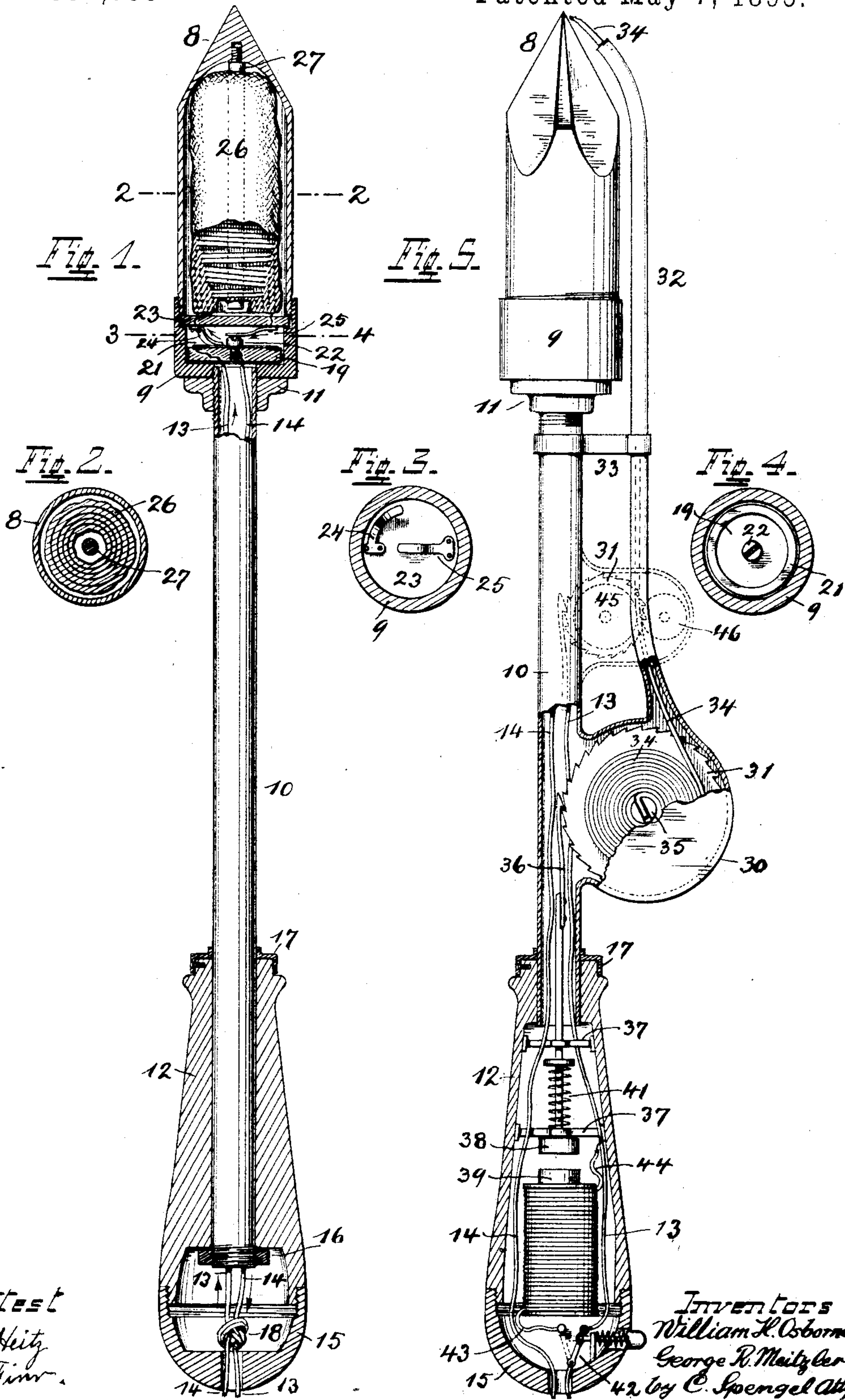


(No Model.)

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ELECTRIC SOLDERING IRON.

No. 538,695.

Patented May 7, 1895.



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# UNITED STATES PATENT OFFICE.

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## ELECTRIC SOLDERING-IRON.

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*To all whom it may concern:*

Be it known that we, WILLIAM H. OSBORNE, residing at Prince's Bay, Richmond county, State of New York, and GEORGE R. MEITZLER, residing at Cincinnati, Hamilton county, State of Ohio, citizens of the United States, have invented certain new and useful Improvements in Electric Soldering-Irons; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, attention being called to the accompanying drawings, with the reference-numerals marked thereon, which form a part of this specification.

This invention relates to improvements in electrically heated soldering irons of the kind where the heat generated by the electric current, while passing through a resistance coil, is utilized to heat the implement. The different features relate to a specially constructed heating-core wherein the wire of the resistance coil is insulated and which receives the heat generated by the latter for transmission by radiation to the tool; to a construction which aids this transmission, to a construction which gives ready access to the heating core, to permit its replacing and convenient re-connection to the electric circuit and finally they relate to an attachment for supplying solder which is operated electrically for the purpose of advancing the latter to the point of the tool where it is used.

In the following specification and particularly pointed out in the claims at the end thereof is found a full description of our invention, its operation, parts and construction, which latter is also illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of an electric soldering-iron provided with our improvements. Fig. 2 is a horizontal cross-section on line 2 2 of Fig. 1. Figs. 3 and 4 are similar views taken on line 3 4 of Fig. 1 and showing the opposite surfaces of said section, Fig. 3 showing the upper and Fig. 4 the lower surface. Fig. 5 is a side elevation, partly in longitudinal section, showing the electrically-operated solder-supplying attachment in position.

8, is the pointed head of the tool of customary shape but preferably cylindrical and hollow. Its inner end is screw threaded and

connects to a correspondingly threaded socket 9, which in turn is screwed to the hollow shank 10.

11, is a lock-nut on the latter and screwing against socket 9, prevents the same from turning on the shank. At its other end this latter has affixed to it the hollow handle 12, through the open rear end of which the current carrying wires 13 and 14, enter. These wires are properly wound and covered with insulating material and of great pliability, so as not to interfere with the manipulation of the tool. This rear-end of the handle consists of a removable cap 15, which permits access to the interior of the handle for the purpose of affixing a nut 16, to the inner end of shank 10, to hold the handle thereon, the front end of the latter being held by a shoulder rigidly affixed to the shank. This removable cap also permits the wire to be knotted as shown at 18, which knot is of a size to prevent it from slipping through the opening in the cap and whereby any strain or pull on the wire is kept from transmission to its interior parts, thereby preventing injury and separation to the interior connections of the wire.

Across the open end of shank 10, and against the bottom of socket 9, rests a disk 19, of insulating material, as hard rubber for instance, in which are embedded a ring 21, and a plug 22, both of metal and forming electrical conductors. The naked ends of wires 13 and 14 are passed through this disk and connect one to ring 21, the other to plug 22. 23, is another similar disk also of insulating material and has affixed to it two metallic tongues 24, and 25, so located thereon that when this latter disk is brought opposite to the other disk, and sufficiently close to it these metallic tongues will come in full contact, the one with ring 21, the other with plug 22. On the other side of disk 23, is the heating core 26, consisting substantially of several concentric coils of fine wire of high electrical resistance, all formed however of one continuous piece of wire, the ends of which pierce disk 23, and connect, one to each of the tongues 24 and 25. As is well understood, the purpose of this fine wire core is to produce, by its resistance to the free passage of the electric current, the heat which is required to heat the soldering iron. The difficulty encountered heretofore in constructing this part in a practical manner for suc-



cessful operation has been to find a material which would sufficiently insulate to prevent short circuits, the volutes of the coils and the coils themselves from each other, and at the same time form a heat-conductor exactly proper for the purpose. It should take up the heat with sufficient readiness, but at the same time retard it in a manner to hold it within the core and prevent its too free radiation. This material consists preferably of powdered calcined soap-stone with a small percentage of lamp-black, held together by a suitable binder, preferably oil and water-glass. If necessary water is added to give it a proper consistency for working. In its plastic state a layer is put around a mandrel and after drying, the formation of the wire core is begun by starting from one end with the winding of the first or inner wire coil. Another layer of the plastic mass is applied over this first coil and after drying the second coil is wound, starting from the end where the first coil was finished and winding back toward the other end. In this manner a sufficient number of coils are added, until the required resistance is obtained, by winding first from one end and then back again to the other, with a layer of the aforesaid mass between each coil and a final outer layer on the outer coil.

The winding is finished in a manner to bring the two wire-ends to the same end of the core, to admit their connection to tongues 24 and 25, for which purpose these ends pierce disk 23. This is all done after the whole is sufficiently dry and has been withdrawn from the mandrel on which it was formed. The so completed core is now inserted within the hollow head 8, into which it freely fits, disk 23, slightly overlapping the inner edge thereof. The head is then screwed into socket 9, until disk 23, rests against a shoulder in the latter, against which it is held in position by the edge of the soldering head. At the same time tongues 24 and 25 have come in contact with ring 21 and plug 22 respectively, so that a complete circuit is now formed, the current passing in on wire 13, to ring 21, to tongue 24, to and through the resistance coils forming part of the heating core 26, out of the latter to tongue 25, to plug 22 and out on wire 14.

The wire forming part of heating core 26, being finer and of higher electrical resistance than the balance of the current-conductors, becomes hot and heats the material which forms the other part of the core which then transmits the heat to the soldering head. To utilize the head of the core as fully as possible a copper or iron core 27, is provided within the hollow space of core 26, which also becomes heated and by being connected to the interior of the soldering point, aids the heating of the same by transmitting its heat to it.

The separable connection of the electric conductors between disks 19 and 23, becomes of advantage when the replacing of core 26, is desired for any purpose. It may be readily taken out and a new one inserted after the

soldering head is unscrewed. The re-establishment of the connection between the electrical conductors presents no difficulties, because tongues 24 and 25, find always their proper positions on ring 21 and plug 22 themselves.

When desired, an attachment to supply solder may be added, which consists of a case 30, connected to or forming part of shank 10. Within it is loosely pivoted a disk 31, and a hollow snout 32 leads from its interior close to the soldering point. This snout is midways supported by a brace 33. The solder is in form of a flat strip 34, which is wound around a post 35, mounted on disk 31, and provided with a split to receive the inner end of the solder-strip, to prevent it from slipping thereon and cause it to rotate with the disk and unwind therefrom. The edge of the latter is provided with ratchet-teeth with which engages the hooked end of a rod 36, which extends back to within the handle where it is guided by cross-pieces 37, 37. The other end of this rod carries an armature 38, which is opposite the end of a magnet 39, from which it is held normally separated by a spring 41, acting against a collar on rod 36. When the operation of this attachment is desired, a spring-actuated switch 42 is depressed by the palm of the hand which holds the tool, said switch then diverting the current through the magnet which now attracts the armature opposite it and draws rod 36, toward it. This causes the hooked end of the latter to rotate disk 31, and the solder to unwind therefrom, which latter now moves out of snout 32 and against the point of the tool. When the switch is released, the magnet is cut out of the circuit again and releases the armature, which with rod 36 is carried forward by spring 41, the hooked end of the rod passing passively over the teeth on the disk and stopping in position for the next operation. While the magnet is thus within the electric circuit of the tool, the current passes through its coil and through short wires 43 and 44, connecting with one of the main-wires. As to wire 44, this connection is permanent while as to wire 43, it is only temporary and completed by the movable arm of switch 42 over which the current passes from wire 13 to wire 43 and through the coil of the magnet. In its other position, the switch simply completes conductor 13, and cuts wire 43 out of the circuit. One of the sides of case 30, should be removable to admit access to it for the purpose of inserting the solder-roll.

Instead of moving the solder as shown, it may be drawn out by two friction rolls 45, 46, the first of which has secured to it the serrated disk 31, with which the hooked end of rod 36 engages in this case. These rollers are located in advance of the case which contains the solder as shown in dotted lines in Fig. 5.

It is our intention to manufacture these tools in different sizes, especially smaller ones suitable for jewelers' use where electrically



heated soldering irons are preferable on account of the greater cleanliness attending their heating.

Having described our invention, we claim as new—

1. In an electrically heated soldering iron, adapted to receive current-carrying conductors and having a hollow soldering head, the combination of a heating core inclosed within the latter, consisting substantially of layers of wire of high resistance, forming part of the current carrying circuit supported and inclosed by a heat-absorbing and conveying mass consisting substantially of calcined powdered soap-stone with a small percentage of lamp-black held together by a suitable binder in which mass the resistance wire is embedded while in its plastic state said mass also supporting the individual layers or bights of the wire in position with reference to the adjoining ones and insulating them from each other.

2. In an electrically heated soldering iron adapted to receive current-carrying conductors and having a hollow soldering head, the combination of an iron heat-transmitting core 27 affixed centrally within the interior of the head, back of the point and with its other free end extending inwardly a hollow heating core 26, consisting substantially of insulated layers of wire of high resistance which form a part of the current-carrying circuit, said heating core occupying the interior of the hollow soldering head and surrounding loosely the iron core 27, with an air space between them.

3. In an electrically heated soldering iron, the combination of a removable hollow soldering head, a heating core for it consisting substantially of insulated layers of wire of high resistance, formed out of one continuous piece, the ends of which protrude at the open end of the soldering head where they are provided with contact pieces, a hollow shank 10, adapted to receive the soldering head and carrying current conveying wires, the ends of which protrude at the open end of the shank where they are also provided with contact pieces, all of which latter are so placed with reference to each other, that when the head is connected to the shank, these contact pieces meet and establish a complete electrical circuit.

4. In an electrically heated soldering iron, the combination of a shank 10, adapted to receive a soldering head and carrying wires forming electrical conductors, the ends of which protrude out of the hollow shank, a disk 19, of insulating material thereat through which these protruding wire-ends pass, a ring 21, and a central plug 22, both forming conductors, embedded in disk 19, and to each of which one of the wire-ends connects, a hollow soldering head adapted to be connected to shank 10, a heating-core within it, consisting substantially of insulated wire of high resistance, a disk 23, of insulating material which receives the ends of the resistance wire which pass therethrough, tongues 24, 25 forming

conductors to which said ends connect, said tongues secured to disk 23 in a position that when this latter is brought opposite disk 19, during the connection of the head to the shank, one of them will come in contact with ring 21, while the other tongue comes in contact with plug 22, whereby the electrical circuit through the tool is completed.

5. In an electrically heated soldering iron, the combination of a hollow soldering head, a heating core therein consisting substantially of insulated wire of high resistance, the ends of which terminate at the open end of the soldering head where they are provided with contact pieces, a hollow shank 10, provided with a screw-threaded socket 9, which is adapted to receive the soldering head, current carrying conductors passing through the hollow shank, their ends terminating in socket 9, where they are provided with contact-pieces, all of these latter so placed, that when the soldering head is screwed into socket 9, they complete the electrical circuit.

6. In an electrically heated soldering iron, the combination of a soldering head, provided with a heating core, a hollow shank with a hollow handle thereon, a removable perforated cap 15, on the end of the latter, current carrying wires passing through shank and handle, knotted at 18, within the latter, such knot being larger than the perforation through cap 15, to prevent exterior strains on the wires from being transmitted to their interior connections.

7. In an electrically heated soldering iron, the combination of a soldering head, a heating core for it, a hollow shank carrying electric conductors and provided with a shoulder 17, a hollow handle on the shank, a nut 16 on the latter and within the hollow part of the handle whereby this latter in conjunction with shoulder 17 is held and confined in position on the shank.

8. In combination with an electrically heated soldering iron, having a soldering head with a heating core for it and a hollow shank and handle, a solder-supplying attachment adapted to carry a rolled strip of solder, a snout 32, for guiding the latter to the point where it is used, a feed-mechanism for moving the solder, a hooked rod 36, provided with an armature and supported in guides in a manner to confine it to a longitudinal movement, a magnet opposite the armature, a spring for holding them normally separated, an electric circuit, and a switch whereby the magnet may be made to form a part of said circuit to render it active to attract the armature for the purpose of reciprocating rod 36, to operate the feed-mechanism which moves the solder.

In testimony whereof we hereunto set our signatures in presence of two witnesses.

WILLIAM H. OSBORNE.  
GEORGE R. MEITZLER.

Witnesses:

C. SPENGEL,  
C. FINN.