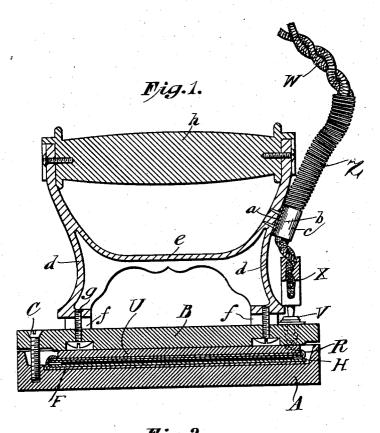
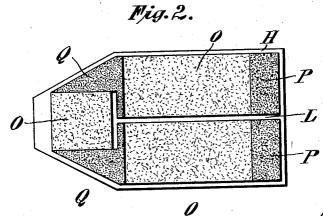
M. LOEWENTHAL. ELECTRIC HEATER. APPLICATION FILED DEC. 8, 1902.

NO MODEL.

5 SHEETS-SHEET 1.





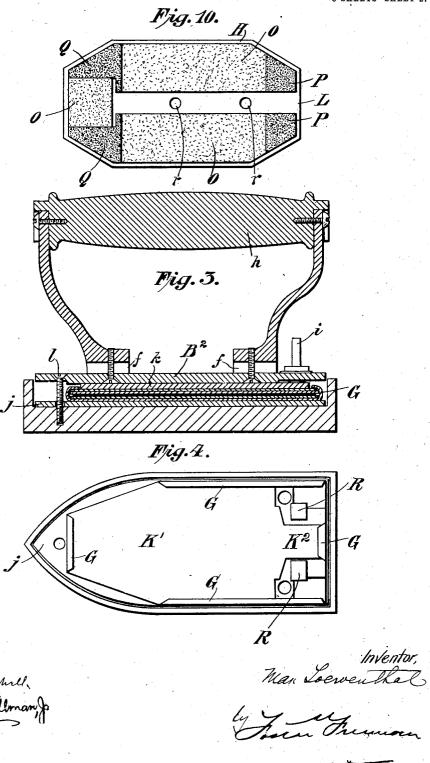
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NO MODEL.

5 SHEETS-SHEET 2.



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NO. MODEL.

5 SHEETS-SHEET 3.

Fig. 7.

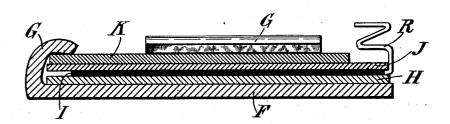
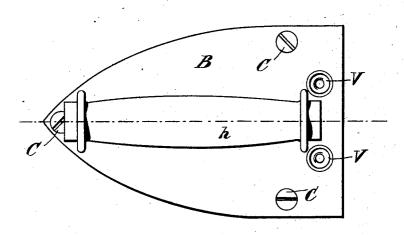
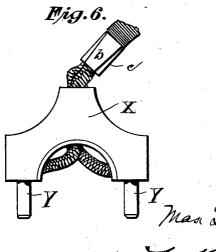


Fig.5.





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NO MODEL.

Fig.11.

5 SHEETS-SHEET 4.

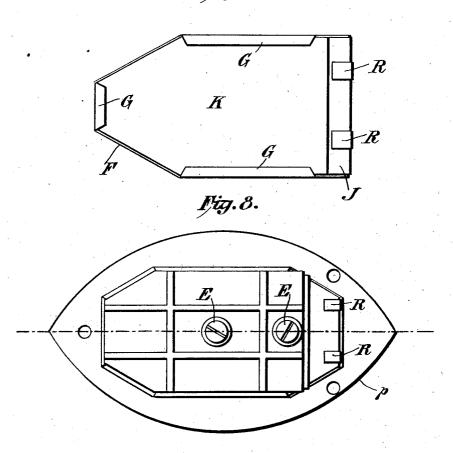
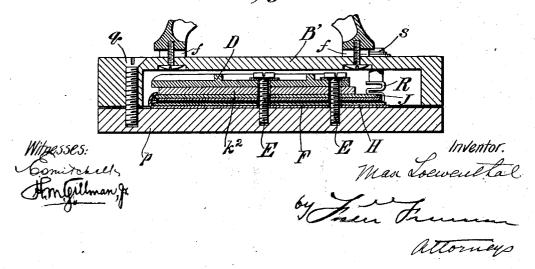


Fig.9.



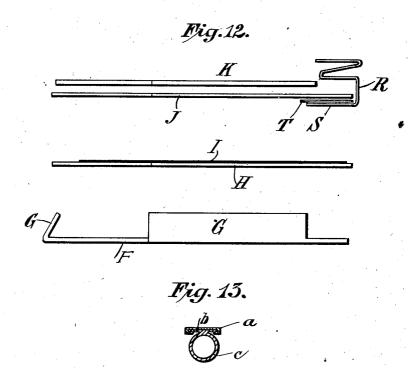
No. 729,369.

PATENTED MAY 26, 1903.

M. LOEWENTHAL. ELECTRIC HEATER. APPLICATION FILED DEC. 8, 1902.

NO MODEL.

5 SHEETS-SHEET 5.



Witgesses: Comitchell Arryllmany; Man Loewenthal

by Josen Recueau

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NITED STATES PATENT

MAX LOEWENTHAL, OF NEW YORK, N. Y.

ELECTRIC HEATER.

SPECIFICATION forming part of Letters Patent No. 729,369, dated May 26, 1903.

Application filed December 8, 1902. Serial No. 134,426. (No model.)

To all whom it may concern:

Be it known that I, MAX LOEWENTHAL, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Electric Irons, of which the following is a specification, accompanied by drawings.

My invention relates to electrically-heated 10 tools, and more particularly to that class of tools heated by means of electrical resistance, and such classes of tools as flat-irons and the like.

The objects of my invention are to improve 15 upon such electrically-heated irons and simplify their construction and arrangement, with increased efficiency.

Further objects of my invention will hereinafter appear; and to these ends my inven-20 tion consists in apparatus for carrying out the above objects constructed and arranged and having the general mode of operation substantially as hereinafter fully described in this specification and shown in the accom-25 panying drawings, in which-

Figure 1 is a longitudinal sectional elevation of one form of electric iron embodying my invention. Fig. 2 is a plan view of an insulating-strip having a conducting layer 30 thereon and adapted for use in the heater element of the iron shown in Fig. 1. Fig. 3 is a longitudinal sectional elevation of a modified form of iron. Fig. 4 is a top plan view of the iron shown in Fig. 3, with the handle 35 and upper plate removed. Fig. 5 is a plan view of the iron shown in Fig. 1. Fig. 6 is an enlarged detail view of the attachment for the iron shown in Fig. 1. Fig. 7 is an enlarged detail longitudinal sectional view of 40 the heater element. Fig. 8 is a top plan view of a modified form of iron, with the top removed. Fig. 9 is a longitudinal sectional elevation, with the handle broken away, of the form of iron shown in Fig. 8. Fig. 10 is a 45 plan view of an insulating-strip provided with a conducting layer and adapted for use in the heater element of iron shown in Fig. 9. Fig. 11 is a top plan view of the holder for the insulating-strip provided with the conducting

50 layer shown in Fig. 2 and in longitudinal sec-

larged detail the different parts or members comprising the heater element. Fig. 13 is a detail view.

Referring to the drawings, it will be seen 55 that my invention relates to electric irons provided with heater elements for electrically heating the irons, the heater element being in the form of a suitable resistance, and I prefer to use that form of resistance fully de- 60 scribed and shown in United States Patent No. 617,375, granted January 10, 1899, to Voigt and Haeffner. In the said patent a construction is described wherein an extremely thin conducting layer is provided 65 upon an insulating-base, thereby forming a suitable electric resistance which is light and compact and of extremely high resistance. The conducting layer consists of fired liquid metal, and suitable forms of insulating-bases 70 having the conducting layer of fired liquid metal are illustrated in the accompanying drawings.

In order to illustrate my invention, I have shown and will describe what may be termed 75 a "heater element," the heating resistance of which comprises the herein-described thin layer of conducting material.

In Figs. 1 and 5 a flat-iron is shown, with one pointed end and one blunt end. In Fig. 80 4, I have shown an iron in a somewhat different form; and Fig. 8 illustrates what may be termed a "double-ender" iron for heavy work. The heater element is of substantially the same construction in these different forms 85 of irons, but is varied to adapt it to the construction of iron in each separate modification, and any desired form of iron may be used.

I have found that the conducting layer of 90 fired metal should be tightly compressed to obtain the best results for heating purposes, and the irons I have shown constructed with this end in view.

In Figs. 1 and 5 the base A of the iron is 95 hollowed for the reception of the heater element, and the cover B is adapted to be suitably secured, as by means of screws C, to the base A. It will be seen that when the parts are assembled the cover does not rest upon 100 the base, and provision is thus afforded for tion in Fig. 7, and Fig. 12 illustrates in en- I tightly pressing the heater element between

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the base A and the cover B. This construction is provided in several of the forms of irons. In the modification shown in Fig. 9, however, the desired pressure upon the conducting layer is obtained by means of tightly securing a plate D down upon the heater element, as by means of the screws E, so that pressure from the cover B' is not necessary. The heater element comprises in each in-

o stance a holder F, which may be of metal and within which the remaining members of the element are placed. The edges G of the holder may be bent to better secure the parts in place, and, as shown in the drawings, the

is insulating-base H, of suitable material, as mica, provided with the conducting layer I, is placed upon the bottom of the holder, and over this another insulating-plate J, of suitable material, as mica, is placed in position. A

20 cover-plate K, of suitable material, as nickel-steel, is then placed in position upon the insulating-plate J, and the whole forms a thin, compact heater element the conducting layer of which forms the resistance. The shape
25 and certain details of the construction of the

and certain details of the construction of the heater element may be varied as desired to

adapt it to various shapes of irons.

Suitable means must be provided for conducting the current of electricity to and from the conducting layer I, and in order to utilize the conducting layer to the best possible advantage as a resistance metallic paint is spread upon the insulating-base H in a substantially U-shaped form, as shown in the plan views of the insulating-base. The sides of the U-shaped painted surface are separated, as shown in the drawings, by a longitudinal unpainted portion L, which may be substantially T shape, if desired, and the central end portions O of the painted surface are not provided with as heavy a conducting layer as at the ends P and portions Q, for it has been found that at the points where the current

enters and leaves the resistance a slightlythicker layer of low-resistance paint is used, while the same is true of the portions Q of

the conducting layer.

In order that electric contact may be made between the outer terminals of the iron and the conducting layer, suitable means may be provided, shown in this instance as metallic springs R, bent into suitable form and arranged with their lower portions S in contact with the end portions P of resistance when the parts of the heater element are assembled, and by making contact from the positive and negative poles of a source of supply with the springs R it will be seen that current will

enter one leg or side of the **U**-shaped conduct60 ing layer and leave at the other leg or side
after having traversed the whole extent of
the layer. Strips of tin-foil T may be inserted
between the portions S of the springs R and
the insulating-plates J, although these are

65 not necessary.

The members of a heater element being assembled and inserted within the base A of an iron, a sheet U of material, such as asbestos, is placed upon the top of the element and then the cover B of the iron screwed securely 70 to the base A, pressing the element tightly between the presser-sheet U and the base A. Suitable means are provided upon the cover B of the iron for making contact with the springs R and for electric terminals to be con-75 nected to the iron, as shown in Fig. 1, the cover B being provided with metallic sockets V, suitably insulated from the iron and adapted to press upon the springs R when the cover is screwed down. The cord W is provided 80 with a suitable plug X, having terminals Y, adapted to the sockets V in the iron. As shown in this instance, the cord W may be also provided with a flexible metallic casing Z and have means for securing the cord to 85 the handle of the iron, and thus removably attach the plug to the iron. The handle of the iron is provided with a socket a, while a suitable securing-flange b, adapted to the socket a, is secured to the cord, as by means of a 90 collar c.

The presser-sheet U has another function besides that of pressing the parts of the heater element tightly together, for it also serves to confine the heat within the iron and to the 95 lower portion thereof. Since the top of the iron will become heated as well as the base, I construct the handle of the iron substantially as shown, forming the legs d, as well as the central portion e, of the handle hollow, and 100 providing short struts f upon the legs d at the bottom thereof, so that there is a small contacting surface between the legs and the cover B of the iron, suitable screws g being utilized to secure the handle to the cover B. By this 105 means the handle is prevented from conducting any considerable part of the heat away from the iron. The grip h may be of suitable

material, as wood. In the modified form of iron shown in Figs. 110 3 and 4 the cover B² is provided with projections of plugs i for completing circuit to the iron, contact being made, as before, between the plugs i and the springs R when the parts of the irons are assembled. In this construc- 115 tion a bottom heat distributing or conducting plate j, such as aluminium, is shown, for better conducting the heat from the element to the base of the iron, and it will be seen that, as before, an upper presser-sheet k, of a ma-120 terial such as asbestos, is used. In the modification described the cover-plate K' of the heater element is cut away, forming a tongue K^2 , and the bottom conducting-plate j is provided with apertures for the securing-screws 125 l. In this instance, the screws l are arranged entirely outside of the conducting layer of heater element, so that no short circuiting may take place. The handle of the iron is provided, as before, with the struts f, whereby 130

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with the cover B² of the iron.

In the modification shown in Figs. 8 and 9 the heater element is secured, as hereinbe-5 fore stated, to the base of the iron by means of suitable screws E. The base p in this instance is not hollowed, but consists of a flat plate to which the hollowed or recessed cover \bar{B}' is secured, as by means of screws q. Since 10 the securing-screws E for the heater element pass directly through all the members of the element in order to press the sheet k^2 and conducting layer evenly and firmly over substantially the entire extent, means must be 15 provided for insulating the screws from the layer of conducting paint, and, as shown in Fig. 10, the apertures r for the screws are provided in the insulating-base of the conducting layer, while a strip of the base is left 20 unpainted up to the apertures, so that there is no contact between the screws E and the conducting layer of the element. As before, the cover B^{\prime} of the iron is provided with contacts shown as sockets s, adapted to make contact 25 with the springs R when the cover and base of the iron are secured together.

It will thus be seen that according to my invention a simple and efficient electric iron is constructed in which the heater element is 30 removable, so that it may be replaced by a new one when worn out, and the parts of the irons of the same general construction are interchangeable, which advantage is true of

the elements.

Obviously some features of my invention may be used without others, and my invention may be embodied in widely-varying forms.

Therefore without limiting myself to the construction shown and described nor enu-40 merating equivalents, I claim, and desire to obtain by Letters Patent, the following:

1. An electrically-heated iron, comprising a base, a removable heater element, comprising a flat strip of relatively high resistance con-45 ducting material, and an insulating-holder enveloping the same, said element located within the base, a cover, contacts on said cover, and means for electrically connecting said resistance with the contacts when the 50 base and cover are connected to each other, substantially as set forth.

2. An electrically-heated iron, comprising a body portion provided with socketed contacts, a removable resistance within the body 55 of the iron, and spring-contacts connecting said resistance electrically with said socketed

contacts, substantially as set forth.

3. An electrically-heated iron, comprising separable portions a removable electric re-60 sistance between the same, contacts on one of said portions, and spring-contacts coöperating therewith, and connected to the resistance, and an inclosing insulating-casing for the resistance, substantially as set forth.

but a small surface of the handle is in contact | a base, a cover, socketed contacts, an electric resistance arranged between the base and cover, and spring-contacts in electrical connection with said resistance, and adapted to make contact with the socketed contacts, 70

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substantially as set forth.

5. An electrically-heated iron, comprising a base, a cover provided with electrical contacts extending therethrough, a removable heater element comprising a flat strip of rela- 75 tively high resistance conducting material and having exposed terminals adapted to register with the contacts in the cover and an insulating-holder enveloping said resistance, said element being arranged between the base 80 and body portion of the iron, the exposed terminals of the element being in electrical connection with the contacts of the cover when the parts are in operative relation.

6. An electrically-heated iron, comprising 85 a base, a cover provided with electrical contacts extending therethrough, a removable heater element comprising a flat strip of relatively high resistance conducting material and having exposed spring-terminals adapted 90 to register with the contacts in the cover and an insulating-holder enveloping said resistance, said element being arranged between the base and body portion of the iron, the exposed terminals of the element being in 95 electrical connection with the contacts of the cover when the parts are in operative

7. An electrically-heated iron, comprising separable portions one of which is provided 100 with contacts and a removable heater element arranged between the said separable portions for heating the tool having yielding contact devices and adapted to be connected to said contacts on one of said portions, sub- 105

stantially as set forth.

8. An electrically - heated tool provided with socketed contacts secured upon the exterior thereof and extending to the interior of the tool and a heating element within the 110 tool, said element provided with resilient contact-pieces adapted to register with the inner ends of said socketed contacts when the tool is in operative condition.

9. An electric heater, comprising separa- 115 ble portions one of which is provided with contacts, and a heater element arranged under pressure between said portions, the element comprising an insulating-base having a conducting layer thereon, and provided with 120 vielding contacts for electrically connecting the conducting layer with the contacts on one of the separable portions of the heater, substantially as set forth.

10. An electric heater, comprising a hol- 125 lowed base, a removable heater element arranged therein and provided with a thin conducting layer of substantially **U** shape upon ne resistance, substantially as set forth.

4. An electrically-heated tool, comprising and a cover secured to the base and tightly 130 pressing the thin conducting layer of the element between the presser-plate and the base of the heater, substantially as set forth.

base of the heater, substantially as set forth.

11. An electric iron, comprising a base, a
5 removable heater element having separated
terminals, a lower conducting-plate, and an
upper presser-plate, a cover for pressing the
element between the presser-plate and base,
contacts on the iron, and means connected to
the heater element and comprising elastic

conductors for electrically connecting the element to said contacts, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

MAX LOEWENTHAL.

Witnesses:

H. G. OGDEN, Jr., E. VAN ZANDT.