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PILOT BURNER-THERMOELECTRIC GENERATOR BRACKET ASSEMBLY

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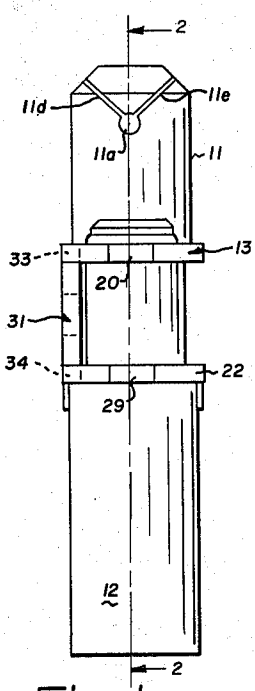


Fig. 1

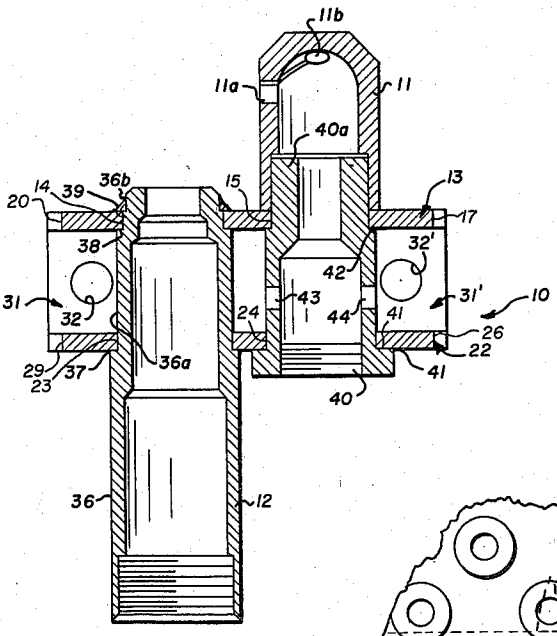


Fig. 2

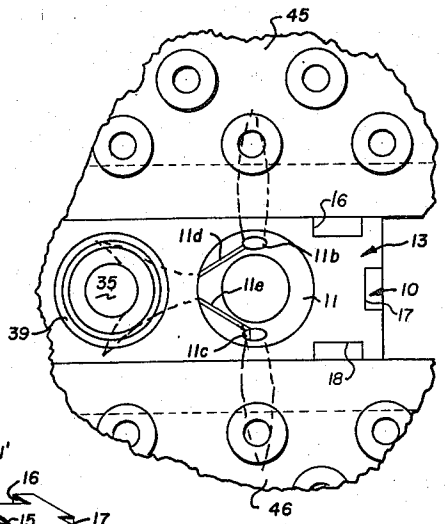


Fig. 3

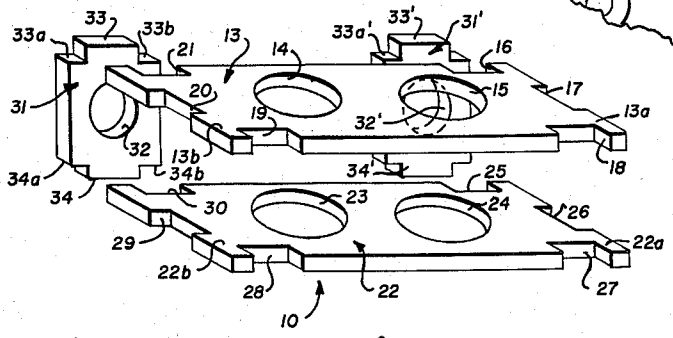


Fig. 4

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3 Claims. (Cl. 158—123)

This invention relates in general to a pilot burner-thermoelectric generator assembly and more particularly to an improved pilot burner-thermoelectric generator mounting bracket assembly for fixedly mounting a pilot burner and generator relative to each other and to an associated main burner or burners.

In low consumption applications, such as in domestic ranges and the like, the spacial relationship between the pilot burner, thermoelectric generator and burner to be ignited is extremely significant, both in terms of millivoltage produced by the thermoelectric generator, which in turn operates a control device, and of the number of B.t.u.'s of fuel per hour required at the pilot burner in order to afford a safe flame.

It is a general object of this invention to provide a mounting bracket assembly which affords a minimum distance between the pilot burner and its associated main burner while maintaining a predetermined rigid relationship between the pilot burner and a thermoelectric generator.

It is another object of this invention to provide a mounting bracket assembly as above characterized which is fabricated from a relatively small number of interchangeable parts permitting fabrication from said parts of a plurality of bracket types for use in a great variety of applications.

Another object of this invention is to provide a mounting bracket fabricated from a plurality of symmetrical pieces affording an interchangeability and non-positionality therebetween such that during manufacture of said bracket the parts may be reversed 180 degrees both transversely and longitudinally and still present identical cooperating surfaces to the other parts.

Another object of the present invention is to provide a device of the aforementioned general characteristics which is especially adapted for mass production manufacture techniques, is easily installed by non-skilled technicians and is otherwise well-adapted for the purposes for which it was designed.

The novel features that are characteristic of the invention are set forth with particularity in the appended claims. The invention, itself, however, both as to its organization and its method of operation together with additional objects and advantages thereof will best be understood by the following description of a specific embodiment when read in connection with the accompanying drawings illustrating one form of the invention:

Figure 1 is a view, in end elevation, of applicant's pilot burner and thermoelectric generator bracket assembly;

Figure 2 is a vertical sectional view of the assembly depicted in Figure 1 taken along the line 2—2;

Figure 3 is a fragmentary plan view of applicant's assembly mounted in operative position with respect to a pair of main burners; and

Figure 4 is an exploded view of the interchangeable parts of the bracket assembly depicted in Figures 1–3.

While the improved pilot burner and thermocouple bracket assembly is shown and described in connection

with a specific pilot burner head or tip, it is to be understood that the improved bracket assembly is not limited to use with this specific type of head, but is adapted for use equally well with other types of heads.

Referring now to the drawing, the disclosed unitary thermoelectric generator and pilot burner bracket assembly **10** includes a tubular pilot burner body member **40** and a tubular thermoelectric generator support member **12** mounted in fixed spacial relationship to each other. More particularly, the supporting bracket assembly **10** comprises an upper bracket member **13** in the form of a rectangular plate having a pair of spaced identical symmetrically placed bores **14** and **15** as shown most clearly in Figure 4. The marginal surfaces or edges of bracket member **13** are formed with a plurality of generally rectangular oppositely disposed apertures or notches **16–21** which are symmetrically placed. As shown, notches **16** and **18** are formed near end **13***a* of bracket member **13** and are preferably offset longitudinally outwardly with respect to the bore **15**, for example, outwardly of the outer transverse tangent to the bore **15**, and notches **19** and **21** are similarly formed near end **13***b* of said bracket member and with respect to the bore **14** for purposes hereinafter appearing. It will be observed that bores **14** and **15** and marginal apertures **16** to **21**, inclusive, are so formed that rotation of member **13**, 180 degrees in a longitudinal or transverse direction will present identical surfaces for coaction with other parts of the bracket assembly during fabrication, as shall now be described.

Spaced directly below the upper bracket member **13** is a lower bracket member **22** preferably of identical size thereto and formed with a pair of bores **23** and **24** identical to each other and which are axially aligned respectively with bores **14** and **15** of the upper bracket, bores **23** and **24** preferably being of somewhat larger diameter than said upper bores. The marginal surfaces or edges of lower bracket member **22** are also formed with a plurality of identical symmetrically placed rectangular notches **25–30** which are of the same size as and are positioned on the periphery of said bracket identically with the notches **16–21** inclusive on the upper bracket member **13**. The lower bracket member **22** is thus symmetrical in the same sense as bracket member **13** is symmetrical.

A rectangular transverse bracket member **31** may be formed with a central bore **32** (which may be tapped in certain applications as desired) and with a pair of identically aligned rectangular lugs or ears **33** and **34**, which as shown in Figure 4, project from opposite ends of member **31** between identical shoulders **33***a*—**33***b* and **34***a*—**34***b*, respectively, formed thereby. It will be observed that since aperture or bore **32** is formed centrally in member **31**, i.e., on both the longitudinal and transverse axes thereof, and that ears **33** and **34** are symmetrically formed, that the member **31** may also be reversed 180 degrees in a transverse or longitudinal direction and present identical surfaces for mating with the other parts. Lugs or ears **33** and **34** are formed just slightly smaller but have the same shape as notches **16–21** inclusive and **25–30** inclusive for mating with a snug fit therein. Upon positioning of the lugs **33** and **34** of member **31** within cooperating notches, for example, notches **21** and **30** in the bracket members **13** and **22**, the shoulders **33***a*—**33***b* and **34***a*—**34***b* engage the under and upper surface portions of bracket members **13** and **22** respectively on opposite sides of said notches to define a spacial relationship between members **13** and **22**.

The assembly **10** may include a second transverse bracket member **31'** shown coacting with notches **16** and **25** respectively of bracket members **13** and **22**, said second bracket member being identical to member **31** in all respects. It will also be observed that transverse bracket

members, such as 31 and 31', may be positioned in any of the corresponding marginal apertures as suitable and desired for a particular application. In the manufacture of the bracket assembly, after the transverse members 31 and 31' are placed in the selected operative positions with respect to members 13 and 22, the parts are fixed relative to each other, as by furnace brazing or other suitable fastening means, to provide a unitary bracket.

As perhaps best shown in Figure 2, the transverse dimension of the transverse bracket members 31 and 31' is such that when said members are placed within notches such as 21 and 30 and 16 and 25 respectively, the outer edges of said transverse members are flush with the ends of bracket members 13 and 22. This relationship, of course, also holds true when the transverse bracket members are inserted in apertures 18 and 27, and 19 and 28. As shown in Figures 1, 3 and 4, the dimensions of the marginal apertures 16–21 and 25–30 and the configuration of the coacting transverse bracket members 31 and 31' are such that a full lap joint is afforded between the support members 31 and 31' and bracket members 13 and 22 and, as shown in Figure 1, the outer surface of the transverse bracket members is flush with the adjacent edges of the members 13 and 22. Thus, the assembly of a transverse bracket member to the bracket members 13 and 22 does not increase the outline of the assembly 10 in plan view established by the outline of the bracket members 13 and 22. This is in contrast to the undesirably larger outline of a similar bracket made by a single stamping.

As perhaps best shown in Figure 2, the tubular thermoelectric generator support member 12 and the tubular pilot burner body member 40 are mounted in the bores 14—23, and 15—24 respectively. The support member 12 may be made of suitable tube or rod stock and is formed with a plurality of counterbores which are adapted to receive and coact with mating complementary surfaces of a thermocouple or thermopile 35 (shown only Figure 3). The outer surface of member 12 is formed with annular shoulders 38 and 37 for coaction with the upper and lower bracket members. For example, the support member 12 may be annular in shape having a first outer diameter 36 which is stepped down at shoulder 37 to a second smaller diameter portion 36*a* extending through bore 23. Shoulder 37 engages with the underside of bracket member 22 when the thermocouple support is inserted within the aperture 23. The member 12 is also formed with a third smaller diameter portion 36*b* within bore 14 which portion forms the shoulder 38 with portion 36*a*. Shoulder 38 engages the underside of bracket member 13 when the support 12 is inserted through aperture 14 in the upper bracket member. As shown in Figure 2, the support member 12 may be mounted in the assembly by brazing at 39 fixedly holding the members in a rigid relationship substantially as shown. It will be observed that shoulders 37 and 38 on member 12 are spaced from each other the same distance as shoulders 33*a*—33*b* and 34*a*—34*b* on transverse bracket member 31.

The pilot burner body member 40 may be press-fitted into apertures 24 and 15 of the bracket members as shown. The member 40 is formed with spaced shoulders 41 and 42, which may be identical to shoulders 38 and 39 and coact respectively with the undersurfaces of members 13 and 22 at the margins of apertures 15 and 24 similarly to shoulders 37 and 38 coacting with marginal surfaces surrounding apertures 23 and 24. The burner body 40 may also be formed with transverse apertures or bores 43 and 44 as suitable and desired to form primary air inlets for inspiration of air into the fuel stream as is well understood in the art.

A pilot burner head or tip 11 may be fixedly mounted, as by a press fit, on a necked down extension 40*a* of the burner body 40 and may be formed with a plurality of flame ports 11*a*, 11*b* and 11*c* which may be interconnected by suitable saw slots 11*d* and 11*e* respectively. Thus, when the head or tip 11 is assembled on extension 40*a*, and as shown in Figure 3, when fuel is burning at the flame ports 11*a*, 11*b* and 11*c*, the flame emitted from flame port 11*a* heats the thermoelectric generator 35, the flame emitted from flame port 11*b* is adapted to ignite an associated main burner on one side of the assembly 10, for example, the burner 45, and the flame emitted from flame port 11*c* is adapted to ignite an associated main burner on the other side, for example the burner 46.

As perhaps best illustrated by Figure 3, when the pilot burner bracket assembly 10 is mounted relative to a pair of burners to be ignited such as 45 and 46, the spacing of the pilot burner head relative to the burners to be ignited is limited only by the thickness of the stock of the bracket members 13 and 22 required around the apertures 23—24, 14—15 for rigidity of said members. This reduced spacing afforded by the improved bracket is important in low consumption applications, since the distance between the pilot burner flame ports such as 11*b* and the burner 45 and the distance between port 11*c* and the burner 46 in a large measure determines the B.t.u. consumption required of said pilot burner. As aforeindicated, this desirable reduced spacing is afforded by virtue of the fact that the transverse bracket members 31 and 31' are connected by full lap joints to the brackets 13 and 22, which connection eliminates the extra stock and space needed for a bending radius necessary to accomplish a bending of sheet stock material of prior art U-shaped bracket members.

The symmetrical aspect of the upper and lower brackets 13, 22 and support members 31, 31' occasion substantial economies in manufacture, since only three inexpensive flat stampings are necessary from which any one of a multiplicity of bracket assemblies can be fabricated, for example, bracket assemblies affording left-hand, right-hand or end mounting. This is in contrast with the manufacture of conventional U-shaped brackets requiring separate expensive dies for each of the many types of bracket assemblies required. It is apparent that the improved structure is extremely desirable from a cost standpoint. Another advantage of the particular assembly shown is that the pilot burner head 11, burner body 40, and the generator support member 12 support each other through the shoulders 42, 41, 37 and 38 which help maintain the proper spacial relationship between the bracket members 12 and 22 and each other and also provide the necessary rigidity to the assembly. Due to the relationship of these shoulders to the members 13 and 22, it is possible to use a single transverse bracket member such as 31 for attachment of the assembly 10 to a main burner, for example, by means of a screw extending through the aperture 32 into said burner. However, in most applications a pair of transverse bracket members such as 31 and 31' are utilized to provide easier mounting of the assembly.

It will be noted that the apertures 16–21 and 25–30 are so arranged on the periphery of the members 13 and 22 the apertures 32 and 32' of the transverse bracket members are offset endwise from the generator support 12 and burner body 40 and therefore are easily accessible for the reception of screws or other suitable fastening and mounting means.

Although a specific embodiment of the invention has been shown and described, it is with full awareness that many modifications thereof are possible. The illustrated form of the invention has been selected for the purposes of disclosure only and is not intended to limit the forms which the invention may take or confine the invention to particular use, all of such other forms, modifications or changes being contemplated as may come within the scope of the appended claims.

What is claimed as the invention is:

1. A bracket comprising a first flat rectangular plate member formed with a plurality of symmetrically dis-

posed identical rectangular apertures at the side and end margins thereof, a second flat rectangular plate member spaced from said first member and formed with a plurality of symmetrically disposed identical rectangular apertures at the side and end margins thereof corresponding to the apertures in said first member, and a third rectangular plate member having first and second identical oppositely directed rectangular ear portions shaped to snugly interfit with each pair of corresponding marginal side or end apertures of said first and second members, said third member affording a connection between said first and second members through interfitted engagement of the first and second ear portions thereof with one pair of said corresponding marginal apertures, assembly of said first, second and third members providing an article having an outline in plan view substantially the same as the outline of said first and second spaced members without said third member.

2. A pilot burner and thermocouple support bracket comprising an elongated flat rectangular first plate member formed with a pair of spaced identical bores disposed on the longitudinal axis thereof in symmetrical relation and with a plurality of symmetrically disposed identical rectangular apertures at the side and end margins thereof, a second elongated flat rectangular plate member spaced from and parallel with said first member and formed with a pair of spaced identical bores disposed on the longitudinal axis thereof in the same symmetrical relation and in axial alignment with the bores in said first member, said second member also being formed with a plurality of symmetrically disposed rectangular apertures at the side and end margins thereof identical and in alignment with the marginal apertures of said first member, a rectangular plate connecting member formed with a pair of identical oppositely directed rectangular ears shaped to snugly interfit with all of the corresponding marginal apertures of said first and second members, said connecting member affording a connection between said first and second members through interfitted engagement of the ears thereof with one pair of said corresponding marginal apertures, means rigidly bonding said connecting and first and second members into an integral rigid assembly, and a tubular generator support member extending through one of said apertures on the longitudinal axis in each of said first and second members, and a tubular pilot burner member extending through the other of said apertures on the longitudinal axis in each of said first and second members.

3. A pilot burner and thermocouple support bracket comprising an elongated flat rectangular first bracket member formed with a pair of spaced identical apertures disposed on the longitudinal axis thereof in symmetrical relation and with a plurality of symmetrically disposed identical rectangular apertures at the side and end margins thereof, a second elongated flat rectangular bracket member spaced from said first member and formed with a pair of spaced identical apertures disposed on the longitudinal axis thereof in the same symmetrical relation and in axial alignment with the apertures in said first member, said second member also being formed with a plurality of symmetrically disposed identical rectangular apertures at the margins thereof in alignment with said rectangular side and end marginal apertures of said first member, first, second and third support members cooperable with said first and second bracket members, said first support member being a rectangular plate member formed with a pair of identical oppositely directed rectangular ears shaped to snugly interfit within all of the corresponding rectangular marginal apertures of said first and second members and being interfitted with one pair of said corresponding marginal apertures, said second and third support members each having a tubular portion extending through one pair of axially alined apertures in said first and second members and each being formed with spaced annular shoulders on said tubular portions in abutting relation with the marginal surfaces surrounding said apertures, and means bonding said bracket members, said second and third support members and said plate into an integral rigid assembly.

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