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PILOT BURNER GENERATOR

Filed March 27, 1961

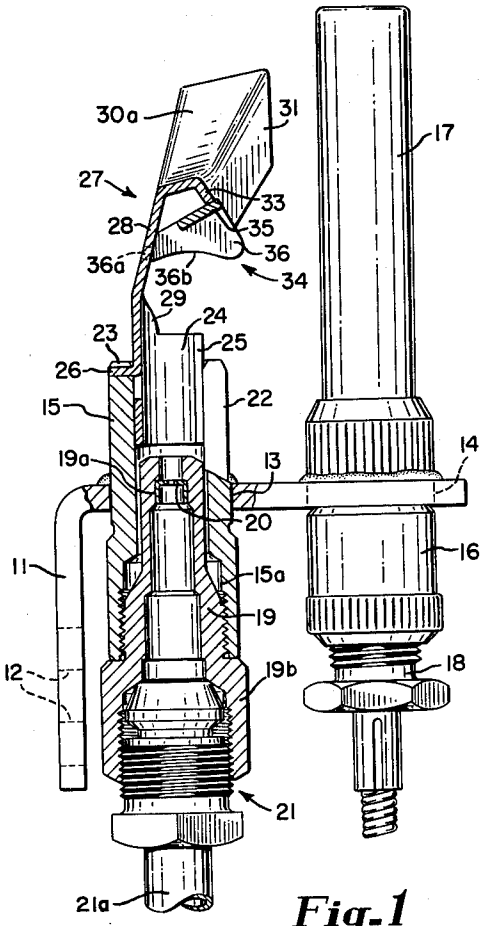


Fig-1

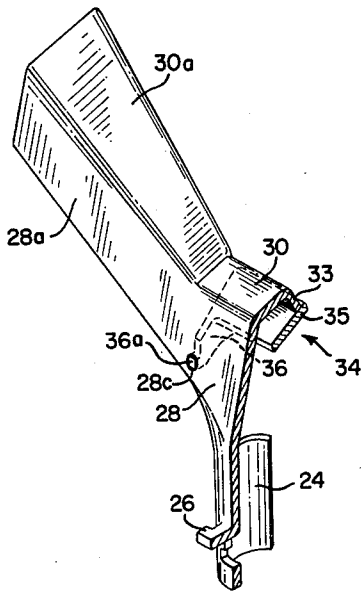


Fig-2

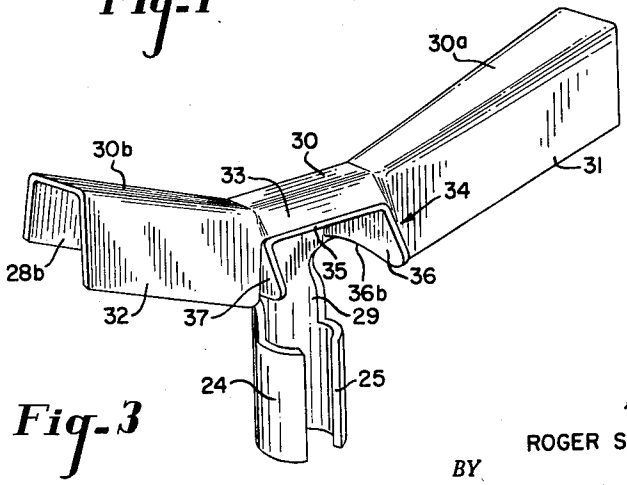


Fig-3

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PILOT BURNER GENERATOR

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This invention relates to gas burners and, more particularly, to pilot burners used to ignite main burners and to heat a flame sensing unit to provide safety control of the gas flowing to the main burner in the event the pilot flame should become extinguished.

One of the objects of this invention is to provide a pilot burner for the above mentioned use which provides quick reduction or extinguishment of the flame heating a temperature sensing unit in the event the gas pressure approaches the point where the flame for igniting the main burner may be insufficient to perform that function.

Another object of the invention is to provide a burner having a target member with flame directing wings thereon to direct a flame toward main burners and means associated with said wings to deflect a portion of the flame onto a flame sensing member only if the gas pressure is sufficient to provide main burner ignition.

Other objects of the invention will become apparent upon reading the following description of the invention in conjunction with the accompanying drawing, wherein:

FIGURE 1 is a side elevation view of the invention with the burner shown in cross-section;

FIGURE 2 is a back perspective, cross-sectional view of the target member per se; and

FIGURE 3 is a front perspective view of the target member per se.

The invention comprises a mounting bracket **11** having bolt receiving holes **12** through a vertical arm thereof. The bracket also has two spaced larger holes **13** and **14** in a horizontal arm thereof in which are welded a burner tube **15** and a thermopile supporting tube **16**, respectively. A thermopile **17** is releasably held in the tube **16** by means of a ring nut **18** screw threaded into the lower end of the tube.

The burner tube has an enlarged and threaded diameter portion **15***a* at its lower end into which is threaded a burner spud **19**.

The spud has an inverted, cup-shaped orifice member **20** located in a reduced diameter portion thereof **19***a* near its upper end. The spud also has an enlarged and threaded diameter portion **19***b* which is adapted to receive a tube coupling **21** for securing a gas tube **21***a* to the spud.

The upper portion of the tube **15** has a slot **22** that extends from the upper end thereof to below the upper end of the spud **19**, on the thermopile side of the tube, to permit air to enter the tube around the spud. Another slot **23** extends downwardly a short distance from the upper end of the tube, on the other side thereof, for a purpose to be presently described.

A target member for the burner consists of a tubular portion **24** having a longitudinal slot **25** therein whose edges align with the edges of the slot **22** in the tube **15**. The portion also has an outwardly struck arm **26** that fits in the slot **23** to keep the slot **25** aligned with the slot **22** and to hold the lower end of the tubular portion in spaced relationship with respect to the spud. The slot formed by striking out the arm **26** serves no function other than to provide material for arm **26**.

Extending upwardly from the tubular portion of the target member, is a target portion generally designated by the reference numeral **27**. This portion consists of a generally flat portion **28** inclined inwardly and upwardly to the axis of the tube and having extensions **28***a* and **28***b* at a slight forwardly extending angle transversely thereof on opposite sides thereof. An arcuate portion **29** connects the portion **28** to the portion **24**. A flat portion **30** extends forward and slightly upwardly from the portion **28** and over the tube **24**. This portion **30** has extensions **30***a* and **30***b*, which also form extensions of the portions **28***a* and **28***b*. These extensions increase in width from the portion **30** to the outer ends thereof and carry at their forward edges, downwardly extending skirt portions **31** and **32**, respectively. A short skirt portion **33** extends downwardly and forwardly from the portion **30** and between the upper adjoining portions of the skirt portions **31** and **32**. Obviously, the angular relationship of the channel-shaped members may be changed to suit a particular need.

A flame deflector member **34** is of inverted U-shape, having a cross or base portion **35** extending between two side walls or legs **36** and **37**. The legs extend beyond the rear edge of the base portion and terminate in two lugs **36***a* (only one of which is shown) that fit into holes **28***c* (only one of which is shown). The rear or inner edge of the base portion **35** is spaced about the same distance from the axes of the tubes and orifice member as is the surface of portion **28**, at the same elevation. The front edges of the base portion and the legs extend a relatively short distance beyond the skirts **31**, **32** and **33**. The lower edges of the legs **36** and **37** are upwardly arched to give the right legs depth to provide carry-over characteristic to the flames and proper flame deflection to the flame sensing member.

Operation

When the invention is installed in a heating plant having two main burners, the bracket is mounted so that one each of the channels formed by the target extensions and skirts are directed toward one each of the main burners so as to ignite them when flames are present at the target burner outlets.

At normal and above normal gas pressures the deflector **34** is able to deflect a flame onto the flame sensing unit, which may be the illustrated thermopile or a rod and tube unit or some other well known unit.

If there should be a drop in gas pressure, the flame to the flame sensor will snuff out or reduce generator output below minimum operating point before the main burner igniting flames reduce to the point they would fail to ignite the main burners.

It is believed that the snuffing out or more rapid decline of the flame sensor flame is due to the fact that the central flame tends to cling to the larger surfaces on which it first impinges, when there is no excess flame to be divided, or to the flooding of the aperture when there is an excess of the flame. Regardless of the theory, it is a fact that in the burner described above, the flame for heating the sensor reduces much more rapidly and becomes extinguished before the igniting flames become incapable of serving their purposes, better than do prior art burners for accomplishing the same general purposes.

As it is possible that modifications of the invention may be made without departing from the spirit thereof, the scope of the invention should be determined from the appended claims.

I claim as my invention:

1. A gas burner comprising a tube, an orifice member in said tube, a target member mounted on said tube in spaced relationship to said orifice member, said target member having a surface inclined inwardly toward the axis of said orifice member and outwardly from said orifice member, said tube having an opening therein to provide for flow of air into said tube above said orifice member, an inverted channel-shaped member extending from said surface for directing a flame generally trans-

verse with respect to the axis of said orifice member, said channel-shaped member having an opening in a side wall thereof substantially opposite said axis, and an inverted U-shaped deflector extending through said opening with an inner edge of the base of of said deflector spaced from and generally parallel to said surface and spaced from the base of said channel-shaped member.

2. In a gas burner, the combination comprising a tube, an orifice member in said tube, a target member mounted on said tube in spaced relationship to said orifice member, said target member having a surface inclined inwardly toward the axis of said orfice member and outwardly from said orifice member, said tube having an opening therein to provide for flow of air into said tube above said orifice member, a channel-shaped member extending from said surface for directing a flame generally transverse with respect to the axis of said orifice member, said channel-shaped member having an opening in a side wall thereof forward of said axis, and an inverted generally U-shaped deflector extending through said opening with an inner edge of the base of said deflector spaced from and substantially parallel to said surface and spaced from the base of said channel-shaped member and the legs of the deflector extending inwardly beyond said base to said surface.

3. A gas burner comprising a tube, an orifice member in said tube, a target member mounted on said tube in spaced relationship to said orifice member, said target member having a surface inclined inwardly toward the axis of said orifice member and outwardly from said orifice member, said tube having an opening therein to provide for flow of air into said tube above said orifice member, an inverted channel-shaped member extending from said surface forming a passage for directing a flame generally transverse with respect to the axis of said orifice member, said channel-shaped member having an opening in a side wall thereof substantially opposite said axis, and an inverted U-shaped deflector forming a passage whose cross-sectional area substantially conforms to said opening, said deflector being secured within said channel-shaped member adjacent said opening with the passage formed by said deflector extending at a substantial angle to the passage formed by said channel-shaped member and with the

passage formed by said inverted U-shaped member lining up with said opening, said deflector further being mounted with the inner edge of the base thereof spaced from and generally parallel to the surface and spaced from the base of said channel-shaped member so that a portion of the gas passing through said tube and said channel-shaped member is deflected by said inverted U-shaped deflector out through said opening.

4. A gas burner comprising a tube, an orifice member in said tube, a target member mounted on said tube in spaced relationship to said orifice member, said target member having a surface inclined inwardly toward the axis of said orifice member and outwardly from said orifice member, an inverted channel-shaped member extending from said surface forming a passage for directing a flame generally transverse with respect to the axis of said orifice member, said channel-shaped member having an opening in a side wall thereof substantially opposite said axis, and an inverted U-shaped deflector forming a passage whose cross-sectional area substantially conforms to said opening, said deflector being secured within said channel-shaped member adjacent said opening with the passage formed by said deflector extending at a substantial angle to the passage formed by said channel-shaped member and with the passage formed by said inverted U-shaped member lining up with said opening, said deflector further being mounted with the inner edge of the base thereof spaced from and generally parallel to the surface and spaced from the base of said channel-shaped member so that a portion of the gas passing through said tube and said channel-shaped member is deflected by said inverted U-shaped deflector out through said opening.

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