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GAS PILOT BURNER AND DRAFT SHIELD

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Fig. 1.

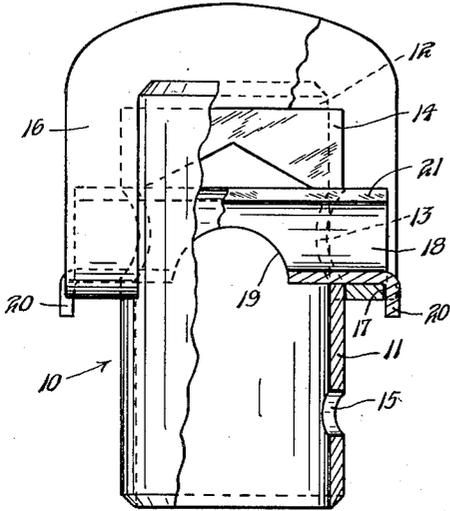


Fig. 2.

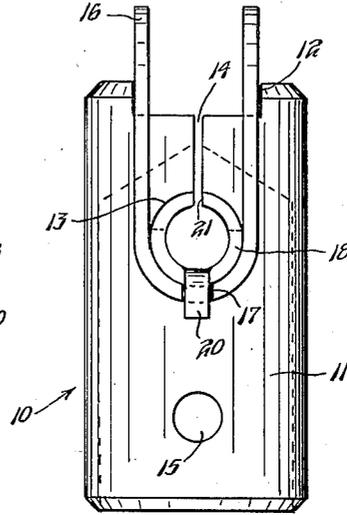


Fig. 3.

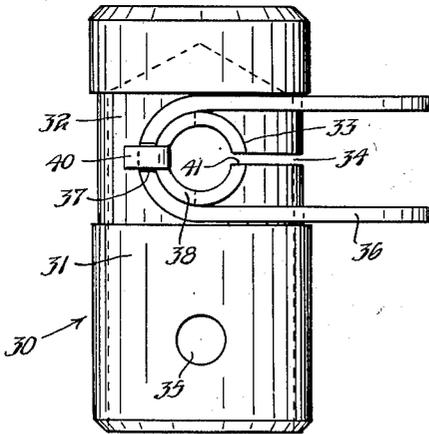
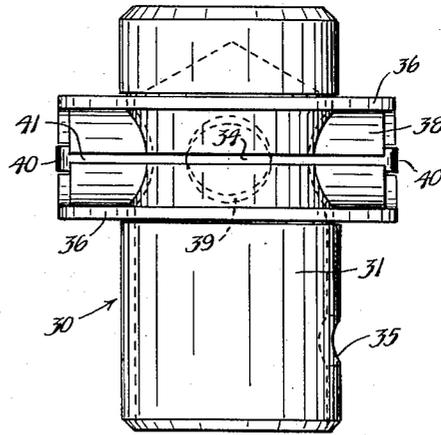


Fig. 4.



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GAS PILOT BURNER AND DRAFT SHIELD

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13 Claims. (Cl. 158—115)

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This invention relates to improvements in gas burners and, more particularly, to improvements in gas burners adapted to heat a thermopile and to provide a pilot flame for an associated and larger burner.

It has been found that it is highly desirable to provide draft shields on pilot burners to prevent strong drafts, usually present in a furnace, from extinguishing the small flame or flames produced by the pilot burner. In burners of this type, the flame produced thereby for igniting the main or larger burner is often extinguished, due to the draft caused by sudden ignition of the main burner. It is the purpose of the slot between the burner orifices to provide a runner flame to carry a flame from another flame to the extinguishing flame orifice to reignite it. It is this runner or carrier flame in particular that must be protected from drafts so as to assure re-ignition of the pilot flame to prevent an unsafe accumulation of fuel in the furnace before ignition.

The prior art pilot burners, having draft shields thereon, are either machined out of heavy stock or otherwise require expensive machining and assembling operations thereon in their production. Separation of the shield from the remainder of the burner, of the prior art constructions for repairing or cleaning, is either impossible or impractical.

One of the objects of this invention is to provide a pilot burner head having a draft shield and an orifice member that are readily assembled and disassembled either for repairing or for cleaning.

Another object of the invention is to provide a pilot burner head composed of separatable elements of inexpensive construction and which may be easily assembled.

Another object of the invention is to provide pilot burner parts which are so interlocked with each other that each retains the other in its assembled position.

A still further object of the invention is to provide a burner head consisting of detachable parts of which at least one may be used in different modifications of the burner head.

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

Figure 1 is a side elevational view of one modification of the invention, showing a portion thereof broken away;

Figure 2 is an end elevational view of the burner shown in Figure 1;

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Figure 3 is a side elevational view of a second modification of the burner; while

Figure 4 is an elevational view of the burner of Figure 3.

Referring now to the modification shown in Figures 1 and 2, the numeral 10 is used to generally designate the entire head. The main body portion 11 is of inverted cup-shape and may be formed either by casting it in this shape or axially boring out a length of round bar stock. A diametrically extending recess 12 is formed in the outer surface of the closed end of the body 11, either by casting said recess therein or by machining it therein. Diametrically opposed outlet apertures or openings 13 are preferably formed by drilling through the walls of the body. They are positioned inwardly from the closed end of the body with their longitudinal common axis parallel to the longitudinal axis of the recess 12. A diametrically and axially extending groove 14 extends from the bottom of recess 12 to the centers of apertures 13. A hole 15 is bored or otherwise formed in the side wall of the body 11 near the open inlet end thereof. This hole is adapted to be placed in alignment with a threaded hole in a burner fuel supply tube (not shown). Thus aligned, a screw passing through opening 15 into the threaded hole of the burner fuel supply tube, will fixedly secure the burner head 10 on the fuel supply tube.

A yoke-like draft shield 16, of inverted U-shape in side elevation and of U-shape in end elevation, is preferably formed out of flat sheet material. The draft shield is first stamped out of the sheet material to provide a substantially rectangular piece having a substantially rectangular opening in the middle thereof. This piece is then bowed longitudinally to give it the above mentioned U-shape in end elevation with the inside radius of curvature of the base of the U the same as, or only slightly larger than, the radius of the aperture 13 in the wall of burner 11. The size and shape of the central aperture in the shield piece 16 is such that when the base of the inverted U-shape portion thereof rests on the bottom of recess 12, the base of the U-shape portion of the shield surrounds the opening 13 in the burner body 11. Notches 17 are formed in the outer end of the bases of the U-shaped portions and diametrically opposite from the slot 14, for a purpose to be hereinafter described.

A burner tip or orifice member 18 may be formed from flat sheet material or tubular stock. Preferably, it is formed by stamping out pieces from sheet material to provide a piece having a large centrally disposed aperture therein and

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axially extending ears 20 equal distance from the side edges thereof. The piece is then shaped to form a longitudinally-slotted tubular member having an outer diameter equal to or slightly less than that of the aperture 13 in the burner body 11. The slot 21, thus formed in the member 18, is of the same width as slot 14 in the burner body 11. The ears 20 are substantially the same width as the notches 17 in the shield 16.

To assemble the above mentioned three pieces of the burner head of this invention, it is only necessary for one to slide the yoke-like member or shield 16 downwardly over the recessed end of the burner body 11 until it rests on the bottom of the recess 12, then to slide the tip member 18 through the shield 16 and the openings 13 in the body 11 with the slot 21 in alignment with the slot 14 and the ears 20 in alignment with notches 17, and then to bend the ears 17 downwardly and into said notches 17 to thereby lock all of the parts in assembled relationship.

The burner head modification shown in Figures 3 and 4 is of the same general construction as that of Figures 1 and 2. It is generally designated by the reference numeral 30 and has a main body portion 31 of inverted cup-shape. Instead of the end recess 12 of the modification of Figures 1 and 2, this modification has an annular groove 32 therein. The apertures 33, and hole 35 are the same as apertures 13 and hole 15 is in the burner head of Figures 1 and 2. The slot 34 is of the same width as slot 14 of the first modification but extends radially through the wall of the body 31 instead of axially there-through as in the first modification.

The draft shield 36 is substantially the same as shield 16 of the first modification except that a central aperture formed therein, in its flat stamped condition, is of more nearly oval shape than rectangular shape. This enables it to fit closely against the bottom of the recess 32 when in its shaped condition and in its assembled position on the body 31. The recesses 37 in the shield 36 are for the same purpose as the recesses 17 in the first modification.

The burner tip member 38 is identical to the tip member 18 of the first modification, with the possible exception that the opening 39 may be of a different diameter than the opening 19 of the first modification. However, it is preferable that the openings 19 and 39 be of the same size so that the burner tips may be interchangeable and only one size of tip need be produced for use in both modifications. The ears 40 and slot 41 are identical to the ears 20 and slot 21 of the first modification.

The three parts of the second modification are assembled into a complete burner head in substantially the same manner as the burner head of the first modification is assembled.

Operation

When the burner head of either modification is secured to a burner supply tube and gas is permitted to flow therethrough, the gas will pass outwardly through the burner body, through the centrally disposed aperture 19 or 39 in the burner tip member, out through both ends of the burner tip member and out through the aligned slots in the burner tip member and a wall of the burner body. When lighted, this burner head will produce two diametrically opposed primary or main flames connected by a runner flame and extending outwardly between the walls of the draft shield 16. One of these main flames is adapted

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to be used as a pilot flame for a much larger main burner associated therewith and the other flame is adapted to be used to heat temperature responsive control means, well known in fuel burning arts, or the hot junction of a thermoelectric device, such as a thermopile. A thermopile, thus heated, is adapted to sufficiently energize a magnetic safety valve so as to hold it open. Flame failure causes deenergization of the thermopile and valve, thus providing safety shut-off of the fuel supply. Obviously, the shield on either burner modification will protect all three of said flames from normal drafts, and the runner flame in particular.

Should the burner head of either modification become damaged or clogged, it is readily apparent that the three elements forming the burner head could be quickly disassembled, by reversing the assembling steps, to remove and replace the damaged element, or to clean the elements. It could then be quickly and easily reassembled and put into operation.

As other modifications of this invention may be made without departing from the spirit thereof, it is to be understood that the scope of the invention is to be determined solely by the appended claims.

I claim as my invention:

1. A burner comprising a cup-shaped body having an open inlet end and a slot extending through a wall of said body at its closed end, said slot having enlarged openings at its ends, a yoke-shaped shield adjacent said slot and encompassing a portion of said body, and means in engagement with said body and said shield so as to retain said shield on said body.

2. A burner comprising a cup-shaped body having an open inlet end and a slot extending through a wall of said body at its closed end, said slot having enlarged openings at its ends, a yoke-shaped shield adjacent said slot and encompassing a portion of said body, and orifice means extending through said openings and in holding engagement with said shield.

3. A burner comprising a body member having open and closed ends, said member having a slot in a wall at its closed end, said slot having an enlarged opening at each of its ends, an orifice member having a slot therein substantially in alignment with said slot in said wall and having spaced outlet openings therein adapted to provide spaced primary flames, said orifice member also having an inlet opening intermediate its ends and having the ends thereof extending through said openings, and means for releasably securing said members together so as to prevent relative movement therebetween.

4. A burner comprising a body member having an open end and a closed end, said closed end having a slot in the wall thereof, said slot having an enlarged opening at one of its ends, an orifice member having a slot in alignment with said slot in the wall of said closed end and inlet and outlet openings therein, said orifice member removably extending through said opening, and draft shield means extending partially around said body adjacent said slot in said wall and partially around said orifice member.

5. A fuel burner comprising a cup-shaped body member having spaced openings adjacent its closed end, a slot in said body member connecting said openings, an orifice member extending through and beyond said openings, and a yoke-shaped draft shield consisting of two parallel spaced U-shaped plates having legs joined across

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adjacent ends, said shield being so positioned externally of said cup-shaped body that the inner edges of the U-shaped plates encompass a portion of said body on opposite sides of said slot and the inner surfaces of the joined ends of the plates engage said orifice member.

6. A fuel burner comprising a cup-shaped body member having spaced openings adjacent its closed end, a slot in said body member connecting said openings, an orifice member extending through said openings, and a yoke-shaped draft shield consisting of two parallel spaced U-shaped plates having legs joined across adjacent ends, said shield being so positioned externally of said cup-shaped body that the inner edges of the U-shaped plates encompass a portion of said body on opposite sides of said slot and the inner surfaces of the joined ends of the plates engage said orifice member, and cooperating means on said shield and orifice member for locking them in their assembled position.

7. A burner comprising a body member having an open and a closed end, an axially extending slot in said closed end having an enlarged opening at one of its ends, an orifice member having a slot substantially in alignment with said slot in said closed end and inlet and outlet openings therein, said orifice member removably extending through said opening, and means for releasably securing said members together.

8. A burner comprising a cup-shaped body member having an open end and a transversely extending slot in its side wall, said slot having an enlarged opening at one of its ends, an orifice member having a slot substantially in alignment with said slot in said wall and inlet and outlet openings therein, said orifice member removably extending through said opening, and means for releasably securing said members together.

9. A burner comprising a cup-shaped body member having an open end and an axially extending slot in its closed end, said slot having an enlarged opening at one of its ends, an orifice member having a slot connecting with said slot in said end and inlet and outlet openings therein, said orifice member extending through said opening, and shield means extending partially around said body and said orifice member.

10. A burner comprising a cup-shaped body member having an open end and a transversely extending slot in its side wall, said slot having an enlarged opening at one of its ends, an orifice member having a slot connecting with said slot in said wall and inlet and outlet openings therein, said orifice member extending through said opening, and shield means extending partially around said body and said orifice member.

11. A fuel burner comprising a hollow body member having a side wall and open and closed ends, a transversely extending slot in its side wall that terminates at each end in spaced openings adjacent said closed end, an orifice member extending through said openings, and a yoke-shaped shield consisting of two parallel spaced U-shaped plates having legs joined across the

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ends of the adjacent parallel legs of said plates, said shield being so positioned that the inner edges of the U-shaped plates encompass a portion of said body and the inner surface of the joined ends of the legs engage said orifice member.

12. A burner comprising a body having an open and a closed end, an outlet opening in the closed end portion of said body, a horizontally extending orifice member having a passage therethrough and an outer end extending through and beyond said opening, said outer end having a fuel outlet communicating with said passage, a shield extending partially around said body and having a horizontally extending imperforate draft deflecting portion positioned below said orifice member and projecting from said body horizontally beyond the outer end of said orifice member, the underside of said orifice member engaging said horizontally extending portion of said shield to maintain the latter in position on said body, and means on said orifice member for securing said orifice member against removal from said body to maintain said shield, orifice member, and body in assembled relationship.

13. A burner comprising a body having an open and a closed end, outlet openings in the closed end portion of said body, a horizontally extending orifice member having a passage therethrough and opposite outer ends extending through and beyond said openings, said outer ends each having a fuel outlet communicating with said passage, a shield extending partially around said body and having horizontally extending imperforate draft deflecting portions positioned below said orifice member and projecting from said body horizontally beyond the outer ends of said orifice member, the underside of said orifice member engaging said horizontally extending portions of said shield to maintain the latter in position on said body, and means on the outer ends of said orifice member for securing said orifice member against removal from said body to maintain said shield, orifice member, and body in assembled relationship.

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