficult to light the pilot burner because it is usually enclosed

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within the heating device in which the burner is installed. In most instances access to the pilot burner is inconvenient, and accordingly I have provided a lighter tube arrangement which enables lighting the pilot burner 17 from a point remote from the pilot burner, such as from the exterior of the heating device. The lighter arrangement comprises a relatively long tube 28 which extends longitudinally of tube 10 on the underside thereof. At one end tube 28 is supported beneath tube 10 by a strap 29 and is connected with fitting 21 through a valve 30. At its opposite end tube 28 is supported on tube 10 by a plug 31 which projects downwardly from the bottom wall of tube 10 and extends laterally into the end of tube 28.

As is shown more clearly in Fig. 5, valve 30 comprises a body member 32 in which two chambers 33 and 34 are formed. The inlet port 35 for chamber 33 is threaded to engage with one leg of T-fitting 21. The outlet port 36 of valve 30 communicates with chamber 34 and is threaded externally to receive a clamping nut 34 which is arranged to connect the inlet end of tube 28 with the valve. A plurality of apertures 38 are spaced circumferentially around outlet port 36, apertures 38 serving to admit air into tube 28. Chambers 33 and 34 communicate through a connecting port 40 which is controlled by a valve member 41 fixed at the end of a push button 42. Push button 42 extends into body 32 from one side thereof and valve 41 is biased to a position normally closing port 40 by a coiled compression spring 44.

Tube 28 is provided with a plurality of ports 45 along one side thereof which preferably extend from adjacent supporting strap 29 along one side of the tube to supporting plug 31. The side of the tube in which ports 45 are formed is preferably that side which is adjacent pilot burner nozzle 17. The arrangement of ports 45 and their construction form an important part of my invention. These ports are preferably formed by lancing the tube circumferentially to provide a plurality of slits 46 spaced longitudinally of the tube and stamping the metal adjacent the slits inwardly to form a plurality of angularly shaped indentations 47 which are in the nature of inwardly struck tabs. It will be noted that indentations 47 taper inwardly from the surface of the tube toward the slits 46 and that at their deeper ends they extend radially inwardly a distance greater than the thickness of the wall of the tube so that the clearance between the inwardly struck tabs and the wall of the tube provides the gas ports 45.

Ports 45 may be advantageously formed by use of a tool such as illustrated at 48. At its lower end the tool is fashioned with a pair of angularly related faces 49 providing a wedge formation which inclines upwardly away from the angularly disposed cutting edges 50 of the tool. When the tool is driven downwardly into the wall of tube 28, the edges 50 lance the tube circumferentially as at 46 and the wedge formation provided by the faces 49 form the trough-like indentations 47. When the lighter tube is relatively long the tool 48 may be driven downwardly to a progressively deeper dimension in a direction away from the inlet end of the tube. This provides ports 45 with progressively increasing area to compensate for the drop in pressure along the tube.

Assuming that the thermostatic switch mechanism 23 is in a relatively cool condition, such as to close the solenoid valve which controls the admission of gas to tube 13, and that conduit 22 is connected with a source of gas, pilot burner 17 may be ignited by simply depressing push button 42 and holding a lighted match over the ports 45 at the end of tube 28 adjacent strap 29. When push button 42 is depressed, valve 41 opens port 40 and permits the passage of fuel from fitting 21 through chambers 33 and 34 in the valve and into tube 28. As the gas flows

through tube 28, air is drawn into the stream of flowing gas through apertures 38 and a combustible mixture of air and gas issues from ports 45. When the gas flowing through ports 45 adjacent strap 29 is ignited, as by a lighted match, the flame of the burning gas progressively and rapidly ignites the gas issuing from the remainder of the ports 45 along tube 28 and produces a ribbon flame which extends from adjacent strap 29 to supporting plug 31. The portion of the flame adjacent pilot burner 17 serves to ignite the gas flowing through the pilot nozzle. After the temperature of controlling mechanism 23 has been raised sufficiently by the heat of the pilot flame to actuate the solenoid valve controlling inlet conduit 13, the flow of gas through tube 10 is established.

Mixing chamber 12 is provided with adjustable ports (not shown) through which air is drawn into the tube to form a combustible mixture of gas and air. A portion of this combustible mixture flowing through the tube 10 to nozzle 11 escapes as a thin stream through slot 25. The flame at pilot burner 17 ignites the stream of gas escaping through slot 25 and a ribbon flame of burning gas is established along the length of slot 25. When this ribbon flame along slot 25 reaches nozzle 11, it ignites the gas flowing through nozzle 11 and the gas burner is thereby set in operation.

It will be observed that the particular construction of ports 45 has several distinct advantages. In the first place, the tapered indentations 45 form a trough for the gas issuing from ports 45 which directs the flame at an angle inclined to the tube so that the flame at each port overlaps the flame at the next successive port, thereby producing a more rapid transmission of the flame than is possible with ports in the form of holes on the surface of the lighter tube. Furthermore, I have found that the formation of the ports 45 by means of the lancing and indenting the metal is more economical than drilling holes, especially with lighter tubes formed of alloy steel.

I have discovered, in addition, that by forming the ports as above described much smaller openings can be produced than is practicable with ports in the nature of round holes or a continuous slot, thereby effecting a saving in the gas consumed per unit length of tube. Therefore for a lighter tube of a given internal diameter, I am able to transmit the flame further.

Other advantages of my lighter tube construction lie in the ease with which the tube may be bent to transmit a flame in a desired path around obstructions and also in the operating characteristics which enable disposing the tube in any position. The lighter tube having the port formation described above will transmit a flame horizontally or vertically upwardly or downwardly. This is not practical with lighter tubes that are provided with a port in the form of a longitudinal slot.

It will also be observed that with my lighter tube construction the ribbon flame may be caused to travel from either end of the tube to the other. This is desir-

able since it enables the user to ascertain whether the pilot burner is ignited. This may be done by simply depressing push button 42 to admit gas to the lighter tube. If the pilot burner is ignited, then its flame will ignite the gas issuing from ports 45 adjacent nozzle 17 and the ribbon flame will then travel along the tube to the ports 45 adjacent strap 29.

It will also be appreciated that, although I have described tube 28 as a means for transmitting a flame from one point to another remote point, the same port construction may be employed in forming burners proper from sheet metal.

I claim:

1. Apparatus for transmitting a flame comprising a sheet metal tube having an inlet at one end thereof for connection with a source of combustible gas, the side wall of said tube having a plurality of gas ports extending longitudinally thereof and spaced apart a distance corresponding generally to the diameter of said tube, said gas ports each being defined by a slit through the side wall of said tube, the metal adjacent one side of each slit being indented such as to produce an opening between the portions of the metal adjacent the opposite sides of said slit, said indented portions being inclined to the longitudinal axis of the tube to form troughs which incline outwardly to the outer surface of the tube from each of said openings, said indented portions being formed progressively deeper in a direction away from said end of said tube.

2. Gas burning apparatus comprising a sheet metal tube having an inlet at one end thereof for connection with a source of combustible gas, the side wall of said tube having a plurality of gas ports extending longitudinally thereof, said gas ports each being defined by a slit through the side wall of said tube, the metal adjacent one side of each slit being indented such as to produce an opening between the portions of the metal adjacent the opposite sides of said slit, said indented portions being inclined to the longitudinal axis of the tube to form troughs which incline outwardly to the outer surface of the tube from each of said openings, said indented portions being formed progressively deeper in a direction away from said end of said tube.

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