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GAS-FUELED PILOT BURNER

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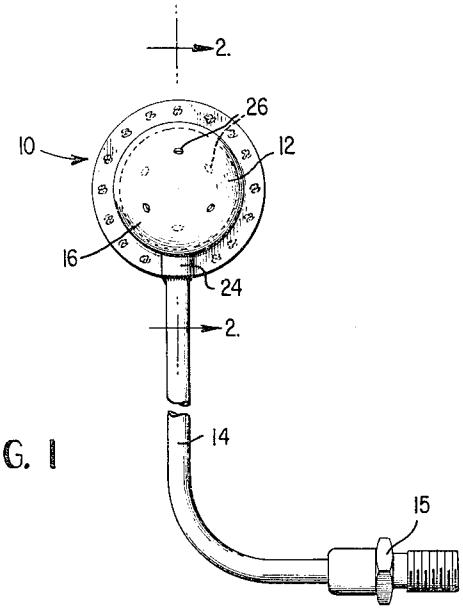


FIG. 1

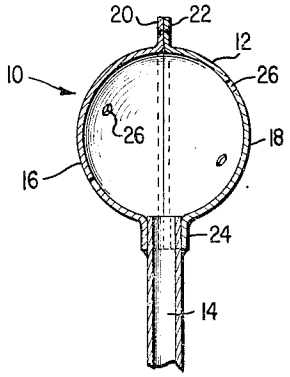


FIG. 2

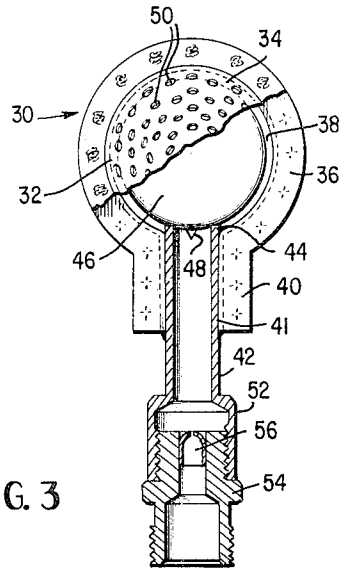


FIG. 3

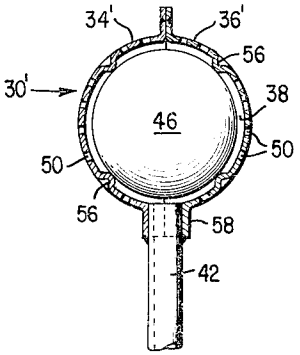


FIG. 4

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GAS-FUELED PILOT BURNER

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This invention relates to draft resistant pilot burners for use in heating systems and the like which employ fluid fuels.

Frequently encountered in such systems is the problem of the pilot flame being extinguished by sudden drafts or changing air currents. When exposed to a draft, the flame is driven downwind, and if the wind velocity is sufficient, it is blown away from the fuel source and extinguished.

Attempts have been made to minimize this problem by the employment of baffles or partially enclosing the pilot burner to protect it from drafts in some directions. However, in order to perform its function, such as igniting fuel at a main burner or heating a thermocouple, the pilot must be exposed to drafts from some direction.

Other deficiencies in prior art pilot burners are the noise produced by the escaping fuel and the usual requirement that the burner be mounted in a particular relationship (i.e., vertical or horizontal) with respect to the device which is to be controlled by the pilot flame. The pilot burner embodying this invention overcomes the above noted defects.

It is an object of this invention to provide a pilot burner having uniform resistance to drafts from all directions.

Another object is to provide a pilot burner in which the burner tip can be universally mounted relative to the component to be affected by the pilot flame.

Another object lies in the provision of a pilot burner in which the fuel is diffused into a plurality of diverging streams to reduce noise and provide a cluster of flames encompassing the burner head providing a uniform resistance to draft from all directions.

Still another object is to provide a pilot burner that is simple in construction, economical to produce, and more efficient in operation than prior art burners.

The foregoing and other objects are achieved by the provision of a hollow spherical burner head formed from a pair of flanged hemispherical shells joined together. Fuel is conducted to the interior of the burner head and escapes through a plurality of ports formed in the spherical wall. The fuel is thus divided into a plurality of diverging streams providing, upon ignition, a cluster of flames encompassing the sphere.

In one form of the invention, a diffusion member, preferably in the form of a solid sphere, having an outer diameter less than the inner diameter of the spherical burner head, is mounted concentrically in the burner head. Fuel flows to the burner ports in the wall of the spherical burner head through the space between the diffusion member and the inner surface of the burner head. Diffusion of the fuel around the inner sphere reduces the noise and permits a greater number of burner ports to be provided in the spherical head. The inner spherical member also prevents the draft from effecting the flame emitting from ports on the opposite side of the burner from the direction of the draft.

Other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings in which:

FIG. 1 is an elevational view of a pilot burner embodying the invention in one form;

FIG. 2 is a sectional view taken on line 2—2 of FIG. 1;

FIG. 3 is an elevational view partially in section of a second form of the invention; and

FIG. 4 is a sectional view of a modification of the pilot burner of FIG. 3.

Referring to FIGS. 1 and 2, a pilot burner 10 is provided with a hollow burner head 12 which may be connected to a source of fuel by a conduit 14 provided with a threaded fitting 15. Burner head 12 is preferably formed by a pair of hemispherical shells 16 and 18 each of which are provided with flanges 20 and 22, respectively. Flanges 20 and 22 are joined together by welding, brazing or other conventional means, to form a hollow sphere. Opposed depressions at the peripheral edges of hemispherical shells 16 and 18 cooperate to form a cylindrical recess 24 for receiving conduit 14.

Formed in the wall of each of the hemispherical shells is a plurality of burner ports 26 for conducting fuel from conduit 14 to the exterior surface of the hollow hemispherical burner head 12. In the embodiment of FIGS. 1 and 2, the preferred arrangement of the ports is to provide a group of three ports in each of hemispherical shells 16 and 18 with the ports spaced equidistant from the center line common to both of the hemispherical shells and, with the group of ports in shell 16 displaced 180° from the group of ports in shell 18 as indicated in FIG. 1. Thus, a cluster of six flames are provided uniformly distributed about the hollow burner head, so that one or more of the flames is always protected from a draft in any direction.

FIG. 3 illustrates a pilot burner embodying the invention in a second form in which a spherical pilot burner head is formed by a pair of shells 34 and 36 joined together to define an internal cavity 38. Shells 34 and 36 are provided with extensions, one of which 40 is illustrated for shell 36, having cooperating depressions forming a cylindrical recess 41 for receiving a fuel conduit 42. End portion 44 of conduit 42 extends into cavity 38 slightly beyond the end of recess 41 to support a spherical diffusion member 46 concentrically within cavity 38.

Diffusion member 46 has an outer diameter which is less than the diameter of cavity 38 to define a space between the outer surface of diffusion member 46 and the wall of cavity 38. Notches 48 are provided in end portion 44 to permit fuel to flow from conduit 42 into cavity 38. Burner head 32 is provided with a plurality of ports 50 uniformly distributed about the spherical surface through which the fuel escapes from the burner head.

Conduit 42 is provided with an enlarged end portion 52 having internal threads for receiving a standard fitting 54. Fitting 54 may or may not be provided with a standard orifice fitting 56 as desired.

The use of the diffusion member 46 permits a larger number of ports to be provided in the burner head and provides more satisfactory operation at low fuel pressures. Diffusion of the fuel from conduit 42 around member 46 also reduces the noise and there is less pressure drop from conduit 42 into cavity 38 due to the small space which the fuel must occupy in the cavity. Flames burning at ports 50 are always protected from drafts from the opposite side of the burner.

FIG. 4 illustrates a burner 30' similar to the FIG. 3 embodiment with a simplified means for supporting the diffusion member 46 within the cavity. Shells 34' and 36' are identical to shells 34 and 36 of FIG. 3 with the exception that a plurality of inwardly projecting indentations 56 are formed in each of the hemispherical shells. Diffusion member 46 is concentrically supported in cavity 38 by the indentations. The construction of FIG. 4 permits conduit

42 to be welded in any desired position in recess 58 and less accuracy is required to locate the parts.

It is preferable in each of the embodiments that the fuel conduits 14 and 42 fit loosely within recesses 24 and 58, respectively so as to minimize the heat conductivity from the burner head to the tubing. In some cases, however, it may be determined that the pilot burner affords an excessive amount of heat for heating a thermocouple or the like, in which event it would be desirable to solder or weld conduits 14, 42 to the burner head.

The spherical burner head permits the burner to be mounted universally with respect to the component that is to be effected by the pilot flames since a cluster of flames encompasses the burner head. The shells forming the spherical burner head may be stamped from sheet metal parts and assembled with ease.

While the invention has been illustrated and described in several specific forms it is understood that the invention is not limited to the exact construction illustrated and that various changes and alterations can be made without departing from the scope of the invention as defined by the appended claims.

What is claimed is:

1. A draft resistant pilot burner comprising,
a pair of hemispherical shells joined together at their peripheries to form a spherical burner head,
a group of at least three ports in the wall of each hemispherical shell spaced equidistant from the horizontal center line common to both hemispherical shells,
the group of ports in one of the hemispherical shells being displaced substantially 180° from the ports in the other hemispherical shell,
said shells forming said spherical burner head being imperforate except for said ports,
and means for conducting fuel to the interior of the spherical burner head.

2. A draft resistant pilot burner comprising,
a burner head having a substantially spherical outer surface,
a cavity in the interior of the burner head,
a cylindrical conduit for fluid fuel extending into the cavity,
a diffusion member mounted in the cavity on the end of said cylindrical conduit and completely enclosed by said burner heads,
the outer surface of the diffusion member being spaced from the cavity wall to define a space between the cavity wall and the outer surface of the diffusion member,
a notch in the end of the cylindrical conduit permitting fuel to flow from the conduit into the space between the cavity wall and the diffusion member,
and a plurality of burner ports uniformly distributed about the surface of the burner head to encompass the burner head with a plurality of diverging flames upon ignition of the fuel.

3. A draft-resistant burner comprising,
a pair of flanged complementary hemispherical shells having their flanges joined together to form a hemispherical burner head,

opposed depressions in the flanges of the complementary shells forming a cylindrical recess communicating with the hollow interior of the spherical burner head,
a conduit for fuel loosely received in the cylindrical recess,
and a plurality of openings in the wall of each hemispherical shell uniformly distributed about the surface thereof to provide a multiplicity of flames at the exterior surface of the spherical burner head upon ignition of fuel emitting from the openings,
said plurality of openings comprising a group of three openings in each hemispherical shell,
said openings being spaced equi-distant from the horizontal center line common to both hemispherical shells,
the group of openings in one of the hemispherical shells being displaced 180° from the group of openings in the other hemispherical shell,
and said shells forming said burner head being imperforate except for said ports.

4. A draft-resistant burner comprising,
an outer sphere including two hemispherical portions,
a spherical diffusion member mounted within the outer sphere in spaced relationship with the outer sphere,
a group of at least three ports in each of said hemispherical portions equally spaced from the horizontal center line common to both of said hemispherical portions,
said group of ports in one hemispherical portion being displaced substantially 180° from the ports in the other hemispherical portion,
said hemispherical portions of the outer sphere being imperforate except for said ports, and
means for conducting fuel into the space between the diffusion member and the outer sphere.

5. A draft-resistant burner as defined in claim 4 wherein said outer sphere has a plurality of indentations projecting radially inwardly into the area enclosed by said outer sphere, said indentations supporting the diffusion member.

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