J. L. & O. G. NILSSON.

SOLDERING TOOL.

APPLICATION FILED JAN. 13, 1908.

929,473. Patented July 27, 1909.

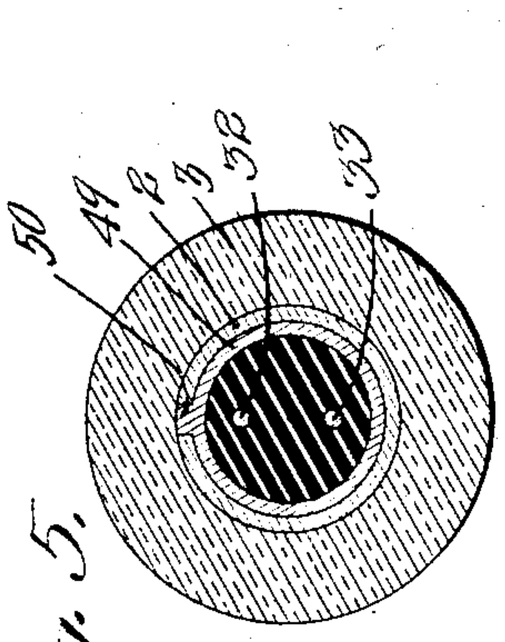

Fig. 5.

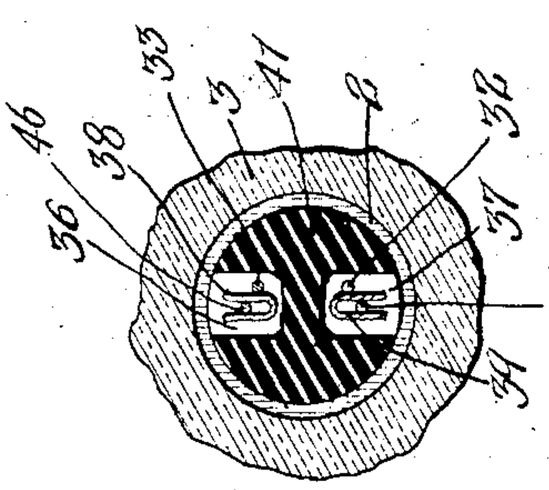

Fig. 6.

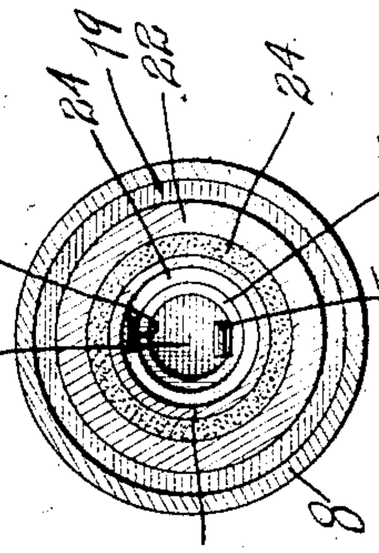

Fig. 4.

Fig. 1.

Fig. 3.

Fig. 2.

Witnesses:
C. C. Olson,
Jno. H. Nelson, Jr.

Inventors
Jno L. Nilsson
Olof G. Nilsson
By. Wemer Peckett & Co.
Attys.

UNITED STATES PATENT OFFICE.

JOHAN LUDVIG NILSSON AND OLOF GUSTAF NILSSON, OF CHICAGO, ILLINOIS.

SOLDERING-TOOL.

No. 929,473. Specification of Letters Patent. Patented July 27, 1909.

Application filed January 13, 1908. Serial No. 410,582.

To all whom it may concern:

Be it known that we JOHAN L. NILSSON and OLOF G. NILSSON, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Soldering-Tools, of which the following is a specification.

Our invention relates to electrically heated soldering irons, and its object is to provide a construction adapted to utilize interchangeably a variety of resistance coils for the purposes of inexpensive repairs or replacements and to adapt the tool to currents of different voltages; to provide means for protecting the joint between the copper tip and casing inclosing coil against the corroding effect of the acid used in soldering; to provide the core and coil with improved electrical contacts; to facilitate separation of the different parts of the tool; to provide means for varying the distance of the hand-grip from the copper tip, or to shorten or lengthen the tool as necessity may require; to provide an improved construction for the heel or rear end of the core upon which the coil is wound, for the purposes of securing strength and at the same time reducing somewhat the conductivity of heat at said end; to provide means at the forward end of the core for the purpose of assisting in the conduction of heat from core to copper tip; to protect the resistance coil, incase it substantially air-tight, and adapt it generally to be freely handled, as a separate part removed from the tool, without danger of injury to the coil and to provide other minor improvements hereinafter referred to.

With the above named objects in view our invention consists in the novel construction, arrangement and combination of parts, hereinafter described in detail, illustrated in the drawing and incorporated in the claims.

In the drawing—Figure 1 is a longitudinal section of a full size tool embodying my invention. Fig. 2 is a similar view of several of the parts separated. Fig. 3 is an enlarged cross section taken on line 3—3 of Fig. 1. Fig. 4 is a similar section taken on line 4—4 of Fig. 1. Fig. 5 is a similar section taken on line 5—5 of Fig. 1. Fig. 6 is a section, partly broken away, taken on line 6—6 of Fig. 1.

Referring in detail to the several views, the body of the tool comprises a tube, handle portion, or piece of gas-piping, 2, a grip 3 slidably mounted on said tube and normally secured thereto against movement by means of an interiorly threaded collar, or chuck, 4,—the opening of which is tapered as shown,—which has threaded engagement with an exteriorly threaded and tapered collar 5 forming a part of the ferrule 6 secured to the grip 3 in any suitable manner.

A steel collar 7 is mounted on the forward end of the tube 2 and this collar is secured to the rear end of a shell 8 within which is what I term a heat cartridge 9. The latter is composed of a copper core 10 upon which is wound a resistance coil 11 and the latter is protected by a copper shell or tube 12. The forward end of the core projects beyond the coil in the form of a threaded nipple 13. Upon this nipple and against the end of the coil 11 is a copper ring 14. This ring, together with the shell 12, is secured against displacement on the core by means of a pin 15 which passes through shell 12, ring 14 and core 10. This separate copper ring 14 is mounted on the core after the threads 16 on its nipple have been cut, which enables the formation of threads so that they will extend fully up to the ring, as shown, and make it possible to screw the butt end of the soldering tip 17 up against the ring 14 very closely. The butt or rear end of the tip 17 has a threaded bore 18 which engages the nipple 13 which conducts the heat to the tip 17 through the walls of said bore 18 while the copper ring 14 carries the heat of the coil and core to the extreme rear end of the tip, or the rim formed by the opening 18.

The outside shell 8 is not threaded directly upon the copper tip 17 for the reason that the acids used in soldering eat into the copper threads and make the joint loose, which not only makes the tip wabbly and unsteady in service, but it also admits the acids to the coil and causes its destruction as well as an insulating film between core and tip. We obviate this difficulty by placing upon the tip 17 a tightly fitting ring 19 which is made of some metal upon which the soldering acid does not act in the above-described manner. Iron and steel will serve very well for the ring 19. With said ring 19 the outside shell 8 has threaded engagement. The forward rim of the ring 19 is beveled as shown at 20 and the beveled portion extends slightly be-

yond the threads on the ring so as to form an annular shoulder 21 against which the forward end of the shell 8 is tightly screwed. The beveled surface is provided to shed the acid away from the joint between the shell 8 and the ring 19.

At the rear end of the coil and core is a thimble 22 and a nipple 23 all in one piece and made out of a metal which is a relatively poor conductor of heat. This thimble and nipple is made out of a solid piece of metal bored out at one end and reduced at the other, as shown. In the recess formed by the bore is mounted a thimble of lava 24 the inner end of the recess in which is of less diameter than the outer end. In the inner or reduced recess is mounted a phosphor bronze contact ring 25 and in the outer or larger portion of the recess is a similar, but larger, ring 26. From the former ring one end, 27, of the resistance coil leads through a suitable perforation in the thimble 22. The larger ring 26 is similarly connected with the opposite end 28 of the coil. The nipple 23 is mounted in an opening 29 in the end of the core and is secured to the core by a transverse pin 30 that passes through both core and nipple.

The tube 2 is filled throughout part of its length with a lava stick 31 in which conducting wires 32 and 33 are embedded. The inner ends of these wires are flattened into contact springs 34 and 35, the former having electrical connection with the outer, or large, ring 26 and the spring 35 having similar connection with the inner and smaller ring 25. These springs, as shown, are curved at their ends so that they shall not stub against the rims of the respective rings when the springs and rings are pushed into contact with each other; thus when the coil is inserted into the shell 8 electrical connection is established automatically between the electrodes of the handle and of the coil. In the outer end of the tube 2 is placed a stick of, preferably, hard rubber insulation in which are oppositely disposed recesses 36 and 37 containing, respectively, a spring clip 38 forming an outer terminus for the wire 33 and a similar clip 39 for the wire 32. A transverse bore 40 in the hard rubber insulation 41 communicates with the recesses 36 and 37 and with a longitudinal bore 42. A pair of wires 42 and 43 lead into the tool through the bore 42 and a knot 45 is formed in these wires to occupy the transverse bore 40, and the free ends thereof, labeled 46 and 47, are engaged by the clips, or clamps, 38 and 39. The knot 45 is larger than the bore 42 and thus prevents pull upon the cord of wires 48 from disengaging the ends 46 and 47 from the clips.

In order to exclude air, gases or vapors from gaining entrance to the interior of the tool, from the handle-end thereof, we provide substantially a hermetic seal between the tube 2 and the insulation 41, which seal consists of a suitable wax ring 49 which is poured into an annular recess around the insulation, through a hole 50 in the tube 2 while the sealing substance is in a fluid state. If for any reason it is necessary to pull out the contents of the tube 2 the seal 49 is liquefied first if its resistance is sufficient to bind the parts together against separation. The other points at which admission of air or fumes might be possible are the joints between the ends of the outer sleeve 8 and the rings 19 and 7. But with the provision of the shoulder 21 and a close fitting of the tube 8 against same this joint is easily made air tight. The ring 7 is provided with a similar annular shoulder 21′ for the same purpose as the shoulder 21. As the grip 3 is made removable from and adjustable upon the tube 2 and the lava and insulation in the tube may be removed therefrom access to the inner parts may be had without having the sleeve 8 removable from the rear ring 7, and the general construction therefore makes it possible to braze the ring 7 and sleeve 8 together, thus leaving only the joint between the tip 17 and between the sleeve or tube 2 and insulation, to be guarded. The latter is simply and effectually accomplished by the molded-in ring 49 and the former by the inclined shedding surface 20, the shoulder 21 and the close contact made possible by the contacting surfaces of the ring 14 and tip 17 as above set forth.

A workman whose duties take him from place to place cannot use the ordinary soldering irons in all places, because the voltage varies on different lines. With the aid of our invention he can use the same tool everywhere by simply providing himself with a few varieties of cartridges 9; that is, resistance coils of varying resistances or numbers of windings. To accomplish the change the tip 17 is simply unscrewed from the shell 8 and the cartridge 9 unscrewed from the tip, a new cartridge firmly screwed in place and the whole inserted in the shell 8. When the tip 17 is turned to engage the threads on collar 19 and sleeve or shell 8 the contacts between the springs 34 and 35 and the phosphor bronze rings 25 and 26 are established and the scraping of the rings against the springs tends to brighten the contacting surfaces, or remove any film or corrosion thereupon tending to interfere with electrical conductivity. The coil 11 is thoroughly protected against being bruised in handling by the shell 12, and is easily guarded against fumes by the construction which provides the ring 14 at one end of the shell and the thimble 22 at the opposite end. As shown in Figs. 1 and 2 the inner edge of the thimble is rabbeted to receive the end of the shell 12 and the parts are driven to-

gether so as to make a completely air and fume tight covering for the coil.

It often happens that it is desirable to vary the reach of the tool, or to vary the position of the grip with respect to the tip, and we provide for this variation by making the grip 3 slidably adjustable upon the tube 2 and then securing it firmly by means of the taper threads on the ring nut 4 and split ring 5 forming an extension of the ferrule.

We claim as new and desire to secure by Letters Patent—

1. In combination, the shell 8, the soldering tip, the handle portion, the wires within said handle portion having their coil contact ends projecting into said shell, and a coil incased by said shell, said coil being removably secured to said tip and having electrodes which automatically slip into electrical connection with said contact ends.

2. In combination, the shell 8, the soldering tip, the handle portion, the wires within said handle portion, the seal in said handle which excludes air from the coil contact ends of said wires, said coil contact ends projecting into said shell, a coil incased by said shell, said coil being removably secured to said tip and having its electrodes arranged to automatically contact with said coil contact ends when the coil is inserted in said shell 8.

3. In a soldering tool, the combination with a resistance coil, its core and contact springs 34 and 35, of a heat transmission ring 14 against the tip 17, a thimble 22 on the rear end of said core and coil, and contact rings 25 and 26 mounted within said thimble 22, said rings being electrically separated from each other and arranged in contact with the wiring in the handle, as set forth.

4. In a soldering tool of the class described, a heat-transmitting ring in combination with the core of the coil, said ring arranged to contact with the butt end of the tip 17 around said core; a heat-resisting member comprising the lava thimble 24 and the means for supporting it upon the rear end of the coil and core, coil terminals within said thimble, and means for removably connecting said coil with the soldering tip and wiring in the handle of the tool.

5. In a tool of the class described, a joint between the tip 17 and shell 8 including the ring 19 interposed between said shell and tip, said ring composed of a material adapted to withstand the action of soldering acids to a higher degree than the metal in said tip.

6. The combination with the copper soldering tip and the shell 8, of the protecting covering 19, on the joint-end of the tip, consisting of steel or iron and having threaded connection with said shell.

7. The combination with the copper tip 17 and the core provided with a threaded nipple and threaded socket joint, of the heat-transmitting copper ring 14 mounted on said core as set forth after formation of the threads on the nipple, whereby said threads may be extended fully up to the ring when same is in place.

8. The combination with the tip 17, the resistance coil and its core, of a shell 8, the joint formed between said tip, core and shell which includes the acid-resisting ring 19 interposed between said tip and shell and the heat-transmitting ring 14 interposed between said coil and tip, said rings arranged closely against said tip to form a closure against acids and fumes, as and for the purpose set forth.

9. The combination, with a tool of the class described, of a separate heat-cartridge 9, a soldering-tip 17, means for separably connecting said tip and cartridge, an acid-resisting ring or band upon said tip, an outer shell 8 having threaded engagement with said ring, and means for loosely or separably connecting said cartridge whereby its resistance coil may receive an electric current through the handle of said tool.

10. The combination with a tool of the class described, of a tip 17, a shell 8, a separate member consisting of a heat-cartridge 9 including a resistance coil, means for separably connecting said tip and cartridge, means for similarly connecting said shell and tip, the latter means including an acid-resisting ring 19 secured to the tip and having threaded engagement with said shell, the contact rings of the coil, heat insulating supports therefor forming a part of said cartridge and consisting of the thimble 24 supporting and separating said rings electrically together with the thimble 22 in which said thimble 24 is held.

11. The combination with a tool of the class described of the separate heating member 9 which consists of a core having a resistance coil wound thereupon and a metal shell surrounding said coil, and closers for the ends of the coil and its surrounding shell which consist of connections with, respectively, the soldering tip 17 and the ends of the coil.

12. In a tool of the class described, the combination of the tube 2, the grip 3 adjustably secured to said tube, the lava stick 31 within said tube, the removable seal 50 and insulation 49 adapted to form an air tight closure for the interior of said tube, the wires 32 and 33 having clips 38 and 39 at one end and projecting contact springs 34 and 35 at their opposite ends, the removable coil having contacts adapted to engage said springs 34 and 35, the shell 8 inclosing said coil, the tip 17 secured to said shell and to the core of said shell removably, and the means for connecting said clips 38 and 39 electrically, which means comprise

the wires 43 and 44 having an irremovably held knot 45 thereon and the loose ends 46 and 47 adapted to engage said clips.

13. The combination with a tool of the class described, of the wires within the handle portion, the ends of said wires being formed into, respectively, the flat spring terminals and the spring-jaw or clip terminals, whereby the feed wire and coil terminals are removably held.

14. The combination with a tool of the class described, of a tubular handle having a pair of conducting wires therein, the ends of which wires are confined within the tool, and means for loosely connecting said ends with the coil terminals and the feed wire terminals, whereby rupture of the wires within the handle of the tool, through twisting or pulling upon the feed wires, is obviated.

15. The combination, with a tool of the class described, of the wires confined within the handle of the tool, the core and coil having terminals which loosely contact with one end of each of said wires, the soldering-head, the shell incasing said core, coil and part of said head for the purpose set forth, and the means, including the knot 45 and spring clips 38 and 39, for removably connecting the loose ends 46 and 47 of the feed wires 32 and 33.

16. In a soldering tool, the combination with the soldering-head and hollow handle, of a core, a coil wound upon said core, a casing loosely containing said core and coil and also incasing a part of said head, the concentric terminals for the coil, the wires within the handle whose ends are in the form of, respectively, spring-jaws, or clips, and flat spring contacts with curved tips, and means for fastening the ends of feed wires to the handle independently of the wires within said handle.

17. The combination with a soldering tool of the class described and its hollow handle, of the wires provided at their respective ends with spring contacts and spring jaws adapted to receive the ends of feed wires, the casing, the core and coil normally contained within said casing and having the coil terminals projecting from the end of the core and slidable against the sides of said spring contacts, the feed wires, means for fastening said feed wires to the handle so that the ends of said feed wires are normally free, and the head having threaded engagement with said core and shell.

18. In combination, the tube 2, the wires 32 and 33, the insulation supporting said wires within the handle or tube 2, the spring contacts formed of the ends of said wires 32 and 33, the core 10 having a coil 11 thereupon, the terminals of said coil consisting of the rings 25 and 26, the shell 8 incasing said core, the head 17 threaded onto said core, said head having a threaded portion covered by said shell and having also an annular shoulder 21 against which the end of said shell abuts, and the means set forth for preventing twisting or pulling of the feed wires out of the handle and for connecting the ends of the feed wires loosely with the ends of said wires 32 and 33.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

JOHAN LUDVIG NILSSON.
OLOF GUSTAF NILSSON.

Witnesses:
J. G. RAESING,
M. C. ALLEN.