June 24, 1952 W. KENNEDY 2,601,299

RADIANT GAS BURNER

Filed Aug. 18, 1947

Fig. 1.

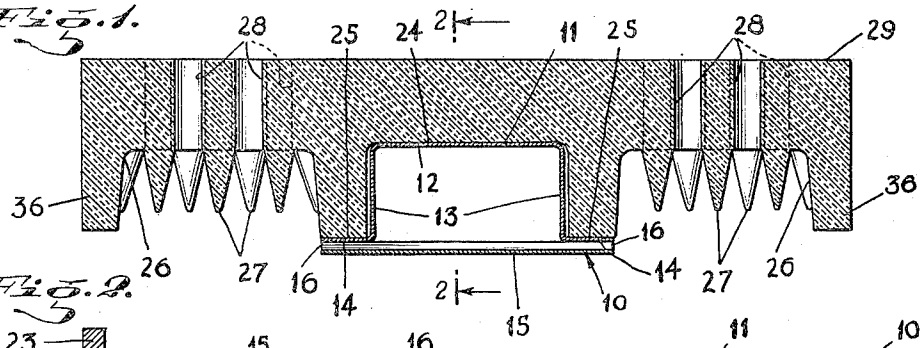


Fig. 2.

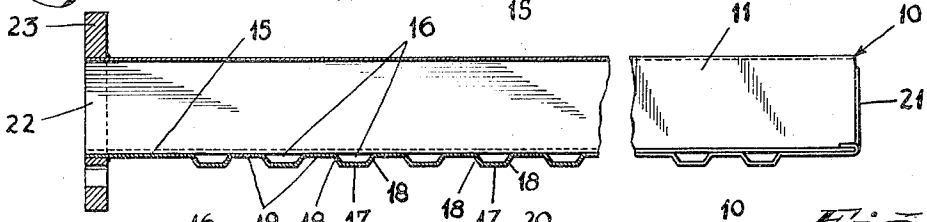


Fig. 3.

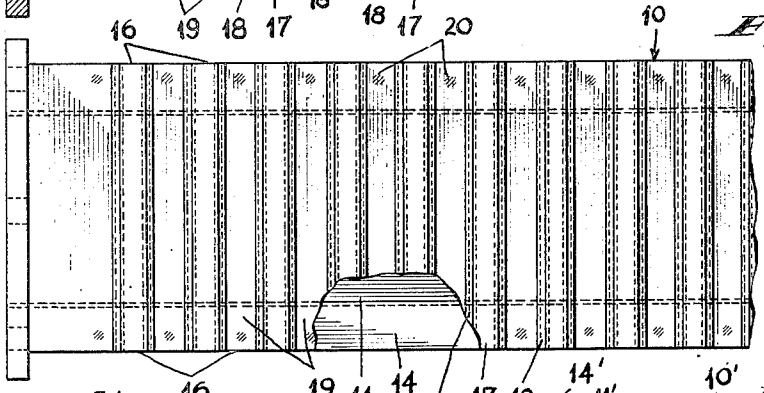


Fig. 4.

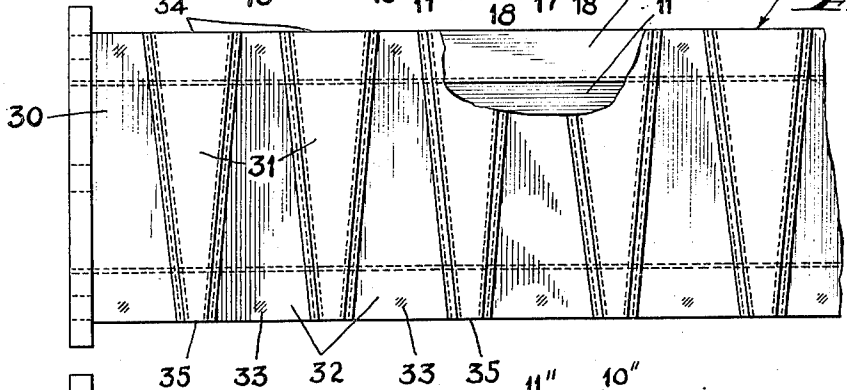
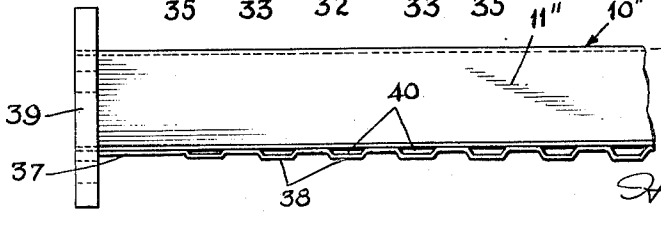


Fig. 5.



INVENTOR
WALTER KENNEDY
BY
Howard C. Thompson
ATTORNEY

Patented June 24, 1952

2,601,299

UNITED STATES PATENT OFFICE

2,601,299

RADIANT GAS BURNER

Walter Kennedy, Cliffside Park, N. J.

Application August 18, 1947, Serial No. 769,274

5 Claims. (Cl. 158—113)

1

This invention relates to burners, designed primarily for use in what are generally termed "Gas Burners." Still more particularly, the invention deals with what may be termed a burner element, constructed from sheet metal parts, fashioned and assembled to form a plurality of laterally extending and longitudinally spaced burner nozzles. The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed, and in which the separate parts are designated by suitable reference characters in each of the views; and in which:

Fig. 1 is a cross sectional view through a burner element, made according to my invention and illustrating a method of its use.

Fig. 2 is a longitudinal section through the burner element, on the line 2—2 of Fig. 1.

Fig. 3 is a plan view of the structure of the burner element, shown in Figs. 1 and 2, with part of the structure omitted and with part broken away.

Fig. 4 is a view similar to Fig. 3, showing a modification; and

Fig. 5 is a view similar to Fig. 2, showing another form of construction.

My invention deals with a burner device or burner element adapted for use in connection with gas appliances or gas fired apparatus of any type or kind. One of the features of my invention is to provide a burner element which is simple and economical in construction and which by reason of its structure will produce efficient burner operations, by reason of the nozzle discharges provided at opposed side edges or walls of the burner element. Further, it is the purpose of my invention to provide a burner element wherein the distribution of the flame may be controlled to produce the desired heating effects or distribution of heat in the appliance or apparatus in connection with which the burner is used.

In Figs. 1 to 3 inclusive, I have shown at 10, one form of burner element which I employ. This element comprises an elongated casing portion 11 having a top wall 12, two side walls 13, said walls terminating at the lower ends in outwardly extending flanges 14. The lower opening of the casing between the side walls 13 is closed by a bottom wall or nozzle plate 15, the width of the plate being equal to the over-all width of the flange portions 14 on the casing 10. The nozzle plate 15 is folded transversely to produce what might be termed a corrugated portion throughout the major part of the length of the

2

casing 10, the corrugated portions forming upon the flanges 14, a series of longitudinally spaced nozzle discharges 16, each nozzle discharge or corrugation being defined by an outer wall 17 having diverging side walls 18. That part of the sheet 15 between each corrugation, namely, the parts 19, seat snugly upon the flanges 14 and are welded or otherwise secured thereto, as indicated in Fig. 3, at 20.

It will be understood that the depth or offsetting of the corrugations defined by the walls 17—18, will control the thickness of the nozzle discharges 16. In the present drawing, the thicknesses have been slightly exaggerated for clearness in the illustration. However, the size of the nozzle passages will govern the use to which the burner is applied.

One end of the casing 10 is closed by an end wall 21, as indicated in Fig. 2 of the drawing, whereas the other end of the casing is open, as seen at 22, and this open end has a flanged portion 23 attached thereto for mounting of the burner element. It will be understood that the gas and air mixture, that is to say, the combustible mixture enters the casing 10 through the opening 22, through any suitable means commonly employed in ranges, burners and the like appliances or apparatus, and then is discharged through the nozzle 16 at opposed side edges of the element 10.

In Fig. 1 of the drawing I have illustrated one adaptation and use of a burner element, insofar as mounting in connection with a radiant is concerned. In Fig. 1, the radiant comprises an elongated body of considerably greater width than the casing 11 and having centrally of the lower surface thereof, a recess 24 for the reception of the casing 11. At opposite sides of the recess 24, the radiant has longitudinal seats 25 upon which the flanges 14 rest. Beyond the seats 25, the radiant has elongated channels 26 and in the channels 26, the radiant has transversely and longitudinally spaced radiant pins 27 of conical formation. Between these pins the radiant has discharge apertures 28 which places the channels 26 in communication with the outer surface 29 or top of the radiant so that products of combustion are free to rise vertically through the apertures 28.

In Fig. 4 of the drawing I have shown a different formation of burner element 10', having a casing portion 11' and flanges 14', similar to the casing 11 and flanges 14 of the structure shown in Figs. 1 to 3 inclusive. The primary difference in Fig. 4, is in the formation of the nozzle plate

and here a nozzle plate 30 is employed, which differs from the plate 15 in having the corrugations 31 of tapered form, rather than the straight form shown in Figs. 1 to 3. Between the corrugations 31 are wall portions 32, similar to the walls 19, which are welded to the flanges 14', as indicated at 33. This construction provides wide discharge nozzles 34 at one side of the burner element and narrow nozzle discharges 35 at the other side thereof. Burner elements of this type and kind may be utilized to control distribution of heat and when a number of burner elements are employed in a complete assemblage, the wide discharge 34 of one element may be directed toward the narrow discharge 35 of an adjacent element. On the other hand, two narrow discharges may be directed toward each other and two wide discharges directed toward each other. In this connection, it will be understood that several units, such as seen in Fig. 1 of the drawing may be arranged side by side in forming a complete burner bed for a gas range, heater or any other type of appliance or apparatus.

Considering Fig. 1 of the drawing, it will here be noted that the outer boundary walls 36 of the channels 26 are of less depth than the seats 25 so that the nozzle discharges, as at 16 will be below the walls 36. Aside from the tapered structure of the nozzle plate 30, as above described, the structure of Fig. 4 is the same as that shown in Figs. 1 to 3 and no further description thereof will be made.

In Fig. 5 of the drawing, I have shown another form of construction wherein the burner element 10'' has a casing 11'', similar to the casing 11—11'. However, substituted for the nozzle plate 15—30 is a nozzle plate 37 wherein the corrugations, as at 38 are gradually tapered and enlarged in depth from the inlet end 39 of the element, to the opposite end thereof, thus producing a more even distribution of the products of combustion to the respective nozzle discharges 40, thereby producing a more even burner flame throughout the full length of the burner element and at opposed sides thereof. It will be understood that the structure of Fig. 5 is applicable to the element shown in Figs. 1 to 3, as well as that shown in Fig. 4.

From a standpoint of construction, the parts of the burner element are made from suitable sheet metal which will withstand the temperature and which will avoid burning-out, particularly of the nozzle discharges. For example, I have found that stainless steel will be suitable for this purpose. By constructing the burner element of the two sheet metal parts, the same may not only be accurately, but economically produced. A positive control is provided for the nozzle discharges by control of the corrugations formed in the nozzle sheet and by varying the depth, width and/or contour of the corrugations, burner elements suitable for any condition can be produced in a simple, practical and economical manner.

It will be understood that the burner element may be of any shape or form, depending upon the uses intended. However, in all instances, discharges will be provided at opposite sides of the fuel tube. It will also be apparent that by constructing burner elements from thin sheet metal of the type and kind under consideration, and utilizing them in the manner illustrated, for example, in Fig. 1, the burner element itself is kept from excessive heat, and in fact its structure and contour produces a more or less natural cooling effect. Cooling in the sense here given is with respect to the normal high temperatures of the burner flame or products of combustion rising directly from the flame.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A burner element of the character described, comprising an elongated sheet metal casing forming an inverted channel having a horizontal wall and depending side walls, said casing being open at one end, the lower edge of each side wall having a laterally extending flange, an independent sheet forming a bottom wall of the casing, said sheet extending onto and covering the lower surfaces of said flanges, said flanges and sheet having elongated parallel and alined edges, said sheet being corrugated transversely for the full width of the sheet, the corrugations engaging said flanges to form thin discharge nozzles spaced longitudinally of said edges for discharging fuel from the casing, and the corrugations of said sheet tapering from one side edge of the sheet to the other to form narrow and wide discharge nozzles at opposed sides of the burner element.

2. The combination with an elongated radiant, comprising an elongated top wall having an elongated depending central portion and side walls both extending substantially the full length thereof, said side walls forming, with the central portion, combustion chambers opening downwardly at side portions of the radiant, said top wall having a multiplicity of discharge apertures therethrough and distributed longitudinally of the radiant and communicating with said chambers, the central portion of the radiant having, on its lower surface, a deep longitudinal recess, of a burner element, the major portion of which is mounted in the recess of said radiant and disposed intermediate said chambers, and said element having, at side edges thereof, outwardly extending thin wall flat nozzles arranged upon the lower surface of said central portion and in alinement with side edges of said central portion for discharge of fuel from said element into the chambers of said radiant.

3. The combination with an elongated radiant, comprising an elongated top wall having a depending central portion and side walls both extending substantially the full length thereof, said side walls forming, with the central portion, combustion chambers opening downwardly at side portions of the radiant, said top wall having a multiplicity of discharge apertures therethrough and distributed longitudinally of the radiant and communicating with said chambers, the central portion of the radiant having, on its lower surface, a deep longitudinal recess, of a burner element, the major portion of which is mounted in the recess of said radiant and disposed intermediate said chambers, said element having, at side edges thereof, outwardly extending thin walled flat nozzles arranged upon the lower surface of said central portion and in alinement with side edges of said central portion for discharge of fuel from said element into the chambers of said radiant, said nozzles comprising sheet metal parts, one of said parts being corrugated to form the discharge openings of said nozzles, and the offsetting of the corrugations of said sheet varying longitudinally thereof to vary the area of said discharge openings.

4. The combination with an elongated radiant, comprising an elongated top wall having a de-

pending central portion and side walls both extending substantially the full length thereof, said side walls forming, with the central portion, combustion chambers opening downwardly at side portions of the radiant, said top wall forming a multiplicity of discharge apertures therethrough and distributed longitudinally of the radiant and communicating with said chambers, the central portion of the radiant having, on its lower surface, a deep longitudinal recess, of a burner element, the major portion of which is mounted in the recess of said radiant and disposed intermediate said chambers, said element having, at side edges thereof, outwardly extending thin walled flat nozzles arranged upon the lower surface of said central portion and in alinement with side edges of said central portion for discharge of fuel from said element into the chambers of said radiant, said element comprising two sheet metal parts, one of the parts being corrugated to form the discharge openings of said nozzles, and said corrugations being tapered.

5. A burner unit for radiants having on the lower surface thereof an elongated recess, in which a burner unit is adapted to be mounted, said unit comprising two elongated sheet metal parts, one part comprising an inverted deep channel having depending parallel side walls, said side walls having laterally extending flanges having parallel edges, the other part being transversely straight throughout its length and closing said channel and arranged upon and secured to the flanges of the first part at longitudinally spaced intervals, said straight part having edges

in alinement with the edges of said flanges, said straight part comprising a sheet corrugated transversely for the full width of the sheet, the corrugations of said sheet intermediate the secured intervals, forming in conjunction with said flanges, thin discharge nozzles for discharging fuel from said casing, an end wall closing one end of the channel of the unit, and the other end of the unit being open for admission of combustible gases into said channel.

WALTER KENNEDY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,842,227	Wirth	Jan. 19, 1932
2,023,624	Tullis	Dec. 10, 1935
2,070,111	Blaney	Feb. 9, 1937
2,142,014	Zink	Dec. 27, 1938
2,170,139	Goodale	Aug. 22, 1939
2,235,635	Herman	Mar. 18, 1941
2,255,349	Christmas	Sept. 9, 1941
2,348,011	Koppel	May 2, 1944
2,372,953	Hurlbut et al.	Apr. 3, 1945
2,494,243	Houllis	Jan. 10, 1950

FOREIGN PATENTS

Number	Country	Date
378,528	Germany	July 18, 1923
487,445	Great Britain	June 21, 1938