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ELECTRIC SOLDERING IRON

Filed Sept. 5, 1933

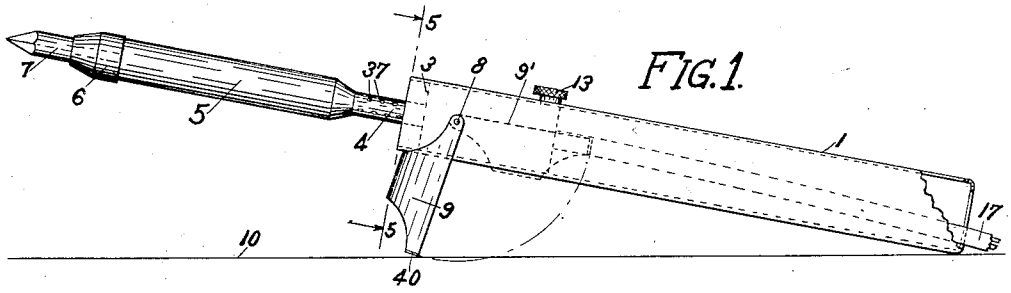


FIG. 1.

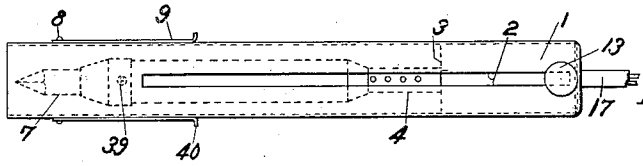


FIG. 2.

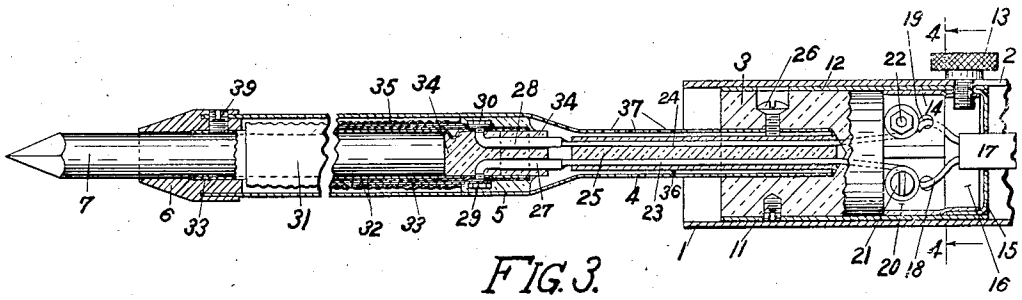
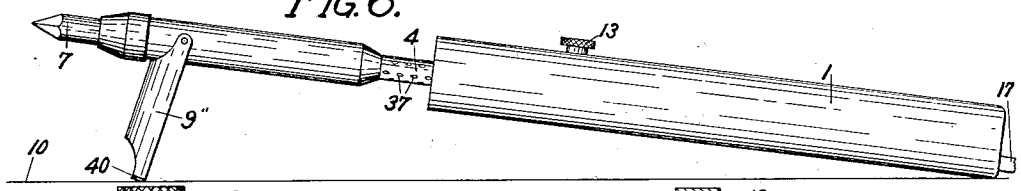


FIG. 3.

FIG. 6.



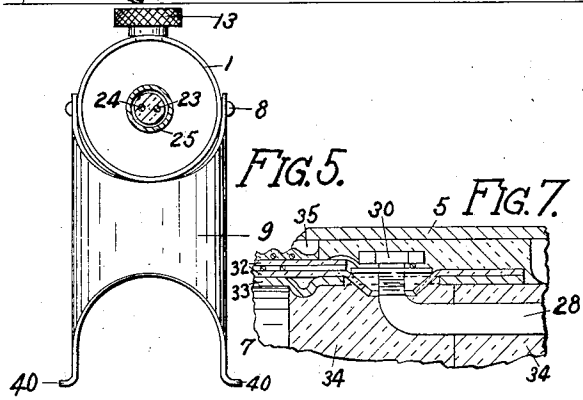


FIG. 5.

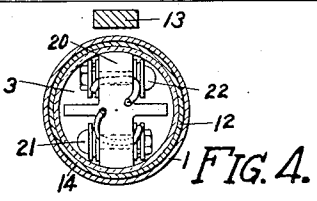


FIG. 4.

FIG. 7.

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ELECTRIC SOLDERING IRON

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10 Claims. (Cl. 219—26)

This invention relates to electric soldering tools and has for its object improvements in the construction of such devices whereby the tool is more effective, safe, handier in use, and more portable. Other features and advantages will appear in the following description and accompanying drawing.

In the drawing Fig. 1 is a side elevation of our improved electric tool in extended position and with a folding supporting leg turned outward.

Fig. 2 is a plan view of the tool in collapsed condition as for placing in the tool kit.

Fig. 3 is an enlarged longitudinal section of the forward half of the iron showing the internal construction thereof.

Fig. 4 is a cross section of Fig. 3 as seen from the line 4—4 thereof.

Fig. 5 is an enlarged cross section of Fig. 1 as seen from the line 5—5 thereof.

Fig. 6 is a side view of the extended tool similar to that of Fig. 1 but showing the folding leg attached to the heating element instead of to the handle.

Fig. 7 is an enlarged sectional view of the construction at the heating element terminals.

In further detail, the improved construction comprises a tubular metal handle 1 slotted along one side as at 2 and slidable within the tube 1 is a block 3 from which extends a tubular metal sleeve 4, 5, at the outer enlarged end of which is a conical chuck 6 of metal and through which extends a cylindrical soldering copper or bit 7, while pivoted at 8 to the outside of the outside of the forward end of the handle 1 is curved sheet metal leg 9 adapted to rigidly support the iron in slanted position from the floor 10, table, or other supporting surface as shown in full lines in Fig. 1, or fold up to overlap and embrace the sides of the tubular handle 1 as indicated by the dotted lines 9' in Fig. 1. This leg may optionally be attached to the sleeve 5 as shown in Fig. 6 at 9'' if desired.

The sliding block 3 within the tubular handle is made of electrically insulating material such as porcelain or bakelite and is secured by means of a screw 11 within a short length of metal tube 12 which fits slidably within the hollow handle 1 and is moved therealong and locked at any position by means of a thumb screw 13 passing through the handle slot 2 and threads through one side of the sliding tube 12 as well as through an inner insulating tube 14 and the neck of its metal closing cap 15 which forms a space 16 between the inner end of insulating block 3 and cap 15.

Cap 15 is centrally apertured to pass a heavily insulated cable 17, the two wires 18, 19 of which pass through holes in a guarded lug 20 formed on the inner end of block 3 and are secured respectively to binding screws 21, 22 which also take the lead wires 23, 24 which extend through porcelain or other insulators 25 within the metal sleeve 4 to supply current to the heating element proper.

Sleeve 4 fits tightly into an axial hole in block 3 and is secured in place by a countersunk screw 26 and the insulator 25 is of less diameter than the sleeve 4 so as to preserve an air space 36 around the insulator as shown. At the point where the sleeve is enlarged to the larger diameter 5 the lead wires 23 and 24 are welded to larger wires 27, 28 which pass into an insulating block or cement plug 34 and turn outwardly with their ends threaded and fitted with thin flat nuts 29, 30 where they attach to the terminals of the heating element 31 which consists of a resistance coil wound over mica or other insulating sheets 32 supported on the outside of a metal tube 33 (preferably brass) which is secured to and extends forwardly from the insulating plug 34. The heating coil is covered outside by a plaster of insulating cement to form a hard cylinder of lesser diameter than the inside of enlarged sleeve 5 so as to preserve an air space 35 thereabout which is vented together with the space 36 through a series of holes 37 in the smaller portion 4 of the sleeve.

The forward end of metal tube 33 passes tightly into a counter bore in the chuck and sleeve 5 extends into a recess formed in the chuck, all parts at this point being held from possibility of displacement by means of a set screw 39 which passes through the parts mentioned and impinges against the copper bit 7 which extends through the chuck and the brass sleeve 33 around which the heating coil is wound. Thus the bit may be adjusted to various points of projection into the hollow heating element and secured with the set screw so as to get any heating effect desired.

When through using the soldering iron the leg 9 is folded up against the tubular handle 1 and the telescopic portion 5 and its bit 7 are slid within the hollow handle by loosening and moving thumb screw 13 along the slot 2 and giving it a slight turn at the end of the slot to lock it so as to prevent the still hot bit from coming out of its protective handle. The sleeve 5 and bit 7, being considerably smaller in diameter than the inside of the handle, are ventilated for quick cooling and will not overheat the handle, so that it is safe to at once replace the soldering iron

in the tool kit. The folding leg 9, it will be noticed has two outwardly turned toes 40, which serve as striking corners to outfold it.

A feature of importance is the support of the heating coil on a brass or other non-magnetizable metal tube into which the solid copper bit slides as this has been found to do away with pitting of the bit which sometimes takes place in electric soldering irons where iron or steel is used in corresponding parts.

Attention is also directed to the construction of our device at the terminals of the resistance coil, or heating element 31, as best shown in Fig. 7.

The metal tube 33 or core of the tool in which the bit is fitted, is provided with openings adjacent the inner end of the bit appreciably larger than the large wires 27, 28, through which openings the ends of wires 27, 28 extend. Nuts 28, 29 are a trifle smaller than these openings and the ends of the resistance coil are secured around the ends of these wires respectively between the nuts and a washer, the washer also being slightly smaller than the openings in the tube 33. The mica sheet 32 extends to the inner end of the tube 33 and is provided with openings aligned over the openings in the tube 33, and which openings in the mica sheet are substantially the same diameter as the wires 27, 28. Thus when the nuts 29, 30 are tightened, the mica sheet is forced over the edges of the holes respectively in the metal tube 33, as indicated in Fig. 7, effectually insulating the edges of the holes in tube from the wires and bringing all of the wire of the resistance coil directly in contact with the metal tube 33, save for the mica, from the terminals thereof.

By the above construction the heat from the resistance coil is transmitted by conduction all along its length to the metal tube which holds the bit, thus none of the heat is carried into the handle and the coil will last indefinitely since none of its length is exposed to the detrimental effects from excessive heating as in those tools where a length of the heating coil finds no material to conduct the heat away from it. Also by our construction, a lower wattage can be used with the same results as in others in which higher wattage is necessary. This is because all of the heat of the coil goes to the core in which the bit is fitted, and from thence directly into the length of the bit that is within the core.

Furthermore, by the above construction, it is possible to reduce the diameter of the shell 5 to the point where it will slide into the handle 1 without making the handle so large that it is unwieldy. To our knowledge no one has before successfully attached the terminals of the resistance coil to the lead-in power wires at the point adjacent the inner end of the bit, and the importance of the feature in our collapsible iron is particularly important in that it prevents conduction of the heat into the handle thereby permitting the tool to be immediately tossed into a tool kit without danger when the tool is collapsed after using.

Having thus described our improved electric soldering tool, what we claim is:—

1. An electric soldering tool comprising a tubular handle, an electric heating element, a soldering bit extending from within said element, means mounting the element and bit for sliding within the handle, and a leg foldably carried by the assemblage adapted for supporting the tool with heated bit elevated when the element and bit are in extended position out of the handle and to be enclosed within the handle when the element and bit are retracted into the handle.

2. An electric soldering tool comprising a tubular handle, a block slidable within the handle and provided with electric terminal connections, power wires extending into the handle from one end thereof connected to said terminal connections, a tubular sleeve secured at one end within the block extending out of the same and handle, a tubular electric heating element within said sleeve with terminal wires extending to the terminal connections of said block, and a soldering bit extending into the outer end of the tubular electric heating element, a chuck at the outer end of said tubular electric heating element through which said bit passes, and a screw extending through the chuck impinging the bit.

3. In a soldering tool provided with a handle, a tubular sleeve mounted at one end within said handle and projecting outwardly therefrom, a tubular heating element within said tubular sleeve at the end thereof remote from the handle, a soldering bit extending into said tubular heating element, power wires connected to said heating element at a point within the projecting sleeve adjacent the inner end of said bit, the handle of said tool being hollow and the mounting of the tubular sleeve being of insulation material and slidable within the handle whereby the sleeve and bit may be withdrawn into the handle.

4. An electric soldering tool comprising a tubular handle, a block wholly enclosed within said tubular handle and slidably mounted therein for sliding substantially from end to end thereof, an elongated tubular member secured at its inner end to said block for movement therewith, said tubular member supporting a heating element and bit in its outer end with the bit projecting from said heating element, said tubular handle adapted to fully enclose the tubular member and bit when the block is at one end of the handle, and substantially the full length of the tubular member being exposed and projecting from the opposite end of the handle when the block is moved to said opposite end, the overall length of said block, tubular member and bit being substantially equal to the overall length of the handle whereby the length of the complete tool when the block, tubular member and bit are enclosed within the handle is substantially half the length of the length of the handle, tool and bit when extended, said block being adapted to support the bit and heating element spaced from the sides of the handle when the bit and heating element are retracted into the handle.

5. In a construction as defined in claim 4, a leg foldably carried by the tool arranged and adapted for supporting the heated bit elevated when the leg is extended and to fold against a side of the tool and within the longitudinal dimensions of the tool when the tubular member including the bit is retracted into the tubular handle.

6. An electric soldering tool comprising an electric heating element, a soldering bit mounted therein adapted to be heated by the element and electrical conductors connected to the heating element for supplying electricity thereto, a handle, means mounting said bit and heating element including the connections between the electrical conductors and heating element for sliding the bit, heating element and electrical connections from a position wholly enclosed within the handle to a position with the bit and heat-

ing element rigidly supported relative to the handle and extended therefrom whereby the length of the tool when collapsed is less than the length of the tool when extended by a distance substantially that of the exposed length of the bit and element when the same are extended from the handle, said bit being substantially spaced from the inner sides of the handle when retracted thereinto.

7. An electrical soldering tool comprising a tubular heating element, a soldering bit mounted therein and projecting therefrom in axial alignment therewith, electrical conductors connecting with said heating element, said heating element, soldering bit and electrical conductors all being rigidly secured together, a tubular handle adapted to fully enclose the heating element and soldering bit and the connections between said electrical conductors and heating element with the electrical conductors extending from one end of the handle, means slidably supporting said heating element and bit within the handle in axial alignment therewith and with the bit spaced from the inner sides of the handle for movement of the bit longitudinally of the handle for exposing said bit from an end of the handle, and means adjacent a side of the handle for sliding said means longitudinally thereof.

8. An electric soldering tool comprising an elongated tubular handle, a block slidable within the handle longitudinally thereof provided with electrical terminal connections, power wires extending into the handle connected to said electrical connections, an electrical heating element rigidly secured to said block and a soldering bit projecting from within said electrical heating element, electrical conductors connecting said heating element and electrical terminal connections, said block being wholly enclosed within said handle and the heating element and bit being adapted to be wholly retracted to within the handle upon sliding said block toward one end thereof and to be exposed upon sliding the block toward the opposite end, releasable means for rigidly securing said block against movement relative to the handle at opposite ends of its longitudinal movement within the handle, said bit being substantially spaced from the inner sides of the handle when retracted thereinto and means insulating said electrical conductors and electrical terminal connectors from the handle.

9. An electric soldering tool comprising an elongated tubular handle, an electric heating element, a soldering bit extending from within said element, means wholly enclosed within said handle and slidable longitudinally thereof mounting the element and bit for supporting the bit extended from the handle and for sliding the bit and element to a position wholly within the handle with the bit spaced from the walls of the handle, said handle being provided with a slot along one side extending longitudinally thereof, locking means extending through said slot adapted to serve as a finger-grip for sliding said means longitudinally of the handle and for positively locking said means at any desired position relative to the length of the handle whereby said bit is adapted to be rigidly secured against movement relative to the handle at any desired point of extension therefrom, electrical conductors extending from said handle and connecting with said element for movement with the means mounting the bit and element and the means mounting the bit and element including the electrical conductors from the handle.

10. In a construction as defined in claim 9, said locking means including a threaded bolt secured at one end to the means mounting the element and bit, a thumb nut on said bolt outwardly of said slot adapted to tightly engage the edges of the slot between the nut and means mounting the bit and element upon turning the nut.

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