

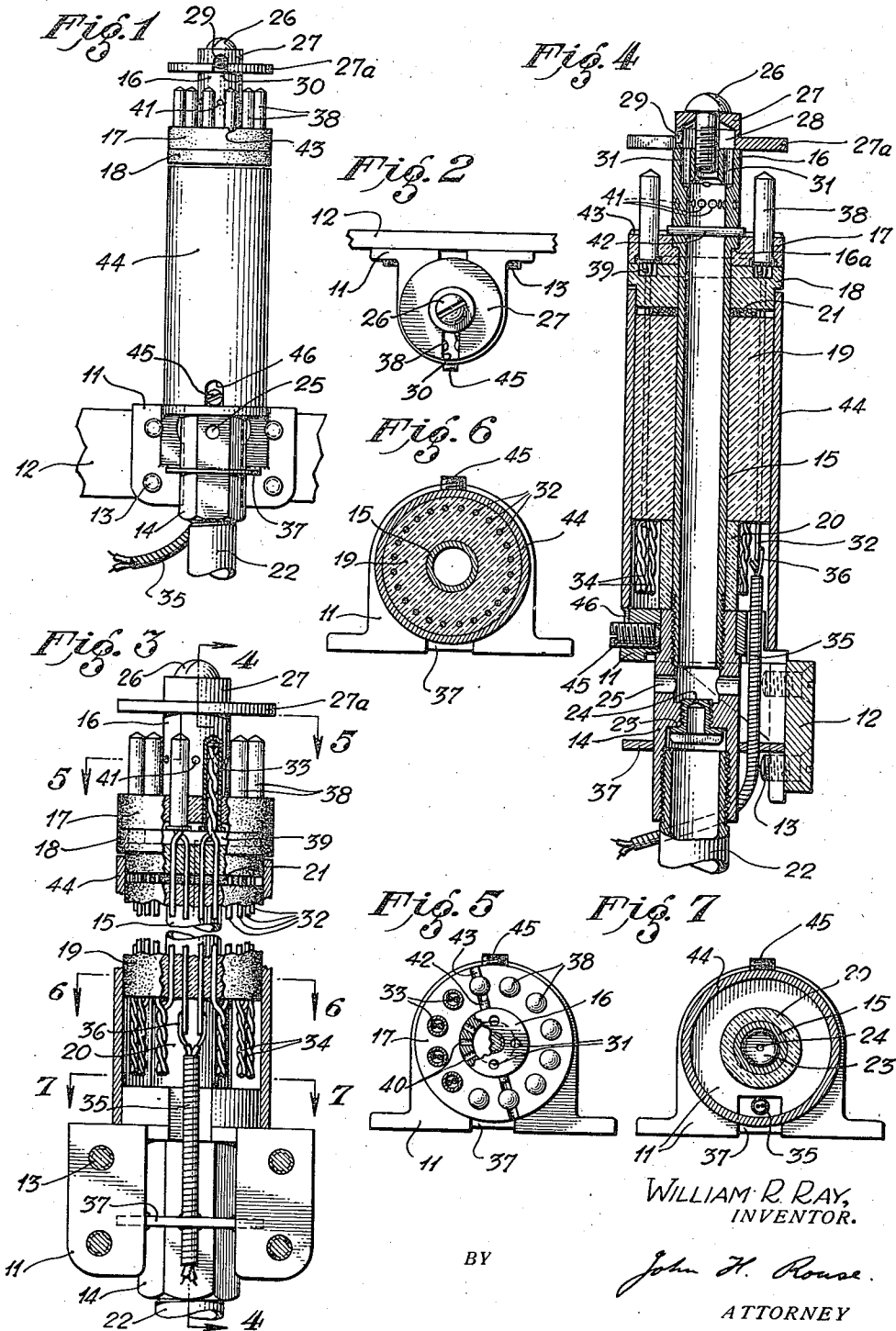
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PILOT GENERATOR

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2,236,609

PILOT GENERATOR

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5 Claims. (Cl. 136-4)

My present invention relates to thermoelectric generating devices and has for its chief object the provision of a thermoelectric generator which incorporates novel features productive of high efficiency, compactability, durability and simplicity of construction.

A particular object of my present invention is the provision of a "pilot generator," consisting of the novel combination of a gas pilot burner with an improved thermoelectric generator.

Other objects and advantages of my invention will be found in the description, the drawing and the appended claims.

For a more complete understanding of the invention, reference may be had to the following detailed description and accompanying drawing, in which

Figure 1 is a front elevation of a device embodying my invention;

Figure 2 is a plan of the device;

Figure 3 is an enlarged back elevation, partly broken away, of the device;

Figure 4 is a section taken on the irregular cutting plane 4-4 of Fig. 3;

Figure 5 is a section taken on the irregular line 5-5 of Fig. 3; and

Figures 6 and 7 are sections taken on the lines 6-6 and 7-7, respectively, of Fig. 3.

Referring particularly to the drawing, the numeral 11 denotes a bracket secured to a support 12 (not shown in Fig. 3 and sectional Figs. 5-7) as by screws 13 and bored to receive the upper cylindrical end portion of a hollow hexagonal member 14. Threadedly connected to said member 14 is a tubular member 15 having an enlarged upper end portion 16. A flange 16a formed by said enlarged portion 16 serves to secure ceramic disk members 17 and 18, a ceramic tubular member 19 and a tubular mica spacer 20 to the upper end surface of member 14 with a cushioning asbestos washer 21 between members 18 and 19.

The lower end portion of member 14 is internally threaded to receive a gas supply conduit 22. An orifice member 23, having a mixing orifice 24, is threadedly secured in a diametrically reduced portion of the internal side wall of member 14. Passageways 25 provide means for admitting air to be mixed with the gas issuing from orifice 24.

Secured to the upper end portion 16 of the tubular member 15, by a screw 26, is a bonnet member 27 having a chamber 28 with which a pilot burner orifice 29 communicates. A slot 30 is formed in the disk portion 27a of the bonnet

member 27 adjacent the orifice 29. Communication between the interior of the upper portion 16 of the tubular member 15 and the chamber 28 is afforded by passageways 31.

The ceramic members 18 and 19 are provided with a plurality of aligned passageways to receive wires 32 arranged in pairs, each pair consisting of wires of thermoelectrically dissimilar material, such as "Chromel" and "Copel" and having their upper end portions twisted and fused together to form thermoelectric hot junctions or couples 33 concentrically surrounding the upper portion 16 of tube 15. The lower end portions of adjacent wires of adjacent pairs are likewise twisted and fused together to form thermoelectric cold junctions or couples 34. The pairs of wires of thermoelectrically dissimilar materials are so arranged and connected together as to form a thermopile, the thermoelectric E. M. F. generated by each hot junction or couple being additive.

External connection to the thermopile may be made by means of an armored cable 35 having a pair of insulated copper wires 36 welded to the ends of the series of wires 32. A disk member 37, having a hexagonal aperture and slidable on the member 14, has an edge abutting the bracket 11 to which it is secured as by solder, and serves to prevent turning of the member 14 with respect to the bracket 11 when the assembled device is screwed onto a conduit 22. The armored cable 35 is passed through a hole formed in the rear portion of the disk 37 and is secured therein, as by solder, to prevent breaking of the wire connections in use.

The hot junctions 33 are surrounded and protected by thin tubular cap members 38, of non-corrosive metal such as stainless steel, and are supported in spaced relation to the member 16 in openings formed in the ceramic member 17, which openings are enlarged at their lower ends to receive the flanged lower end portions of the caps 38, which flanges serve to retain said caps in position. The upper surface of member 18 has an annular groove 39 to provide clearance for the twisted lower end portions of the hot junctions or couples 33.

The side wall of the upper portion 16 of the tubular fuel supply member 15 is provided with a series of radial passageways 40 (Fig. 5) communicating with a circumferential row of orifices 41, disposed in staggered relation with the cap members 38, for the emission of gas which, when ignited, forms a series of small flames directed between adjacent couple caps. The caps

38, and the hot junctions or couples within them, are thus heated by the hot outer portions of the flames. If the flames were arranged to play directly upon the cap members, part of the cap would be subjected to the relatively cold center portion of the flame, whereas by my arrangement that cold portion is between the caps. This arrangement also prevents the formation of soot on the caps which would tend to decrease the heating effect.

The disk portion 27a of the bonnet member is heated by the couple flames, which it tends to spread laterally. The disk 27a, in its heated condition, tends to maintain combustion, and so reduces the possibility of accidental extinction of the flames. In the event of accidental extinction of either the pilot flame or the couple-heating flames, the slot 30 permits reignition of the one by the other. By loosening the screw 28, the bonnet 27 may be rotated so as to direct the pilot flame issuing from the orifice 29 in any desired lateral direction for ignition purposes. By omission or sealing of the orifice 29, the device may be used as a thermoelectric generator alone, if so desired.

To maintain the staggered relation of the orifices 41 with the caps 38, the member 16 is provided with a pin 42 cooperating with a radial groove 43 formed in the upper surface of the ceramic member 17. Surrounding the ceramic member 19, and positioned between the outer flanges of the members 18 and 11, is a tubular metallic member 44. The length of said cover member 44 is made slightly less than the distance between the flanges between which it is positioned, so as to allow for thermal expansion of the member.

A set-screw 45 serves to secure the members 11 and 14 in position together, the outer end portion of the set-screw extending through a notch 46 formed in the lower end portion of the cover member 44 to prevent rotation of that member.

While I have described the members 17, 18 and 19 as being of ceramic material and the member 20 as being of mica, it is to be understood that any suitable heat-resistant material may be employed in these members.

It will be seen that, by my invention, I have provided a novel, efficient and compact thermoelectric generating apparatus which has particular utility in connection with thermoelectrically energized devices, such as, for example, the fluid valve device shown and described in the copending application of William A. Ray, Serial No. 172,180, filed November 1, 1937.

While I have shown and described a preferred embodiment of my invention, I wish it to be understood that modifications may be made and that no limitations on the invention are intended than are imposed by the scope of the appended claims.

I claim as my invention:

1. In a device of the character described, a tubular gas burner, means for connecting the lower end of said burner with a supply of gas, a substantially tubular member of heat-resistant insulating material surrounding at least a portion of said burner and having passageways therein disposed in parallel relation to the axis of said burner, and wires in said passageways, each alternate wire being composed of thermoelectrically dissimilar metal and the end portions of adjacent wires being joined together to form a thermopile having hot and cold junctions, said hot junctions being arranged adjacent the upper 75

end of said burner so as to be heated by the flame thereof.

2. In a device of the character described, the combination of a gas burner having a substantially tubular body and a circumferential row of orifices in the upper side wall thereof, means for connecting the lower end of said tubular body with a supply of gas, a hollow member of heat-resistant insulating material surrounding a lower portion of said tubular body and having passageways therein disposed in parallel relation to the axis of said burner, and wires in said passageways, each alternate wire being composed of thermoelectrically dissimilar metals and the end portions of adjacent wires being joined together to form a thermopile having hot and cold junctions, said hot junctions being arranged adjacent said orifices so as to be heated by the flames issuing therefrom.

3. In a device of the character described, the combination of a gas pilot burner having a substantially tubular body and a circumferential row of orifices in the upper side wall thereof, means for connecting the lower end of said tubular body with a supply of gas, a hollow ceramic member surrounding a lower portion of said tubular body and having passageways therein disposed in parallel relation to the axis of said burner, and wires in said passageways, each alternate wire being composed of thermoelectrically dissimilar material and the end portions of adjacent wires being joined together to form a thermopile having hot and cold junctions, said hot junctions being arranged adjacent to said orifices so as to be heated by the flames issuing therefrom.

4. In a device of the character described, the combination of a gas pilot burner having a substantially tubular body and a circumferential row of orifices in the upper side wall thereof, a pilot burner head on the upper end portion of said tubular body, means connecting the lower end of said tubular body with a supply of gas, a hollow ceramic member surrounding a lower portion of said tubular body and having a concentrically disposed row of passageways therethrough, wires in said passageways, each alternate wire being composed of thermoelectrically dissimilar material and the end portions of adjacent wires being joined together to form a thermopile having hot and cold junctions, and protective cap members of noncorrosive metal on each of said hot junctions, said caps being arranged adjacent to said orifices so as to be heated by the ignited gas issuing therefrom.

5. In a device of the character described, the combination of a gas pilot burner having a substantially tubular body and a circumferential row of orifices in the upper side wall thereof, a pilot burner head on the upper end portion of said tubular body, a concentric metallic disk arranged intermediate of said burner head and said row of orifices and extending beyond said tubular body, means connecting the lower end of said tubular body with a supply of gas, a hollow ceramic member surrounding a lower portion of said tubular body and having a concentrically disposed row of passageways therethrough, and wires in said passageways, each alternate wire being composed of thermoelectrically dissimilar material and the end portions of adjacent wires being joined together to form a thermopile having hot and cold junctions, said hot junctions being arranged adjacent to said orifices so as to be heated by the ignited gas issuing therefrom.

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