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PILOT BURNER-THERMOCOUPLE COMBINATION

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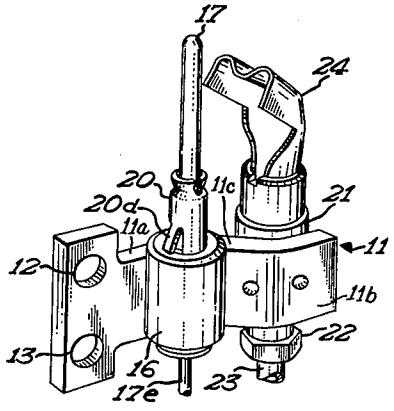


Fig 1

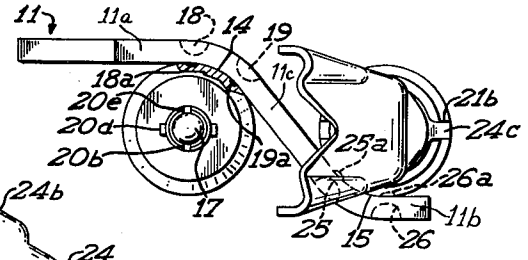


Fig 2

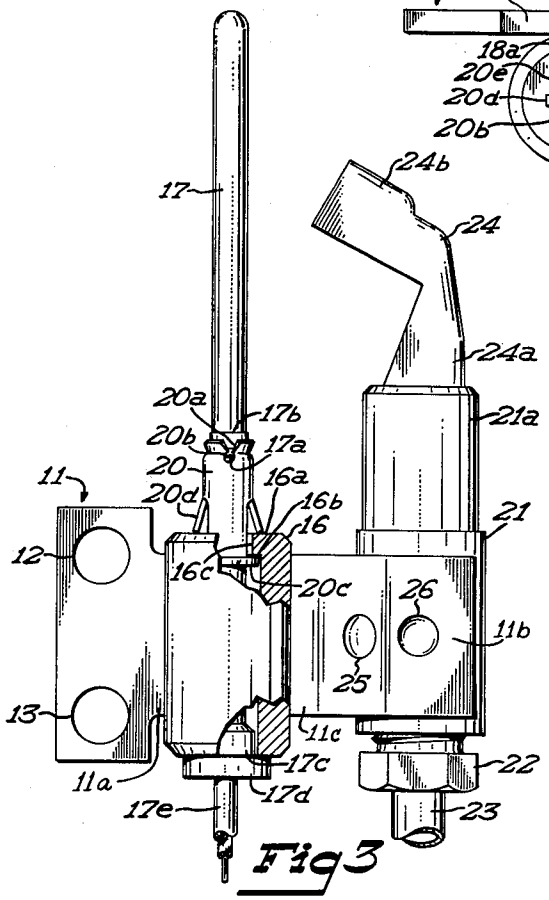


Fig 3

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PILOT BURNER-THERMOCOUPLE COMBINATION

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This invention relates to a combination pilot burner and flame sensor and, more particularly, to the combination of a pilot burner and a thermocouple, forming a thermoelectric generator for use in conjunction with a main burner.

Thermoelectric generators, of the same general type as disclosed herein, are well known in the prior art and are used in conjunction with electromagnetically operated safety valves to provide for the flow of gas to an associated main burner only when a pilot flame is in existence for igniting the gas issuing from the main burner.

It is one of the objects of this invention to provide a less expensive, yet strong and reliable combination of a flame sensing unit and a pilot burner, for heating the unit and for igniting a main burner, and supported by a very simple bracket construction.

Another object of the invention is to provide a mounting bracket for a pilot burner and an associated flame sensor, which is made of a single piece of sheet metal.

Another object of the invention is to provide a sheet metal supporting bracket for a pilot burner and an associated flame sensor which is inexpensive yet, due to the shape thereof, provides a very rigid and strong construction that is easily formed and assembled with its associated parts.

Other objects of the invention will become apparent upon reading the following detailed description of the invention in conjunction with the accompanying drawing wherein:

FIGURE 1 is a perspective view of the invention;

FIGURE 2 is a plan view of the invention; and

FIGURE 3 is a side elevational view of the invention, with portions of the supporting means for the flame sensing unit broken away.

The thermoelectric generator comprises a generally T-shaped bracket member **11** made of heavy gauge sheet metal and having two apertures **12** and **13** in the head portion thereof for the reception of bolts (not shown) to mount the bracket on a main burner (not shown). The bracket member has an arcuate bend **14** intermediate its length and a similar but reverse arcuate bend **15** near its outer end or the end away from the head thereof. The arcs of the bends are of substantially the same radius and length so that the arm or portion **11***a* of the bracket member adjacent the head is substantially parallel to the arm or portion **11***b* of the bracket member at its outer end, with the portion **11***c* extending diagonally therebetween.

A tubular support **16** for a flame sensing unit, which, in the preferred embodiment, is a thermocouple **17**, has an inwardly extending annular flange **16***a* which provides an abutment shoulder **16***b* around an opening **16***c* in its upper end.

To aid in securing the tubular member **16** to the bracket **11** in the arcuate portion **14**, two dimples **18** and **19** were made in the opposite side of the bracket member to form slight protrusions from the arcuate surface **14** so that when the tubular portion was clamped to the bracket member by welding electrodes and current passed through the bracket and the tubular member, the protrusions were melted to form spot welds **18***a* and **19***a* to snugly hold the tubular member in the arcuate portion **14** of the bracket.

Extending through the opening **16***c* is a conventional

split sleeve **20** made of resilient material, such as steel, which has a notch **20***a* therein opposite a longitudinally extending slot **20***e* and inwardly struck portions **20***b* forming two inwardly extending arcuate portions adapted to register with an annular groove **17***a* formed in the thermocouple **17**. The lower end of the split sleeve **20** has an outwardly extending flange portion **20***c* that bears against the shoulder **16***b* of the holder **16**. Outwardly struck arms **20***d* bear against the upper surface of the flange **16***a* and cooperate with the flange **20***c* to hold the resilient member **20** in assembled position. The member **20** is placed in the illustrated assembled position by inserting it into the bottom of the tubular member **16** and forcing it through the member by springing the arms **20***d* inwardly as it slides through the interior of the sleeve and through the opening **16***c*, whereupon the arms **20***d* can spring outwardly into position over the flange **16***a*.

The flame sensing unit or thermocouple **17** is positioned in the holder **16** and the split sleeve **20** by also being inserted through the bottom of the sleeve **16** and the member **20**, by resiliently biasing the inwardly extending portions **20***b* outwardly by a camming action of the thermocouple, so that the enlarged diameter portion **17***b* adjacent the groove **17***a* may pass therethrough, permitting the inwardly extending portion **20***b* to resiliently snap into the groove **17***a* and retain the thermocouple **17** in its assembled position. The thermocouple has two enlarged diameter portions **17***c*, which is only slightly less than the inside diameter of the sleeve **16**, and **17***d*, which is somewhat larger than the inside diameter of the sleeve **16**, to serve as means to abut against the lower end of the sleeve **16** and limit the inward movement of the thermocouple with respect to the sleeve.

A pilot burner comprising a cylindrical body portion **21**, having a reduced diameter portion **21***a*, is internally threaded at its lower end to receive a pipe coupling **22** for connecting a supplied pipe **23** to the burner body. A target type of burner head **24** has a cylindrical portion **24***a* that fits into the upper end of the reduced diameter portion **21***a* and a flame directing portion **24***b* for directing the flame over the flame sensing unit and to the side of the flame sensing unit for igniting the main burner. An outwardly struck tab **24***c* of the member **24** serves to anchor the head **24** non-rotatably in one of a pair of notches **21***b* formed in the upper edge of the burner body.

The forming of dimples **25** and **26** in the opposite side of the bracket and at the ends of the arcuate bend **15**, provided protrusions against which the burner body was forced at the time of holding it on the bracket for the welding operation. Spot welds **25***a* and **26***a* resulted when current was passed through the burner body and the bracket, as in the welding of the sleeve **16** to the bracket.

It is thus seen that, due to the bends in the sheet metal forming the bracket, the bracket member provides a very rigid mounting and, due to the positioning of the flame sensing holder and the burner body in the bends of the bracket, these members are properly spaced and aligned with each other by a very simple and inexpensive assembling technique.

The invention is illustrated as having an arrangement whereby if the bracket **11** were bolted to a main burner by having bolts pass through the openings **12** and **13** therein and into the main burner, with the conduit **23** connected to a source of fuel, a flame from the burner head **24***b* would impinge on the upper end of the thermocouple **17**, with portions of the flame passing by the thermocouple, with at least one portion thereof flowing in a direction toward the main burner. The head is so designed that should the flame portion for igniting the main burner become sufficiently small so as to be incapable

of lighting the main burner, the portion of the flame playing on the thermocouple will cease to heat the thermocouple sufficiently to cause it to energize a conventional safety valve to which it is connected, causing the gas to the main burner to be cut off.

Should it be necessary to replace the thermocouple, it may be removed from its holder **16** by merely pulling downwardly on the concentric lead **17***e* connected thereto. The enlarged diameter portion or rib **17***b* will cam the detents or inwardly extending portions **20***b* outwardly to permit the rib **17***b* to move downwardly and thus free the thermocouple for outward movement from the holder **16**. A new thermocouple may be installed by merely forcing it through the holder **16** and through the spring clip **20**, as in the initial assembly thereof.

As modifications may be made in the invention without departing from the spirit thereof, the scope of the invention should be determined from the appended claims.

I claim:

1. A safety pilot comprising a bracket having a pair of spaced arcuate bends therein to provide a pair of longitudinally offset and generally parallel arms joined by an intermediate portion; a tubular support for holding a temperature sensing unit and having a radius substantially the same as the radius of said arcuate bends mounted in one of said bends; a tubular pilot burner body having a radius substantially the same as the radius of said arcuate bends and mounted in the other of said bends, said tubular support and tubular pilot burner body being secured to said bracket in said bends by means located at said bends; and means for securing said temperature sensing unit in said support.

2. In a safety pilot the combination comprising a metal bracket having a pair of bends therein to provide a pair of longitudinally offset and generally parallel arms joined by an intermediate portion; a tubular support, for holding a temperature sensing unit, mounted in one of said bends; a tubular pilot burner body mounted in the other of said bends, with said intermediate portion lying therebetween; and means for detachably securing said temperature sensing unit in said support.

3. A safety pilot comprising a sheet metal bracket having a pair of bends therein to provide a pair of generally parallel arms joined by an intermediate diagonally extending portion; a tubular support, for hoding a temperature sensing unit, mounted in one of said bends, said support an internal annular flange at one end thereof and a spring clip member extending through and mounted on said flange for resiliently engaging the temperature sensing unit; and a tubular pilot burner body mounted in the other of said bends, with said intermediate diagonally extending portion lying therebetween.

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