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SOLDERING IRON

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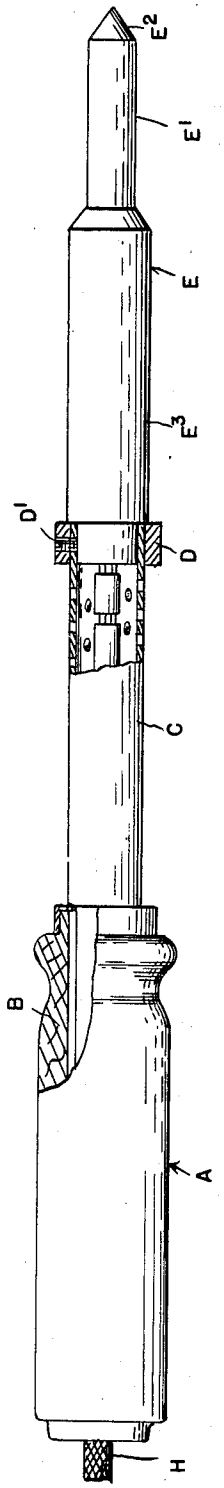


FIG. 1.

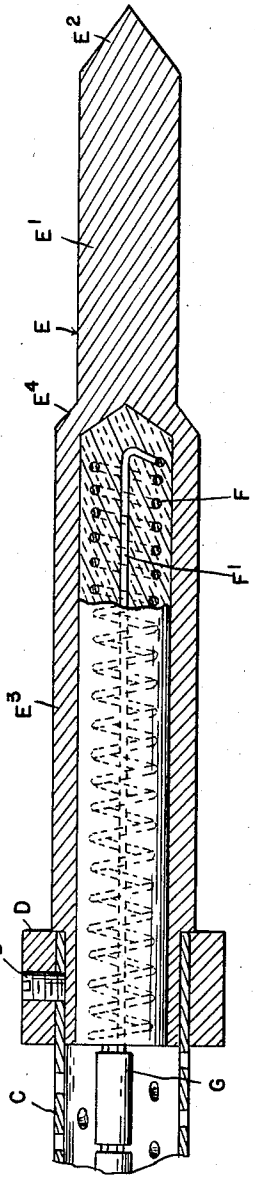


FIG. 2.

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SOLDERING IRON

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Application July 5, 1938, Serial No. 217,606

1 Claim. (Cl. 219—26)

The invention relates to electrically heated tools. It is the primary object of the invention to obtain a construction of soldering iron which is adapted for more or less constant use in connection with fine work, such as forming electrical connections in radio apparatus. For such use it is essential that the soldering point should be of relatively small diameter, such for instance as three-eighths of an inch, in order that it may be inserted within the restricted space limits available. This renders the construction of the tool difficult for heating resistors designed for operation with commercial electrical currents require more space for their installation. This is for the reason that if the required resistance is obtained by decreasing the cross section of the resistor, it becomes so small as to have a very limited life, as well as rendering it difficult to properly conduct the heat generated to the working point of the tool. On the other hand, if the required resistance is obtained by increasing the length of the resistor, then as before stated, it cannot be placed in heat conducting relation to the working point without considerably increasing the dimensions over those desirable.

To overcome these difficulties, we have designed a construction in which the working portion of the tool is small in diameter and of solid cross section. Integral with this portion is a tubular shank portion sufficiently enlarged in diameter to provide therein the space for the resistor and to have a surrounding wall of a cross sectional area at least equal to that of the portion of solid section. Within the hollow shank is a coiled metallic resistor, the convolutions of which are embedded in an insulator cement of relatively high thermal conductivity. The inner end of the coil has a terminal portion which extends axially through the coil, and this portion and the terminal portion at the opposite end of the coil extend beyond the cement body, and are available for attachment to the electrical service. Such a construction forms a replaceable unit which can be quickly attached to or detached from a supporting handle provided with the service connections.

The resistor coil is formed of a wire sufficiently large in cross section to have a reasonable length of life. This necessarily decreases the resistance of a coil which can be stored within the available space, but the voltage of the electrical service is sufficiently reduced to properly limit the heating effect. Thus, we obtain a soldering tool of the required restricted dimensions and because of the low voltage, this tool may be maintained at working temperature at relatively small expense.

The replaceable unit above described may be used with any suitable handle construction, but preferably one corresponding to that in the parent application above referred to. This, together with the specific construction of the unit, are illustrated in the accompanying drawing, in which:

Figure 1 is a sectional elevation of our improved tool;

Figure 2 is an enlarged central longitudinal section through the replaceable unit.

As illustrated, A is a suitable handle member preferably having a hollow wooden portion B and a tubular metallic shank C. The outer end of the shank C has a metal reinforcing collar D attached thereto, which is provided with a threaded aperture for receiving a set screw D'.

E is the replaceable unit which has a solid portion E' of relatively small diameter, such for instance as three-eighths of an inch. The outer end of this portion has a point E^2 while the inner end is provided with an integral tubular shank E^3 sufficiently enlarged in external diameter to provide a chamber for the reception of the heating unit with a surrounding wall of a cross sectional area at least equal to that of the solid portion E'. The portions of different diameters merge into each other through a tapering portion E^4, and the construction is such that the heat generated within the chamber and communicated to the walls thereof will readily flow into the solid portion E' to maintain the same at the required temperature. The rear end of the tubular shank E^3 is slightly reduced in diameter to fit within the tubular shank C and reinforcing collar D, and is secured thereto by the set screw D'. The resistor F is formed of a metallic wire or strip coiled to be but slightly less in diameter than the internal diameter of the tubular shank E^3. The terminal portion F' from the inner end of the coil extends rearward through the axis of the coil and out beyond the end of the tubular shank E^3. The coil is then embedded in a suitable insulator cement, such as "Alundum" which completely fills the chamber within the shank E^3 and maintains good thermal conduction between the convolutions of the coil and the wall of the shank. The terminal F' and the terminal F^2 from the opposite end of the coil, are sufficiently extended to be connected with the service within the hollow handle B. These portions preferably pass through insulator beads G strung thereon which hold them from

short circuiting with each other or with the metallic tube C. The electrical service is supplied through a suitable flexible conductor cord H and the connections between the conductor wires and the terminal portions F' and F^2 are within the hollow handle. Preferably, the head C′ has extending therefrom a plate support H. The unit is preferably constructed to be operated by current at a voltage from 6 to 30 and such current may be supplied either from storage batteries or from a commercial service through a suitable transformer, not shown.

What we claim as our invention is:

A replaceable unit for electrically heated soldering irons comprising a member having a portion of relatively small diameter and solid cross section and an integral tubular shank portion, the walls of said shank portion being of a cross sectional area at least equal to that of the solid portion, a tapering portion connecting said tubular and solid portions and also integral therewith, a coiled metallic resistor completely enclosed within said tubular portion, an insulator cement of relatively high thermal conductivity filling the chamber within said tubular shank and embedding said coiled resistor, the resistance of said resistor being proportioned to maintain a working temperature in the solid portion of said unit when connected to an electrical service of not over thirty volts, a handle provided with such electrical service, a ventilated tubular shank detachably connecting said handle to the inner end of the tubular portion of said unit, and terminal conductors from said unit extending through said tubular shank and connected with said service.

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