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PILOT BURNER CONSTRUCTIONS AND THE LIKE

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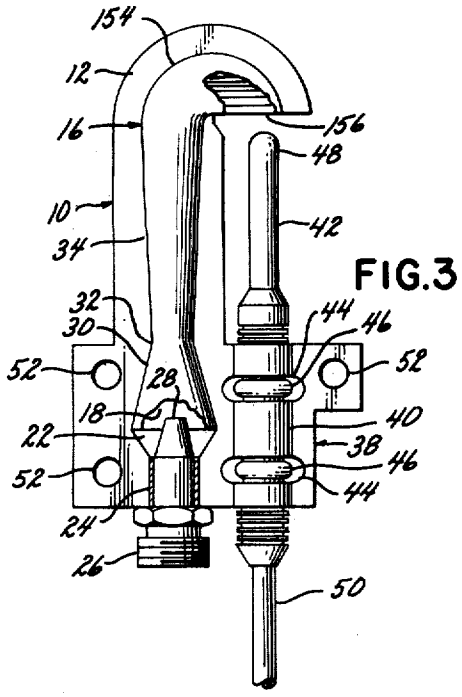


FIG.3

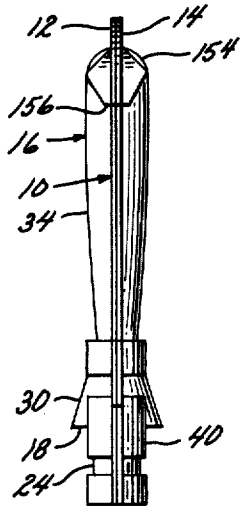


FIG.4

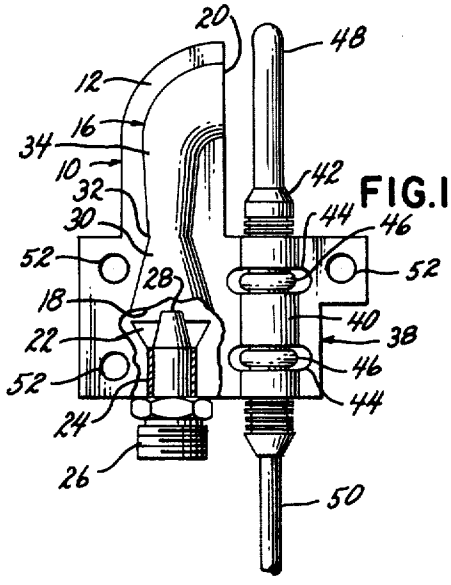


FIG.1

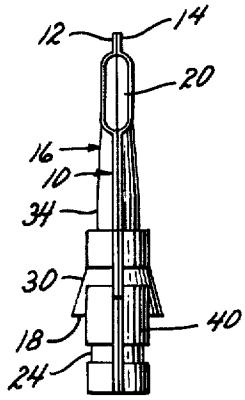


FIG.2

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PILOT BURNER CONSTRUCTIONS AND THE LIKE

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This invention relates to pilot burners of the primary aerated type for maintaining an ignition flame for a main burner and for heating the hot junction of the thermocouple of a fuel control system.

A problem frequently encountered in pilot burners is that of lint collecting at the primary air opening of the burner to the extent that an insufficient amount of air is mixed with the fuel which causes the pilot flame to be extinguished.

Another problem frequently encountered is the extinguishment of the pilot flame caused by drafts. If rapidly moving air enters the fuel passage at the primary air inlet and proceeds up the passageway to the outlet of the burner, the flame may be blown away from the outlet. This is the result when the rate of flow through the passageway greatly exceeds the rate of propagation of the flame. Conversely, if rapidly moving air enters the fuel passageway from the burner outlet in opposition to the fuel flow, the pilot flame may be forced back down the fuel passageway and be extinguished for lack of sufficient oxygen. This is the result of the rate of flame propagation exceeding the rate of fuel flow out of the burner.

It is therefore an object of this invention to reduce the collection of lint at the primary air inlet of a pilot burner.

It is a further object of this invention to prevent the extinguishment of the pilot flame of a burner caused by drafts.

Another object of this invention is to reduce the effects of drafts or wind variations on the pilot flame of a burner.

These and other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings wherein:

FIGURE 1 is a side elevational view of one form of the invention with parts cut away for clarity.

FIGURE 2 is an end view of the burner of FIGURE 1 with the thermocouple removed for purposes of clarity.

FIGURE 3 is a side elevation of another form of pilot burner with portions cut away for purposes of clarity.

FIGURE 4 is an end view of the pilot burner of FIGURE 3 with the thermocouple removed for purposes of clarity.

Referring to the form of invention illustrated in FIGURES 1 and 2, a pilot burner is illustrated comprising a body **10** which is formed from a pair of complementary sheet metal members **12** and **14**. Depressions are formed in members **12** and **14** for providing a fuel conduit or passageway **16**. One end of passage **16** provides an inlet opening **18**, and the other outlet or burner port **20**.

Body portion **10** is cut away at **22** adjacent inlet opening **18**, and formed in body **10** by depressions in members **12** and **14** is a cylindrical recess **24** adjacent cut away portion **22**. Mounted in recess **24** is a threaded connecting element **26** for connecting the pilot burner with a source of fluid fuel. Orifice **28** of connecting element **26** projects into inlet **18** and provides a fuel injection for fuel passage **16**. The walls of passage **16** adjacent inlet opening **18** are laterally spaced from orifice **28** providing a primary air inlet for the burner.

The walls of a portion **30** of passage **16** converge from inlet opening **18** to form a Venturi throat **32** of reduced diameter downstream from inlet **18**. Passage **16** has a straight portion **34** beyond Venturi throat **32**, which connects with a curved portion **36**. The wall of passage **16** diverges from Venturi throat **32** to the relatively large

burner port or outlet **20** at the end of curved portion **36**.

Formed on the side of body **10** adjacent the outlet **20** is a support bracket portion **38**. Complementary depressions in members **12** and **14** form a cylindrical recess **40** for receiving a thermocouple **42**. A pair of vertically spaced slots **44** are formed in recess **40** for receiving shoulders **46** of thermocouple **32**. Thus, it is seen that the flame emitting from burner port **20**, will impinge on the thermoelectric junction **48** of thermocouple **42** which may be connected by means of lead **50** in circuit with an electromagnet of a fuel control device of a main burner (not shown).

With the above described construction, the relatively large primary air inlet permits passage of large lint particles. These particles are entrained in the rapidly moving fuel-air stream through passage **16** and are carried out the large burner port **20** into the flame where they are incinerated.

Referring now to the modified form of FIGURES 3 and 4, wherein like structure is identified by corresponding reference numerals, fuel passage **16** has a curved portion **154** which connects straight portion **34** with a burner port or outlet **156**. Outlet **156** is so disposed that the flame will impinge downwardly on the thermoelectric junction **48** of thermocouple **42**. Curved portion **154** defines a 180 degree bend in passage **16**. Thus, the direction of flow through passage **16** is reversed between the inlet and the outlet, and the burner port or outlet **156** defines a plane which is parallel to the plane defined by inlet **18**. Since the primary air inlet and the burner outlet are oriented in substantially the same direction, any draft directed toward the primary air inlet tending to blow the pilot flame away from the burner, would be counteracted by a corresponding increase in pressure at the burner port tending to force the pilot flame back down the fuel passage. The net effect would be that the flame would remain positioned at the outlet of the burner as desired.

While specific forms of the invention have been disclosed, it will be understood that various modifications of structure may be effected without departing from the scope of this invention as defined by the following claims.

I claim:

1. A pilot burner comprising in combination, a pair of generally flat sheet metal members secured together to form a body portion, each of said sheet metal members having complementary depressions formed therein to produce a conduit for a fluid fuel formed in said body portion and having a primary air opening whose inlet edges lie in a plane and a fluid fuel outlet port parallel to said plane and defined by spaced edges of said sheet metal members and defining a parallel plane with the plane defined by said air inlet, the wall of said conduit converging from said inlet to form a Venturi throat downstream of said inlet and diverging from said Venturi throat to said outlet and curving adjacent said outlet, each of said sheet metal members having cutaway portions to form said air inlet, said sheet metal members having complementary depressions adjacent and upstream from said cutaway portions to form a fuel injection means supporting recess, and fuel injection means mounted on said body portion in said recess and projecting into said inlet, the walls of said sheet metal members adjacent to and downstream of said inlet being laterally spaced from said fuel injection means, said inlet edges being formed by said walls upstream from said fuel injection means and at the beginning of said converging portion of said conduit, whereby lint entering said primary air inlet will be entrained in the rapidly flowing fluid through said conduit to be incinerated at said burner port, said combination further comprising a laterally projecting support bracket on said body portion formed by extensions of said sheet metal members having complementary depres-

sions to form a cylindrical recess in said support bracket, a thermocouple mounted in said cylindrical recess, and having a thermoelectric junction disposed adjacent said burner port, whereby the flame caused by combustion of fuel at said burner port will impinge on said thermoelectric junction.

2. A pilot burner comprising in combination, a pair of generally flat sheet metal members secured together to form a body portion, each of said sheet metal members having complementary depressions formed therein to produce a conduit for a fluid fuel formed in said body portion and having a primary air opening whose inlet edges lie in a plane and a fluid fuel outlet port parallel to said plane and defined by spaced edges of said sheet metal members and defining a parallel plane with the plane defined by said air inlet, the wall of said conduit converging from said inlet to form a Venturi throat downstream of said inlet and diverging from said Venturi throat to said outlet and curving adjacent said outlet, each of said sheet metal members having cutaway portions to form said air inlet, said sheet metal members having complementary depressions adjacent and upstream from said cutaway portions to form a fuel injection means supporting recess, and fuel injection means mounted on said body portion in said recess and projecting into said inlet, the walls of said sheet metal members adjacent to and downstream of said inlet being laterally spaced from said fuel injection means, said inlet edges being formed by said walls upstream from said fuel injection means and at the beginning of said converging portion of said conduit, whereby lint entering said primary air inlet will be entrained in the rapidly flowing fluid through said conduit to be incinerated at said burner port, said combination further comprising a laterally projecting support bracket on said body portion formed by extensions of said sheet metal members having complementary depressions to form a cylindrical recess in said support bracket, a thermocouple mounted in said cylindrical recess, and having a thermoelectric junction disposed adjacent said burner port, whereby the flame caused by combustion of fuel at said burner port will impinge on said thermoelectric junction, in which combination said cylindrical last named recess and said thermocouple are parallel to the axis of said fuel injection means supporting recess, and said wall of said conduit curves 180° to direct the flame discharged at said fuel outlet in alignment to said thermoelectric junction.

3. In combination, a pair of complementary generally flat sheet metal members secured together and formed

to produce complementary depresssions which when joined together along a juncture plane form a generally flat pilot burner body, said complementary depressions forming a conduit for fluid fuel formed in said body having a primary air opening whose inlet edges lie in a plane and an outlet opening terminating in a plane parallel to said inlet edges, said complementary depressions having complementary curved portions to form said conduit with a curved portion terminating at said outlet, the wall of said conduit converging from said air inlet to form a Venturi throat of reduced diameter upstream from said air inlet and diverging from said Venturi throat to said outlet, said sheet metal members having complementary semicylindrical depressions forming a fuel injector supporting cylindrical conduit upstream from said air inlet, a cylindrical fuel injector mounted in said cylindrical conduit and projecting into said inlet, said sheet metal members being cut at said air inlet and being laterally spaced from said fuel injector thereby defining said primary air inlet disposed upstream from said fuel injector and at the beginning of said converging portion of said conduit, whereby flow through said conduit will entrain lint entering said primary air inlet to said outlet to be incinerated by combustion of said fuel at said outlet, said sheet metal members projecting laterally from said fuel injector supporting cylindrical conduit to form a laterally projecting support bracket having complementary depressions forming a thermocouple supporting recess in said bracket, a thermocouple mounted in said thermocouple supporting recess, said thermocouple having a thermoelectric junction disposed adjacent said fuel outlet, whereby the flame caused by combustion of fuel at said fuel outlet heats said thermoelectric junction.

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