United States Patent [19]

Du Perow

[11] **3,822,982**

[45] **July 9, 1974**

[54] **GAS BURNER STRUCTURE**

[75] Inventor: **Donald E. Du Perow,** Bloomfield Hills, Mich.

[73] Assignee: **Lincoln Brass Works,** Detroit, Mich.

[22] Filed: **June 6, 1973**

[21] Appl. No.: **367,520**

[52] **U.S. Cl.** ..... **431/193,** 126/39 E

[51] **Int. Cl.** **F24c 3/10**

[58] **Field of Search** ..... 431/191, 192, 193, 194; 126/39 E

[56] **References Cited**

UNITED STATES PATENTS

3,219,098	11/1965	Fulmer	431/193 X
3,280,885	10/1966	Kindl	431/193
3,619,099	11/1971	Moss et al.	431/192

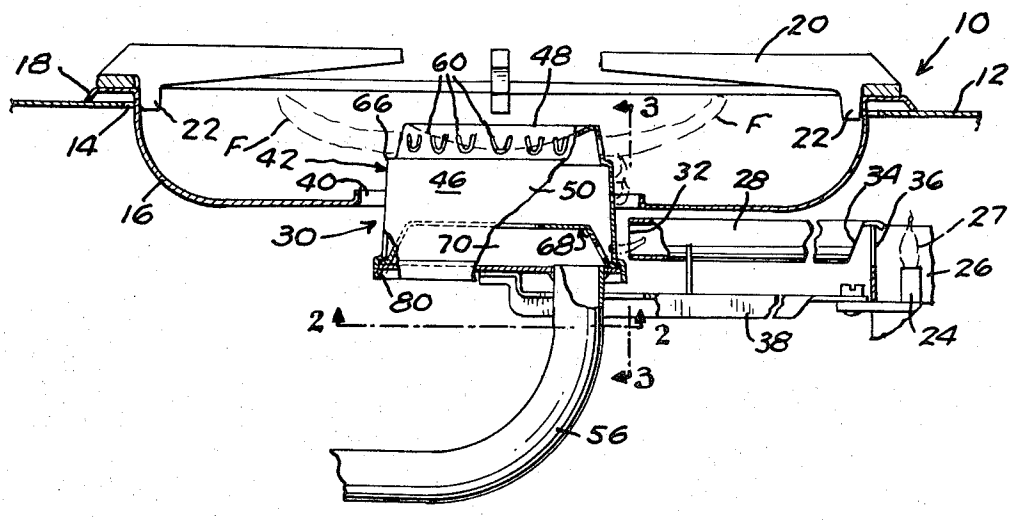
Primary Examiner—Edward G. Favors

Attorney, Agent, or Firm—Barnes, Kisselle, Raisch & Choate

[57] **ABSTRACT**

In a gas burner having a top and a ring of burner ports adjacent thereto, the gas inlet through the burner base is located adjacent a side of the burner body instead of centrally. An inverted dish-shaped baffle having a central opening distributes gas evenly to the burner ports but delays gas en route from the inlet to the burner ports. An opening in the baffle issues gas directly to flash-tube-charge-and ignition porting for quick ignition. Result: diminished "roll out" of flames from the burner ports upon ignition.

21 Claims, 7 Drawing Figures



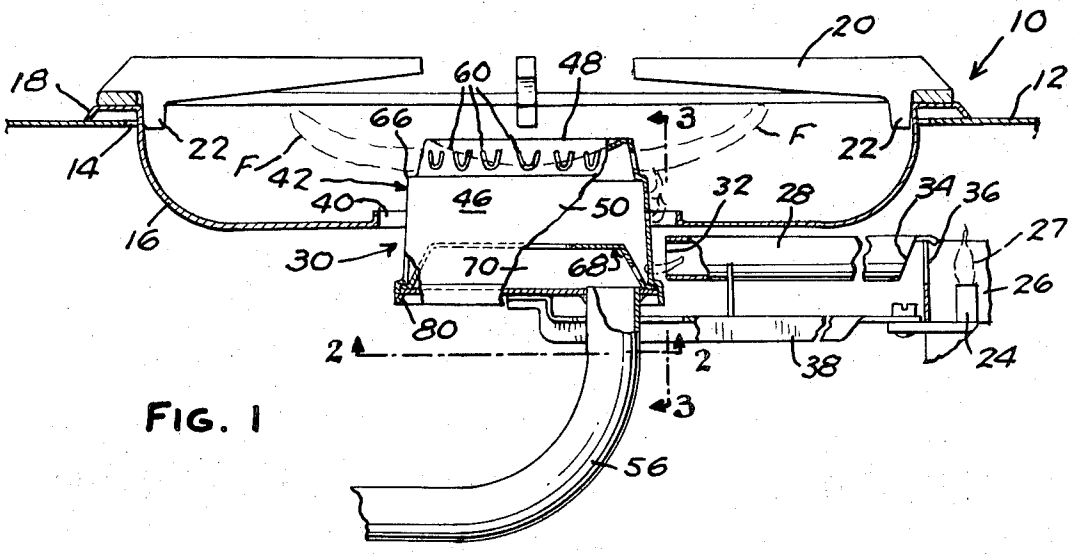


FIG. 1

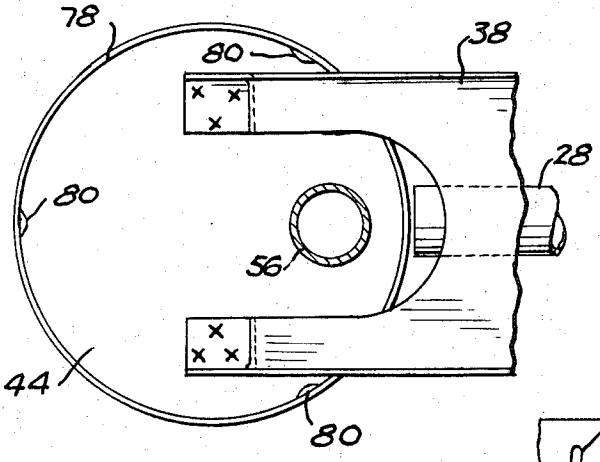


FIG. 2

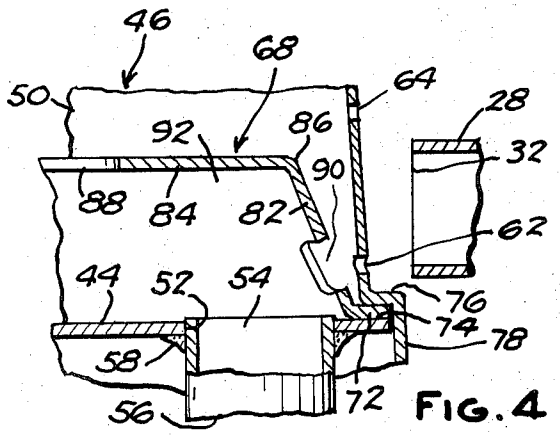


FIG. 4

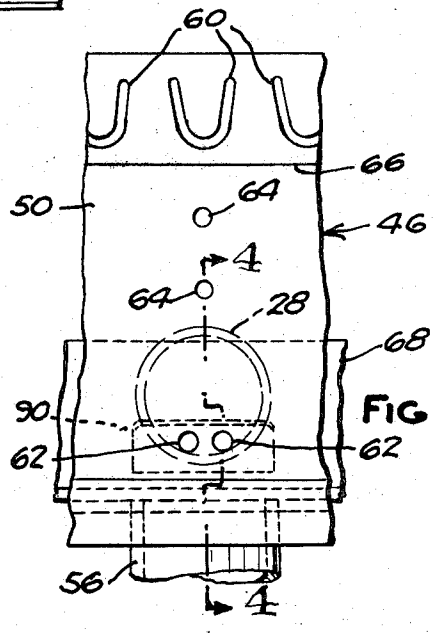


FIG. 3

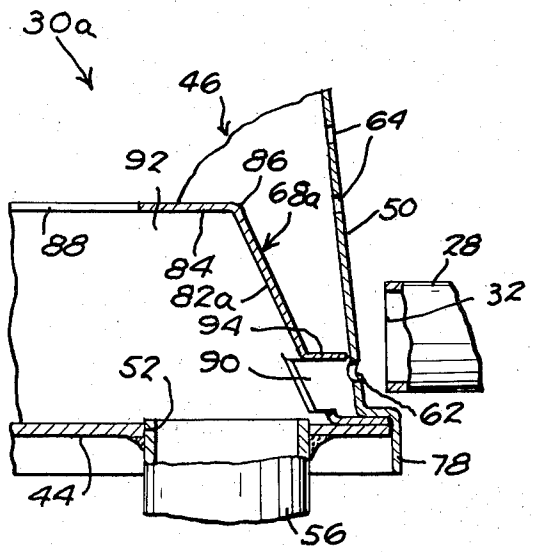


FIG. 5

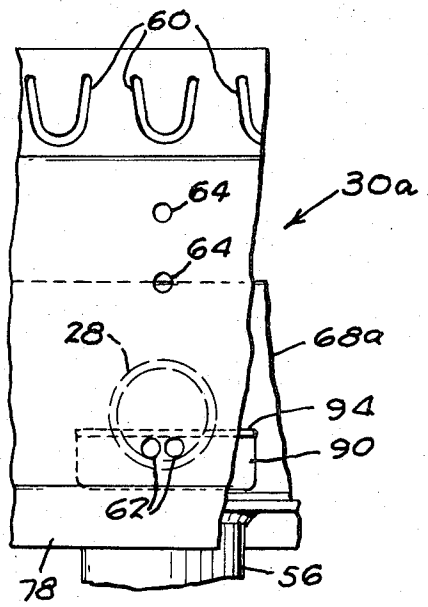


FIG. 6

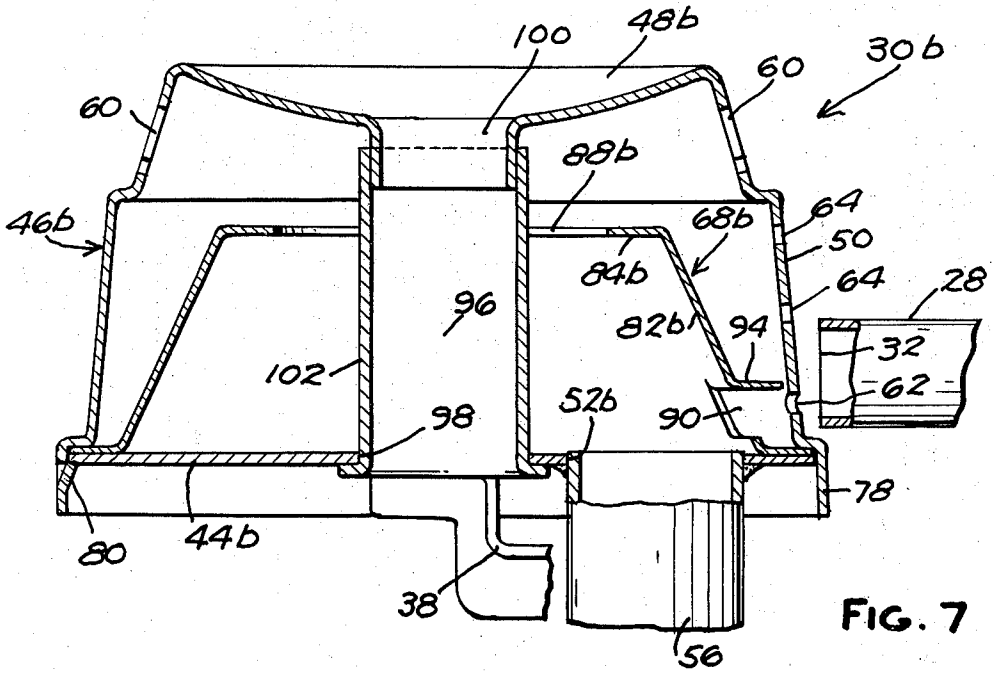


FIG. 7

GAS BURNER STRUCTURE

This invention relates generally to gas burners of the type used in domestic gas ranges and more particularly to gas burners of the type wherein the burner body comprises a base with a cup inverted over it. An end of the cup defines the top of the burner body and the side wall of the cup is apertured to form a ring of burner ports adjacent the burner top.

The side wall of the burner body is also provided with porting through which gas issues into a flash tube which conducts the gas to a pilot flame at which ignition occurs. Ignition flashes back to this porting and is carried up to the burner ports by one or more carry-up ports in the side wall above the flash-tube-charge-and ignition porting.

It is conventional in this type of burner to provide a gas inlet opening at a central location in the burner base to facilitate uniform distribution of the incoming gas to the burner ports. When the burner is turned on, the gas issuing from the inlet quickly reaches the burner ports and considerable of the gas issues through the burner ports before it is ignited. When the gas does ignite, a flame momentarily is formed which extends an unusual distance outwardly and upwardly from the burner. Thereafter the flame quickly shrinks to its normal size. This initial outward puff of the flame upon ignition is referred to in the art as "roll out."

In the conventional burner of the type under consideration, this "roll out" is regarded as excessive and dangerous in that it is capable of igniting such human appurtenances as negligees, sleeves, hair of a child, or the like.

The object of the present invention is to provide a relatively simple, inexpensive burner structure of the type discussed which is improved to reduce the extent of "roll out" to safe proportions. One form of the invention is shown in the accompanying drawings.

FIG. 1 is a fragmentary view partly in elevation and partly in section illustrating a gas range equipped with a burner structure according to the present invention.

FIG. 2 is an enlarged scale sectional view on line 2—2 of FIG. 1.

FIG. 3 is an enlarged scale fragmentary elevational view on line 3—3 of FIG. 1.

FIG. 4 is a further enlarged sectional view on line 4—4 of FIG. 3.

FIG. 5 is a view similar to FIG. 4 but illustrating a modified form of burner structure.

FIG. 6 is a view similar to FIG. 3 but illustrating the burner structure of FIG. 5.

FIG. 7 is a generally central vertical sectional view of another modified form of burner structure.

Shown in the drawings is a gas range **10** having a top **12** with an opening **14**. A drip pan or aeration pan **16** is supported within opening **14** by means of a flange **18** on the pan engaged with range top **12**. A grate **20** is supported on flange **18** and centered within pan **16** by lugs **22**. The range has a pilot burner **24** disposed within a shield **26**. Pilot flame **27** burns at the pilot burner.

A flash tube **28** extends between pilot **24** and each of a number of gas burners as is conventional. Only one gas burner **30** is illustrated and this burner embodies the present invention. Flash tube **28** has an end **32** adjacent burner **30** and an end **34** aligned with an opening **36** in shield **26** adjacent pilot flame **27**. Burner **30** is

supported by a bracket **38** within a central aeration opening **40** in pan **16**.

Burner **30** has a body **42** defined in part by a base plate **44** and in part by an inverted closed-center cup **46** which defines a top **48** and an adjoining side wall **50**. Base **44** has a gas inlet opening **52** and in the structure illustrated the downstream end portion **54** of a mixing tube **56** is secured within opening **52** by suitable means such as a fused metal connection **58** (FIG. 4).

Side wall **50** is apertured to provide a ring of burner ports **60** just below top **48**, one or more flash-tube-charge-and ignition ports **62** in a lower portion of the burner body, and one or more carry-up ports **64** between porting **62** and burner ports **60**. Side wall **50** is formed with a shoulder **66** below burner ports **60** to protect flames F from drafts of air flowing upwardly around the burner.

Inlet **52** is positioned relatively closely to a portion of side wall **50** which contains porting **62, 64** rather than at the conventional central location in base plate **44**. A baffle **68** is disposed within the chamber **70** defined by base plate **44** and cup **46**. This baffle has the form of an inverted dish with an outwardly flanged peripheral edge **72** engaged against the top peripheral portion **74** of base plate **44**. Side wall **50** of burner cup **46** has an outward shoulder **76** below porting **62**, the bottom of which is engaged against the top of flange **72**. Side wall **50** continues downwardly from shoulder **76** in a skirt **78** which surrounds base plate **44** and flange **72**. Skirt **78** is lanced and deformed inwardly under base plate **44** as illustrated at **80** to secure cup **46**, baffle **68** and base plate **44** together with flange **72** in clamped relation between shoulder **76** and peripheral portion **74** of base plate **44**.

Baffle **68** has a side wall portion **82** which extends upwardly from flange **72** and inwardly toward the center of chamber **70** generally along the slant height of a cone. Wall portion **82** extends circumferentially around the interior of chamber **70** and adjoins a horizontal wall portion **84** at **86**. Wall portion **84** has a central opening **88** which is located substantially centrally within chamber **70**. Wall portion **82** is apertured to provide a bypass opening **90** which is aligned with and closely adjacent porting **62** for a purpose to be described. Baffle **68** comprises a very inexpensive metal stamping.

In use, it will be assumed that initially gas burner **30** is turned off. When the appropriate valving is opened, fuel gas flows through mixing tube **56** and inlet **52** into that portion **92** of chamber **70** which lies within baffle **68**. This gas impinges upon baffle walls **82, 84** and is deflected circumferentially beneath the baffle and radially inwardly toward central opening **88**. The gas quickly becomes distributed evenly around the circumference of chamber portion **92** and begins to flow toward central opening **88** from all directions. However, before any of the gas can reach burner ports **60** it must again change direction and flow upwardly through opening **88** and then outwardly. Gas en route from inlet **52** to burner ports **60** thus must follow a relatively long, plural direction path and the gas is delayed substantially in reaching the burner ports. The gas is distributed uniformly to burner ports **60** from central opening **88**.

Meanwhile, some of the gas from inlet **52** bypasses baffle walls **82, 84** by issuing through bypass opening **90** and immediately flows through porting **62** into end

32 of flash tube 28. Thus the gas follows a very short path from inlet 52 to the flash tube. The gas flows through the tube, openings 34 and 36, and is ignited by flame 27. Ignition flashes back to porting 62 and is carried upwardly by porting 64 to ignite gas by then issuing from burner ports 60.

By thus deflecting the main stream of the gas and lengthening the time required for it to flow from offset inlet 52 to burner ports 60 while at the same time bypassing some of the gas through a short path into flash tube 28, less gas can flow through the burner ports before it is ignited. This materially reduces the extent of the "roll out" of flames F upon ignition.

Central opening 88 in the baffle preferably has an effective area greater than that of inlet 52 to provide a slower rate of flow of the gas from baffle 68 to the burner ports. Bypass opening 90 is shown as having a greater effective area than that of porting 62 so that gas issuing from opening 90 blankets porting 62 to insure a flow of gas therethrough into the flash tube. Inlet 52 need not be located in the same vertical plane as opening 90 and porting 62 but could be circumferentially displaced therefrom. However, it is important that opening 90 be aligned with porting 62.

The modified burner structure 30*a* shown in FIGS. 5 and 6 is in general similar to that described above except that wall 82*a* of baffle 68*a* has an outwardly turned lip portion 94 which overlies bypass opening 90 and extends toward cup wall 50 above flash-tube-charge-and ignition porting 62. Lip 94 has two functions. It positively deflects gas issuing through bypass 90 toward porting 62 to insure rapid ignition; and it prevents gas from flowing directly upwardly from inlet 52 to the burner ports 60 above opening 90, which might cause uneven burning at ports 60. For optimum operation, lip 94 is desirable in some burners and unnecessary in others depending upon the specific dimensioning and configuration of the burner involved. Lip 94 is used, for example, where the distance between opening 90 and porting 62 is more than minimal as shown in FIG. 5.

The modified burner structure 30*b* illustrated in FIG. 7 is similar to those described above except that it is of the type which has a central duct or passageway 96 for passing secondary air to flames F burning at burner ports 60. For this purpose, base plate 44*b* and burner top 48*b* are provided respectively with central openings 98 and 100. A tube 102 extending between these openings defines passageway 96.

Inlet 52*b* and the downstream end of mixing tube 56 are disposed between tube 102 and side wall 50 of cup 46*b*. Central opening 88*b* of baffle 68*b* surrounds tube 102. The baffle is illustrated as having a lip 94 overlying bypass opening 90 as in the form shown in FIGS. 5 and 6. Functioning of this form of the invention is similar to that described with respect to the forms of the invention illustrated in FIGS. 1–4 and FIGS. 5,6.

From FIG. 7 it will be seen that central opening 88*b* in baffle 68*b* extends radially outwardly slightly beyond the radially inner edge of inlet opening 52*b*. Small portions of the areas of these openings are thus in vertical alignment. This construction may be required to meet the dimensional and configuration requirements of certain burners, both closed-center (FIGS. 1–6) and open-center (FIG. 7). In such burners a very small portion of the gas initially entering the burner may pass directly upwardly through the central opening, but the major proportion of the gas is deflected and distributed as described by baffle 68, 68*a*, or 68*b*. Moreover, once the circumferential distribution and radially inward flow of gas has been effected, the small percentage of gas which flows vertically from inlet 52 or 52*b* toward the central opening is diverted inwardly by the radially inward flow of gas toward the central opening. As a practical matter, substantially all of the gas flow is diverted in a plural direction path in passing from inlet 52 or 52*b* to burner ports 60.

I claim:

1. In a gas burner having a chamber defined by a bottom having a fuel gas inlet, a top and a side wall apertured to provide burner ports and flash-tube-charge-and ignition porting, improved structure which comprises,
   - said inlet having a location which is off-center with respect to said bottom and top,
   - means forming a baffle within said chamber having portions positioned and contoured to substantially equalize the flow to said burner ports of gas issuing from said off-center location,
   - said portions being effective to deflect gas en route from said inlet to said burner ports into a plural-direction, relatively long path,
   - said baffle being apertured to provide a bypass positioned to issue gas in a relatively short path to said flash-tube-charge-and ignition porting.

2. In a gas burner having a chamber defined by a bottom having a fuel gas inlet, a top and a side wall apertured to provide burner ports and flash-tube-charge-and ignition porting, improved structure which comprises,
   - said inlet having a location which is off-center with respect to said bottom and top,
   - means forming a baffle within said chamber having portions positioned and contoured to substantially equalize the flow to said burner ports of gas issuing from said off-center location,
   - said portions being effective to deflect gas en route from said inlet to said burner ports into a plural-direction, relatively long path,
   - said baffle being provided with a bypass positioned to issue gas in a relatively short path to said flash-tube-charge-and ignition porting,
   - said bypass comprising an apertured portion of said baffle aligned with said porting.

3. The structure defined in claim 2 wherein said apertured portion has an effective area greater than that of said porting.

4. The structure defined in claim 2 wherein the distance between said apertured portion and porting is less than a cross dimension of said apertured portion.

5. The structure defined in claim 2 wherein said inlet, apertured portion, and porting have portions which lie on a common vertical plane.

6. The structure defined in claim 2 and including in addition means defining a lip positioned above said apertured portion and extending toward said flash-tube-charge-and ignition porting to direct gas issuing from said apertured portion toward said porting.

7. The structure defined in claim 6 wherein said lip comprises a portion of said baffle.

8. In a gas burner having a chamber defined by a bottom having a fuel gas inlet, a top and a side wall apertured to provide burner ports and flash-tube-charge-

and ignition porting, improved structure which comprises,

said inlet having a location which is off-center with respect to said bottom and top,

means forming a baffle within said chamber having portions positioned and contoured to substantially equalize the flow to said burner ports of gas issuing from said off-center location,

said portions being effective to deflect gas en route from said inlet to said burner ports into a plural-direction, relatively long path,

said baffle being provided with a bypass positioned to issue gas in a relatively short path to said flash-tube-charge-and ignition porting,

said baffle comprising an inverted dish-shaped element having a peripheral edge engaged against said bottom and a wall which extends upwardly from said bottom and toward the center of said chamber,

said baffle portions comprising one portion of said wall above and aligned with said inlet, other portions of said wall extending around the chamber interior from said first portion, and a central portion of said wall apertured to issue gas toward said burner top.

9. The structure defined in claim **8** wherein said bypass comprises an opening in an upwardly extending portion of said wall aligned with said flash-tube-charge-and ignition porting.

10. The structure defined in claim **9** wherein the axes of said inlet and porting are respectively generally vertical and generally horizontal, said opening being positioned between said inlet and porting and having an axis angled to the aforesaid axes.

11. The structure defined in claim **8** wherein said central portion has a single aperture substantially centered in said chamber, said aperture having an effective area greater than that of said inlet.

12. The structure defined in claim **11** wherein said aperture is completely out of vertical alignment with said inlet.

13. The structure defined in claim **11** wherein small proportions of the areas of said aperture and inlet are in vertical alignment.

14. The structure defined in claim **8** wherein said element has a flange at said peripheral edge clamped between portions of said side wall and bottom.

15. The structure defined in claim **14** wherein said portion of said side wall comprises an outward shoulder, the bottom of which engages said flange.

16. The structure defined in claim **8** wherein said wall of said dish-shaped element has one region which extends upwardly from said peripheral edge and toward the center of said chamber generally along the slant height of a cone, and another region adjoining said one region and extending generally horizontally toward the center of said chamber, said other region being so apertured.

17. The structure defined in claim **16** wherein said bypass comprises an opening in said one region of said wall positioned closely adjacent said flash-tube-charge-and ignition porting.

18. The structure defined in claim **17** wherein said other region has a single aperture substantially centered in said chamber and having a cross dimension greater than that of said inlet, said peripheral edge having an outward flange clamped between said bottom and an outward shoulder adjacent a lower portion of said side wall.

19. The structure defined in claim **8** wherein said bypass comprises an opening in said one portion of said wall aligned with said flash-tube-charge-and ignition porting,

said one wall portion adjacent the upper edge of said opening being turned outwardly to define a lip projecting toward said porting to direct gas issuing from said opening toward said porting.

20. The structure defined in claim **11** wherein said chamber bottom and top have closed centers.

21. The structure defined in claim **11** and including in addition a secondary air duct extending vertically through central portions of said bottom and top, said duct passing centrally through said aperture.

* * * * *