

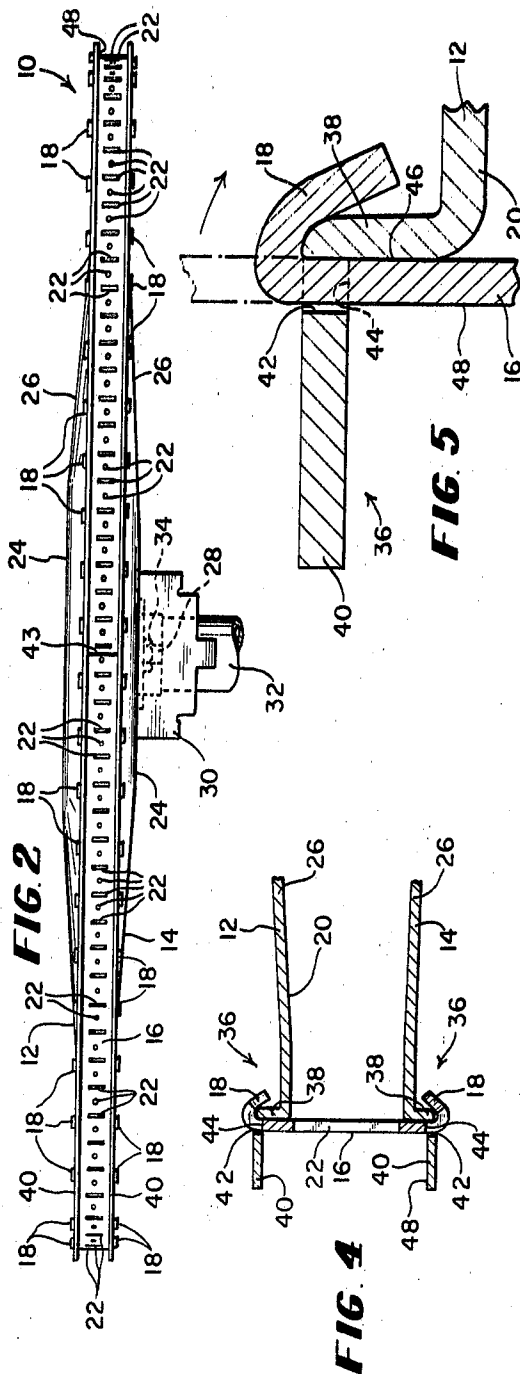
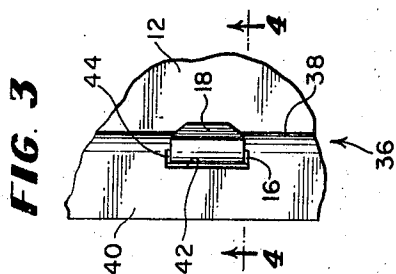
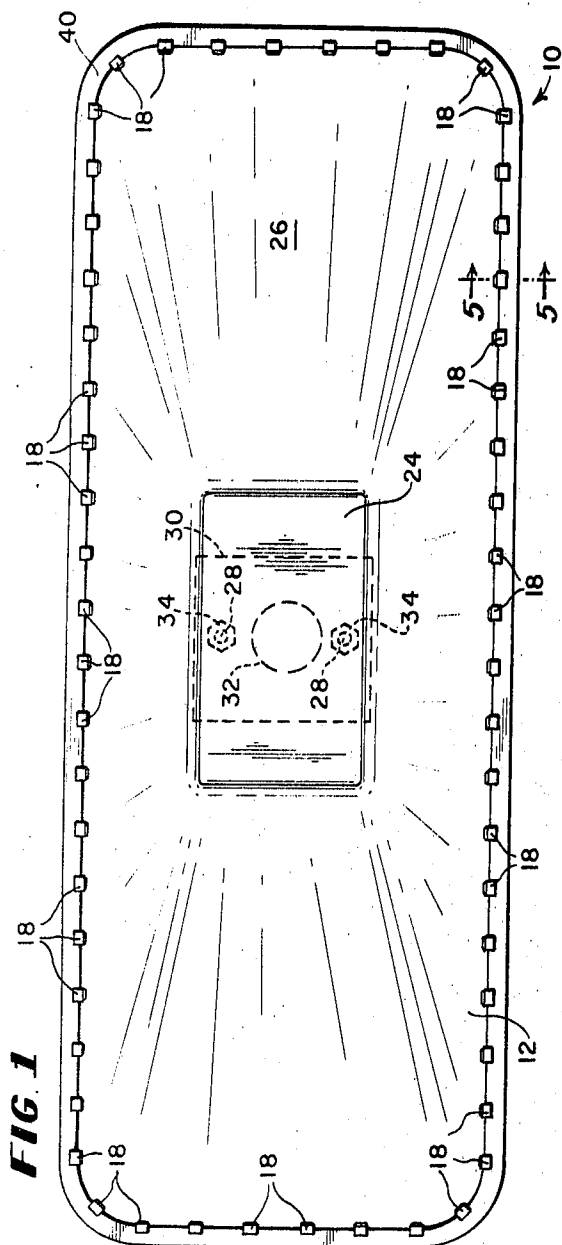
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BURNER

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3,664,591
BURNER

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6 Claims

ABSTRACT OF THE DISCLOSURE

A gas burner includes stamped sheet metal top and bottom plates of similar configuration and capable of being formed with a single die. The plate edges are spaced apart to form a gap receiving a metal strip including burner ports and including projecting tabs extending through slots in the plates and bent over to clamp the strip between the plates.

The present invention relates to improvements in the structure and in the manufacture of burners such as gas burners.

Burners are known wherein sheet metal parts requiring several often complex and expensive forming operations are joined together by fasteners or by welding in order to form a burner enclosure or chamber having burner ports for the emission of fuel. If one or more fasteners are used, the expense of manufacture and operation may be increased, and in addition difficulties are often encountered in obtaining a permanent and strong construction having good sealing qualities between the burner enclosure and the surrounding atmosphere. If parts of the burner are welded together, the initial seal is satisfactory. However, welded seams or joints are quite inflexible and thus tend to open up or become broken in use by thermal expansion and contraction of portions of the burner. In known burners, difficulties may also be encountered in accurately forming the burner ports and in making adaptations of the burner design which may be necessary for various installations.

Among the important objects of the present invention are to provide an improved burner construction wherein parts of the burner can be formed and joined together easily, reliably, and at a minimum expense; to provide a burner capable of maintaining a secure and reliable seal over long usage; to provide a burner wherein the flame ports can be accurately formed in a material of any desired thickness and wherein the burner flame retention characteristics are maximized; and to provide improvements in the manufacture of burners.

In brief, in accordance with the present invention there is provided a burner having top and bottom plates with their edges connected by means of tab and slot connections to the upper and lower edges of a port strip including burner ports formed therein. The top and bottom plates are similar in shape, and advantageously may be formed with one die. The port strip is formed and ported as a flat strip, thereby effecting savings in manufacturing costs and also permitting accurate formation of ports and the use of any desired thickness of material for the strip. The tab and slot connection produces a dual seal between the port strip and the plates including both a large area interface sealing region, as well as an abutting edge seal. Both seals are formed and tightened as the tabs are clamped into position in the manufacture of the burner. The tab and slot connection avoids the need for the use of fasteners or for welding or casting or other operations.

The invention together with the above and other objects and advantages may be better understood in connection

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with the following detailed description of the embodiment of the invention shown in the drawings wherein:

FIG. 1 is a top view of a burner constructed in accordance with the present invention;

FIG. 2 is a side view of the burner of FIG. 1;

FIG. 3 is an enlarged fragmentary top view of a portion of the burner of FIG. 1;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 3; and

FIG. 5 is a greatly enlarged fragmentary sectional view taken along the line 5—5 of FIG. 1.

Having reference now to the drawings, there is illustrated a burner designated as a whole by the reference numeral 10 and constructed in accordance with the principles of the present invention. The illustrated burner 10 is a gaseous fuel burner intended for use in an outdoor barbeque grill installation, although it should be understood that the features of the present invention have application to burners of various other types.

In accordance with an important feature of the present invention, the burner 10 includes a top plate 12, a bottom plate 14 and a port strip member 16 connected between the edges of the top plate 12 and bottom plate 14 by a series of tabs 18. The coextensive plates 12 and 14 together with the strip member 16 form a burner chamber or enclosure 20 (FIG. 4) into which gaseous fuel is introduced. Formed along the length of the strip member 16 are a series of burner ports 22 in the form of alternate circular holes and slots from which fuel is emitted for combustion.

An important advantage of the burner of the present invention resides in the fact that the top plate 12 and the bottom plate 14 are of similar or identical shape and construction. Consequently, the plates 12 and 14 may be stamped and cut from sheet metal by a single die, and this advantage permits a substantial saving in tooling costs for the burner. Each plate 12 and 14 includes a flat central region 24 surrounded by a sloping wall 26 extending nearly to the edge of the plate and giving to the completed burner enclosure 20 a somewhat tapered or feathered configuration. The flat wall 24 of the bottom plate 14 is provided with mounting studs 28 to permit the attachment of a suitable mounting bracket 30 and fuel inlet conduit 32, such as a mixing tube or the like, to the burner through the agency of fasteners 34.

In order to permit attachment of the port strip member 16 in such a way as to minimize manufacturing costs, to provide excellent gas sealing characteristics and to provide for reliable flame retention characteristics, the top plate 12 and bottom plate 14 are each provided with a continuous peripheral edge or lip structure generally designated as 36. More specifically, the plates 12 and 14 each include a short offset wall 38 lying in a generally vertical plane. The wall 38 of the upper plate 12 extends upwardly or away from the chamber 20, while the wall 38 of the lower plate 14 extends downwardly, also away from the chamber 20. Extending outwardly from the wall 38 of each plate 12 and 14 is an additional wall or lateral extension 40. Spaced at regular intervals inwardly of the outermost edge of the wall 40 are a series of slots or openings 42 adapted to receive the tabs 18. In accordance with the invention, the slots 42 are formed in the walls 40 so that they are tangent with the outermost surface of the walls 38.

Referring more specifically now to the construction of the port strip member 16, this member is initially formed in a flat condition by a conventional severing operation from a supply of sheet metal. The port strip member 16 includes the tabs 18 initially formed flat at regularly spaced intervals along the length of the port strip. Consequently, the tabs 18 may readily be formed at the same time that the member 16 is prepared. The burner ports

22 are punched or otherwise formed in the port strip member 16, and this operation may be carried out while the member 16 is in a flat condition. In contrast to many prior art burner constructions, the burner ports 22 may therefore be formed easily and very accurately since it is not necessary to work on a curved or otherwise inconveniently shaped member. After the member 16 has been prepared with the tabs 18 and with the burner ports 22, it is then bent into a shape complementary to that of the edges of the coextensive top plate 12 and bottom plate 14, and its ends abut one another as indicated by the reference numeral 43 in FIG. 2.

In joining the top plate 12 and bottom plate 14 to the port strip member 16 in order to complete the burner 10, the tabs 18 are aligned with the slots or openings 42 and the member 16 is sandwiched in proper position between the plates 12 and 14. As the plates are moved toward one another relative to each other and to the member 16, the tabs 18 extend through the slots 42 until such time as the inner surfaces of the walls 40 abut against top and bottom edges 44 of the strip member 16. At this time, the tabs 18 extend outwardly, substantially in the position partly shown in broken lines in FIG. 5. Since the slots 42 are tangent to the outermost surfaces of the walls 38, the inner surface of the port strip member 16 interfaces with the outer surface of the walls 38 of the plates 12 and 14.

In order to complete the assembly, each of the tabs 18 is bent inwardly and downwardly or upwardly of the corresponding plate 12 or 14 to the position best shown in full lines in FIG. 5. In this position the tabs are bent or clamped over the outer end of the offset walls 38. This operation may be carried out with suitable simple tools. As the bending takes place, the chamber 20 formed within the burner 10 is reliably and firmly sealed. More specifically, there is produced a first face-to-face seal between the outer surface of the wall 38 and the inner surface of the strip 16, this seal being indicated in FIG. 5 and designated by the reference numeral 46. In addition, there is produced an abutting edge seal between the upper and lower edges 44 of the strip 16 and the inner surfaces of the walls 40. Both of these seal regions are formed and strengthened by the clamping effect as the tabs 18 are bent into position around the walls 38.

The resulting burner construction is not entirely rigid and inflexible as is the case in welded constructions. Consequently, the seals provided at the region 46 and at the edges 44 remain firm and reliable after continued usage and do not deteriorate due to thermal expansion and contraction.

The edge construction 36 including the extending walls 40 provides an open sided recess or chamber designated by the reference numeral 48 and best shown in FIGS. 2 and 4. This chamber is somewhat protected from the surrounding atmosphere, and has been found to enhance the flame retention characteristics of the burner 10.

With the novel construction of the burner 10, it is easily possible to vary the width and/or thickness of the port strip member 16 to adapt the burner for different installations and requirements. Further, there is no necessity for the strip 16 to be of the same thickness or the same material as the plates 12 and 14.

While the invention has been described in connection with details of the illustrated embodiment, those skilled in the art may devise other embodiments or modifications falling within the spirit and scope of the invention as defined in the accompanying claims.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A burner including top and bottom plates each including spaced slots adjacent the edges thereof, a strip member sandwiched between the top and bottom plates and including tabs received in said slots and clamping said strip member between said plates, each plate including a peripheral edge structure including an offset wall having a surface adapted to interface with the surface of said strip member, said edge structures each including a laterally extending wall extending from said offset wall and adapted to be abutted by top and bottom edges of said strip member, inlet means for introducing fuel means within the burner, and a series of burner ports defined in said strip member.

2. The burner of claim 1, said top and bottom plates being substantially of identical configuration.

3. The burner of claim 1, said slots extending through said laterally extending wall tangent to said surface of said offset wall.

4. The burner of claim 3, said tabs being bent around the end portions of said offset walls.

5. A burner including top and bottom plates and a strip member sandwiched between the top and bottom plates adjacent the edges thereof, said strip member including tabs engaging said plates and clamping said strip member between said plates, a fuel inlet in one of said top and bottom plates, and burner ports in said strip member, said top and bottom plates extending outwardly past said strip member and cooperating with said strip member to form a partially enclosed flame retention chamber.

6. A burner comprising in combination:

a top plate;

a bottom plate disposed below the top plate;

said top and bottom plates having spaced, generally coextensive peripheral portions defining an elongated gap;

an elongated port strip disposed between said plates and having edges abutting said peripheral portions in said gap to define a burner chamber enclosed by said plates and port strip;

means for admitting fuel into said chamber;

burner ports defined in said port strip;

slots formed adjacent the edges of said top and bottom plates;

and a plurality of tabs extending from the edges of said port strip through said slots and clamping said top and bottom plates into engagement with said port strip.

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