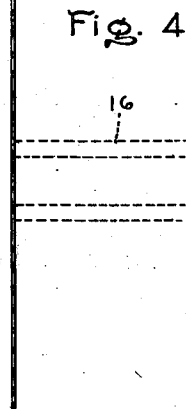
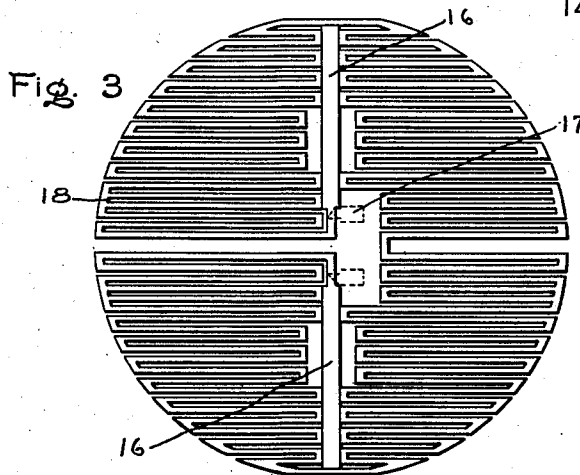
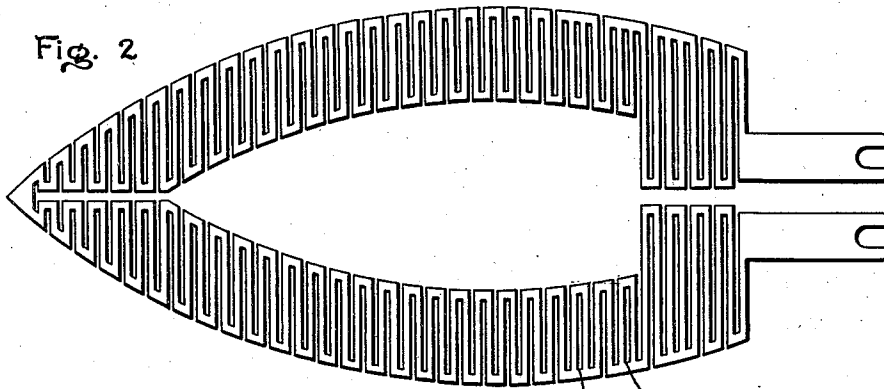
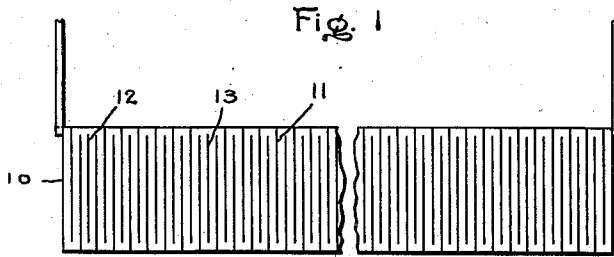


L. F. PARKHURST.
RESISTANCE UNIT.
APPLICATION FILED DEC. 8, 1908.

953,393.

Patented Mar. 29, 1910.



WITNESSES:

Lester H. Fulmer,
J. Ellis Allen.

INVENTOR

LEON F. PARKHURST.

BY

Alvin S. Davis

ATTY.

UNITED STATES PATENT OFFICE.

LEON F. PARKHURST, OF PITTSFIELD, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

RESISTANCE UNIT.

953,393.

Specification of Letters Patent.

Patented Mar. 29, 1910.

Application filed December 9, 1908. Serial No. 466,612.

To all whom it may concern:

Be it known that I, LEON F. PARKHURST, a citizen of the United States, residing at Pittsfield, county of Berkshire, State of Massachusetts, have invented certain new and useful Improvements in Resistance Units, of which the following is a specification.

My invention relates to resistance units for electric heaters and the like and has for its object the provision of a device of this character which may be produced at a very low cost and at the same time be very efficient and durable.

One of the objects of my invention is to produce a heating unit from a thin sheet of resistance material. This is done by cutting the unit out of the sheet either by punching it out in the desired form, cutting slits in the sheet or in any other desired way.

Another object of my invention is to produce a unit in which the resistance may be properly adjusted after it is punched or cut. A thin unit made in this way has a great many advantages over the units heretofore produced. For instance, it is capable of being placed in very intimate thermal relation with the device to be heated, and is easily held in contact with the exact surface to be heated. That is, the unit may be easily made to conform to the shape of the surface to be heated.

Other objects of my invention will appear in the course of the following specification, in which I have shown my invention embodied in concrete form for purposes of illustration.

Referring to the drawings, Figure 1 represents one form of my invention in which the unit is constructed by cutting slits in a sheet of resistance material; Fig. 2 represents a second form in which the unit is punched out of a sheet of resistance material; Fig. 3 represents a circular form which is punched out, the terminals being produced by slitting the material; and Fig. 4 represents a side view of this unit.

Referring to the drawing, 10 represents a zig zag resistance ribbon which has been formed from a sheet of resistance material. The particular material used in this unit forms no part of my invention, although it is preferable and in some cases essential, that the material be of such a nature that

it will insulate itself by oxidation on heating. Such a material is disclosed in the patent of John T. H. Dempster, No. 901,428, dated Oct. 20, 1908.

In the form shown in Fig. 1, the unit is made by cutting the slits 11 in a sheet alternately from opposite sides as shown. This construction is possible with material which is self-insulating but it would be rather difficult to mechanically apply insulation to a portion which has been slitted. The slits or cuts in the sheet may be made by running the sheet through rolls, having a series of cutting edges on their surfaces, or in any other way desired. If desired, some of the cuts may be shortened, as for instance, at 12 and 13, so as to leave the metal between the two sections or loops of the ribbon integral, thereby short circuiting these loops. Afterward, if desired, these portions may be cut so as to open the short circuits on the loops to accurately adjust the resistance.

In Fig. 2 I have shown a form of unit which is punched out of a sheet of material. This unit is shown for purposes of illustration in the form of a flat iron with the central portion cut away. It is obvious, of course, that other forms may be likewise used, as for instance, that shown in Fig. 3. In this case certain sections are likewise short circuited, as at 14—15. This method of varying the resistance is much more convenient in the case of the punched unit than it is where the form shown in Fig. 1 is used. As many as required of these integral portions 14 and 15 may be sheared or cut away after the unit is formed so as to vary the resistance of the unit. It is obvious that each one of these bars which is left integral cuts out a section of the conductor. This I consider a very important feature, inasmuch as in rolling the resistance material to a very thin sheet of a few thousandths inch it is impossible to make it of uniform gage; likewise the resistance of the material itself may vary. A definite potential drop over two units even when punched out of the same sheet will not be produced and when the units are rolled at different times this variation is considerable even if the utmost pains are taken to make the sheet thickness the same. This is especially the case with the high resistance metal described in the Dempster patent which is hard and causes

the rolls to spring; and the irregularity of thickness is greatly intensified by the fact that the specific resistance of the metal is exceedingly high, over sixty times that of copper. But this is readily corrected by my method as by making a cut through one or more of the webs 18 the resistance of each particular unit may be brought to a standard value, so that several units when placed on a circuit of the same potential will all evolve the same heat and run at the same temperature.

In Fig. 3 is shown a unit which might be described as being formed by a combination of the processes shown in Figs. 1 and 2. In this case the unit is punched out in the form shown in Fig. 3 and the strips 16 are then cut or sheared out in any desired way. These strips 16 then form terminals, being bent at right angles to the sheet, as shown in dotted lines 17. In this case, certain of the loops or sections of the conductor are likewise short circuited, as at 18. It will be observed that in the unit herein described, a large amount of resistance may be placed in a very limited area, and the resistance of the unit may be accurately adjusted. The unit is likewise very easily produced and may be made in practically any shape. The self-insulating property of the metal lends itself in a peculiar manner to the method of producing units herein disclosed.

While I have disclosed my invention as being constructed in a concrete manner in accordance with the patent statutes, it should be understood that I do not desire to limit myself thereto, since various modifications thereof will suggest themselves to those skilled in the art without departing from the spirit of my invention, the scope of which is set forth in the annexed claims.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. A heating unit comprising a resistance grid having integral members short circuiting sections thereof.

2. The process of forming a resistance unit consisting in cutting a looped conductor from sheet metal of high specific resistance and then graduating the resistance by modifying one or more of the loops.

3. The process of forming a resistance unit consisting in cutting a looped conductor from sheet metal of high specific resistance

and then varying the resistance of one or more loops.

4. The process of forming a resistance unit consisting in cutting a looped conductor from sheet metal of high specific resistance and then varying the length of one or more loops while still maintaining its section.

5. The process of forming a resistance unit which consists in cutting a zig-zag conductor with some of the sections short-circuited out of a sheet of resistance material.

6. The process of forming a resistance unit which consists in cutting a continuous looped conductor with some of the loops short circuited out of a sheet of resistance material.

7. The process of forming a resistance unit which consists in cutting a looped conductor with some of the loops short circuited out of a sheet of resistance material and then opening the short circuits to adjust the resistance.

8. The process of forming a resistance unit which consists in slitting a thin sheet of resistance material having self insulating properties when heated to form a continuous looped conductor.

9. The process of forming a resistance unit which consists in cutting parallel slits in a sheet of resistance material having self insulating properties when heated, to form a continuous zig-zag conductor.

10. A resistance unit comprising a continuous looped resistance ribbon having integral members short circuiting certain of said loops.

11. A resistance unit comprising a continuous zig-zag resistance ribbon having integral members across certain of the sections to short circuit them.

12. A resistance unit comprising a continuous looped resistance ribbon coated with a thin insulating oxid, having integral members short circuiting certain of said loops.

13. A resistance unit comprising a continuous zig-zag resistance ribbon cut out of a thin sheet of resistance material, certain portions being left integral to short circuit sections of the ribbon.

In witness whereof, I have hereunto set my hand this seventh day of December 1908.

LEON F. PARKHURST.

Witnesses:

CHARLES RUGGEN,
JAMES I. CARROLL.