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THERMAL GENERATOR

Filed Feb. 2, 1924

Fig. 1.

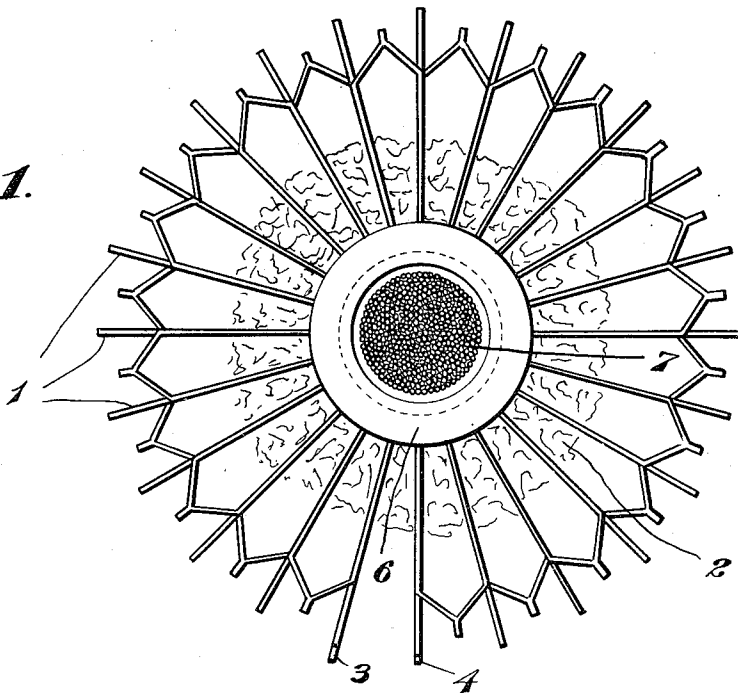
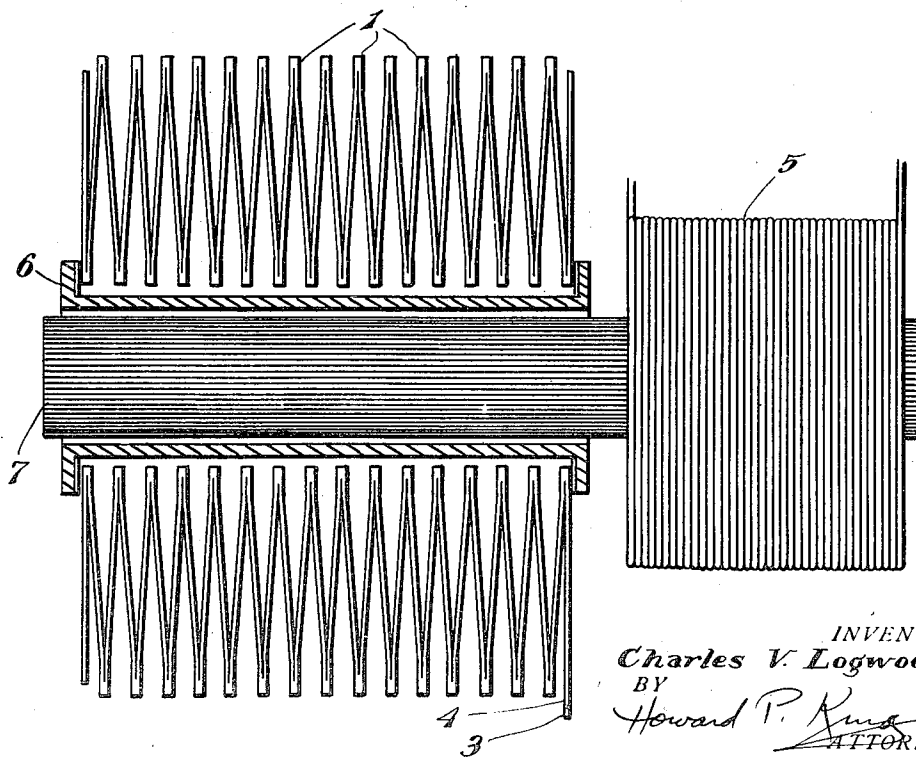


Fig. 2.



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THERMAL GENERATOR.

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This invention relates to thermal generators, and more particularly to a thermal generator and the means of heating the same which may be utilized as a source of current supply for radio apparatus.

The objects of the invention are to provide a thermal generator which is practical as a means for obtaining proper current for radio apparatus; to provide means for arranging a plurality of thermo couple units in such a manner that the same may be uniformly heated; to enable a single heater to be utilized for all of the units; to provide a device wherein the ends opposite from the heated ends of the units will remain cool; to provide novel means for heating the units; to enable alternating current to be used as the source of energy for creating the heat; to secure simplicity of construction and operation, and to obtain other advantages and results as may be brought out in the following description.

Referring to the accompanying drawing in which like numerals of reference indicate similar parts throughout the several views;

Figure 1 is an end view of an apparatus embodying my invention; and

Figure 2 is a vertical sectional view through the same.

In the specific embodiment of the invention illustrated in said drawing, reference numeral 1 indicates one of a plurality of units by means of which current may be generated. Said units each consist of two wires or pieces of metal of different material. I prefer to employ one wire of copel and one wire of chromel. It is a well known physical fact that when two dissimilar metals are brought together at one end of each and secured, as by welding, and the joint then heated, that an electric potential difference may be obtained across the other ends. It is this physical fact which I take advantage of in the present invention, and find that the two metals referred to above give very satisfactory results. The unit 1 consists of the two dissimilar metals referred to above preferably in the form of wire of those metals, the wires being each welded at one end to the other wire and the wires or legs extending from the welded end both in the same general direction and spread apart toward their other ends.

The problem in utilization of thermo couples has been to obtain a compact ar-

rangement whereby a great quantity of the thermo couple units may be arranged in series and in which all the ends to be heated may have a uniform heat applied thereto. I have devised a thermo couple wherein the units are arranged in a series and wherein the ends to be heated are in substantially the same plane and all extending to substantially the same straight line in said plane. The several units are duplicates of each other and are positioned side by side in a longitudinal uniform series. I provide a plurality of these series, arranging the series of series radially with respect to a common axis as clearly shown in Figure 1. The several series may be held against displacement with respect to each other by any suitable means, and in the present showing I have indicated a suitable filler 2 disposed between the series securely holding the same. The filler 2 not only provides means for retaining the series in proper relation to each other, but also acts as a means for confining the heat to the central portion of the device so that the outer ends of the units may be kept cool. For this reason, it is preferable to employ a suitable heat resisting substance such as asbestos which has the added advantage of being readily moulded when in a plastic state.

Each assembly of units comprising a series provides an electric circuit which starts at one end and ends at the other. The end legs of each series are connected one to the series at one side and the other to the series on the other side, so that all of the series will provide a circuit following back and forth through the series of series from one point in the annular arrangement of series all the way around and back to substantially the same point. The legs where the circuit is to start and end are not connected, one of them being indicated by reference numeral 3 and the other by reference numeral 4 constituting the terminals from which the full amount of current may be secured from the apparatus.

It will be observed that in view of the fact that the units of each series or longitudinal row are joined together in series and the several rows are joined together in series that the end terminals of the entire series will give a voltage equal to the summation of the voltages of the units. Obviously as many units as desired may be employed in

a series and as many series employed in the annular arrangement as there is room to accommodate them, and I do not wish to be understood as restricting myself to the exact number of units or the exact number of series shown. Furthermore, it is not necessary to utilize all of the current generated, but the desired voltage can be obtained if it is less than the entire voltage of the series, by tapping off between any proper number of series. In the arrangement shown, the terminals as well as the connected ends of the units project outwardly, and it is very convenient to tap off from any one as desired.

For the purpose of heating the inwardly projecting ends of the units I have shown herein a transformer having a primary and a metal cylinder in place of or constituting the secondary. Obviously there are a number of arrangements of primary and secondary which might be used, but for purposes of illustration I have shown a straight core on which the primary and cylinder are arranged end to end. The primary, upon passage of alternating current therethrough, sets up an induced current in the secondary. Since, however, the secondary is a metal cylinder, it amounts to a short circuit in the secondary and the induced current is changed into heat. The heat is sufficient to make the cylinder very hot and it is the heat of this cylinder which I utilize for heating the inner ends of the units. As illustrated in the drawing, the core is preferably composed of a plurality of iron wires grouped together into cylinder formation and inserted through the secondary cylinder as clearly shown in Figure 2. The secondary cylinder and the inner ends of the units are proportioned in size and positioned so as to space the said inner ends of the units out of contact with the said cylinder so as to avoid short circuiting the generated current. Also, I have shown flanges on the end of the cylinder with suitable insulation such as mica between the flanges and the end units.

While I have shown the transformer arrangement utilizing a straight core, it is to be understood that any of the various arrangements of transformers may be utilized.

Also, I have shown in the drawing the units arranged in longitudinal series and the series of series arranged radially around the secondary cylinder, but it is to be understood that this arrangement may be reversed utilizing radial series and the successive series positioned longitudinally of the core, as more clearly shown in my co-pending application, S. N. 690,198 without departing from the spirit or scope of the present invention.

Obviously other detail changes and modifications may be made in the manufacture and use of my invention, and I do not wish to be understood as limiting myself to the exact structure shown except as set forth in the following claims when construed in the light of the prior art.

Having thus described my invention, I claim:—

1. A thermal generator comprising a plurality of units adapted to generate current by heating said units, an induction coil for producing an induced current, and means for converting the induced current into induced heat for heating the units.

2. A thermal generator comprising a plurality of units adapted to generate current by heating said units, a metallic cylinder arranged adjacent the ends of the said units which are to be heated, and means for heating said cylinder by induction.

3. A thermal generator comprising a plurality of units adapted to generate current by heating said units, and an induction coil and core having means associated therewith adapted to produce heat for heating said units.

4. A thermal generator comprising a plurality of units adapted to generate current by heating said units, a cylinder, and an induction coil for heating said cylinder.

5. A thermal generator comprising a cylinder, a plurality of units adapted to generate current when heated arranged around said cylinder, and an induction coil having a core extending through said cylinder for inducing current in the short circuit produced by said cylinder so as to convert the induced current into heat for heating the cylinder and units.

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