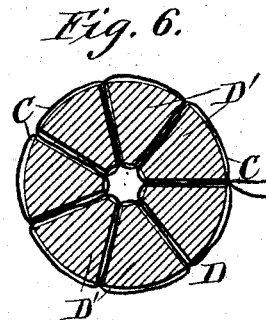
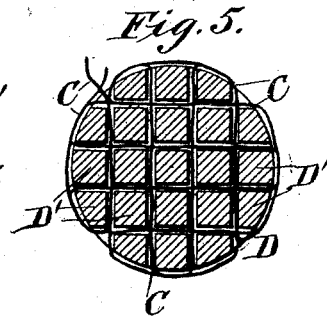
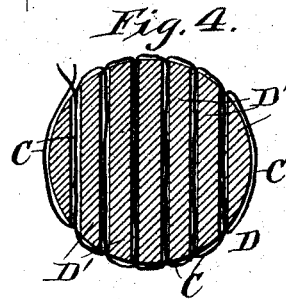
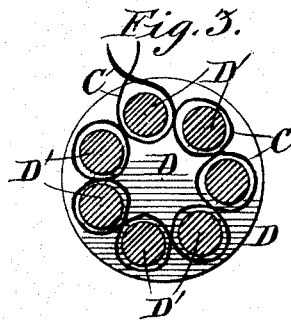
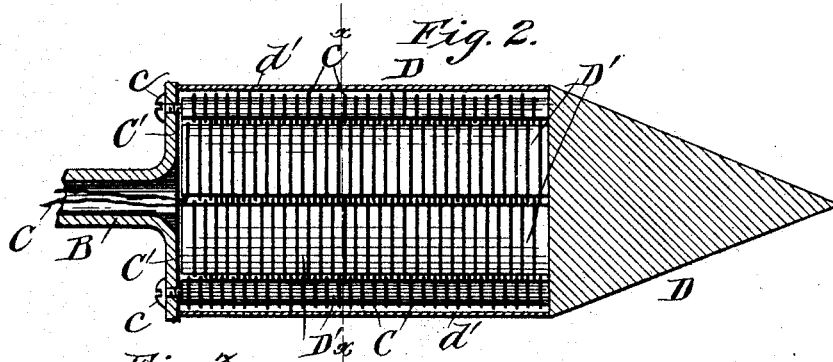
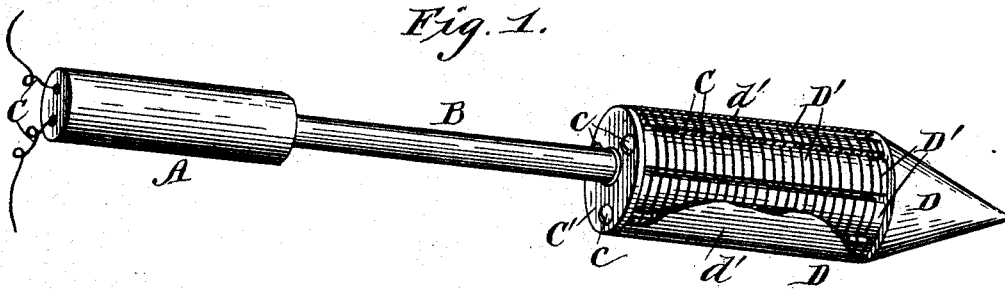


S. B. JENKINS.  
ELECTRICALLY HEATED SOLDERING IRON.

No. 491,311.

Patented Feb. 7, 1893.



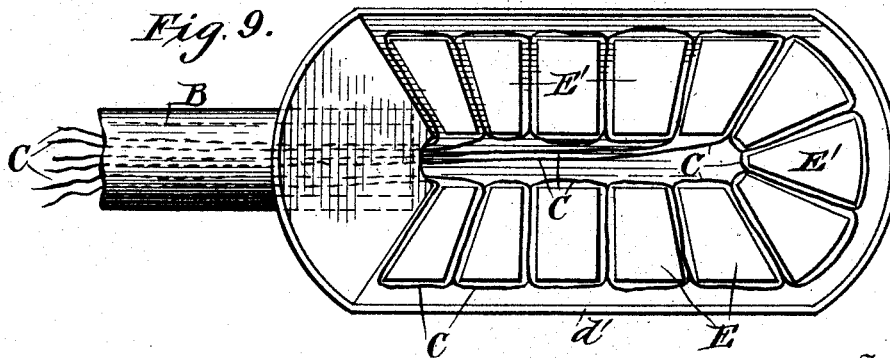
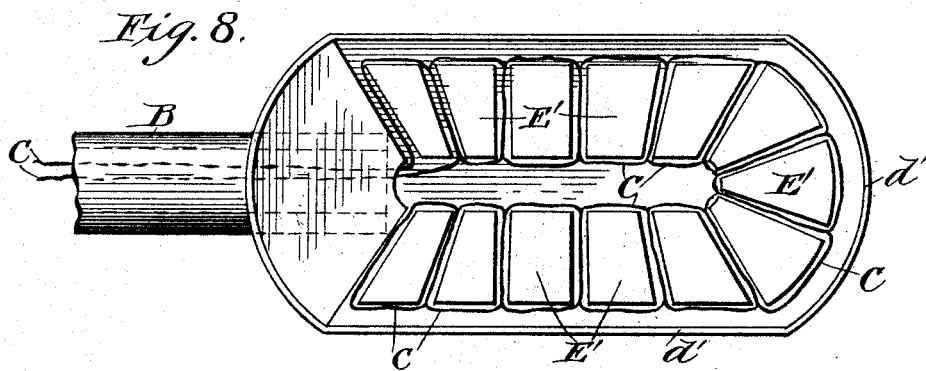
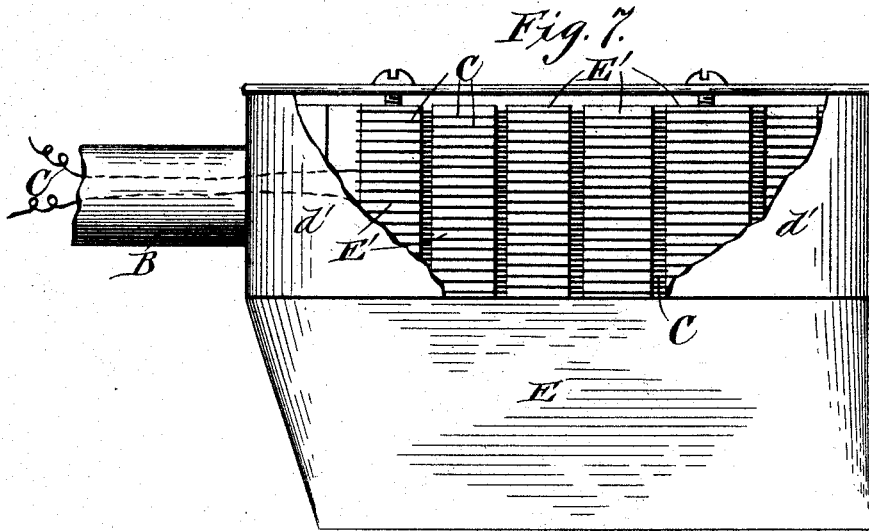
Witnesses  
S. J. Leverance.  
E. J. Bussey.

Inventor  
Samuel B. Jenkins  
by  
Wm. H. Babcock  
Attorney

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Witnesses  
*Everance*  
*E. Hussen*

Inventor  
*Samuel B Jenkins*  
by  
*W. H. Bakrock*  
Attorney

# UNITED STATES PATENT OFFICE.

SAMUEL B. JENKINS, OF BOSTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE AMERICAN ELECTRIC HEATING COMPANY, OF SAME PLACE.

## ELECTRICALLY-HEATED SOLDERING-IRON.

SPECIFICATION forming part of Letters Patent No. 491,311, dated February 7, 1893.

Application filed June 8, 1892. Serial No. 435,927. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL B. JENKINS, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Electric Heaters and Soldering-Irons; and I do hereby 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.

This invention relates to electric heaters having a core or cores and a wire or wires wound thereon, the latter being in electric circuit.

The chief objects of my improvement are to permit the use of a great length of wire, while having every part of it in contact with the core, instead of the said wire being piled in successive layers, compelling the heat from the outer layers to penetrate the inner ones before reaching the core; also to secure the wire or equivalent electrical conductor firmly in place; and finally to provide for conducting the heat generated thereby from the said wire to the surface or point where it is to be applied, without obstruction accumulation or delay. To effect these results, I make use of a core or mass, which in part is divided into, or which is provided with, sub-cores or bars, arranged in proximity to each other, the wire being wound or woven between and around them, not encircling any one bar nor forming any coil or layer which is outside of another, but making a complete system of winding for all. The core may be magnetic or non magnetic; the former being preferred for many heating purposes; but the latter for soldering-irons, which I have chosen to illustrate and describe in this application, as one particularly serviceable embodiment of the invention stated.

My invention also consists more specifically in the construction of the said electrically heated soldering-irons and the combination of the parts and elements constituting the same substantially as hereinafter set forth and claimed.

In the accompanying drawings Figure 1 represents a perspective view of a soldering-

iron, embodying my invention, a part of the exterior casing being broken away to show the sub-cores or bars and the winding; Fig. 2 represents a longitudinal section, on a larger scale, of the operating end of the iron, the bars or sub-cores and the wire wound thereon being shown in elevation; Figs. 3, 4, 5 and 6 represent cross-sections through different forms of the device taken on the line  $x-x$  of Fig. 2; Fig. 7 represents a side elevation, partly broken away, of a heavy hatchet-form soldering-iron constructed according to this invention; Fig. 8 represents a plan view of the same, and Fig. 9 represents a modification having two wires.

A designates the hollow handle and B the tubular stem of the soldering iron these parts being constructed in any convenient way to allow the passage of the ends of the heating wire C out through them from the bars or sub-cores on which it is wound. The said stem is attached to or formed with a disk or plate C', which constitutes the base of the soldering head or point D as shown in Fig. 1. This head or point is also the heating core and provided with a series of rearwardly extending bars or sub-cores D' to which the said disk is fastened by screws  $c$ . These bars may be simply cast as such, with the said point or may be formed by cutting or sawing through, lengthwise a cylindrical rearward extension of the said point; or by cutting or sawing into the center of it from various points of the circumference; or in any other way. They may have individually in cross-section a circular form, as in Fig. 3; or a square form, except the curved outer faces of the outer bars, as in Fig. 5; or that of parallel sections of the circle, as in Fig. 4, with true segments at the side; or that of sectors as in Fig. 6. In short, any suitable form may be adopted. The wire C is woven about these bars passing from one to another and crossing itself as shown in Figs. 3 4 and 6, forming approximately a series of the numeral 8; or it may be wound in any other way, having the same general characteristics of passing from bar to bar without forming coils or successive layers about any. The wire is securely packed between the bars, and no part of it can get

out of place. It constitutes in effect a single helix of great length of wire, every point of which is next to some part of the core and may transmit heat thereto with no loss by absorption or conduction, which must occur when there is intervening material. A shell *d'* of sheet metal surrounds the said bars and the winding of wire.

The hatchet-form soldering-iron shown in Figs. 7 and 8 is constructed in accordance with the same principle as the pointed soldering-iron before described; its solid wedge-shaped lower part E corresponding to the point D, and being provided with upwardly extending bars or sub cores E', corresponding to the bars D' already described. These may have any convenient shape or arrangement as before described and the wire C is wound thereon from bar to bar in the same manner, the bars constituting the warp and the wire the weft of this weaving.

Instead of using a single wire, two or more wires may be employed as shown in Fig. 9 each wire being woven about a different set or part of a set of the bars. Thus the heat may be increased or diminished by sending an electrical current about all of the bars or about a less number only, the several wires being in different circuits or branch-circuits and controlled by any suitable means, for cutting off one or more of them from the source of electricity. The circuits may be arranged in parallel or in series as preferred.

The wire or wires must be insulated by painting coating or in any other convenient manner, to avoid short circuiting; and any other suitable conductor may be substituted for wire.

The length of wire employed will insure sufficient resistance to produce a high degree of heat, and the mass of material in the head or core and its bars or sub-cores will conduct this heat to the point of application without risk of injury to the wire or any other part by over-heating. As every part of the woven wire is in contact with some one of the bars or sub cores, the transmission of heat is very rapid and direct. The wire thus woven is held in place as firmly as if it were part of a fabric, and is not liable to dislodgment by any of the influences which may put out of order helicoidal piles of wire wound in successive layers.

For a soldering-iron, copper or other non-magnetic material of proper hardness and

heat-conductivity will answer very well copper being practically the best; but a heater thus constructed is of course available for many other purposes, and sometimes such a heater will be the better for magnetization, on account of the additional heat of hysteresis, or some convenience in ordinary magnetic action by attraction or repulsion. When desired the core and sub cores may be of soft iron, securing these further advantages. In this case an even number of bars or sub cores should be used and the shell *d'* is preferably dispensed with. But of course the heat-conductivity will be less than with a core of copper. With this latter it is often well to have an uneven number of such bars for the sake of a better appearance. But I do not limit myself in any use or circumstances to any particular number or shape of bars, nor to any particular method of weaving the wire about the bars, nor to the construction of the other parts described and shown.

A soldering iron made in accordance with this invention will be an efficient and durable tool; and as a result of the large amount of wire which can be applied in small space it may be made for any potential up to two hundred and twenty volts without unduly increasing the size.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an electrical heating device, a core provided with a series of bars or sub-cores in combination with a conductor of electricity woven between and around the said bars substantially as and for the purpose set forth.

2. In an electrical heating device, a core of magnetic material provided with a series of bars or subcores in combination with a conductor of electricity woven between and around the said bars substantially as and for the purpose set forth.

3. In an electric soldering iron the combination of a head or point having a series of bars extending rearwardly therefrom with an electric conductor woven about and between the said bars substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL B. JENKINS.

Witnesses:

EDWIN W. PIERCE,  
PELATIAH R. TRIPP.