Aug. 14, 1928. 1,680,406

C. B. BACKER

ELECTRIC IRON

Filed Oct. 20, 1927 2 Sheets-Sheet 1

Fig. 1.

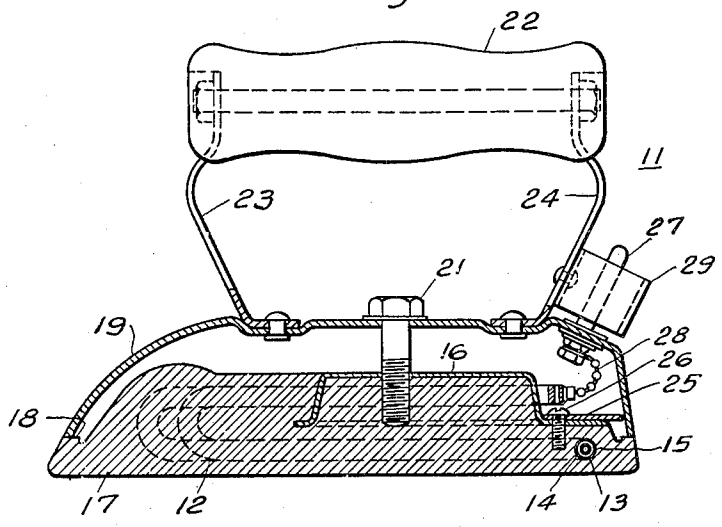


Fig. 2.

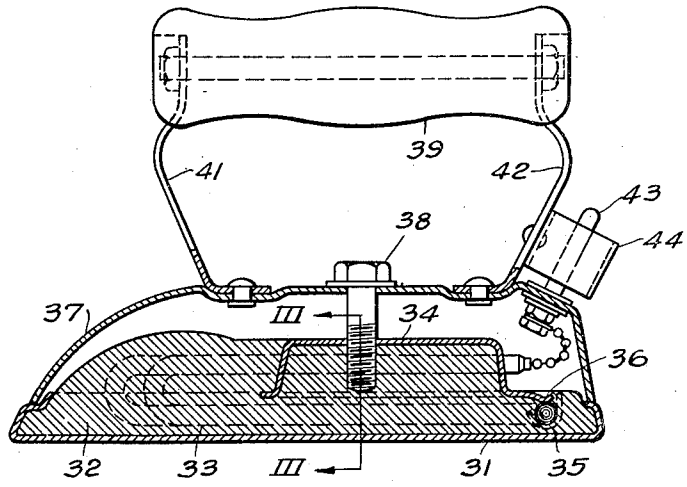
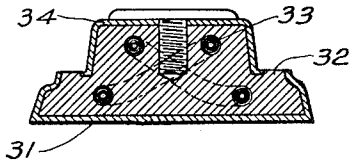


Fig. 3.



INVENTOR
Christian B. Backer.
BY
Wesley Gibbs
ATTORNEY

Aug. 14, 1928. 1,680,406

C. B. BACKER

ELECTRIC IRON

Filed Oct. 20, 1927 2 Sheets-Sheet 2

Fig. 4

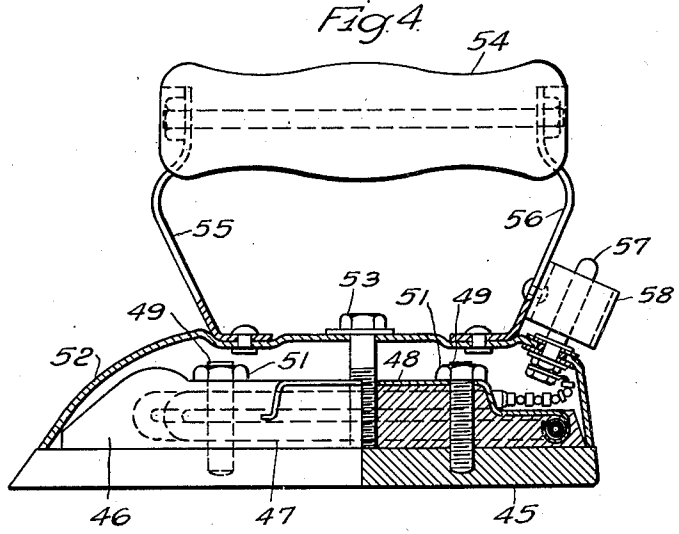


Fig. 5.

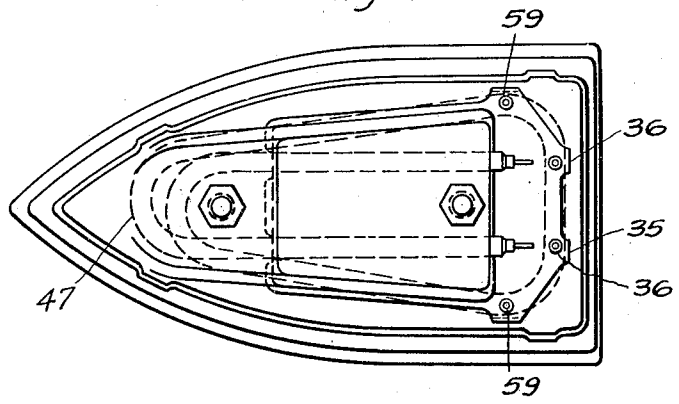
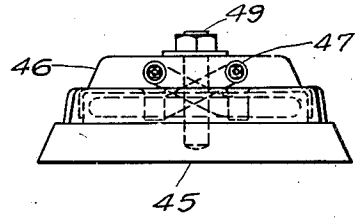


Fig. 6.



INVENTOR

Christian B. Backer.

BY

Wesley G. Carr

ATTORNEY

Patented Aug. 14, 1928. 1,680,406

UNITED STATES PATENT OFFICE.

CHRISTIAN B. BACKER, OF BROOKLYN, NEW YORK.

ELECTRIC IRON.

Application filed October 20, 1927. Serial No. 227,444.

My invention relates to electrically heated devices and paricularly to electric irons.

An object of my invention is to provide a relatively simple, inexpensive and highly efficient construction for an electric iron.

Another object of my invention is to provide an electric iron embodying a metal-encased tubular heating element embedded in a mass of cast iron.

Another object of my invention is to provide an electric iron embodying a metal-encased tubular heating element and a sheet-metal member for supporting the heating element in its proper operative position, both during the casting operation and thereafter.

Another object of my invention is to provide an electric iron embodying cast-in heating elements in which the danger of unsound castings shall be reduced to a minimum.

In practicing my invention, I provide a metal-encased tubular heating element preshaped to comprise a plurality of substantially parallel-extending straight portions located in two planes, a sheet-metal plate, of substantially inverted cup-shape, for supporting the tubular heating element, a mass of cast metal filling the member of inverted cup-shape and embedding the heating element, and a suitable cover and handle for the iron.

In a modified form of electric iron, I provide, in addition to the above, a lower sheet-metal member of substantially cup-shape and of triangular form in which the mass of cast metal is also located.

In the drawings,

Figure 1 is a view, in longitudinal vertical section, through an electric iron embodying my invention,

Fig. 2 is a view, in vertical longitudinal section, through a modified form of electric iron embodying my invention,

Fig. 3 is a view, in lateral section therethrough, taken on the line III—III of Fig. 2,

Fig. 4 is a view, partially in side elevation and partially in longitudinal vertical section, through another modification embodying my invention,

Fig. 5 is a top plan view of the body portion of the iron shown in Fig. 4, the cover member having been removed, and

Fig. 6 is a view, in rear elevation, of the assembly shown in Fig. 5.

Referring more particularly to the device shown in Fig. 1, an electric iron 11, embodies a tubular heating element 12 which comprises an outer metal casing 13, a resistor helix 14 located therein and separated therefrom by a crystalline mass 15 of magnesium hydroxide or oxide. The tubular heating element is made in accordance with the method disclosed and claimed in my reissue Patent No. 16,340.

The method therein disclosed and claimed may be briefly described as follows:

A resistor wire is wound into helical form and is then located within an open helix of magnesium strip. The two helices are then located within the outer metal casing 13, fitting loosely therein. This assembly is then subjected to the action of either high-temperature and high-pressure steam, or water, for a predetermined length of time, which changes the initially metallic magnesium to a crystalline mass of magnesium hydroxide or oxide. The initially metallic magnesium swells during this change and occupies substantially double the initial space. The result of this is that the helix or resistor wire is held tightly within the metal tube 13 and provides a relatively low thermal-resistance heat path from the resistor wire to the metal casing.

The heating element 12 and its metal casing 13 may be bent to any desired shape, such as that shown in the drawings, either before the above described treatment has been effected or thereafter.

As it is desired to embed the above-described heating element within a mass of cast metal and it is desirable to provide a supporting means therefor I provide a sheet-metal plate 16 which is bent to substantially cup-shape and is of rectangular contour. The bent-over or rim portions thereof, in two sides of the member 16, are provided with openings therethrough, through which the upper and end portions of the heating element may extend. The member 16 is located within a suitable mold (not shown), which is used in casting a mass 17 of metal around the heating element and around at least a portion of the member 16 of cup-shape. That side of the member 16 located at the forward part of the electric iron is the one which I prefer to also embed in the mass 17, while the rear side thereof, located closely adjacent to the end portions of the heating element 12, constitutes an outer wall for a portion of the mass of cast metal. The intermediate portion of the member 16 con-

stitutes the surface of at least a part of the upper face of the mass 17 of cast metal.

The mass 17 is provided with a peripheral shoulder 18 therearound, which shoulder is operatively engaged by the lower rim of a cover 19 of usual construction. The cover is clamped against the shoulder 18 by a screw bolt 21. A handle 22 is supported on the cover 19 by handle straps 23 and 24, in a manner well known in the art. I may provide a small spacing plate 25 at the rear portion of the mass 17 which is clamped thereagainst by a screw 26. The outer edge of the plate 25 engages the inner surface of the rear portion of the cover 19 and cooperates with the bolt 21 to maintain the cover in proper operative position on the mass 17.

The mass 17 of cast iron, the heating element 12 and the member 16 may be called the body portion of the iron.

A plurality of terminal pins 27, only one of which is shown in the drawing, are insulatedly mounted on the cover 19 and have the ends 28 of the resistor 14 connected thereto, in a manner well known in the art. A terminal pin guard 29 is secured to the rear handle strap 24.

One of the problems connected with the manufacture of an electric iron of this type is that of obtaining a sufficiently high percentage of sound castings. This problem is accentuated by the fact that the operating or ironing surface of the member 17 may be the upper surface when the member is being cast, so that there is a tendency for this part of the mass to be spongy or porous. If this sponginess extends too deeply into the casting, it may be necessary to discard it, whereby there is lost not only the casting but also the heating element embedded therein.

The modification of my invention shown in Fig. 2 of the drawings, tends to avoid the above-mentioned defect. A bottom sheet-metal plate 31, of cup-shape, is provided, its form being that of the usual electric iron. A mass 32 of metal is cast within this bottom plate which is preferably made of mild sheet steel, a heating element 33 of the same general type as hereinbefore described being embedded therein. An upper supporting and clamping member 34 is provided, which is made of sheet metal and of substantially inverted cup-shape. This element is substantially the same as has hereinbefore been described in connection with member 16, with the exception that the rear rim or edge portion thereof is provided with depending integral flange portions 35 which are bent around the metal casing of the heating element 33. Other portions of the rear rim are recessed downwardly, as shown at 36, to press the tubular heating element into the bent-over portions 35.

Substantially the same method of molding and casting is employed as was described above, except that the body portion constituted by the members 31, 32, 33 and 34 are located in their normal or up-right positions within a mold. The bottom surface of the member 31 may be easily and quickly polished and plated, as is usual in the art, and will provide a highly efficient ironing surface.

A cover 37 is held against the peripheral portion of the member 31 by a single bolt 38, and a handle 39 is supported on the cover by handle straps 41 and 42. Terminal pins 43 are insulatedly mounted in the rear portion of the cover 37 and have the ends of the resistor wire connected thereto. A guard 44 surrounds the pins 43 and is secured to the rear handle strap 42.

A further modification, which is illustrated in Figs. 4 and 6 inclusive, embodies another solution of the problem of obtaining a sufficiently high percentage of castings which are sound at the ironing surface thereof.

The body portion of the iron, in this modification, comprises a sole plate 45 which may be cast, machined, polished and plated separate from the other parts of the body portion, a top casting 46 in which is embedded a metal-encased tubular heating element 47, of the same general character as hereinbefore described, and a top plate 48. The edge portions of the member 48 are provided with openings in the front and the rear sides thereof, through which the end portions of the heating element 47 may extend to be held thereby, particularly during the molding and casting operations. In all other respects, the details of construction of the top casting 46, the heating elements 47 and the top plate 48, are the same as have already been described. The top casting is tightly clamped against the machined upper surface of the sole plate 45 by a plurality of studs 49 and nuts 51. A cover 52, of the usual shape and construction, is clamped against the upper peripheral portion of the sole plate 45 by a single bolt 53. A handle 54 is supported on the cover by handle straps 55 and 56. Terminal pins 57, only one of which is shown in the drawings, are insulatedly mounted at the rear portion of the cover member 42 and have the ends of the resistor wire electrically connected thereto, in a manner well known in the art. A terminal pin guard 58 surrounds the pins 57 and is supported by the rear strap 56.

As is shown more particularly in Fig. 5 of the drawings, the top plate 48 is provided with depending integral lugs 45 hereinbefore mentioned, in connection with Fig. 2 and is provided also with similar depending lugs 59 at the sides theerof which prevent lateral movement of the heating element, as well as support the heating element by the return-bent end portions thereof, these mem-

bers operating in substantially the same manner as do the portions 35. Recesses 36 are provided, as was hereinbefore described in connection with the member 34 shown in Fig. 2.

I have found that it is possible to manufacture an electric iron of this type at a relatively small expense and I find also that it is possible to obtain a relatively high percentage of sound castings, thereby making the loss of castings and embedded heating elements relatively small.

As the hereinbefore described metal-encased tubular heating element is a highly efficient one in that the temperature gradient from the resistor wire to the metal casing is relatively small, and as it is possible to effect a close engagement of the cast metal with the outer surface of the metal casing, as by tinning the same before the casting operation, I find that a device of this kind will operate with but a relatively small temperature gradient between the resistor and the ironing surface of the body portion.

Various modifications may be made in the device embodying my invention without departing from the spirit and the scope thereof, and I desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art or are set forth in the appended claims.

I claim as my invention:

1. In an electric iron, in combination, a tubular heating element, a mass of cast-metal embedding said heating element, and a sheet-metal top plate covering a portion of said mass of cast-metal for holding said tubular heating element in predetermined position in said mass of cast metal.

2. In an electric iron, in combination, a mass of cast metal, a metal-encased tubular heating element embedded in said mass, and a sheet-metal top plate of substantially inverted cup-shape for supporting said heating element and for preventing movement thereof in any one of three major directions.

3. In an electric iron, in combination, a mass of cast metal, a metal-encased tubular heating element embedded in said mass, and a sheet metal top plate of substantially inverted cup-shape, a portion of the rim being also embedded in the cast metal for supporting the heating element in proper operative position.

4. In an electric iron, in combination, a mass of cast metal, a metal-encased tubular heating element embodying a plurality of return-bent portions located in two different planes embedded in said mass and a sheet-metal top plate, of inverted cup-shape, having openings in the rim portion through which the upper portions of the tubular heating element extend to be held thereby.

5. In an electric iron, in combination, a sheet-metal member of substantially cup-shape, a mass of cast metal therein, a metal-encased tubular heating element embedded in the mass of cast metal, and an upper sheet-metal member of substantially inverted cup-shape constituting a portion of the upper surface of said mass of cast metal and initially supporting said heating element.

In testimony whereof, I have hereunto subscribed my name this 10th day of October, 1927.

CHRISTIAN B. BACKER.