Dec. 17, 1963 G. A. DADAS 3,114,411

BURNER MEANS FOR AIR-GAS MIXTURES

Filed March 13, 1961 4 Sheets-Sheet 1

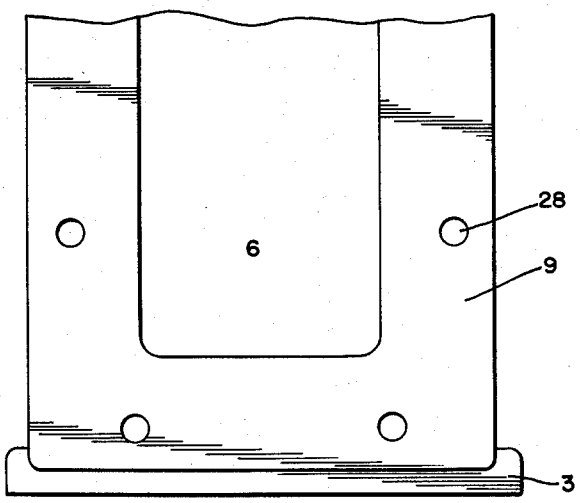


Fig. 1

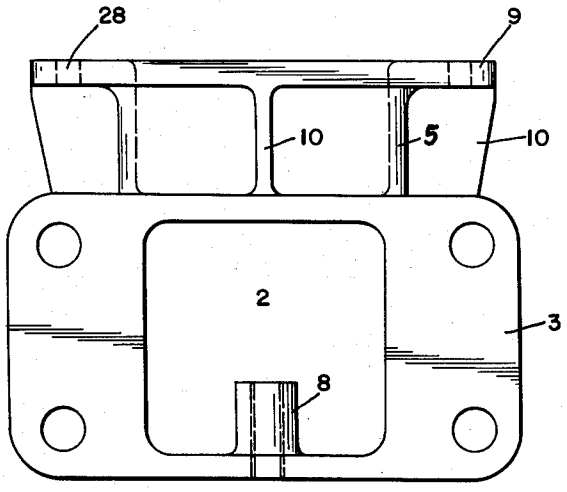


Fig. 2

INVENTOR.

GUST ALEX DADAS

BY Frank R Hyler

ATTORNEY

Dec. 17, 1963 G. A. DADAS 3,114,411

BURNER MEANS FOR AIR-GAS MIXTURES

Filed March 13, 1961 4 Sheets-Sheet 2

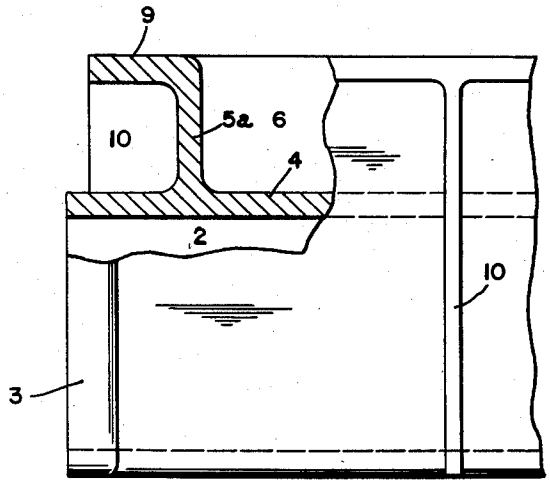


Fig. 3

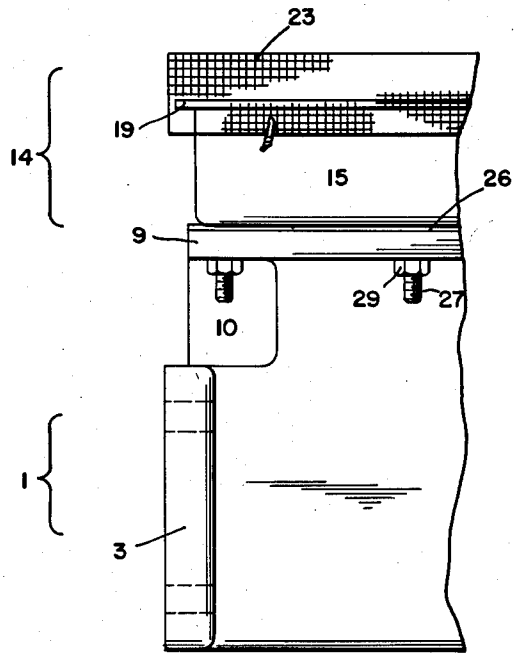


Fig. 4

INVENTOR.

GUST ALEX DADAS

BY Frank R. Higley

ATTORNEY

Dec. 17, 1963 G. A. DADAS 3,114,411

BURNER MEANS FOR AIR-GAS MIXTURES

Filed March 13, 1961 4 Sheets-Sheet 3

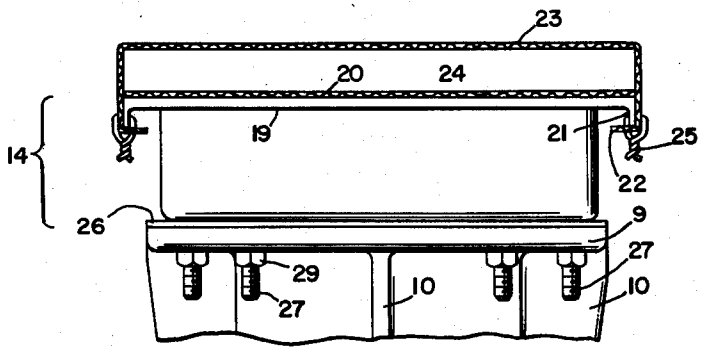


Fig. 5

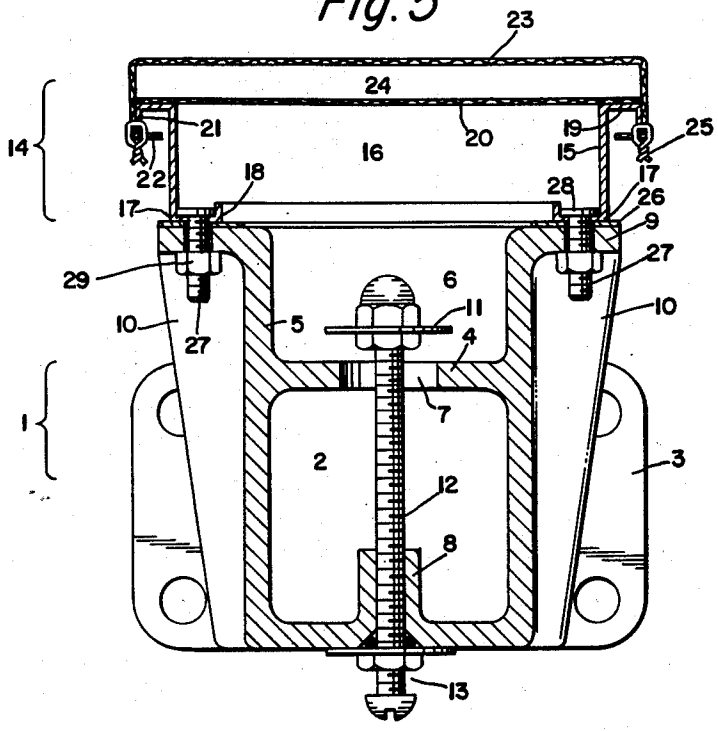


Fig. 6

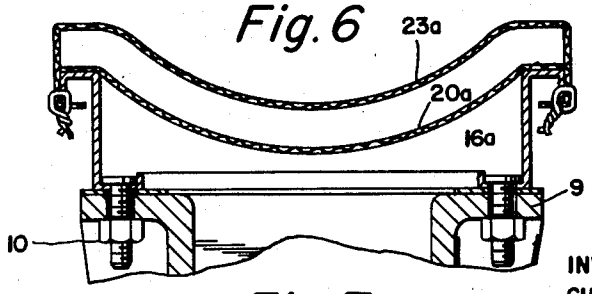


Fig. 7

INVENTOR.
GUST ALEX DADAS

BY Frank R. Hyler

ATTORNEY

Dec. 17, 1963 G. A. DADAS 3,114,411

BURNER MEANS FOR AIR-GAS MIXTURES

Filed March 13, 1961 4 Sheets-Sheet 4

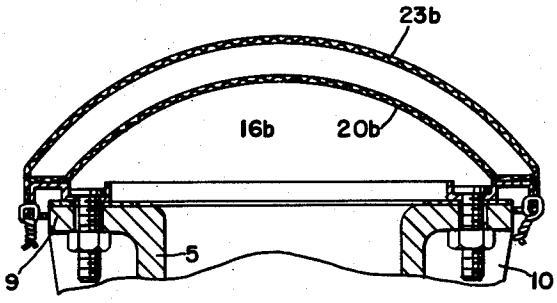


Fig. 8

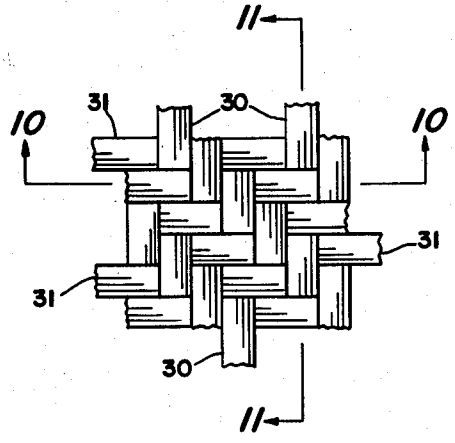


Fig. 9

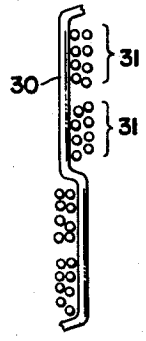


Fig. 11

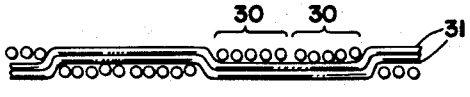


Fig. 10

INVENTOR.
GUST ALEX DADAS
BY
ATTORNEY

United States Patent Office 3,114,411 Patented Dec. 17, 1963

3,114,411

BURNER MEANS FOR AIR-GAS MIXTURES

Gust Alex Dadas, Cleveland, Ohio, assignor to Pyronics, Inc., Cleveland, Ohio, a corporation of Ohio

Filed Mar. 13, 1961, Ser. No. 95,117
1 Claim. (Cl. 158—116)

This invention relates to burners for air-gas mixtures under pressure and proportioned for complete combustion, wherein combustion commences at the downstream face of a porous membrane, hereinafter termed screen or burner screen, through which mixture flow is had and by which flashback or backfire is prevented.

Burners of such class, include an infra-red industrial type wherein a reverberatory grid screen is arranged in spaced relation to the burner screen, to be heated by combustion under low pressure for radiant dispersion of the heat energy thus generated.

An object of the invention is to provide an improved infra-red burner, as a unit capable of installation interconnected with other similar burner units in various combinations thereof, wherein individual pressure adjustment for each may easily be made externally thereof and during its operation, as according to its relative location in the installation.

The burner unit includes, as a further object of the invention, a base assembly for receiving the air-gas mixture under line pressure, and a screen assembly mounted thereon to receive the mixture therefrom at lower adjusted pressure, for its combustion.

The burner screen face contemplated is of elongated rectangular outline, and the base includes a through manifold passage chamber for high pressure mixture supply; and the invention includes, as another object, novel and improved means for flow from such first chamber, through a second chamber wherein mixture metering and distribution is had at reduced pressure, thence to a third chamber wherein expansion is had and pressure further reduced immediately upstream of the burner screen, with uniformity throughout its face.

The invention includes as another object, novel employment and location of joinder, between the base and screen assemblies in defining the second and third chambers and their relation.

And another object is to provide the metering and distribution had in the second chamber employing a novel cooperative relation between walls thereof and valve therein.

While the burner of this invention is operable in other dispositions, for convenience it is herein shown and considered as disposed for principally upward thermal output, and adjustment from below.

Also, in some of the drawings, parts are shown conventionally as will appear.

Still further objects and advantages will be apparent from the following description taken in connection with the accompanying drawings, and disclosing the invention in presently preferred form.

In the drawings:

FIG. 1 is a plan view of an end portion of the body part of the base assembly;

FIG. 2 is an end elevation of the same;

FIG. 3 is a side elevation thereof with parts broken away to show details of construction;

FIG. 4 shows, in side elevation, an end portion of the body together with the screen assembly mounted thereon;

FIG. 5 shows, in end elevation, the screen assembly as mounted on the body, the top portion only, of the latter appearing;

FIG. 6 is a view, in transverse sectional elevation, of the complete burner unit, including the base assembly with its burner assembly mounted thereon.

Base Assembly

The burner unit of this invention includes a base assembly generally designated at **1**, FIGS. 4 and 6, of which the principal parts are a body and valve means mounted therein.

The body, may be a ferrous casting, and as shown in FIGS. 1, 2, 3, 4 and 6, is provided with a through endwise manifold passage **2**, of generally rectangular section, and at its ends has means, such as the flanges **3** with bolt holes indicated in FIGS. 2, 4 and 6, for interconnection with other similar parts for passage communication therewith, inlet of high pressure gas-air mixture, or a closure, as known in the art.

The passage **2** is defined by a pair of side walls **5**, a bottom wall best shown in FIG. 6, and a transverse or cross wall **4**, FIGS. 3 and 6. The side walls **5** extend upwardly beyond the cross wall to provide sides of an elongated cavity **6** above the passage, and end walls **5***a* for the cavity extend between the side walls and upwardly from the cross wall.

The cavity **6** thus opens upwardly, and an outturned flange **9** is arranged about its mouth.

As shown, FIGS. 3 and 4, the end walls **5***a* are offset from the ends of the body sufficiently that the flange does not extend therebeyond.

The cross wall **4** is provided with a centrally located port **7**, and the body with a boss **8** therebelow, as shown in FIGS. 2 and 6.

The body may preferably be ribbed as at **10**, FIGS. 2 to 6, to resist warping and dissipate heat under operating conditions.

The valve means of the base assembly appears in FIG. 6. As there shown it includes a head **11** disposed within the cavity **6** above the port **7** and extending laterally therebeyond.

The valve head is mounted on the body by a stem **12** threadedly mounted in the boss **8**, extending upwardly through the port **7** and downwardly therefrom below the body for external adjustment of the head as by the screw slot and lock nut, with adjacent packing ring and retaining washer all generally indicated at **13**, during burner operation, to control flow through the port **7** from the manifold passage **2** to the cavity **6**.

It will be apparent that the valve means not only controls the amount of flow through the port, but also, by the disposition and overhang of its head **11** thereover, provides distribution within the cavity **6**, the closer and longer side walls of which cooperate in distribution toward the end walls.

Burner Screen Assembly

As shown in FIGS. 4, 5 and 6, the burner screen assembly, generally indicated at **14**, includes a rectangular frame of stainless steel or the like, defining a hollow **16** proportioned according to the base body, with side walls **15** and end walls therebetween, and a continuous peripheral flange **17** inturned along the bottom edges thereof to overlie the outturned flange **9**, as appears in FIG. 6, the flange **17** preferably terminating inwardly with an upturned lip **18**. Along the upper edges of its walls, the frame includes a continuous peripheral outturned flange **19**.

The burner assembly includes a burner screen **20**, of tightly interwoven wire strands or of other suitable material, peripherally overlying the flange **19** and mounted thereon as by welding thereto to cover the hollow **16**.

As shown in FIGS. 5 and 6, the stretches of the flange **19** running longitudinally of the burner are downturned along their extremities to provide lips **21**.

The burner assembly also includes a reverberatory and protective grid or guard screen **23**, of heavy gauge wire in open weave having a face spaced from the burner screen **20** to define a combustion chamber **24**.

Along its longitudinal edges, the grid is downturned, thence inturned as at **22**, and replaceably secured to the lips **21** of the frame as by wire ties **25**, extending through longitudinally spaced perforations in lips **21** of the frame.

Endwise of the burner unit, as best appears in FIG. 4, the faces of the flanges **3**, the end walls of the frame, and the ends of the grid **23** are disposed substantially coextensively to provide ignition between interconnected units. The burner assembly is disposed upon the base assembly so that the inturned flange **17** of the former overlies the outturned peripheral flange **9** of the latter, the hollow **16** thus peripherally overhanging the cavity **6** and communicating therewith throughout the cavity mouth.

The burner assembly is mounted on the base assembly by interconnection of the flange **17** of the former with the flange **9** of the latter, with a suitably perforated gasket **26** between the complementary faces thereof.

As here shown, the interconnection is provided by stud bolts **27** in spaced relation, each having a head **28** welded to the flange **18** of the frame of the burner assembly, and extending therefrom through a complementary opening in the flange **9** of the base body, with a nut **29** accessible for tightening outside the unit, below the flanges.

Operation

It will be apparent that any plurality of burner units as herein set forth may be interconnected by their coupling flanges **3**, to provide an effectively continuous length of burner surface, and also of manifold passageway.

Each unit includes the above disclosed means providing three chambers through which flow of combustible mixture is had in succession.

First, a manifold chamber or passage, at line pressure with egress through the port **7**.

Second, a distributing chamber or cavity **6**, at lower adjusted pressure with ingress through the port **7** metered by its valve head **11** as adjusted from below the unit by means of its valve stem. Within the cavity the mixture flows radially from the valve head and is deflected horizontally by the near side walls toward the relatively remote end walls, so that conditions at the cavity mouth have substantial uniformity throughout.

Third, an expansion chamber or hollow **16**, overhanging the cavity and open to its mouth, and to which the burner screen is directly exposed as the top thereof, at still lower pressure.

Thus although the burner face outline be rectangular and greatly elongated, and manifold pressure be great, combustion will be uniform throughout the face including its corners.

I claim:

In an infra-red burner unit adapted for interconnection with similar units for their mounting and coincident operation:

a base body having
- a through manifold passage,
- and an elongated cavity thereabove
  - with a rectangular mouth opening upwardly therefrom,
- with a cross wall separating said passage and said cavity and having a port therebetween,

valve means having
- a head portion within said cavity for control of said port and cooperative with the sides of said cavity for distrubution toward the cavity ends
- and means for mounting said head portion in said body for adjustment toward and from said cross wall from below said body,
- said body also having an outturned flange about said cavity mouth,

a rectangular frame defining a hollow
- peripherally overhanging said cavity, and having upstanding side walls with an inturned bottom flange overlying and secured to said outturned flange,

and burner screen means mounted on said frame to cover the top thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

1,368,120	Cole	Feb. 8, 1921
1,554,045	Snow	Sept. 12, 1925
2,048,207	Yeager	July 21, 1936
2,255,298	Reichhelm	Sept. 9, 1941
2,336,816	Thompson	Dec. 14, 1943
2,373,492	Nelson et al.	Apr. 10, 1945
2,638,976	Vixler	May 19, 1953
2,987,118	Brown	June 6, 1961

FOREIGN PATENTS

1,557	Great Britain	of 1914
127,328	Germany	Jan. 14, 1902
588,433	Canada	Dec. 8, 1959
798,076	Great Britain	July 16, 1958
1,108,655	France	Sept. 7, 1955

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,114,411 December 17, 1963

Gust Alex Dadas

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the drawings, Sheets 3 and 4, strike out Figs. 7 to 11 inclusive.

Signed and sealed this 9th day of June 1964.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents