No. 521,914. Patented June 26, 1894.

Fig. 1.

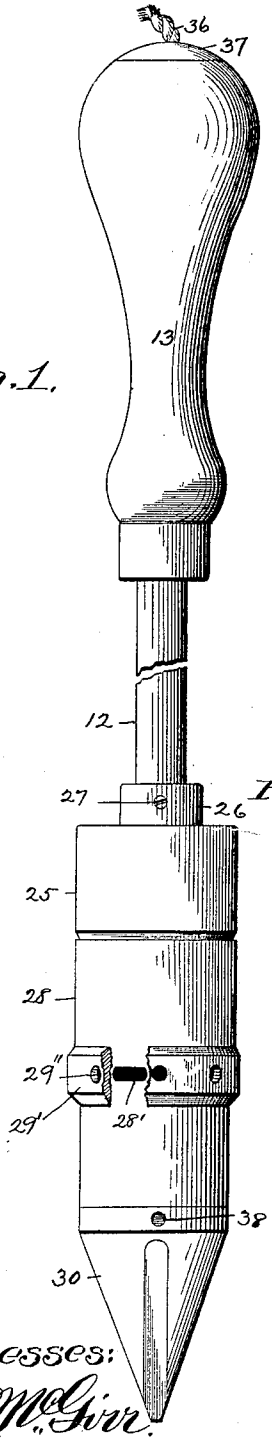

Fig. 3.

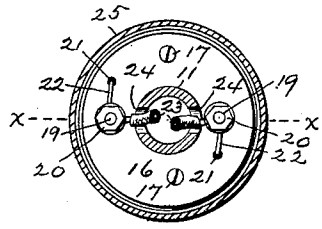

Fig. 4.

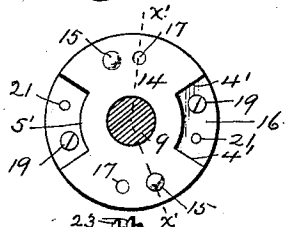

Fig. 5.

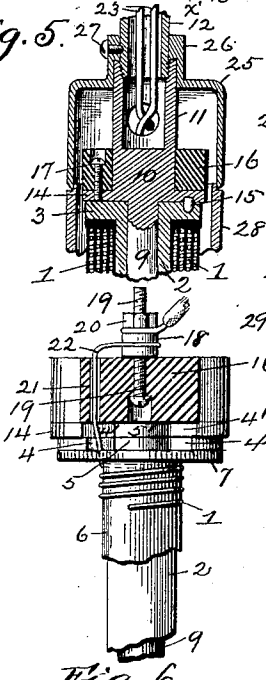

Fig. 6.

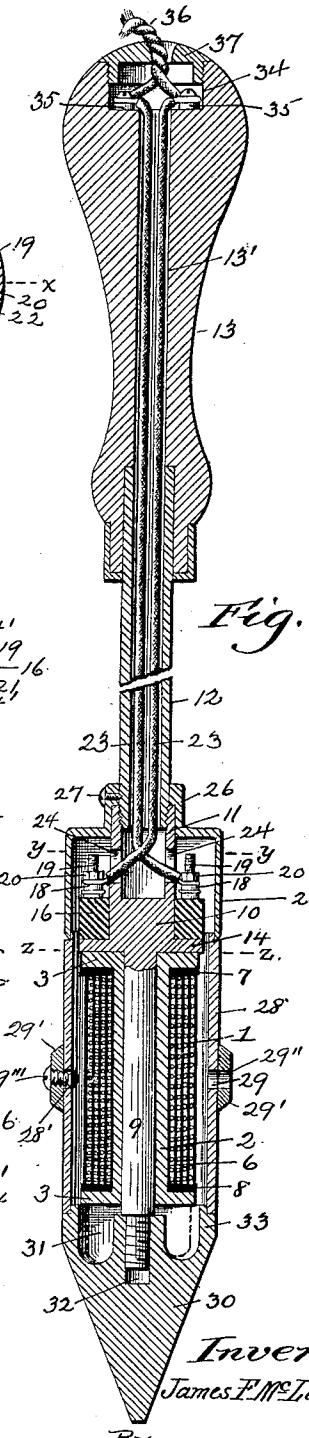

Fig. 2.

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UNITED STATES PATENT OFFICE.

JAMES F. McLAUGHLIN, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC SOLDERING-TOOL.

SPECIFICATION forming part of Letters Patent No. 521,914, dated June 26, 1894.

Application filed May 19, 1893. Serial No. 474,777. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McLAUGHLIN, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric Soldering-Tools, of which the following is a specification.

My invention has reference to improvements in electric soldering tools, the object of the improvement being to render such tool efficient for practical use and all its parts accessible for inspection and repair.

In the accompanying drawings, which form a part of this specification, I have illustrated a practical embodiment of my invention, but the same may be changed variously without departing from the main characteristics of the same.

Figure 1, is an elevation of my improved soldering iron; Fig. 2, an axial section of the same on line x—x of Fig. 3. Fig. 3, is a view of a cross section on line y—y of Fig. 2, looking downward. Fig. 4, is a view of a cross-section on line z, z of Fig. 2, looking upward, and with the mantle of the soldering tool removed. Fig. 5, is a vertical section of a portion of the tool, on line x' x', of Fig. 4, and Fig. 6, is an elevation of a detail of construction with parts in section.

Like numerals of reference indicate like parts throughout the drawings.

The essential part of the tool is the portion which is heated by the passage of the current through a high resistance conductor and which carries the soldering bit proper, the handle of the tool and the stem or neck by which it is connected with the handle being of any preferred ordinary construction and forms no part of my present invention.

The heating conductor 1, is disposed upon a spool or bobbin 2, which may be made of insulating refractory material, such as porcelain, but such material being a poor conductor of heat, I make this spool, by preference, of a metal that may be heated to a dull red without melting or collapsing; I have found iron or even brass to answer all requirements. One of the flanges 3, has cut away two ring segments, on diametrically opposite sides, similar to the cut away ring segment illustrated in Fig. 4, in connection with another element of construction, as will presently appear. This shape of flange 3, is shown in elevation in Fig. 6, where 4, 4, represent the radial sides of one of these cuts, corresponding to the radial sides 4′, 4′, shown in Fig. 4, and 5 represents the circular portion of one of these cuts, corresponding to the like portion 5′, shown in Fig. 4.

The spool 2, has a layer 6, of refractory insulating material, like asbestus, upon its cylindrical portion and washers 7, 8, of like material on the inner sides of the flanges. The heating conductor 1, is wound on this spool with its turns slightly separated, and with insulating coverings separating the successive layers of wire, and a final covering over the last layer of wire. The insulating material used for this purpose must be refractory and should also be of such character as to exclude the air from the heating conductor, and I use asbestus cloth saturated with some refractory cement. In this manner the heating conductor becomes entirely embedded in insulation, practically excluding the air and permitting the use of a base metal wire, such as iron or German silver; I have found the latter to answer all requirements. The projecting ends of this heating conductor are made either of copper or some other good conductor, or are made of the same high resistance metal as the main portion, but in the latter case the ends are doubled up a number of times, as is well known to those skilled in the art.

The spool 2, is mounted upon a spindle 9, which projects axially from one end of a cylindrical casting 10, the other end of which is formed into a thimble 11, screw-threaded internally and receiving the screw-threaded end of the tubular stem or neck 12, to the other end of which the handle 13, is secured. At the point where the spindle 9, extends from the casting 10, the latter is formed with a flange 14, which has two diametrically opposite ring segments 4′, 5′, 4′, cut away, as clearly shown in plan view in Fig. 4, and also in elevation in Fig. 6; these cuts 4′, 5′, 4′, coincide with the like cuts 4, 5, 4, in the flange 3, of the spool 2, hereinbefore described, and this coincidence is preserved by two studs 15, 15, whereby the turning of the spool upon the spindle 9, is prevented.

Upon the cylindrical casting 10, is mounted

an annular block 16, of porcelain, slate or other refractory insulating material, secured to the flange 14, by screws 17, 17. This block 16, has mounted upon it two binding posts or conductors 18, 18, at diametrically opposite sides, corresponding in position to the segmental cuts in the flanges 3 and 14, and these connectors or binding posts are secured upon the block by screws 19 and nuts 20, as shown. Adjacent to these binding posts the block 16, has the holes or channels 21, through which the terminals 22 of the heating conductor are passed and connected with the binding posts, as clearly shown in Figs. 3 and 6. To the same binding posts are connected the leading wires 23, 23, passing together through the hollow stem or neck 12, and then each through a lateral opening 24, in the thimble 11 of the casting 10.

The rear portions of the devices so far described are covered by the cylindrical cap 25, which is formed with a neck 26, loosely fitting over the stem 12, and over the open end of the thimble 11; this cap when slid forward over the binding posts and block 16, is clamped to stem 12, by a binding screw 27. A cylindrical mantle 28, having a number of perforations 29, is then fitted with one end against the edge or engaging the edge of the cap, and loosely surrounding the heating coil, and the soldering bit 30, is screwed upon the screw-threaded projecting end of the spindle 9, and engages or fits against the forward edge of the mantle, thereby clamping the mantle between the cap and the bit, and at the same time securing the bit to the other parts of the tool.

The point of the bit may be shaped in any desired manner, according to the nature of the work which it is desired to perform with the same, and ordinarily there will be a number of bits of differently shaped working points or edges which may be exchanged, but the butt end of each bit is constructed as shown. There is a deep annular groove 31, formed in the butt face of the bit, leaving a boss or hub in the center; this boss has a screw-thread cut in a central hole 32, which fits over and screws onto the screw-threaded end of the spindle 9. The edge of the butt is rabbeted, as shown, to receive the edge of the mantle. The wall of the butt may be left so thick that it will partly pass over the flange of the spool, and thus securely clamp the latter; this is indicated in dotted lines in Fig. 2, but this construction is not absolutely necessary, since the spool is sufficiently well prevented from sliding forward by the terminal wires 22, and the thinner walls 33, shown in solid lines, are ordinarily sufficient. The terminals of the heating coil, where they come from the spool, pass through small holes in the asbestus washer 7, and then through the holes 21, in the block 16; they are thereby held away from the sides of the segmental cuts in the flanges 3 and 14, but as an additional precaution against a short-circuit at these points, the cuts may be lined or even filled with insulating cement.

The handle 13, has a central perforation 13', which at its rear end expands into a chamber 34; in this chamber the ends of the leading wires are secured to binding posts 35, and to the same posts are also connected the terminals of the feeding wires 36, which are twisted into a cord which passes through an opening in the cap 37.

Numerous other means for connecting and disconnecting the feeding wires may be employed, as will be understood by those skilled in the art.

The cap 25, the mantle 28 and the bit 30 are made of copper or brass or other good conductor of heat, and when a current of proper strength is passed through the heating coil, the latter becomes heated first and gradually but rapidly heats the other parts, until the bit attains the temperature required for soldering. This temperature of the bit will be reached when, and will be maintained so long as, the heating coil is in that state of incandescence, which is recognized by those skilled in the art as "cherry red," and the perforations 29, in the mantle, in conjunction with an accessory device, which will presently be described, enable the operator to regulate the heat. The heat may also be regulated by regulating the flow of current by any of the well known devices, but ordinarily such regulation will be unnecessary.

The perforations 29 in the mantle 28, are in one circular plane, and between two of these perforations there is formed a short slot 28', shown in Figs. 1 and 2. A ring 29', is loosely fitted upon the mantle and is provided with a row of perforations 29'', corresponding to the perforations 29 on the mantle. A screw-pin 29''', is tapped into the ring 29', and enters loosely into the slot 28', whereby the ring is held upon the mantle but is allowed to be turned upon the same to the extent of the length of the slot. When this ring is turned so as to make the perforations 29'' to register with the perforations 29, the heat of the coil will partly radiate through these holes and the temperature of the bit will be reduced. When, however, the ring is so turned as to partly or wholly cover the perforations 29, the radiation into the air is partly or wholly cut off, and the temperature of the soldering bit rises. In this manner I am enabled to regulate the heat of the bit within considerable limits without varying the flow of current, and I have found this convenient mode of regulation quite effective. The ring 29', may be turned by a pointed tool which may be inserted in any one of the perforations 29'', or by means of a special tool which may be made for the purpose.

With the construction herein shown, it is easy to replace one heating coil by another of different capacity, or to exchange one form or

size of bit for another. For this purpose it is only necessary to unscrew the bit by means of a tool inserted in the hole 38, in the wall of the bit, then remove the mantle, then loosen the screw 27 and slide the cap 25 back upon the neck 12, whereby the binding posts 18, become accessible. The terminals of the heating coil are then removed from the binding posts, and the bobbin with the heating coil is slipped off from the spindle 9. Another heating coil and another bit may now be placed upon the tool.

Having now fully described my invention, I claim and desire to secure by Letters Patent—

1. In an electric soldering iron, the combination of a casting, a spool or bobbin removably mounted upon the same, a heating coil upon the spool and binding posts to which the terminals of the coil are detachably secured; with leading wires also detachably secured to the binding posts, a metallic mantle for the coil, and a removable bit securing the mantle in place, substantially as described.

2. An electric soldering iron, composed of a removable heating coil mounted upon a casting binding posts for connecting the terminals of the coil with the leading wires, a two part removable metallic covering for the coil and binding posts, and a removable bit for locking these parts together, substantially as described.

3. In an electric soldering iron, the combination of a cylindrical casting formed at one end into a thimble and at the other end as a spindle, an annular insulating block upon the casting carrying binding posts for connection with the leading wires passing through the thimble, and a spool with a heating coil mounted upon the spindle, said coil having its terminals also connected with the binding posts; with locking pins between the casting and spool to prevent the latter from turning with reference to the former, and a bit screwed upon the spindle, substantially as described.

5. In an electric soldering tool, the combination of a heating coil and a perforated inclosing mantle for the same, with means for controlling the radiation of heat through the perforations, substantially as described.

5. In an electric soldering tool, the combination of a heating coil and a perforated inclosing mantle for the same; with a perforated ring upon the mantle, adapted to turn upon the latter, whereby the size of the passages for radiation of heat from the coil into the air can be regulated, substantially as described.

6. In an electric soldering tool, the combination of a heating coil and an inclosing mantle provided with a circumferential series of heat radiating passages; with a ring, rotatable upon the mantle provided with holes corresponding to the said passages, whereby the latter may be partly or wholly closed and the heat of the tool regulated, substantially as described.

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

JAMES F. McLAUGHLIN.

Witnesses:
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MICHAEL G. PLUNKETT.