Nov. 11, 1947. A. C. SCHICKLER 2,430,688

PILOT BURNER GUARD

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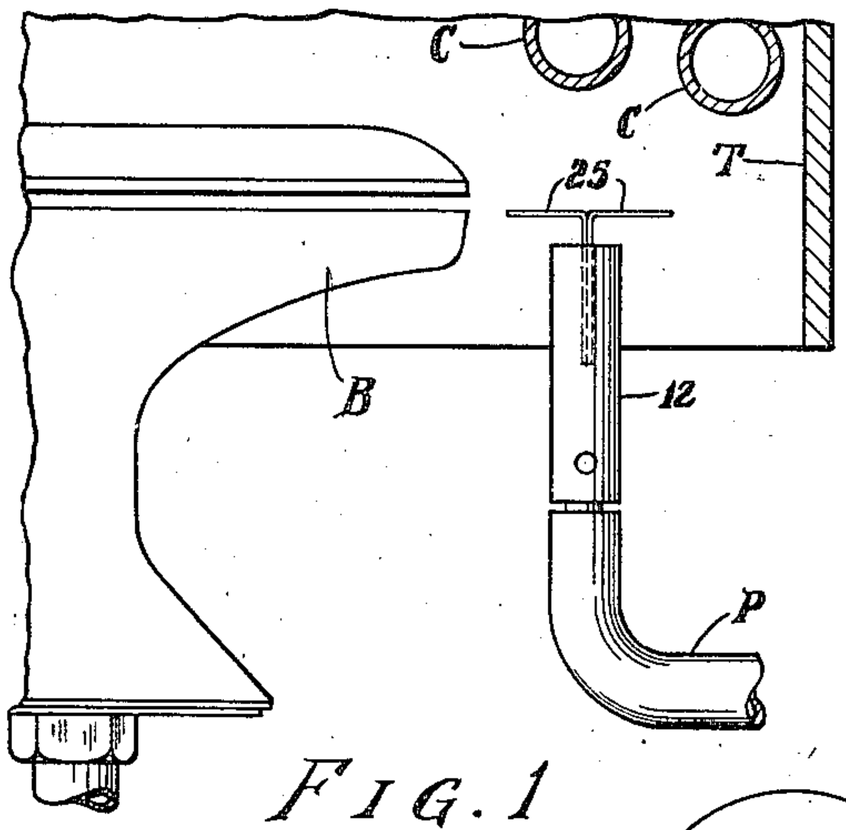

FIG. 1

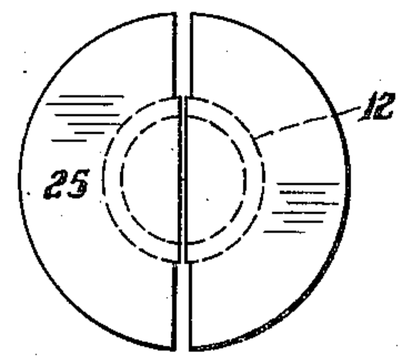

FIG. 3

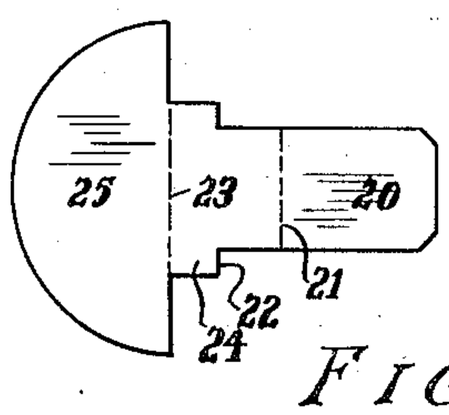

FIG. 4

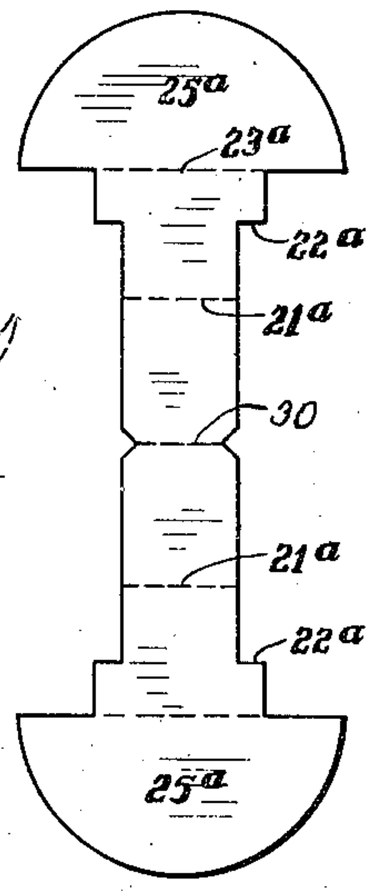

FIG. 8

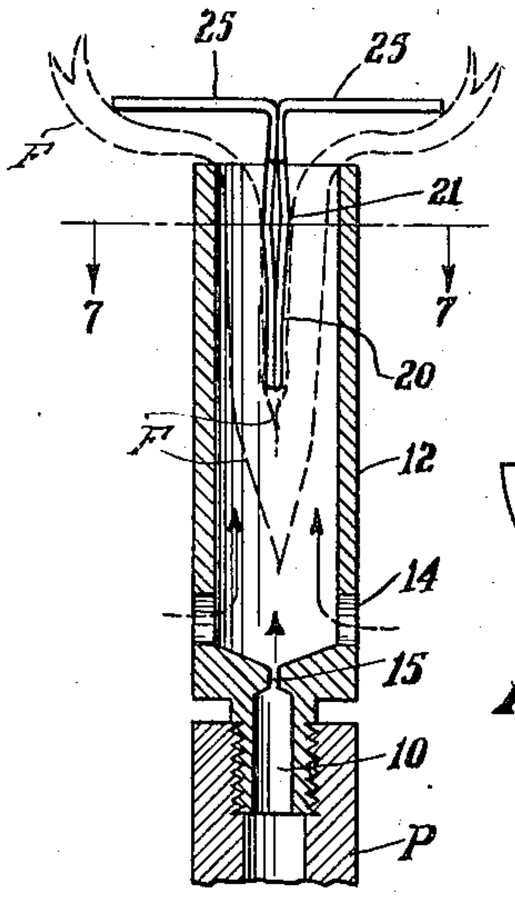

FIG. 2

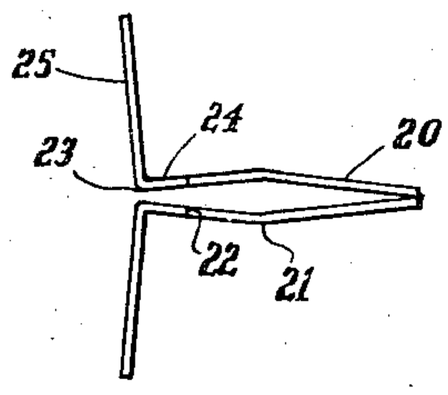

FIG. 5

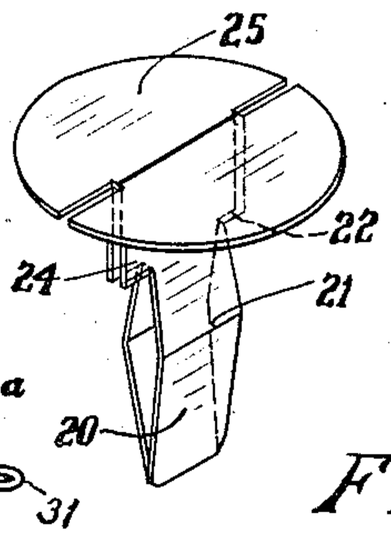

FIG. 6

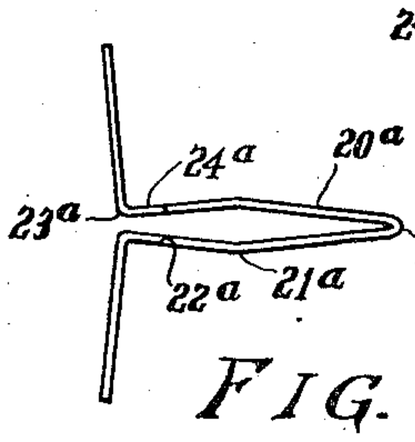

FIG. 9

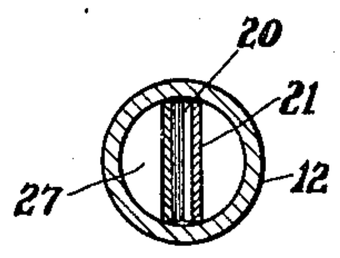

FIG. 7

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PILOT BURNER GUARD

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4 Claims. (Cl. 158—113)

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The general object of this invention is to protect the flame of a pilot light from drafts and from violent air disturbances resulting from extinguishing or lighting the main burner, and also to prevent foreign particles such as soot, coal dust and the like getting into the burner.

Another object is to retard or impede the velocity of the gas flame when the gas pressure supply thereto rises to higher than normal, and thus preventing self-extinguishing of the flame. At the same time, it is desirable for more effective burning that the velocity pressure be translated into a comparatively static pressure producing an evenly burning flame.

A simple form of pilot burner or pilot "light" which is economical of gas, provides a good hot flame and desirable mixture is that of the Bunsen burner type.

In such burners variations in gas pressure and velocity of flow may result in breaking the continuity of the flame, thus extinguishing it. It is desirable, and therefore one of the objects of this invention, to retard the flame (gas) velocity resulting from high supply pressure.

A more specific object is to divide the mixing stream within the burner tube, which aids in retarding the flame velocity and affords a baffle preventing violent air flow from striking the entire flame and protecting it against extinguishment.

Another object is to provide such a device for use with a standard simple pilot tube burner, and which device may be very cheaply manufactured, is capable of convenient assembly with the burner tube, and which holds itself in position by spring tension.

A preferred form of my invention is illustrated in the accompanying drawings in which

Fig. 1 shows the present invention associated with the pilot burner, and also showing the relative position of hot water heating coils;

Fig. 2 is an enlarged axial section through the pilot burner, and my invention attached thereto;

Fig. 3 is a top plan of the same;

Fig. 4 shows a blank, and Fig. 5 is a side elevation of the blank of Fig. 4 after bending;

Fig. 6 is a perspective view showing two of these blanks ready for insertion in the burner tube;

Fig. 7 is a horizontal section on the line 7—7 of Fig. 2;

Fig. 8 shows a blank of a modified form, and Fig. 9 is a side elevation of the same after bending.

In Fig. 1, B designates the main burner such as used for a hot water tank, the side wall of which is indicated at T. Water heating coils are

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indicated at C. These parts are shown merely as illustrative of any use of such pilot burners.

A gas supply line P leading to the vicinity of the burner is shown as provided with threads to receive a threaded nipple 10 at the lower end of the burner tube 12 open at its upper end and provided with air openings 14 appropriately positioned above the opening 15 for the gas inlet jet.

As normally used, this burner is placed closely adjacent to the orifices of the main burner B, and its flame normally rises substantially above the open end of the tube 12. When so used various disadvantages result.

A serious difficulty is that of the violent disturbances of air and gas resulting when the main burner is shut off and its flame is suddenly extinguished with a violent reaction such as results from the explosive burning of gas remaining in the chamber of the main burner. This disturbance often extinguishes the flame of the pilot, and unless provision is made for automatically relighting the pilot, which provision is often expensive and not always reliable, the main burner may be turned on and remain on in an unlighted condition.

Extraneous sudden drafts may extinguish the pilot flame, particularly when this flame is burning either very weakly due to low gas pressure, or is burning at a higher position than normal due to greater velocity resulting from high pressure from the jet 15.

In such conditions the pilot flame is particularly vulnerable to being extinguished. Various guards and relighting devices have been devised, obviously adding expense and which are not always found to be reliable.

As indicated in the foregoing stated objects, the present invention consists of an exceedingly simple and yet very effective means for protecting the flame from such extinguishment.

I have found it important to retard the flame velocity, and also very valuable to interpose a dividing baffle projecting downwardly into the mixing stream as indicated at F′ in broken lines in Fig. 2, and extending across and dividing the upper portion of the tube, as appears in Fig. 7.

It is also desirable to spread the flame as is indicated at F in Figs. 1 and 2. In dividing the mixing stream for the flame, it is essential to have sufficient mixture for uniform burning at either side of the baffle.

One of the present difficulties is the acid attacking the burner tube, now usually made of brass, and resulting from condensate of flue

products falling from the surfaces above, such as the tube C.

In practice the tube of the burner is often eaten away in a short time by the effects of the condensate. Soot and condensate form a carbon, sometimes completely blocking the gas burning and mixing passage of the burner.

To avoid these difficulties, various devices such as special acid resisting tips, for example, lava tips, are mounted at the top of the burner. However, these increase resistance to the flow and change adversely affect the character of the flame.

A preferred embodiment of my invention comprises a pair of members having reed-like tongue portions 20 adapted to fit closely into the tube across its diameter, and having a wider portion 23 providing outwardly extending shoulders 22 spaced a predetermined distance from an enlarged semi-circular head portion 25, which may be bent along a line indicated by the broken line 24 to the shape shown in Fig. 5.

The portion 20 is preferably bent along a line 21 sufficiently to give a permanent set in approximately the position shown, so that when placed back to back two of these parts present a portion of the tongues spaced apart, but which because of the snug fit when inserted into the tube are pressed approximately together. In this position the tongue members tend to bring the tip portions and the shoulder portions 23 into tight engagement while pressing the knee portions 21 outwardly.

When thin metal is punched or blanked from sheet material, sharp and slightly rough edges are formed, and the spreading action between the two members 20 presses these edges into the material of the tube, aiding in holding the assembled guard members very tightly and rigidly in position. This spring action in the back to back position of the members 20 and 23 properly positions the portions 25 in flame spreading position by centering the lower tips of the members 20 across the diameter of the tube, as indicated in Fig. 7.

Even though stainless steel of only ten to fifteen thousandths of an inch thick is used for the guard parts for burner tubes having a quarter of an inch inside diameter for example, I have found that the spring tension is sufficient to hold the parts firmly even after long periods of burning in the high temperature of a flame produced by this character of burner.

Obviously, when these new parts are first assembled, the firmness with which they may be held during handling and shipment, etc., prior to use, depends on the stiffness of the metal and the extent of the offset or bend formed in the members 20.

The position of the bend 21 is preferably approximately that shown which facilitates the two lower ends entering the tube and being wedged into position without danger of distortion of the portions within the tube or the head portions 25 above.

When in the described position it will be noted that the mixture stream for the flame is divided by the pair of reed-like tongues 20 which form a partition across the upper end of the tube.

It is important to avoid setting up eddies in the mixture stream, and an advantage of using very thin material is that the two lower edges pressed together present substantially a knife edge dividing the stream, as indicated in the broken lines F in Fig. 2 without impeding the flow of the burning gas.

It will be noted, of course, that the thickness of the metal illustrated in the drawings, as well as the space between the members 20 in Fig. 7, is exaggerated for convenience in illustration. However, the dividing and spreading of the mixture stream retards the velocity of it somewhat. Thus, gas flowing from the jet 15 under pressure equivalent to eight inches of water may burn effectively in a stable flame, by reason of having translated the velocity to static efficient burning pressure under the canopy formed by the wings 25. Burning under low pressures, however, is not impaired. The protection afforded to the flame is effective whether burning at high or low pressures.

It will be seen that extraneous air violently striking the burner and guard from either side is baffled and retarded by the partition across the upper end of the tube, and air from above or below is likewise deflected by the wings 25.

As indicated above, a serious source of trouble is that of particles of scale, condensate and soot falling from tubes C and other surfaces onto and into the open top of the burner. Obviously, the members 25 forming a circular canopy over its open end effectively prevent this from occurring.

A very important advantage of the invention is the convenience of making a blank such as shown in Fig. 4, and with one operation of a bending die finishing it so that both parts of the guard are formed from identical blanks.

The uniform nature of tubes 12 and their present wide use facilitates using this simple two piece safety attachment.

As a modified form of this invention, certain advantages may be attained by making the two guard members, such as heretofore described, from a single blank, as shown in Figs. 8 and 9, and then bending at the middle portion along a broken line 30, forming a sharp connecting nose portion 31 facilitating thrusting the folded together elements into the burner tube in the position shown in Figs. 1 and 2.

In this form the guard has the convenience of being handled as one piece, and the bent portions 21*a* corresponding to the bends 21 may be augmented by spring action at the connecting nose 31. Even thinner material may be used in this form. However, care must be exercised to avoid the bluntness of the surface at 31 from causing eddy currents impairing the burning of the flame.

When bent to the position shown in Fig. 9, this form presents the two flat reed-like portions 20*a* corresponding to the portions 20; likewise the shoulders 22*a* of the enlargements 24*a* below the bends 23*a* space the wing members 25*a* in the positions shown for the wings 25.

It will be seen from the foregoing that I have utilized the present simplest form of pilot burner, and have provided for it a most effective guard, controlling velocity, preventing inadvertent extinguishment and serving to exclude foreign particles.

Having thus described my invention, what I claim is:

1. In combination with the pilot burner having an upwardly opening tube for the flame, of a pair of reed-like blades fitted into the tube and tightly engaging the inside thereof at opposite sides, and each having a horizontally positioned guard plate extending outwardly over

the upper edges of the tube parallel therewith and spaced therefrom, said blades having shoulders extending over and engaging the top of the tube to effect the spacing of the horizontally turned portions.

2. The combination with Bunsen type burner tube for a pilot flame having an axial gas inlet and side air openings, a pair of flat metal members tightly fitting into the tube across its diameter and extending into the tube and acting to divide the flame, and having outwardly projecting shoulders engaging the upper edge of the tube, and having integral horizontal semi-circular extensions forming a circular guard spaced above the tube.

3. A pair of members stamped from thin flat metal and shaped to form a flame guard for an upwardly opening burner tube, and having tongue portions tightly fitting across the diameter of the tube and extending inwardly a distance greater than the diameter, and having

widened portions forming shoulders engaging the upper edge of the tube, and having laterally turned enlarged head portions which when placed in mutually supporting position form a circular flame spreader and burner guard.

4. A burner guard such as described in claim 3 in which said tongue portions are integrally connected along a sharp folded line at their lower ends.

ALBERT C. SCHICKLER.

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