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ELECTRICALLY HEATED TOOL.

APPLICATION FILED FEB. 10, 1908. RENEWED DEC. 1, 1908.

912,765. Patented Feb. 16, 1909.

Fig. 1.

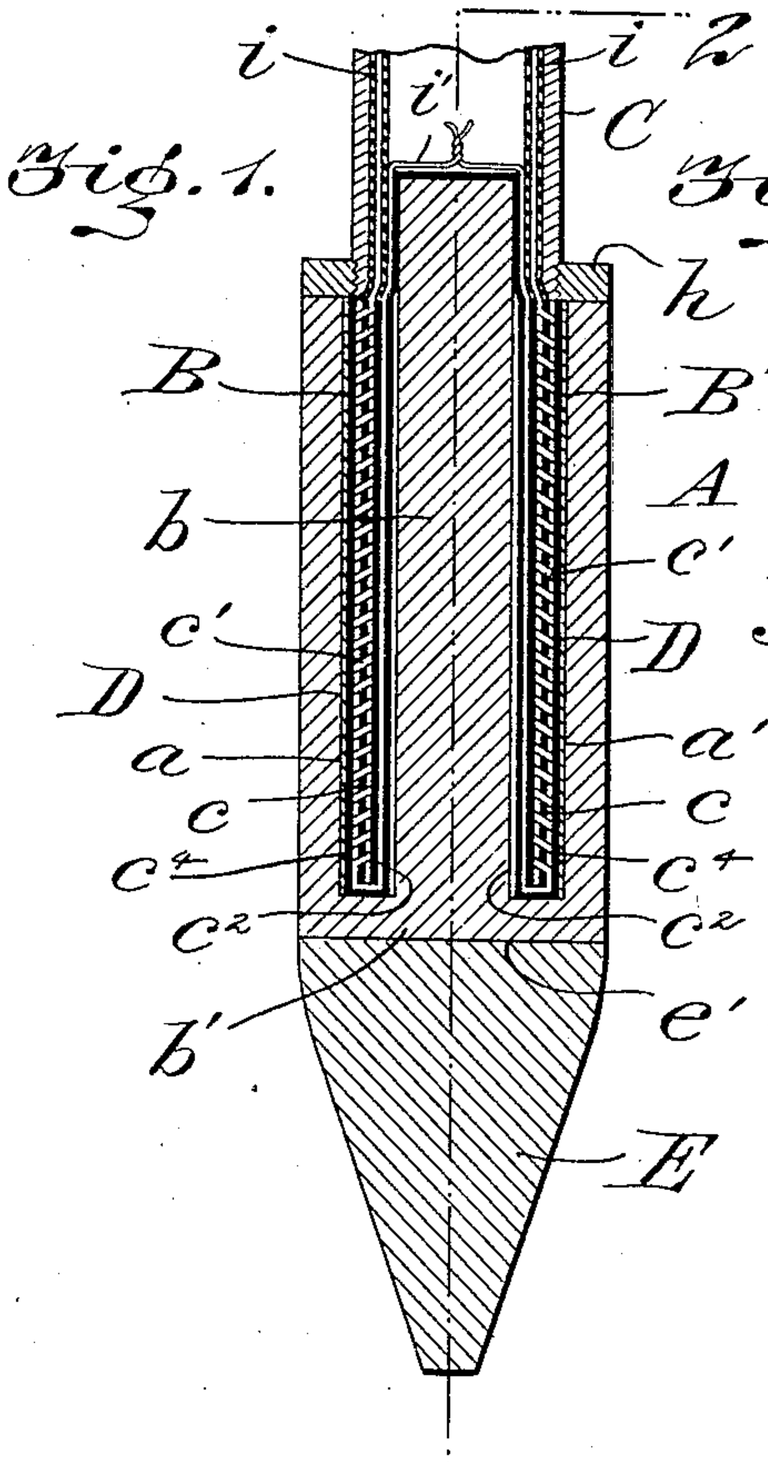


Fig. 2.

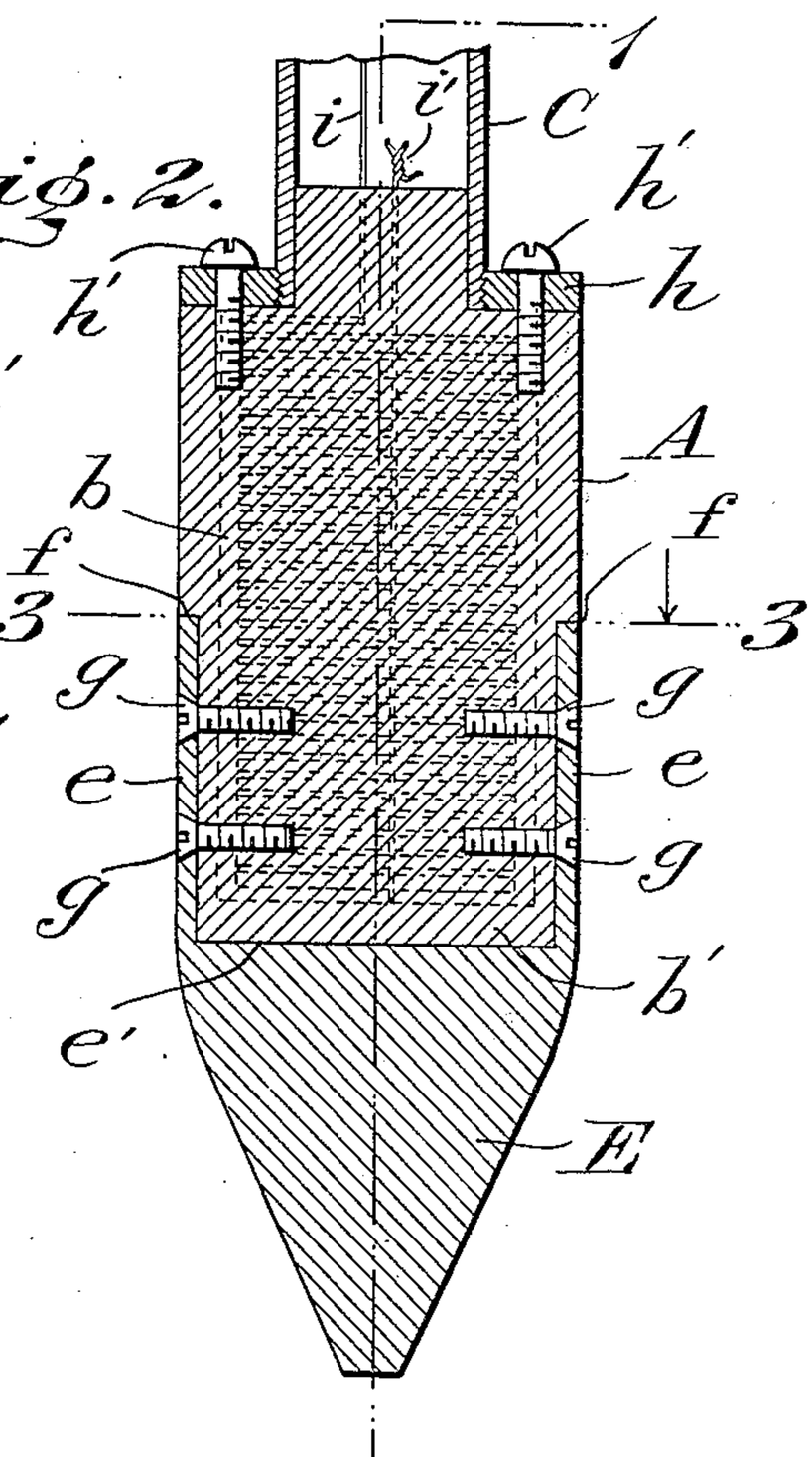


Fig. 3.

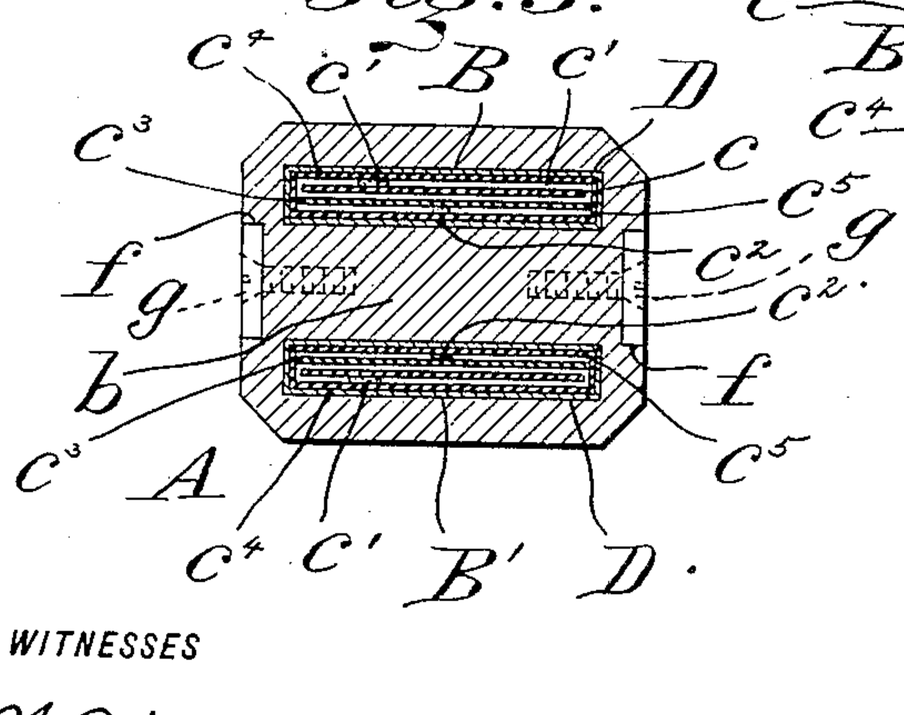
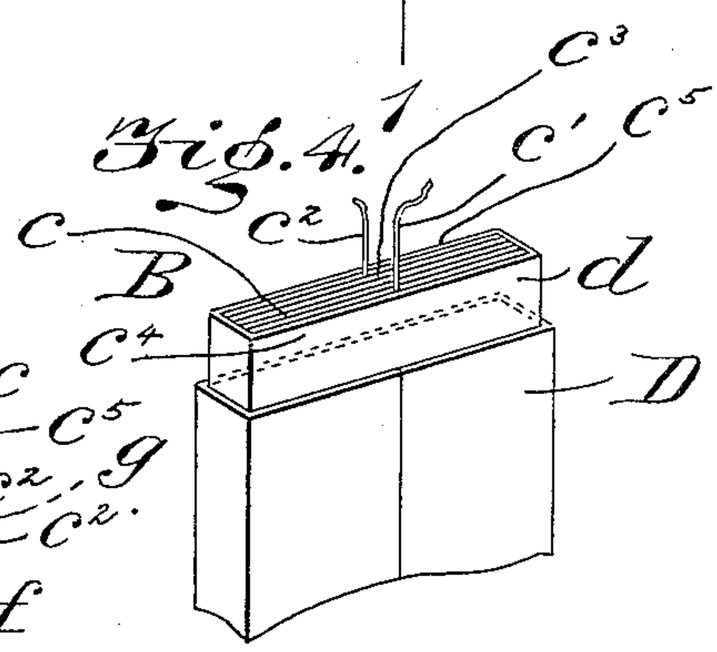


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

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ELECTRICALLY-HEATED TOOL.

No. 912,765. Specification of Letters Patent. Patented Feb. 16, 1909.

Application filed February 10, 1908, Serial No. 415,257. Renewed December 1, 1908. Serial No. 465,581.

To all whom it may concern:

Be it known that we, MAURICE J. WOHL and ABBOT A. LOW, citizens of the United States, residing in the city of New York, borough of Manhattan, county of New York, and Horseshoe, county of St. Lawrence, respectively, and State of New York, have invented a certain new and useful Electrically-Heated Tool, of which the following is a specification.

This invention is an electrically-heated tool, more especially a soldering iron.

An essential part of the invention is a detachable tip which is coupled to a body of the tool in such manner as to have close metallic union therewith, whereby the heat of the body is conducted to said tip for the purpose of keeping the latter at the temperature required for service.

Another part of the invention contemplates the distribution of metal, entering into the construction of the tool body, in such relation to a plurality of electrically-operated heating-units as to secure the rapid absorption by the metal of the heat developed by said units, whereby the tool-body is quickly heated, the heat is distributed to the working parts, and economy of electric current is secured.

Another part of the invention is a novel form of heating unit wherein the electrical resistance is composed of a metallic wire or ribbon which is so protected or enveloped that its position on a core is not disturbed during the operations of inserting the heating unit into, or withdrawing it from, the tool-body.

In the accompanying drawings, we have illustrated one practical embodiment of the invention, but the construction shown therein is to be understood as illustrative, only, and not as defining the limits of the invention.

Figure 1 is a longitudinal section through a portion of a soldering iron embodying this invention, the plane of the section being indicated by the dotted line 2—2 of Fig. 1. Fig. 2 is a similar section in a plane at right angles to Fig. 1 and on the dotted line 2—2. Fig. 3 is a cross section on the line 3—3 of Fig. 2. Fig. 4 is a detail perspective view showing one of the electrically operated heating units.

A designates the body of the tool which is composed of a mass of heat absorbing metal, such for example as copper, or an appropriate alloy. Said body is preferably cast in a single piece substantially in the form shown in Figs. 1 to 3 inclusive, that is to say, the body is substantially rectangular, although the shape is immaterial. The body is provided with a plurality of longitudinal chambers, a, a' which are separated by an intermediate wall, b, the latter being integral with the body, A. As shown, the body is closed at one end of the chambers by an end wall, b', and from this end wall extends the intermediate wall, b. The chambers, a, a', open through one end of the body, A, while the other ends of said chambers are closed by the end wall, b'. The intermediate wall, b, is thus joined at one end with the wall, b', and its side edges are integral with the opposite sides of the body, A, see Figs. 1 and 3.

It should be understood that we may employ any suitable number of heaters, and chambers for the reception of the heaters, but in the drawings, the body of the tool is shown as having the two chambers, a, a', which are adapted for the reception of the heating units, B, B', respectively. Each heating unit is arranged in one of the chambers so as to be between the intermediate wall, b, and one side of the tool body, and each heating unit is adapted to be supplied with current by leading-in wires which extend through the hollow stock, C.

Each heating unit, B, B', is composed of a core, c, a winding of resistance material, c', on said core, said winding having a return lead, c^2, other layers of insulating material, c^3, c^4, applied to the respective sides of the flat winding, c', and an extra layer, c^5, between the winding and the return lead, c^2, thereof. The core and the layers, c^3, c^4, c^5, are composed, preferably, of mica, and these layers are assembled loosely together. The resistance material is composed of a metallic wire or ribbon which is wound on the core, c, so as to produce a substantially flat coil, and against this resistance coil are applied the layers, c^3, c^4. The return lead, c^2, is next to the layer, c^3, and outside of this return lead is applied the layer, c^5. The heating unit composed of the several layers and the coil is adapted to be inserted by slipping it endwise into one of the chambers, a or a', and to protect the coil from disar-

rangement on the core during such insertion or withdrawal, we prefer to provide an envelop which incases the several loose parts of the heating unit. As shown in the drawings, the heating unit is substantially enveloped by a wrapper, D, composed, preferably, of a pliable sheet of material, such as metal. This wrapper is folded around the heating unit so as to inclose the several elements thereof, the end portions of the unit being somewhat exposed. If desired, however, another envelop or wrapper, *d*, may incase the heating unit, and be arranged within the metallic wrapper, D. The wrapper holds the parts of the heating unit in position so as to prevent disarrangement of the resistance coil. When the heating unit is in service, the heat developed by the resistance causes the metallic wrapper, D, to expand and to engage frictionally with the walls of the chamber within the metallic body, whereby the heating unit is held firmly in position when the current is admitted to the resistance coil. With the tool in a cold condition, the metallic wrapper of the heating unit contracts and the unit may be readily withdrawn from the chambered body, should it be desired to repair or replace said unit.

E designates a removable tip-member. Said member may be composed of any suitable material, such as copper or metallic alloy, and it may have any desired shape and size. This tip-member is provided with tongues, *e*, *e*, which are integral with the main portion thereof, said tongues being parallel to each other and extending upwardly from the member. Between the tongues, at its upper side, the tip-member is provided with a substantially flat face, *e'*, adapted to have intimate contact with the end wall, *b'*, of the body, A. Said body, A, is provided with longitudinal channels, *f*, in two sides thereof, said channels being in the transverse plane of the intermediate wall, *b*, of the chambered body. These channels extend for a suitable length and they open through the lower end face of the body. The tongues, *e*, of the tip-member are fitted in said grooves, *f*, so as to lie substantially flush with the opposite faces of the tool body. If desired, the tongues may be secured rigidly to said body, A, by suitable fastening means, and in Figs. 2 and 3, we have shown screws, *g*, adapted to pass through openings in the tongues, *e*, and to engage with the threads formed in tapped holes in the intermediate walls, *b*, of said body.

In electrically heated tools of the class to which this invention relates, the heat developed by the electrical resistance is communicated to the sides of the iron, and some difficulty has been experienced in keeping the tip of the iron at a temperature which will maintain the iron in a serviceable condition at all times. Our construction is intended to overcome this objection. The tip-member is in intimate mechanical engagement with a solid end portion of the body, and the tongues, *e*, are held in close mechanical engagement with the hottest part of said body, whereby said tongues are adapted to be heated by the body and to conduct or transmit the heat to the tip-member. It will be understood that the screws may be disconnected and the tip-member withdrawn from the body, thus making provision for replacing the tip-member when worn, or for interchanging tip-members of different shapes and sizes on the electrically heated body.

The stock, C, is shown as being threaded into a plate, *h*, the latter being applied to the upper end portion of the body, A, for the purpose of closing the open ends of the chambers, *a*, *a'*. This plate, *h*, is secured in position by suitable screws, *h'*, and, if desired, the plate, *h*, may be united hermetically to the end of the tool body by cementing said plate thereto, thus precluding the admission of water or other liquid into the chambers and the heating units within said tool body. The leading-in wires, *i*, extend through the hollow stock C, and they are connected with the resistance wires or ribbons, *c'*. The return leads, c^2, are united together as at *i'*, and from these leads extend a suitable return conductor.

Having thus fully described the invention, what we claim as new, and desire to secure by Letters Patent is:

1. In an electrically heated tool, a body, and a removable member, said member being provided with a plurality of tongues which are in engagement with the body and operate to conduct the heat thereof to said member.

2. In an electrically heated tool, a body, and a removable member engaging mechanically therewith, said member having a plurality of tongues which engage with the respective sides of the body.

3. In an electrically heated tool, a body, and a tip-member in mechanical contact with said body, said tip-member having tongues which engage with the sides and are substantially flush with the surface thereof.

4. In an electrically heated tool, a body provided with grooves, a removable tip-member, and tongues projecting from said tip-member and secured in said grooves so as to be substantially flush with the body.

5. In an electrically heated tool, a body, a removable tip-member, grooves in one of said parts, and tongues extending from the other part so as to occupy said grooves.

6. In an electrically heated tool, a chambered body having a solid internal wall, a

member provided with tongues, said tongues being fitted to said body opposite to the wall thereof, and means for securing the tongues to the body and the aforesaid wall thereof.

7. In an electrically heated tool, a chambered body, an electrically-operated heating unit adapted to occupy said chamber, said unit comprising a flat wound resistance coil and insulating layers in contact with said coil, and an expansible metallic element substantially incasing the parts comprising said heating unit and adapted to be expanded by the heat of the resistance into close mechanical contact with the walls of the chambered body.

8. In an electrically heated tool, a chambered body, an electrically-operated heating unit adapted to occupy said chamber, said heating unit comprising a resistance coil substantially incased by insulating layers, and a metallic envelop loosely embracing the parts of said heating unit, whereby the envelop is expanded by the heat of the unit into close metallic contact with said body.

9. In an electrically heated tool, a chambered body, an electrically-operated heating unit adapted to occupy said chamber, said heating unit comprising a resistance coil wound on a core of insulating material, and said coil being in engagement with mica insulating layers, and a metallic envelop substantially incasing the parts comprising the heating unit, and in contact with the mica layers thereof, the edges of said envelop being unconfined and said envelop being adapted to expand when the heating unit is in operation in the body.

10. In an electrically heated tool, a chambered body, a heating unit composed of a resistance wound on an insulated core, an envelop substantially incasing the parts of said unit and adapted to afford protection to said resistance on the insertion and withdrawal of the unit, and insulating layers intermediate the wound resistance and the envelop for electrically insulating said resistance from said envelop.

11. In an electrically heated tool, a chambered body, a heating unit composed of a flat core, a winding of resistance material loosely embracing the core, insulating layers on the respective sides of the core in engagement with the respective sides of the flat winding of said resistance, and a metallic envelop incasing the loose parts of said heating unit.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

MAURICE J. WOHL.
ABBOT A. LOW.

Witnesses:
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LOUIS A. JEPPÉ.