Sept. 12, 1961 J. T. ALGER 2,999,535

FLAME SHAPERS

Filed March 20, 1957

FIG. 1

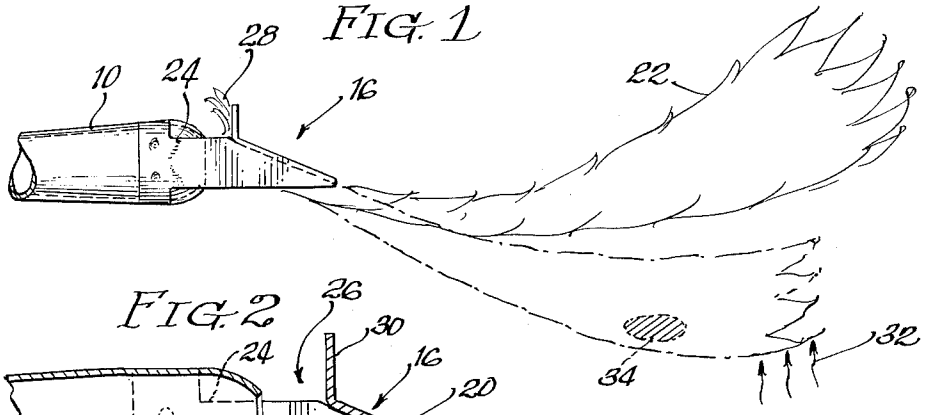


FIG. 2

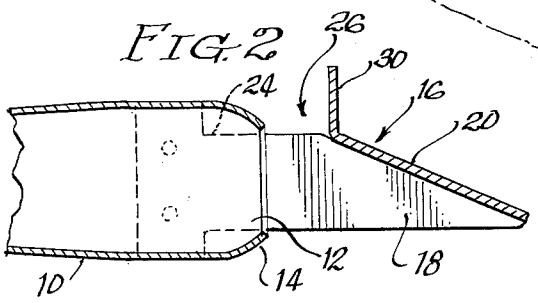


FIG. 3

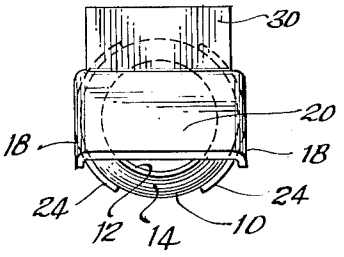


FIG. 4

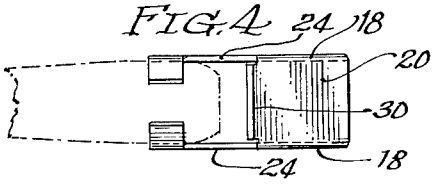


FIG. 5

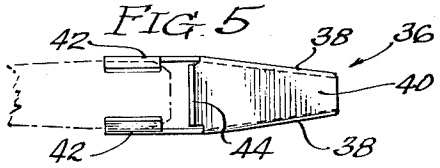


FIG. 7

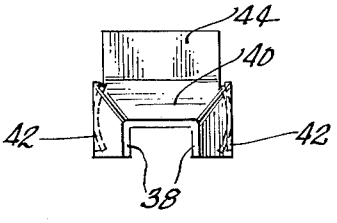


FIG. 6

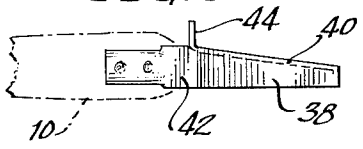
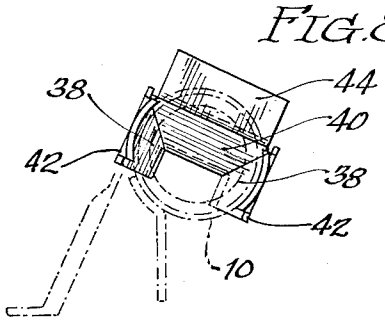


FIG. 8



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FLAME SHAPERS

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This invention relates to flame shapers or spreaders for gas burners, or the like.

One object of the present invention is to provide a flame shaper that may be mounted on a gas burner tube so as to produce a long flat flame which is directed obliquely from the end of the tube, in a downward or lateral direction.

A further object is to provide a new and improved flame shaper or spreader of the foregoing character which will produce a flame adapted to be deflected upwardly or laterally by a forced draft, as in a clothes dryer, or the like.

Further objects and advantages of the present invention will appear from the following description, taken with the accompanying drawings, in which

FIG. 1 is a side elevational view showing a gas burner with a flame shaper or spreader that will be described as an illustrative embodiment of the present invention.

FIG. 2 is a somewhat enlarged central elevational sectional view of the burner and flame shaper shown in FIG. 1.

FIG. 3 is a front end view of the flame shaper.

FIG. 4 is a top view of the flame shaper of FIG. 1.

FIG. 5 is a top view of a modified flame shaper.

FIG. 6 is a side elevational view of the modified flame shaper of FIG. 5.

FIG. 7 is a front end view of the flame shaper of FIG. 5.

FIG. 8 is a rear end view, showing a special application of the flame shaper of FIG. 5, with the flame shaper tilted laterally.

It will be seen that FIGS. 1 and 2 illustrate a known form of burner tube **10**, having a port **12** adapted to discharge a mixture of fuel and air, for combustion in a flame having its base adjacent to the port. It will also be seen that the burner tube **10** is turned inwardly around the port **12** at an acute angle, to define a flange **14**. The tube **10** is shown as being horizontal.

The main flame from the burner tube **10** is deflected downwardly or laterally, in this case downwardly, by a flame shaper or spreader **16** which is in the general form of an inverted shovel or scoop. Thus, the flame shaper **16** has a pair of side walls or flanges **18** with a top wall or web **20** extending therebetween. It will be seen that the top wall **20** is flat in form and is inclined downwardly across the axis of the burner tube **10**. Thus, the top wall deflects the flame downwardly, while cooperating with the side wall flanges **18** to flatten and lengthen the flame. In FIG. 1, the flame is indicated at **22**.

The side flanges **18** have mounting legs or extensions **24** which straddle the end of the burner tube **10** and are welded or otherwise suitably secured thereto. The mounting legs **24** space the inclined top wall **20** outwardly from the end of the burner tube **10** so that a definite gap **26** is formed therebetween.

To provide a small retaining flame **28** adjacent to the base of the main flame, an ear or flange **30** is arranged to project upwardly from the inner end of the top wall **20**. It will be seen that the ear **30** catches a small part of the combustible mixture and directs it into the retaining flame. The small retaining flame **28** has the effect of stabilizing the main flame **22** so that the main flame will not readily be blown out.

The exact flame pattern produced by the flame shaper

16 can readily be varied by changing the proportions of the flame shaper. Thus, the angularity of the top wall **20** determines the extent to which the flame is deflected downwardly. The length and narrowness of the flame may be increased by increasing the length of the side and top walls **18** and **20**, and decreasing the spacing between the side walls.

The flame shaper **16** is especially well adapted for use in a clothes dryer or some other device in which a forced updraft, represented at **32** in FIG. 1, is normally produced adjacent the outer end of the main flame **22**. It will be understood that the forced draft **32** is produced by a blower or the like, not shown. The forced draft has the effect of deflecting the outer end of the flame **22** upwardly, generally to the position shown in full lines in FIG. 1. When the forced draft is absent, the flame shaper **16** will have the effect of deflecting the flame to a lower path, indicated in broken lines in FIG. 1. This movement of the flame **22** may be utilized to operate a safety switch or other control device **34**, adapted to shut off the burner **10** when the forced draft **30** is absent. It will be seen that the safety switch **34** is positioned in the lower path occupied by the flame when the forced draft **32** is not present, but is below the normal path of the flame. Thus, the heat of the flame will operate the safety switch **34** only when the forced draft is absent.

FIGS. 5–7 illustrate the slightly modified flame shaper **36** adapted to produce a narrower flame than that produced by the flame shaper of FIGS. 1–4. Thus, the flame shaper **36** has side wall flanges **38** which taper or converge toward each other, from their inner to their outer ends. As before, a top wall **40** extends between the side wall flanges **38** and is inclined downwardly between those inner and outer ends, but, in this case, the angle of inclination is somewhat less than in the flame shaper of FIG. 1. As in the first embodiment, the side wall flanges **38** have mounting leg portions **42**, which straddle the burner tube **10** and space the top wall **40** outwardly from the end of the burner tube. At the inner end of the upper wall **40** an upwardly directed flange or ear **44** provides a retaining flame as before.

FIG. 8 shows a special application of the flame shaper **36**, with the flame shaper tilted laterally so as to provide a flame which is deflected laterally, as well as downwardly, by the inclined top wall **40**.

The flame shapers have the important advantage of producing a flame which is long and flat and which is inclined downwardly. As already indicated, the flame shaper may be employed to advantage where there is a forced updraft that normally will deflect the outer end of the flame upwardly, away from the safety device that will cut off the flame if the updraft is absent. Thus, the flame shaper may be employed in clothes dryers or other devices utilizing a forced air blast.

Various modifications, alternative constructions and equivalents may be employed without departing from the true spirit and scope of the invention, as exemplified in the foregoing description and defined in the following claims.

I claim:

1. In a burner, the combination comprising a mixture tube with a front end having an axial discharge port therein to discharge fuel-air mixture from said tube, a generally inverted channel-shaped flame shaper having a substantially flat planar top wall spaced forwardly from the end of said mixture tube and inclined downwardly between its rear and front ends across the axis of said mixture tube to deflect most of the mixture downwardly to form a main flame portion, a pair of laterally spaced substantially flat generally vertical sidewall flanges projecting downwardly from said top wall and extending generally from rear to front along said top wall to confine

the portion of the mixture intercepted by said top wall, said sidewall flanges having leg portions constituting rearward extensions thereof and extending rearwardly of the rear end of said top wall and terminating in mounting portions secured to said mixture tube, said leg portions having a gap therebetween opening upwardly between said front end of said tube and said rear end of said top wall, and a substantially vertical flame-retaining wall portion extending upwardly from the rear end of said top wall and in a transverse direction relative to the general direction of said sidewall flanges, said flame-retaining wall being spaced forwardly from the end of said tube at the front end of said gap, the lower portion of said flame-retaining wall being disposed below the level of the upper portion of said port for intercepting and upwardly deflecting a portion of the mixture through said gap to form a relatively small secondary flame portion.

2. In a burner, the combination comprising a mixture tube with a front end having an axial discharge port therein to discharge fuel-air mixture from said tube, a generally channel-shaped flame shaper having a substantially straight planar deflecting wall with its rear end spaced forwardly from the end of said tube and extending obliquely from rear to front across the axis of said tube at a small angle to said axis for deflecting most of the mixture in one transverse direction to form a main flame portion, a pair of opposed laterally spaced sidewall flanges projecting from said deflecting wall in said one transverse direction and extending generally from rear to front along said deflecting wall to confine the portion of the mixture intercepted by said deflecting wall, said sidewall flanges having leg portions constituting rearward extensions thereof and extending rearwardly of the rear end of said deflecting wall and terminating in mounting portions secured to said mixture tube, said leg portions having a gap therebetween opening upwardly between said front end of said tube and said rear end of said deflecting wall, and a flame-retaining wall connected to said rear end of said deflecting wall at the front end of said gap and extending from said deflecting wall in a direction generally opposite to said one transverse direction, said flame-retaining wall extending transversely to the general direction of said sidewall flanges and being spaced forwardly from the front end of said tube and opposite a portion of said port for intercepting and deflecting a portion of the mixture through said gap between said flame-retaining wall and said tube to form a relatively small secondary flame portion.

3. In a burner, the combination comprising a mixture tube with a front end having an axial discharge port therein to discharge fuel-air mixture from said tube, a generally channel-shaped flame shaper having a substantially straight planar deflecting wall with its rear end spaced forwardly from the end of said tube and extending obliquely from rear to front across the axis of said tube at a small angle to said axis for deflecting most of the mixture in one transverse direction to form a main flame portion, a pair of opposed laterally spaced sidewall flanges projecting from said deflecting wall in said one transverse direction and extending generally from rear to front along said deflecting wall to confine the portion of the mixture intercepted by said deflecting wall, said sidewall flanges converging progressively to a substantial extent toward each other in a forward direction, said sidewall flanges having leg portions constituting rearward extensions thereof and extending rearwardly of the rear end of said deflecting wall and terminating in mounting portions secured to said mixture tube, said leg portions having a gap therebetween opening upwardly between said front end of said tube and said rear end of said deflecting wall, and a flame-retaining wall connected to said rear end of said deflecting wall at the front end of said gap and extending from said deflecting wall in a direction generally opposite to said one transverse direction, said flame-retaining wall extending transversely to the general direction of said sidewall flanges and being spaced forwardly from the front end of said tube and opposite a portion of said port for intercepting and deflecting a portion of the mixture through said gap between said flame-retaining wall and said tube to form a relatively small secondary flame portion.

4. In a burner, the combination comprising a generally horizontal mixture tube with a front end having an axial discharge port therein to discharge fuel-air mixture from said tube, a generally inverted channel-shaped flame shaper having a substantially straight planar top wall with its rear end spaced forwardly from the end of said tube and inclined downwardly between its rear and front ends across the axis of said tube for deflecting most of the mixture downwardly to form a main flame portion, a pair of opposed laterally spaced sidewall flanges projecting downwardly from said top wall and extending generally from rear to front along said top wall to confine the portion of the mixture intercepted by said top wall, said sidewall flanges having leg portions constituting rearward extensions thereof and extending rearwardly of the rear end of said top wall and terminating in mounting portions secured to said mixture tube, said leg portions having a gap therebetween opening upwardly between said front end of said tube and said rear end of said top wall, and a flame-retaining wall connected to the rear end of said top wall at the front end of said gap and extending upwardly from said top wall and in a transverse direction relative to the general direction of said sidewall flanges, said flame-retaining wall being spaced forwardly from the front end of said tube and opposite a portion of said port for carrying a portion of the mixture upwardly through said gap to form a relatively small upwardly directed secondary flame portion.

5. A flame shaper for use on the front end of a mixture tube of a burner, said flame shaper comprising a generally inverted channel-shaped structure having a pair of spaced opposed substantially flat generally vertical sidewall flanges extending generally in a rear-to-front direction with a substantially flat planar top wall extending therebetween and inclined downwardly between its rear and front ends for deflecting fuel-air mixture downwardly to form a main flame portion, said sidewall flanges having leg portions constituting rearward extensions thereof and extending rearwardly of the rear end of said top wall, said leg portions having mounting portions at their rear ends for mounting said flame shaper on a mixture tube with the rear end of said top wall spaced forwardly therefrom, said leg portions having an upwardly opening gap therebetween with the rear end of said top wall at the front end of said gap, and a flame-retaining wall projecting upwardly from the rear end of said top wall at the front end of said gap and extending transversely to the general direction of said sidewall flanges for carrying a portion of the mixture upwardly through said gap to form an upwardly directed relatively small secondary flame portion, said sidewall flanges converging progressively toward each other to a substantial extent in a forward direction.

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