

G. E. BERNECKER.
ELECTRIC RESISTANCE DEVICE AND MEANS FOR REGULATING THE SAME.
APPLICATION FILED OCT. 31, 1911.

1,123,225.

Patented Jan. 5, 1915.

Fig. 1.

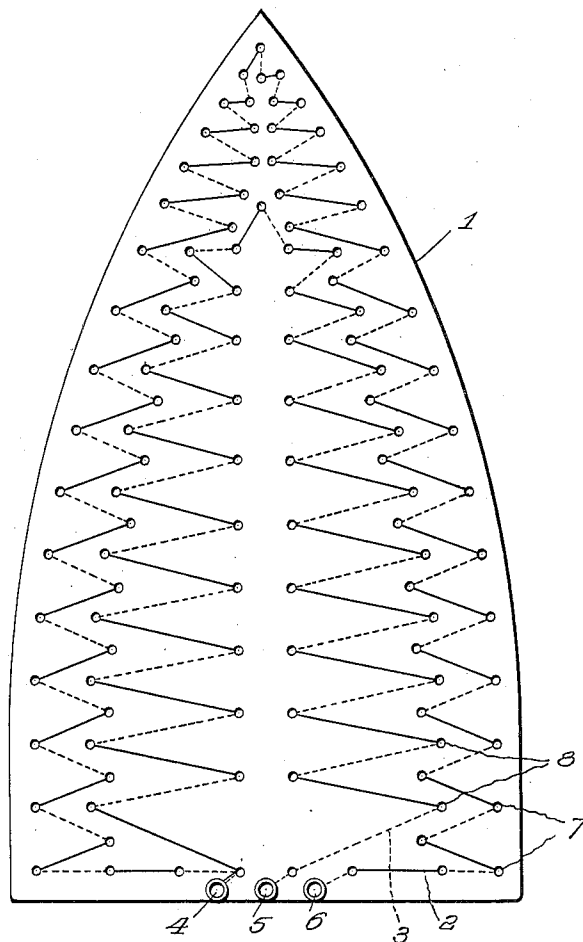
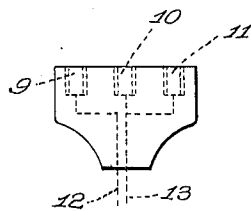


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ELECTRIC-RESISTANCE DEVICE AND MEANS FOR REGULATING THE SAME.

1,123,225

Specification of Letters Patent.

Patented Jan. 5, 1915.

Application filed October 31, 1911. Serial No. 657,794.

To all whom it may concern:

Be it known that I, GEORGE E. BERNECKER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Electric-Resistance Devices and Means for Regulating the Same, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to electric resistance devices and means for regulating the same.

It has among its objects to provide an improved electric resistance device and improved means for regulating the same.

A further object of my invention is to provide an improved electric resistance unit carrying a plurality of resistance sections, wherein the unit is so constructed and arranged as to be readily adapted to operate with any desired amount of said resistance in circuit.

A further object of my invention is to provide improved means, including an adjustable plug member, for regulating at will the amount of resistance in circuit.

Other objects and advantages of my improved construction will hereinafter appear.

In the accompanying drawings, I have for purposes of illustration shown one form which my invention may assume in practice. My invention is not, however, limited to this form, but may assume other forms.

In the views of these drawings: Figure 1 shows a diagrammatic plan view of a unit. Fig. 2 shows a diagrammatic view of a plug member therefor.

In these drawings I have, for purposes of illustration, shown my improved resistance device applied to use as a heating element for an electric laundry iron. In this construction an insulating base 1 carries a plurality of resistance sections 2 and 3 of any suitable type. The ends of the resistance sections 2 and 3 are preferably brought out at the back of the base 1 to three terminal members 4, 5 and 6, one of the ends of each section being brought out at the common terminal 4, and the three terminal members being arranged to be engaged by an adjustable temperature controlling plug member.

The base 1 is, in a preferred form, made

of mica and of a shape adapted to permit it to fit within the object to be heated. The several heating conductors or sections of resistance material may be carried by this base in any suitable manner. In the construction shown this base is provided with a plurality of series of perforations 7 and 8 arranged to receive the resistance material. In a preferred form the perforations 7 are arranged in staggered relation in substantially parallel rows around the side and tip of the base 1. The perforations 8 are preferably similarly arranged within the perforations 7, as shown in Fig. 1. If desired, instead of using the perforations I may use stuck-up ears or other devices for holding the resistance material upon the unit. In a preferred form the perforations are arranged slightly closer together at the tip of the iron in order that the resistance material may compensate for the additional heat loss at that point, and thus maintain a substantially uniform temperature.

The resistance sections may be formed of any suitable resistance material of widely different types and may assume various other forms than that shown for purposes of illustration. The coils 2 and 3 in the construction shown are preferably wound upon the base 1 in the perforations 7 and 8 respectively in a zig-zag manner, alternately on the opposite sides of the base, the resistance coil 2 being passed around the outside of the unit to the tip and then brought backward to the back of the iron, while the resistance coil 3 is similarly passed up toward the tip in the perforations 8, nearer the center of the base, and then brought to the back of the iron. If desired, there may be any suitable distance between the inner ends of the convolutions of the coil 3 in order to distribute the heat to the surface of the iron in the desired amount.

In a preferred form, I place the terminal members 4, 5 and 6 at the back of the base, so that the connections to the same may be more readily made. These terminal members may be of any desired construction, and I have accordingly only illustrated them diagrammatically, indicating them by circles upon the back of the base 1. If desired, they may assume the form of plugs and may be secured in any suitable manner to the base or to a portion of a device inclosing the base. In a preferred form one of

the ends of the resistance coil 2 is connected to the plug 6, and its other end is connected to the plug 4, while one of the ends of the resistance material 3 is connected to the plug 5, and its other end is connected to the plug 4. Thus it is seen that three terminals are provided to which the two coils are connected, and that the coils are so arranged that the coil 3 may be connected either in series or parallel with the coil 2, or both coils may be cut entirely out of circuit upon changing the connections of the same.

In Fig. 2, I have shown diagrammatically an adjustable controlling or regulating plug which may be used in a preferred construction. The body of this plug is preferably made of a suitable insulating material, and in a preferred form carries a plurality of contacts 9, 10 and 11, insulated from each other within suitable recesses in one of its faces, which are adapted to engage the plugs 4, 5 and 6. The line conductors 12 and 13 are connected to the several contacts 9, 10 and 11 by any suitable means, the contact 9 being connected to the conductor 12 in a preferred form, while the contacts 10 and 11 are both preferably tapped into the conductor 13. With such a plug I am able to change the circuit connections of the device, in order to provide, when desired, a high initial heat, a lower running heat, or to cut the coils out of circuit altogether. For instance, when the device to be heated is cold, and it is desired to quickly bring the same to a running heat, I place the plug in such a position that the contacts 4, 5 and 6 engage the contacts 9, 10 and 11 respectively. With the plug in such a position the circuit through the unit may be considered to be closed from the conductor 13 in parallel through the sections of resistance material 2 and 3, through the contact 9 and back to the line conductor 12. Thus it is seen that the two coils are arranged in parallel so that they develop a high heat well adapted to bring the iron quickly to its running temperature. For instance, the resistances may be adapted to use a current of 5 amperes when connected in this manner. When the iron has reached its running temperature all that it is necessary to do in order to cut down the heat generated is to move the plug member to the right so that the contacts 9 and 10 engage the contacts 5 and 6 respectively. When in this position the circuit connections of the two coils has been changed from parallel to series. The circuit then extends from the conductor 13 through the section 2, the section 8 and the contact 9 to the other line conductor 12. With the coils thus in series the amount of heat generated by the unit is materially reduced. For instance, using the amperage illustra-

tion referred to above: The amperage used when the coils are in series may amount to approximately $1\frac{1}{2}$ amperes as against 5 amperes used when the coils are in parallel. Thus it is seen that the current used with the coils in parallel relation may be substantially four times that used when the coils are in series relation, and that since the heat generated is proportional to the current flow the initial heat may be four times the running heat, so that the device to be heated may be very quickly brought to its running heat. When it is desired to cut the two coils out of circuit and still leave the plug on, all that it is necessary to do is to move the plug to the left so that the contacts 10 and 11 engage the contacts 4 and 5 respectively. In this position there is no current flowing through the iron, since the contacts 10 and 11 are connected to the same branch of the circuit.

By my improved construction I have provided an electric resistance unit which is adapted to provide a plurality of heats. For instance, the unit may be adapted to provide a high heat to bring the object to be heated quickly up to its running temperature, and then later adapted to provide a lower heat sufficient to maintain the latter at this temperature. If desired, the plug member may be entirely removed, so that the object to be heated, as for instance in the case of an iron, may be used without any connection to it after it has reached the running heat. Further, by my improved arrangement I am able to provide a heating unit of a very simple construction, which may be made up in very compact form, and which is adapted to develop and withstand high temperatures. Further, by the use of the two coils, either in series or parallel, I am able to provide a unit which is well adapted to have long life in service. The operation of changing the heat developed by the unit is very simple, since all that it is necessary to do is for the operator to remove the plug and reinsert it in the desired position. This may be readily done by the operator without any appreciable delay. Further, the plug member may be so constructed that it will occupy substantially the same space as that used by the ordinary attachment device. Further, by my improved construction I am able to materially increase the efficiency of the iron for a given amount of current flow, and to materially increase the economy of operation which is possible, since I am able to take advantage of the fact that after the object to be heated has been raised to its running heat a smaller amount of heat is required to maintain it at that temperature than is required to bring it to that temperature in the first instance.

While I have for purpose of illustration in this application described my invention as applied to an electric laundry iron, it is

obvious that my invention may be adapted to a wide range of uses with electric heating or other devices. Consequently, I do not wish to be limited to the specific construction shown for purposes of illustration, but wish rather to include within the scope of this application all of those forms of my invention falling within its spirit.

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

1. In an electric resistance unit, an insulating base, and a plurality of heating coils wound in zig-zag form thereon and passing alternately on opposite surfaces of said unit through openings in said base, one of said coils being arranged around the periphery of said base and another being arranged within said coil, the two coils being arranged to provide a greater heat at a predetermined portion of said base.
2. In an electric resistance unit, an insulating base, a plurality of heating coils wound in zig-zag form thereon and passing alternately on opposite surfaces of said unit through openings in said base, one of said coils being arranged around the periphery

of said base and another being arranged within said coil, the two coils being arranged to provide a greater heat at a predetermined portion of said base, and terminal plugs carried by said base and connected to said coils.

3. In an electric resistance unit, an insulating base, a plurality of heating coils wound in zig-zag form thereon and passing alternately on opposite surfaces of said unit through openings in said base, one of said coils being arranged around the periphery of said base and another being arranged within said coil, the two coils being arranged to provide a greater heat at a predetermined portion of said base, and terminal plugs carried by said base and connected to said coils, each of said coils having one end connected to a common terminal.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

GEORGE E. BERNECKER.

Witnesses:

E. R. KING,

GEO. B. JONES.

Correction in Letters Patent No. 1,123,225.

It is hereby certified that in Letters Patent No. 1,123,225, granted January 5, 1915, upon the application of George E. Bernecker, of Chicago, Illinois, for an improvement in "Electric-Resistance Devices and Means for Regulating the Same," an error appears in the printed specification requiring correction as follows: Page 2, line 61, for the reference-numeral "8" read 3; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of March, A. D., 1915.

[SEAL.]

J. T. NEWTON,

Acting Commissioner of Patents.