Dec. 14, 1943. G. L. WARD 2,336,904

ELECTRICALLY HEATED SOLDERING APPARATUS

Filed July 17, 1942

FIG. 1.

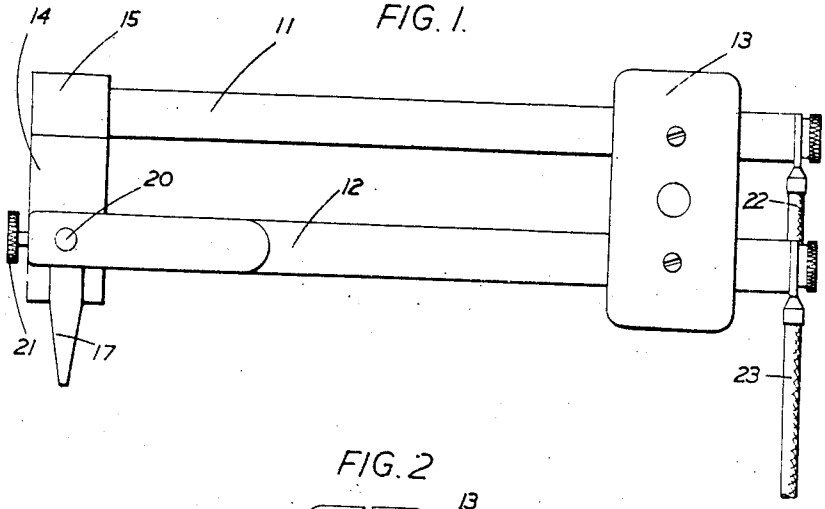


FIG. 2

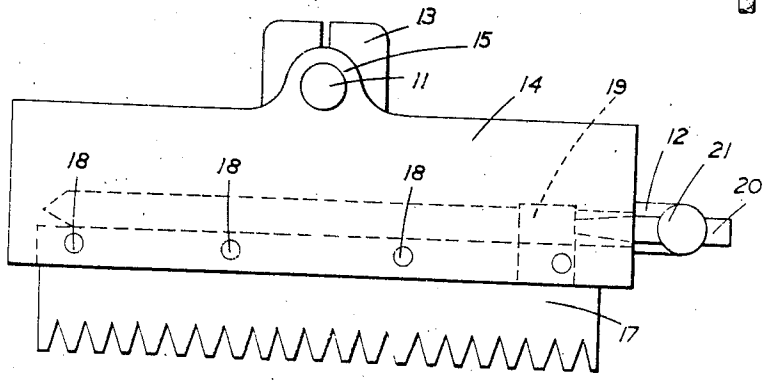
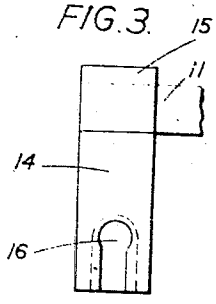


FIG. 3.



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ELECTRICALLY HEATED SOLDERING APPARATUS

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4 Claims. (Cl. 219—26)

This invention relates to tools for electric soldering.

A description will now be given of the accompanying drawing, in which,

Fig. 1 is a side view of an electric soldering tool made in accordance with the invention;

Fig. 2 is a front view thereof, and

Fig. 3 is an end view of a part, namely the bit-holder.

Referring to the drawing, two conducting arms 11 and 12 extend forwardly in parallel one above the other from a clamp 13 at their rear end. The upper arm 11 enters at its extremity into a tool-bit holder 14 made of steel, being riveted and brazed thereto to ensure a good mechanical and electrical connection. The bit holder 14 is in the shape substantially of a rectangular block lying in the plane of the ends of the arms and hence normal to the arms themselves, a lug 15 being provided at the middle of its top edge to receive the upper conducting arm. The bottom edge has a slot 16 formed therein, extending from one end nearly but not quite to the other. This slot is of key-hole shape when viewed from the end, that is to say it has a lower portion with straight sides running right to the bottom edge, and an upper portion which has the shape in section of a circle lying wholly within the body of the metal.

The soldering bit 17 is of copper, and is comb-shaped, the back of the comb being located within the lower straight-sided portion of the key-hole slot 16 and the teeth extended downwardly from the bottom edge of the bit holder. Grub screws 18 pass through the front of the bit holder near its bottom edge to fix the comb in place.

Within the upper circular-sectioned portion of the slot 16 is located a carbon rod which is of high-resistance carbon and which constitutes the heating element. At the innermost end the slot 16 is conical, coming to a point at about an angle of 60°, and into this cone fits the similarly pointed end of the carbon rod which is thus, at that end, accurately centered. Near the outer end the circular portion of the slot is enlarged a little at 19, and into the enlarged portion is fitted a short sleeve of heat and electrical insulating material such as vitroesil having a bore smaller than the slot in which the carbon rod is a close fit so that its outer end also is accurately centered. Behind the carbon rod is a conducting plug 20, preferably of silver steel, which fits comfortably in the slot and which is tapered at its inner end where it engages the carbon.

The second of the two conducting arms, the lower one 12, is bent so that its forward extremity overlies the mouth of the circular-sectioned slot in the end of the bit-holder 14, and is provided with a diametrical hole which is coaxial with the slot. Through this hole passes the conducting plug 20, being fixed by a screw 21 passing into the end of the arm.

The rear ends of the two conducting arms 11 and 12 are connected to current supply leads 22 and 23, the supply being preferably of low voltage and large current value, as would be obtainable from a step-down transformer fed from commercial mains. When the supply is switched on, the current will flow in a circuit consisting of the upper arm 11, the bit holder 14, the conical point on the inner end of the carbon rod, the length of the carbon rod itself, the plug 20, and the lower arm 12. The carbon, being of high resistance, will heat up, and the heat will be conducted to the teeth of the comb 17. Except at its ends, the carbon rod is out of contact with either the bit-holder or the bit, otherwise a short-circuit of the current would occur.

The comb soldering bit can be made to suit any multi soldering operation, and in any shape, to suit the parts to be soldered. Again, the soldering head can also be made with two or more sets of combs—each soldering comb heated by a separate carbon electrode.

With this method of soldering, the soldering medium, such as flux and solder foil can be placed on the part to be soldered, and the soldering comb used solely for the purpose of applying the necessary heat to carry out the soldering operation. This would also apply to the application of solder paste. This process is possible because, with the comb type of soldering bit heated by a carbon electrode, soldering temperature is quickly attained, and a uniform heat is distributed over the entire length of the comb and maintained during the operation.

The tool head can be used, or adapted for use, with either a hand-operated or foot-operated machine.

What is claimed is:

1. An electric soldering tool comprising, a substantially-rectangular bit-holder of steel, an electrical connection from one current lead to said bit holder, a bit of copper with its rear portion located in the straight-sided portion of a key-hole slot in the bit-holder, a circular-section rod of carbon located in the circular-section portion of said key-hole slot and engaging the bit-holder only at the inner end where a point on the rod fits into a conical recess in the slot end-wall, a

sleeve of insulating material constituting a spacer between the rod and slot near the outer end, a plug engaging the outer end of the carbon rod firmly, and an electrical connection from the second current lead to said plug.

2. An electrical soldering tool as claimed in claim 1, in which the bit-holder and the plug are mounted respectively on the ends of two arms extending forwardly in parallel from a clamp at their rear end.

3. An electrical soldering tool as claimed in claim 1, in which the bit is comb-shaped.

4. An electrical soldering tool as claimed in claim 1, in which the plug is of silver steel.

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