H. P. MacLAGAN.

SOLDERING TOOL.

APPLICATION FILED JUNE 20, 1910.

1,008,922. Patented Nov. 14, 1911.

Fig. 2.

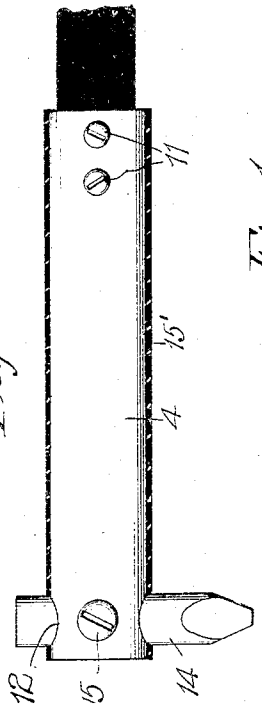


Fig. 1.

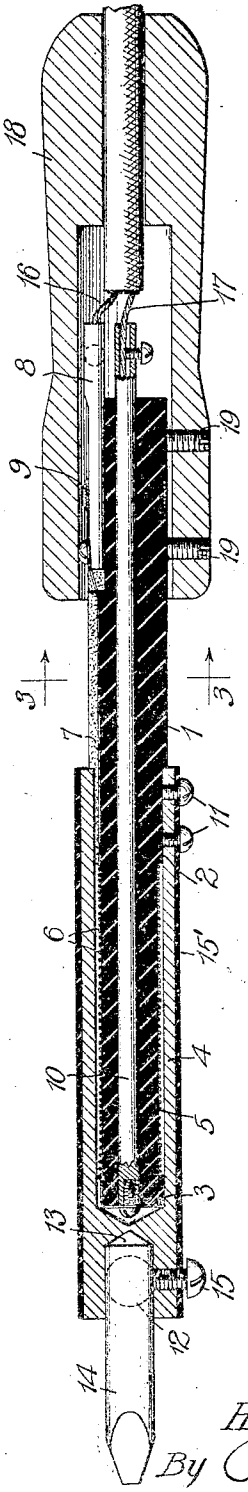


Fig. 3.

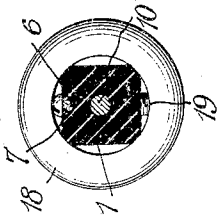
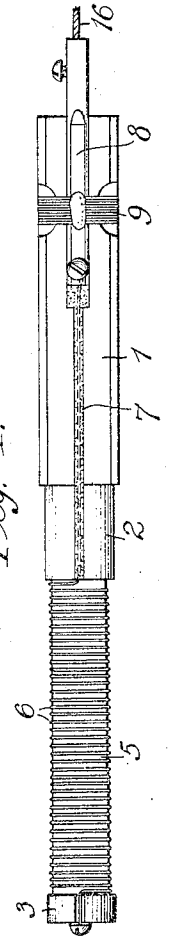


Fig. 4.



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UNITED STATES PATENT OFFICE.

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SOLDERING-TOOL.

1,008,922. Specification of Letters Patent. Patented Nov. 14, 1911.

Application filed June 20, 1910. Serial No. 567,852.

To all whom it may concern:

Be it known that I, HECTOR P. MacLAGAN, a citizen of the United States, residing at Park Ridge, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Soldering-Tools, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention pertains to an improved construction of soldering tools adapted to be electrically heated and is characterized particularly by an increased efficiency of operation and simplicity of construction.

An important result secured by my invention is that the heating coil is so disposed that it is all equally effective in communicating heat to the parts to be heated thereby and furthermore this heating effect is the result entirely of radiation from the coil to the associated conducting metal, no resisting material being interposed between the two.

The several drawings illustrating my invention are as follows:

Figure 1 is a longitudinal sectional view through my improved soldering tool; Fig. 2 is a side view of the metal conducting portion, showing the tip in its alternate position; Fig. 3 is a sectional view taken along the line 3, 3, Fig. 1; and Fig. 4 is a side view of the heating coil and its insulating support removed from the handle and the parts heated thereby.

Similar numerals refer to similar parts throughout the several views.

As shown in the drawings, my soldering tool consists essentially of a core 1 of insulating material such as asbestos wood, porcelain, lava, or any similar material having a high insulating value and considerable mechanical strength. The end of the core 1 is of a cylindrical conformation as shown at 2 and 3 and of a diameter slightly smaller than the bore of the conducting shell 4. The core 1 is cylindrical in form between the portions 2 and 3 and of somewhat smaller diameter, as indicated at 5, and upon this portion of reduced diameter a coil 6 is wound, which coil consists of bare wire having a very high specific resistance. One end of the coil 6 is extended through a channel 7 in the core 1 to a terminal 8 secured to the upper end of the core by means of a binding wire 9. Obviously, equivalent securing means may be employed for retaining the terminal 8 in place. The other end of the coil 6 is connected to the lower end of a rod or tube 10, which extends completely through the core 1 and forms at its upper end a terminal for receiving the conductor used to supply current to the tool. The rod or tube 10, besides conducting the current, also serves to reinforce the core 1 so that it may have the requisite mechanical strength.

The conducting member or shell 4 as above noted is bored so that it will readily slip over the portions 2 and 3 of the core 1 and when in place against the shoulder between the body portion of the core and the portion 2 it is retained in place by the set screws 11. In this relation the coil 6 is separated from the inside of the shell 4 by as small a distance as is practicable to prevent short-circuiting the coil through the shell 4, as a result of which, since the coil consists of but a single layer, every portion of it is equally effective in communicating heat by radiation to the shell.

The shell 4 is provided at its lower end with openings 12 and 13 drilled therein at right angles to receive a soldering tip 14 in either the position indicated in Fig. 1 or that shown in Fig. 2, and in either position the tip is held in place by a set screw 15. The hole 13, extending longitudinally into the conducting shell 4, is stopped a sufficient distance from the bore formed for the heating coil so that a solid wall of metal is left between the hole 13 and the main bore of the shell, as a result of which the fumes resulting from the soldering operation as a result of the flux employed cannot pass through the outer end of the shell 4 and attack the coil 6.

The shell 4 and tip 14 are preferably made of copper to effectively conduct the heat from the coil 6 to the solder to be melted and, if desired, an insulating shell 15′ may be disposed around the shell 4 to prevent loss of heat from the outer surface of the shell by radiation. As a result of the construction employed for securing the tip 14 in the outer end of the shell 4, the fumes of the soldering fluxes, as well as the fluxes themselves, if they by accident enter the joint between these parts, cannot so corrode the tip or the shell that the removal of the tip is impossible, as a result of which

the tip may readily be cleaned to prevent the formation of an insulating film between the tip and the shell which would result in a greatly decreased efficiency of operation, since it would seriously interfere with the transfer of heat from the shell 4 to the tip 14.

The connector 8 and the upper end of the rod or tube 10 are adapted to receive the conductors 16 and 17 which enter the handle 18 from its rear end to supply the current necessary to heat the coil 6, the handle 18 being suitably constructed of insulating material to inclose the upper end of the core 1 as well as to entirely protect the terminal 8, in which position it is held by the set screws 19. As a result of the construction described the handle 18 is secured to the shell 4 solely by means of the core 1 and its reinforcing rod or tube 10. Thus the amount of heat transferred from the shell 4 to the handle 18 is reduced to a minimum.

As a result of constructing the resistance element in the manner above described I find that it is possible to use much less current, since a less intensity of heat is required than is the case where the heating coil is wound in several layers which are separated from each other by material having a high specific resistance, as mica or asbestos, which construction is necessary where the heat is not directly communicated from the heating coil to the element to be heated, but is, on the other hand, communicated only by conduction through material having a comparatively low conductivity. Most of the difficulty experienced in the use of electrically heating soldering tools in the past has been due to the fact that the coils have been constructed in the manner just indicated, as a result of which the layer of the coil which has been most thoroughly protected from radiation has been the one to heat excessively and ultimately burn out. By my construction no part of the coil is overheated, and if for any reason it is necessary to repair the coil or to rewind it, this may readily be done on account of the extreme simplicity of the construction as well as the facility with which the core 1 may be given a rigid and uniform relation as to the portions adapted to receive the winding. A further advantage resulting from the low intensity of heat required in my construction is that the coil 6 is expanded but little by the heating operation and this expansion is not sufficient to cause a displacement of the turns of the coil relatively to each other to short-circuit such turns.

While I have shown my invention in the particular embodiment herein disclosed, I do not, however, limit myself to this construction, but desire to claim any equivalent that will suggest itself to those skilled in the art.

What I claim is:

1. In a soldering tool, the combination of a heating coil, a conducting shell surrounding the coil and directly exposed to radiation from such coil, and a soldering tip associated with the shell, such shell being imperforate at its tip end so as to form a continuous closure thereat for the heating coil.

2. In a soldering tool, the combination of a heating coil, a conducting shell associated with said coil, said shell having two pockets, a soldering tip of such size as to fit in either pocket, and a set screw for holding the tip in the shell in either position.

3. In a soldering tool, the combination of a core of insulating material, a heating coil comprising a single layer of wire wound on one end of such core, a conducting shell secured to the core around the coil, and a handle separated from the shell and secured thereto only by means of the core.

4. In a soldering tool, the combination of a core of insulating material, a heating coil wound on one end of such core, a conducting shell secured to the core around the coil, a handle separated from the shell and secured thereto only by means of the core, a soldering tip, and an insulating tube surrounding the shell.

5. In a soldering tool, the combination of an insulating core having a cylindrical portion at one end of smaller diameter than the cylindrical portions adjacent thereto, a heating coil wound in a single layer upon the portion of the core of smaller diameter, a shell of copper having an internal diameter practically equal to the diameter of the portions of the core adjacent to the coil and supported by such portions, and a handle secured to the other end of the core.

6. In a soldering tool, the combination of an insulating core having a cylindrical portion at one end of smaller diameter than the cylindrical portions adjacent thereto, a heating coil wound in a single layer upon the portion of the core of smaller diameter, a shell of copper having an internal diameter practically equal to the diameter of the portions of the core adjacent to the coil and supported by such portions, a handle secured to the other end of the core, and connectors carried by the core inside of the handle forming the terminals of the coil.

7. In a soldering tool, the combination of an insulating core having a cylindrical portion at one end of smaller diameter than the cylindrical portions adjacent thereto, a heating coil wound in a single layer upon the portion of the core of smaller diameter, a shell of copper having an internal diameter practically equal to the diameter of the portions of the core adjacent to the coil and supported by such portions, a handle secured to the other end of the core, and a soldering tip removably secured to the shell.

8. In a soldering tool, the combination of an insulating core having a cylindrical portion at one end of smaller diameter than the cylindrical portions adjacent thereto, a heating coil wound in a single layer upon the portion of the core of smaller diameter, a shell of copper having an internal diameter practically equal to the diameter of the portions of the core adjacent to the coil and supported by such portions, a handle secured to the other end of the core, and a soldering tip removably secured to the shell in either of two positions.

9. In a soldering tool, the combination of an insulating core having a cylindrical portion at one end of smaller diameter than the cylindrical portions adjacent thereto, a heating coil wound in a single layer upon the portion of the core of smaller diameter, a shell of copper having an internal diameter practically equal to the diameter of the portions of the core adjacent to the coil and supported by such portions, a handle secured to the other end of the core, connectors carried by the core inside of the handle forming the terminals of the coil, a soldering tip removably secured to the shell in either of two positions, and an insulating tube surrounding the shell.

10. In a soldering tool, an elongated insulating core, a metallic reinforcing member extending longitudinally of said core, a handle mounted on one end of said core, a resistance coil on the other end of said core, one end of said resistance coil being connected with the end of said reinforcing rod, and a connector at said first-named end of said core with which the other end of said coil is connected.

11. In a soldering tool, an elongated insulating core, a reinforcing rod of metal extending through said core, a handle having a pocket into which the end of said core extends, a coil of wire wound on the other end of said core, one end of said coil being connected with said reinforcing rod, a connector mounted upon said core in said pocket in said handle, said connector being connected with the other end of said coil, a conducting lead extending from said connector, and a conducting lead extending from the end of said reinforcing rod inside said pocket.

12. In a soldering tool, an elongated insulating core, a reinforcing rod of metal extending through said core, a handle having a pocket into which the end of said core extends, a coil of wire wound on the other end of said core, one end of said coil being connected with said reinforcing rod, a connector mounted upon said core in said pocket in said handle, said connector being connected with the other end of said coil, a conducting lead extending from said connector, a conducting lead extending from the end of said reinforcing rod inside said pocket, and a heat conducting member surrounding but spaced away from said coil.

In witness whereof, I hereunto subscribe my name this 3rd day of June, A. D. 1910.

HECTOR P. MACLAGAN.

Witnesses:
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