

UNITED STATES PATENT OFFICE.

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ELECTRIC SOLDERING-IRON.

1,106,476.

Specification of Letters Patent.

Patented Aug. 11, 1914.

Application filed May 23, 1913. Serial No. 769,396.

To all whom it may concern:

Be it known that I, JAMES CHARLES ROYCE, a subject of the King of Great Britain, and resident of the city of Toronto, county of York, Province of Ontario, in the Dominion of Canada, have invented certain new and useful Improvements in Electric Soldering-Irons, described in the following specification and illustrated in the accompanying drawings, that form part of the same.

The objects of the invention are, to devise an improved form of electric soldering iron which will operate economically, will develop the required heat and may be retained at a constant temperature, and further to devise a construction which will stand a considerable amount of abuse and will not be likely to get out of order and which may be very easily and quickly repaired.

The principal feature of the invention consists in the novel construction and arrangement of parts whereby the heating element is held in positive contact with a core of high heat conductivity.

In the drawings, Figure 1 is a top plan view of a soldering iron constructed in accordance with this invention. Fig. 2 is a vertical longitudinal mid-sectional view. Fig. 3 is a detail plan view of the central core and one of the heating elements. Fig. 4 is a cross sectional view of Fig. 2 through the line *a-b*.

Like numerals of reference indicate like corresponding parts in each figure.

Referring to the drawings, 1 is a rectangular casing open at one end and having the opposite and closed end 2 formed with a central hole 3 therethrough.

4 is the core of the instrument formed preferably of copper and of rectangular cross section of greater width than its depth and having the square end 5 adapted to fit snugly against the inner side of the closed end 2 of the casing 1 and having a threaded stem 6 extending centrally from said square end and projecting through the hole 3.

7 is the point of the instrument of pyramidal shape having a threaded hole 8 therein into which the threaded stem 6 extends, the base of said point screwing up tightly against the end of the casing 1.

9 and 10 are a pair of electric heating elements preferably formed with a central core 11 of a long narrow shape around which is

wound in spiral form a length of suitable resistance material, each consecutive layer of which is insulated by suitable insulating material. The elements are bound on the outer edge by an encompassing wire band 12 which is in electrical contact with the outer coil of the resistance material and is formed with an adjustable connection 13 to which the electric terminals are secured. The elements 9 and 10 are placed flat upon the core 4, a sheet of mica insulation 14 being laid over the surface of said core and they are secured in place by the screws 15 extending through the holes 16 in the core 4, being threaded into the cores 11 of the heating elements. The screws are insulated from the center core 4 of the instrument but form an electrical contact between the cores of the elements. The inner end of each of the spiral coils of the elements is electrically connected to the center core 11 so that the current flowing in through the wire 17 flows through one element and is conducted from the core thereof to the core of the other element by means of the screws 15 and flows outwardly through the coil to the return wire 18. These wires pass out through the hollow handle 19 secured in the cap closing the open end of the casing 1.

21 are flat metal plates placed against the outer faces of the heating elements 9 and 10 and insulated therefrom by a layer of mica or suitable insulating material 22. The plates 21 are held in pressure contact with the heater elements 9 and 10 by means of the set screws 23 and 24. The core 4 and the plates 21 are of less width than the interior width of the casing 1 so that there will always be a dead air space surrounding the elements and the said core to minimize the induction of heat from the core to the said outer casing. This space also allows the free lateral expansion of the heating elements without danger of their coming into contact with the sides of the casing. The inner walls of the casing 1 are covered with a suitable insulation such as mica or asbestos to further minimize the radiation of heat from the heating elements to said casing and to avoid the possibility of short circuits.

The construction of this instrument is very simple and in use when the electric current is turned on it flows through the heating elements arranged one on each side of the flat central core 4 in series and said elements impart their heat direct to the

copper core which has very high heat conductivity. The heat thus imparted to the flat copper core is conducted through the contact of the center stem 6 and the closely engaging non-insulated square end 5 and casing 1 to the point 7 and as said point contains the greatest body of material the heat will be concentrated there. The plates 21 for holding the heating elements closely in contact with the core are preferably of cast iron and these are separated from the inner wall of the outer casing by a dead air space all around so that there will be very little conductivity of heat laterally.

15 The form of element described is particularly adaptable to the construction of the device herein set forth as the heating members can be clamped in close engaging contact with the core. The arrangement of the elements, one on each side of the core insures a uniform application of heat and makes a perfectly balanced instrument which will not be liable to be distorted. The instrument can be very readily taken apart or put together and there are no delicate parts which can be injuriously affected.

What I claim as my invention is:—

1. In an electric soldering iron, a soldering point, a core of high heat conductivity secured to said point formed of rectangular shape presenting two broad flat contact surfaces, a pair of electric heating elements engaging the broad flat faces of said core and electrically insulated therefrom, a casing surrounding said core and heating elements and spaced therefrom, and means extending inwardly from said casing and clamping said heating elements against said core.

2. In an electric soldering iron, a soldering point, a core of high heat conductivity secured to said point formed of rectangular shape presenting two broad flat contact surfaces, a pair of electric heating elements engaging the broad flat faces of said core and electrically insulated therefrom, a casing surrounding said core and heating elements

and spaced therefrom and forming a dead air space therearound, flat plate members arranged on the outer sides of said heating elements, and set screws extending through said inclosing casing and engaging said plates and clamping said elements in positive contact with the faces of said core.

3. In an electric soldering iron, a soldering point, a core secured to said point formed of rectangular shape presenting two broad flat surfaces extending longitudinally thereof, a pair of long flat heating elements arranged with their flat faces in contact with the broad flat faces of said core, said elements having central cores of metal, clamping members extending through one of said element cores to the other element core and electrically insulated from the main core and forming an electrical connection from the core of one element to the core of the other placing said elements in series connection, and a casing inclosing said core and elements.

4. In an electric soldering iron, a hollow rectangular casing having an inturned flange at one end, a core of high heat conductivity extending longitudinally of said casing and centrally arranged therein, having a flange at one end adapted to engage the flanged end of said casing, a point secured to one end of said core and clamping said core and casing together, a pair of electric heating elements held in close contact with said core and electrically insulated therefrom, flat plate members engaging the outer faces of said heating elements and electrically insulated therefrom, means for clamping said plates in contact with said heating elements, and a hollow handle connected to said casing.

Signed at the city of Toronto, Ontario, Canada, this 13th day of May 1913.

JAMES CHARLES ROYCE.

Witnesses:

E. HERON,

D. S. TENELL.