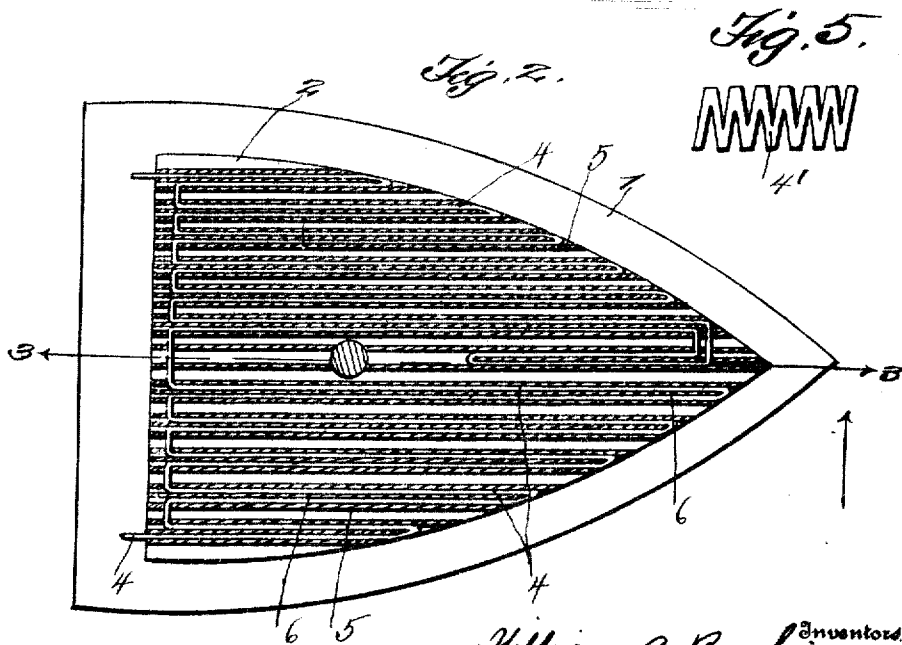
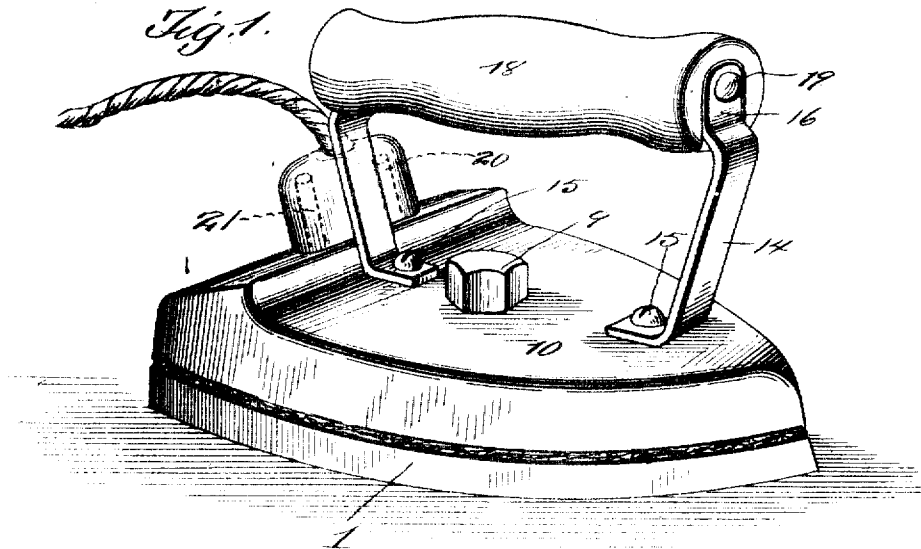


W. A. RANKIN & W. M. HARWOOD.
ELECTRIC HEATER.
APPLICATION FILED OCT. 23, 1908.

935,816.

Patented Oct. 5, 1909.
2 SHEETS—SHEET 1.



Witnesses

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Fig. 3.

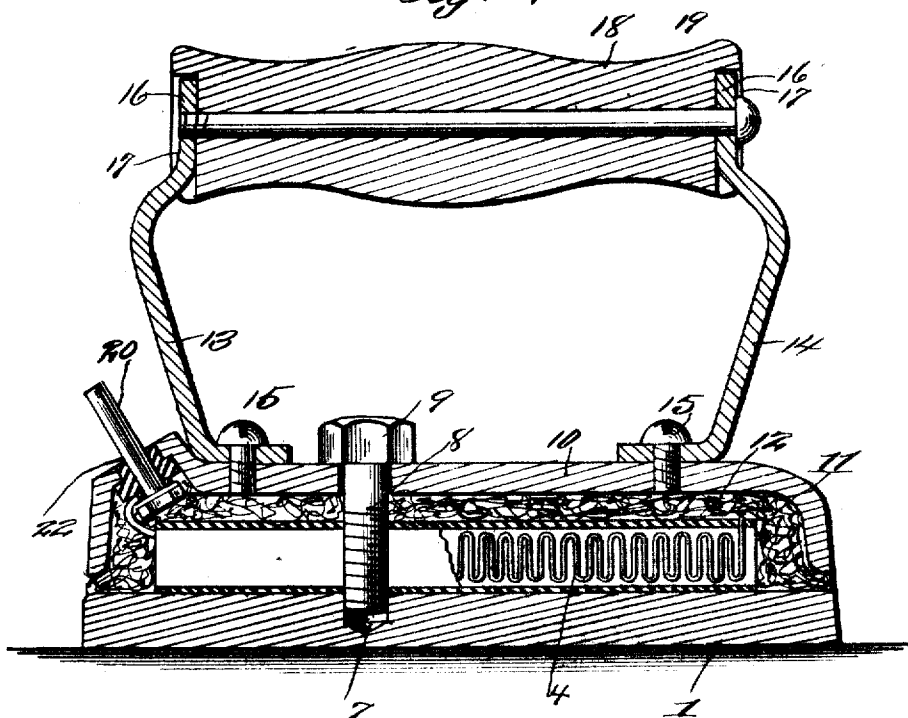
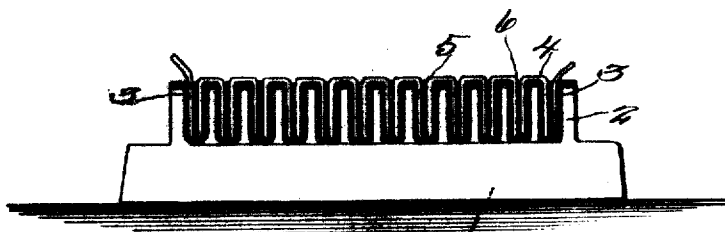


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ELECTRIC HEATER.

935,816.

Specification of Letters Patent.

Patented Oct. 5, 1909.

Application filed October 23, 1908. Serial No. 459,214.

To all whom it may concern:

Be it known that we, WILLIAM A. RANKIN and WILLARD M. HARWOOD, both citizens of the United States of America, and residents of Hutchinson, in the county of Reno and State of Kansas, have invented certain new and useful Improvements in Electric Heaters, of which the following is a specification.

This invention relates to certain new and useful improvements in electric heaters and, although we have chosen to illustrate the same as embodied in an electrically heated sad iron, it is to be understood that the features of the invention soon to be described are capable of embodiment in a variety of types of electrically heated apparatus other than sad irons, among which may be mentioned soldering irons, branding irons, stoves, griddles, laundry machinery and the like.

Heretofore in the construction of electrically heated devices it has been customary to make the heating element separate from the device to be heated, and held in contact therewith. In this form, part of the resistance not being in intimate contact with the device to be heated, is liable to become overheated as the heat from those parts has to be carried away by transmission through the parts that are in contact or by radiation, thus some parts of the resistance are overheated and the life of the element materially shortened.

The invention has for its objects among others to so arrange the resistance that all parts of the conductor are in intimate contact with the part to be heated, for the purpose of securing the rapid transmission of heat to the body to be heated, whereby economy in current consumption is secured and the danger of overheating the resistance is eliminated.

A further object of this invention is to so arrange the resistance in the slots, that a helix is not formed around the metal to be heated, thereby eliminating induction or magnetic lag. We endeavor to do this by placing the resistance elements in grooves or slots. While it is best to have these slots directly in the device, the face of which is to do the work, when necessary or desired, they may be in a plate having a surface adapted to be brought into intimate contact with the device to be heated.

The resistance elements are formed of an electrical conducting material, preferably

one of high resistance. They are of a form whereby we get a long path of travel for the current, and we are thus enabled to use a conductor of great carrying capacity in a compact space. The way in which we have contemplated making the resistance elements is in the form of a zig-zag grid or a flattened helix or wire formed in a zig-zag manner, as shown in the attached drawings.

We do not intend to limit ourselves to the exact form shown in the attached drawings, but desire to use that one of the forms of resistance, mentioned above, as will best adapt itself to the particular device being made. Neither do we intend to limit ourselves to the exact form of slots shown. Where practical, they may be molded in or machined, or, in certain devices, as, for example, a vessel in which to heat fluids, a sheet of metal may be formed up leaving slots on one side to receive the resistance and grooves on the other side forming a large area for the contact of the fluid, thus carrying the heat away rapidly.

Other objects and advantages of the invention will hereinafter appear and the novel features thereof will be particularly pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the numerals of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a perspective view of a sad iron embodying our improvement. Fig. 2 is a top plan with the cover removed. Fig. 3 is a substantially central longitudinal section through the completed iron with a portion broken away, the section being taken on the line 3—3 of Fig. 2. Fig. 4 is an end elevation. Fig. 5 is a detail of one of the forms of zig-zag grids that we may employ.

We aim further to combine the resistance with the body to be heated in an improved manner whereby great efficiency is secured with a minimum expenditure of current.

Like numerals of reference indicate like parts throughout the several views.

Referring to the drawings, 1 designates the body portion or bottom of the device, of whatever nature it may be, in this instance shown as the bottom portion of a sad iron, having an integral raised portion 2, in which raised portion are a plurality of slots 3 adapted to receive the resistance element,

which, in this instance, we have chosen to show in the form of a zig-zag grid 4, being a flattened helix or wire formed in a zig-zag manner, as shown best in Fig. 3, the said grid being insulated from the walls of the slots by suitable insulating material 5. Where two layers of the resistance are placed in the same slot, they are insulated from each other by the insulation 6, as seen clearly in Fig. 4. In Fig. 2 the resistance element is shown as with the breaks omitted. The bottom or body portion 1, in this instance, is shown as provided with a screw-threaded opening 7 which is adapted to receive a screw 8 having a head 9, said screw being passed through the cover 10 and through the raised portion 2 and engaging said opening to secure the cover fixedly in position to allow of its ready removal when desired. This cover is chambered upon its under side, as seen at 11, to receive the raised portion 2 of the body 1 and is separated from the latter by means of suitable non-heat conducting material 12, as seen clearly in Fig. 3.

13 and 14 are supports secured to the cover 10 by suitable means, as the screws 15, the upper ends of these supports having the portions 16 which are parallel to each other and received within recesses 17 in the ends of a handle 18, the screw rod 19 serving to hold the handle and the said parallel portions of the supports in position, as seen clearly in Fig. 3.

In assembling the parts, the resistance element 4, together with the proper insulations 5 and 6, is embedded in the slots 3. One end of the resistance element is connected to the terminal 20 and the other end is secured to a like terminal 21 in the usual manner. These terminals are insulated from the cover by suitable insulating washer 22, as seen best in Fig. 3.

In use, the electrical connections being made with the terminals in the usual manner, the current passes through the resistance 4, and the heat thus generated is absorbed by the bottom or body portion 1 as fast as generated, therefore the resistance material cannot be heated to a greater degree than the device to be heated and the life of the device is therefore materially lengthened. It will be observed that, by the arrangement above described, in which the resistance element is formed of an electric conducting material of a high resistance and of a zig-zag form, that we obtain a long path of travel for the current and thus are enabled to use a conductor of great carrying capacity in a small compact space which in many forms of electrically heated devices is most essential.

From the above it will be seen that we have devised a simple, cheap, yet durable and efficient electric heater, and, while the structural embodiment of the invention, as

hereinbefore described, is what we at the present time consider preferable, it is evident that the same is subject to changes, variations and modifications without departing from the spirit of the invention or sacrificing any of its advantages. We therefore do not intend to restrict ourselves to the exact details, proportions of parts or other mechanical features, but reserve the right to make such changes, variations and modifications as come properly within the scope of the protection prayed, as stated in the appended claims.

It is evident that the zig-zag grid may be of different form; for instance in Fig. 5 we have shown one form 4' which consists of a thin strip or ribbon slotted or slitted on alternate sides so as to produce a long path of travel for the current; hence where in the following claims we refer to a zig-zag grid we wish to be understood as covering all different forms of grid of such nature where such increased path for the current is provided.

What is claimed as new is:—

1. In a device of the character described, a body formed upon one side with an acting face and upon the opposite side with an integral raised portion with a series of slots formed therein, and a resistance element or elements in said slots and composed of a high resistance material of zig-zag form.

2. In a device of the character described, a body formed upon one side with an acting face and upon the opposite side with an integral raised portion with a series of slots formed therein, and a resistance element or elements in said slots and composed of a ribbon of resistance material, slotted on alternate sides to provide a relatively long path of travel for the current.

3. In an electro-heated apparatus, the combination of a metal plate formed upon one side with an acting face and upon the opposite side with an integral raised portion having a series of slots, a resistance insulated from and embedded in said slots and arranged to readily radiate the heat generated to the metal plate.

4. A resistance unit comprising a metal plate formed upon one side with an acting face and upon the opposite side with an integral raised portion having a series of slots and adapted to be held in close contact with the device to be heated, and a resistance embedded in and insulated from said slots.

5. A resistance unit comprising a metal plate formed upon one side with an acting face and upon the opposite side with an integral raised portion having a series of slots, a resistance element insulated from and arranged in said slots, no helix being formed on the metal to be heated.

6. In an electric heater, a body formed on one side with an acting face and on the op-

posite side with an integral raised portion having a multiplicity of slots, and a resistance element in the form of a zig-zag grid disposed in said slots and suitably insulated therefrom, and a cover having a depending flanged portion secured over the raised portion of the body.

7. In an electric heater, a body formed on one side with an acting face and on the opposite side with an integral raised portion having a multiplicity of slots, a resistance element in the form of a zig-zag grid disposed in said slots and suitably insulated therefrom, a cover having a chambered portion to receive the raised portion of the body, non-heat conducting material separating said raised portion and cover, terminals having their inner ends embedded in said material with an end of the resistance element secured to each, and means for detachably securing the cover to the body portion.

8. In an electric heater, a body formed on one side with an acting face and on the opposite side with an integral raised portion

with a multiplicity of slots and a zig-zag grid disposed in said slots, with two layers in each slot, said layers being insulated from each other and from the walls of the slots.

9. In an electric heater, a body formed on one side with an acting face and on the opposite side with an integral raised portion with a multiplicity of slots, a zig-zag grid disposed in said slots, with two layers in each slot, said layers being insulated from each other and from the walls of the slots, a chambered cover receiving said raised portion, a non-heat conducting material separating said raised portion and cover, means detachably securing the cover to the body portion, and terminals carried by the cover and insulated therefrom.

Signed by us at Hutchinson, Kansas, this 17th day of October 1908.

WILLIAM A. RANKIN.
WILLARD M. HARWOOD.

Witnesses:

H. J. Moss,
C. M. WILLIAMS.