

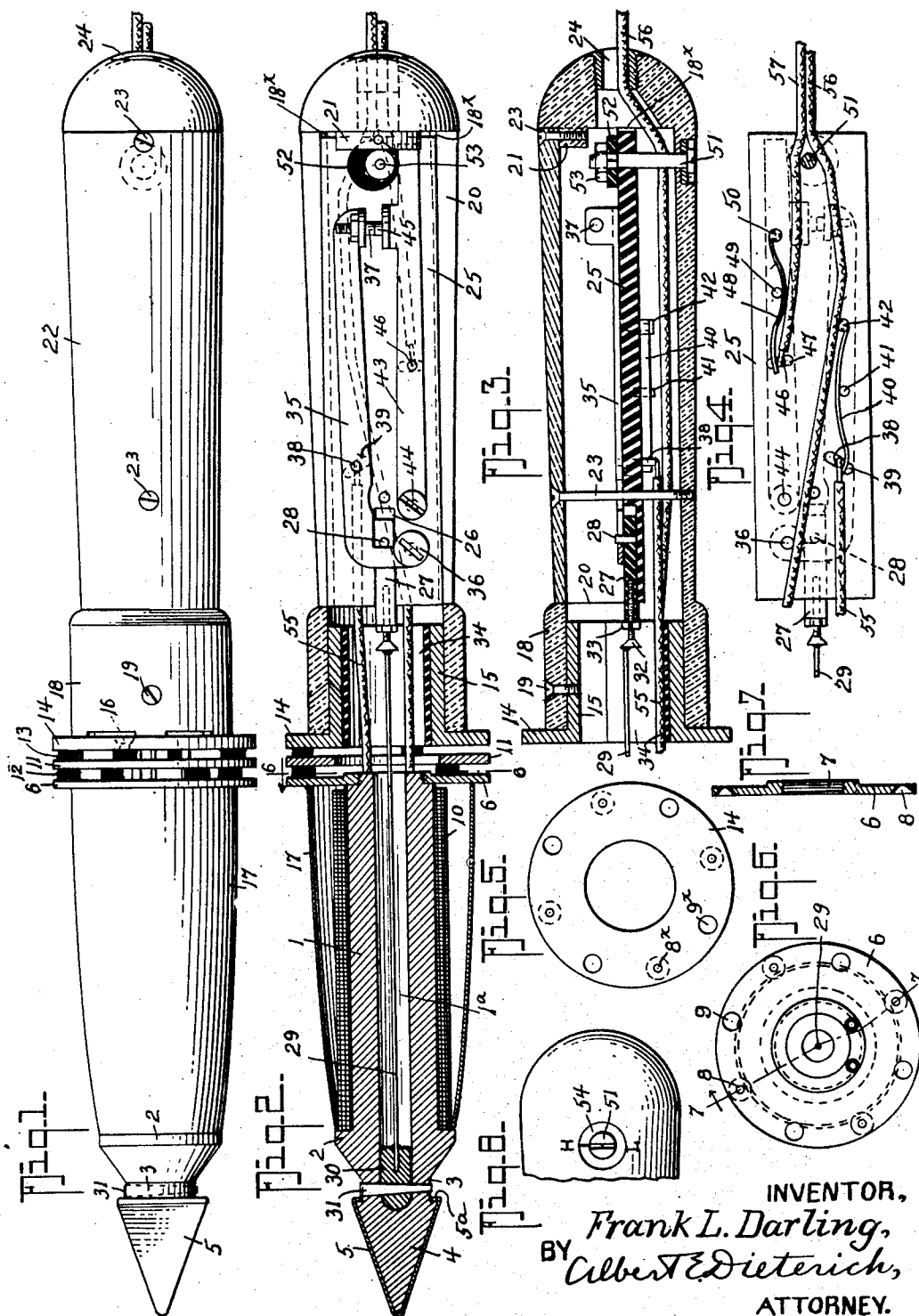
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SOLDERING IRON

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SOLDERING IRON

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My invention relates to soldering irons of the electrically heated type. The invention has for its objects:

1. To provide an iron of relatively light weight.
2. To provide an iron in which the expansion of the heated part serves as a thermostat to control a circuit breaker.
3. To provide an iron in which the temperature may be set by the user and automatically controlled for any heat from zero to 500 degrees.
4. To provide for the operation of the circuit breaker to open the circuit by a pull action, thereby avoiding stacking the connection and causing inaccurate operation.
5. To provide an iron with a thermostatic control such that the circuit will be opened at the proper time even though the contact points should stick.
6. To provide an iron with a new kind of tip that can easily and cheaply be replaced when necessary.
7. To provide means to reduce to a minimum heat conduction from the iron proper to the handle.

Other objects will in part be obvious and in part will be pointed out hereinafter.

To the attainment of the aforesaid objects and ends the invention further resides in those novel details of construction, combination and arrangement of parts, all of which will be first described in detail hereinafter and will then be specifically pointed out in the appended claims, reference being had to the accompanying drawing, in which:

Fig. 1 is a plan view of an iron according to my invention.

Fig. 2 is a part central horizontal section and part plan view of the same with the cover part of the handle omitted.

Fig. 3 is a central vertical longitudinal section of the handle and the parts contained therein.

Fig. 4 is an inverted plan view of the circuit breaker plate and the parts carried by it.

Fig. 5 is a face view of the handle-coupling member looking from left to right in Fig. 3.

Fig. 6 is a section on the line 6—6 of Fig. 2 looking in the direction of the arrow, the insulation spacers and connecting screws being omitted.

Fig. 7 is a detail section, on the line 7—7 of Fig. 6, of the iron-coupling plate.

Fig. 8 is a detail view hereinafter specifically referred to.

In the drawing, in which like numerals of reference indicate like parts in all figures, 1 represents the part of the instrument to which the heat is applied (commonly referred to as the "iron"). In

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my instrument the part 1 is made of a suitable aluminum alloy. It is cylindrical in form and has a flange 2 and a pyramidal tip 4 connected with the flange part by a neck 3. The pyramidal tip 4 is covered by a stamped metal (copper) sheath 5 which is removably held tightly in place by crimping over portions of its inner edge as at 5^a. At its inner end the "iron" 1 is threaded into the threaded hole 7 of a coupling plate or ring 6. The "iron" 1 is bored as at 1^a to receive the anchor 30 for the pull wire 29, later again referred to.

The plate 6 has screw holes 8 for connecting screws to join plate 6 to the intermediate ring 11, insulators 12 being interposed through which insulators the connecting screws are passed. The plate 6 also has air holes 9.

A heating coil 10 is placed on the member 1 between the flange 2 and the iron-coupling member 6, and a metal shield 17 is placed over the same, as shown in Figs. 1 and 2.

The handle unit is best shown in Figs. 2 and 3 by reference to which it will be seen that 18 is the handle of suitable material that is a poor conductor of heat. The handle is hollow and is cut apart as at 20 to provide a removable cover 22 which is held in place by screws 23, the longer one of which passes through a hole in the insulation base plate 25 and threads into a fixed part of the handle while the shorter screw is threaded into a saddle 21. The outer end of the handle is bored and bushed as at 24 to pass in the power wires 56 and 57. The handle 18 is mounted on the mounting bushing 15 and held thereon by a screw 19. The mounting bushing 15 is integrally formed with a handle-coupling flange 14 which is connected to ring 11 by screws 16 which pass through holes 8^a in flange 14 and insulation 13, and are screwed into ring 11 at places staggered with respect to the screws and screw holes of plate 6.

Flange 14 also has vent holes 9^a. The handle has recessed portions 18^a in which the circuit breaker base plate 25 rests and is held in place by the cover 22.

Mounted on the base plate 25 is an L-shaped lever 35 whose longer leg carries a contact point 37, and whose shorter leg is pivoted at 36. A pin 38, carried by the longer leg, projects through a slot 39 in the base plate 25 and is engaged by a return spring 40. The spring 40 is anchored at 42 and passes over a fixed pin 41 on the plate 25 so that the spring 40 constantly urges the lever 35 toward its circuit-closing position. Also mounted on the plate 25 is a lever 43 that is pivoted at one end, as at 44, and carries a contact point

45 to cooperate with contact point 37, the extreme or free end of the lever being held in contact with a temperature regulating cam 52 by means of a spring 48 which is anchored at 50, passes over a fixed pin 49 and engages a pin 46 on the lever 43. The pin 46 passes through a slot 47.

The cam 52 is carried by an adjusting bolt or screw 51 that passes through and is soldered to a washer 54. The bolt also passes through a hole in plate 25 and the cam 52 is held to the bolt by a nut 53. The washer 54 has a mark and the handle has H and L marks to indicate high and low temperature adjustments.

The wire 29 is attached in any suitable way (as by welding) to the screw 32 and to the anchor 30. The anchor 30 is held in place by the key pin 31 in the neck 3. The screw 32 is adjustably threaded into a slide 27 which works in a groove or recess 26 in plate 25 and has a pin 28 to engage the shorter arm of the lever 35. A jam nut 33 holds screw 32 in place. When the tool is cold, pin 28 is free of lever 35 but when the tool heats up, expansion of the member 1 exerts a pull on wire 29, causing pin 28 to contact lever 35 and when the right temperature is reached moves lever 35 to break the circuit. The temperature at which the circuit is broken depends on the position to which cam 52 is set. The tool is set for its maximum heat when lever 43 is engaged by the low side of the cam, and by turning the cam settings for any desired degree of heat less than maximum can be had and controlled at that setting. As shown, the tool is set for maximum heat.

One power wire 56 runs direct to coil 10, another 57 runs to pin 46, while a third wire 58 connects coil 10 with pin 38. A piece of sheet insulation 34 prevents possible short circuits to bushing 15.

The tool which I have constructed according to this disclosure can be set to operate from a maximum of 500 watts down to 50 watts. As will be seen, the control is very positive as it is operated by the expansion of the part 1 acting on the circuit breaker with a pull through wire 29 sufficient to break apart the points, even though they should stick more or less. Of course, as will be obvious to anyone skilled in the art, the wire 29 should have a lesser co-efficient of expansion than the material of part 1 or it must be kept cooler than part 1 or both. The coupling 6, 12, 11, 13, 14 not only lessens heat conduction between the handle portion and the heating portion of the tool but serves to ventilate somewhat the space containing the wire 29 thereby cooling it below the temperature of part 1.

The new style copper tip 5 is an important improvement. These tips can be stamped from one-sixteenth inch copper at low cost and sold to the users of the tools as replacement points. This does away with the usual practice of screwing copper tips into the heating elements; as these points oxidize rapidly, it is frequently impossible

to screw the tips out without ruining the irons for replacement. My tip 5 can be easily pried off with an ordinary screw driver and a new one can be installed instantly.

By the new construction of my tool I have reduced the weight of a 500 watt iron to less than one-half of that of one of the best irons now on the market.

From the foregoing description, taken in connection with the accompanying drawing, it is thought that the construction, operation, and advantages of the invention will be clear to those skilled in the art.

What I claim is:

1. In an electrically heated soldering iron, two units one of which is a chambered heating unit and the other of which is a handle and a heat-controlling unit; a heat-insulating and chamber ventilating coupling joining said units together; and means anchored to the heating unit and lying in the chambers of said units and mechanically connected to the heat-controlling unit and operable by the expansion and contraction of the heating unit for effecting operation of the heat-controlling instrumentalities of the heat-controlling unit.

2. In an electrically heated soldering iron, a heating unit and a handle, said units having connecting chambers; a ventilated coupling between said units and effecting communication between said chambers and the atmosphere; a circuit make and break device mounted in said handle; and a pull connection between said device and the heating unit operable by the expansion and contraction of the heating unit in use, said pull connection lying within said chambers.

3. In an electrically heated soldering iron, an expansible and contractable element to be heated which has a bore and a tip; an electric heating coil on said element; a handle having a chamber; a ventilated insulated coupling between said element and said handle and communicating with said bore and said chamber and the atmosphere; a circuit opening and closing device mounted in said handle and including a shiftable operating element; a wire anchored at one of its ends in said bore and connected at its other end to said shiftable operating element; and an electric circuit including said heating coil and said circuit opening and closing device.

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