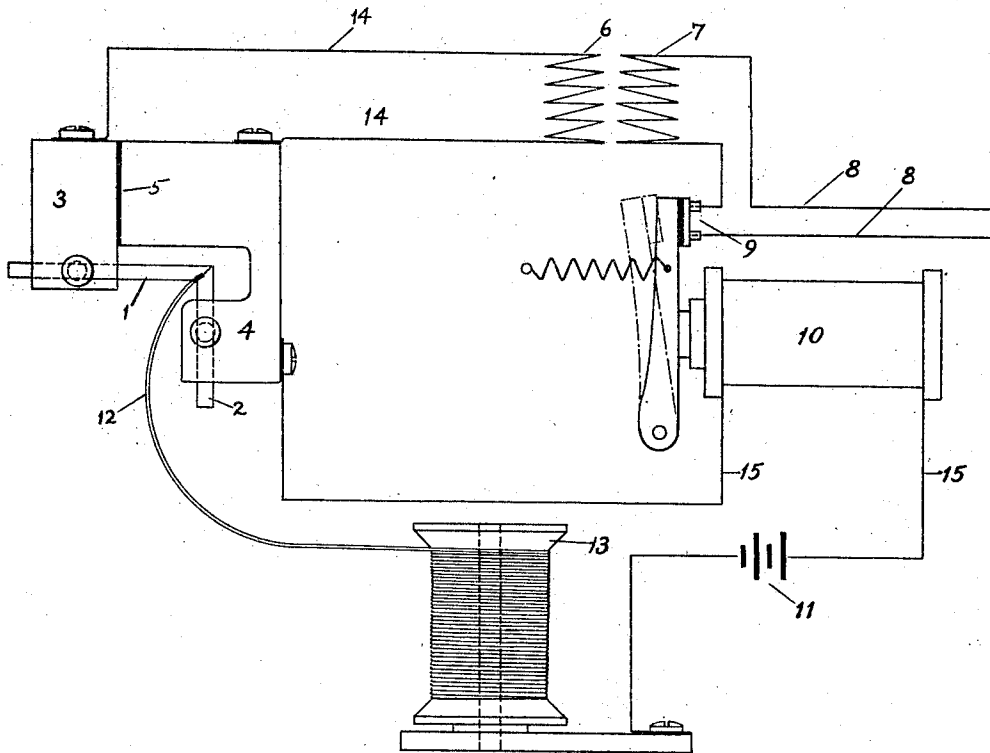


F. A. COSTELLO,
ELECTRICALLY UNITING METALS.
APPLICATION FILED JAN. 3, 1911. RENEWED OCT. 11, 1917.

1,248,812.

Patented Dec. 4, 1917.



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ELECTRICALLY UNITING METALS.

1,248,812.

Specification of Letters Patent.

Patented Dec. 4, 1917.

Application filed January 3, 1911, Serial No. 600,587. Renewed October 11, 1917, Serial No. 196,090.

To all whom it may concern:

Be it known that I, FREDERICK A. COSTELLO, a citizen of the United States, residing at Southbridge, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Electrically Uniting Metals, of which the following is a specification.

My invention relates to an improved method of, and apparatus for, electrically uniting metals.

The invention consists broadly in placing the metals to be united in electrical contact and providing means for controlling the flow of current through the parts to be united by the melting away of the uniting material.

In carrying out my method in its preferable form, I first provide means for clamping the parts to be united so that they may be retained in desired position. I next provide means for electrically connecting the parts to be united and the clamping means when the electric circuit is complete and then provide means for electrically connecting the material which is to be fused to unite the parts in such a manner that when the material which is to be fused is brought into contact with the joint which is to be united, the circuit electrically connecting the clamping means is completed and the portion of the material to be fused which is in contact with the joint will be melted off, thereby breaking the circuit connecting the clamping means and uniting the parts when the fused material solidifies.

In order that the above described method of uniting metals may be carried into effect in an economical and expeditious manner on a large scale, I have devised an apparatus well adapted for my purpose which I will now describe.

Referring to the drawings:

1 and 2 are the parts to be united. 3 and 4 are the clamps for holding the parts to be united. 5 is an insulating strip separating the clamps 3 and 4. 6 and 7 is a step-down transformer whose primary coil is in series with the power supply and relay contacts. The secondary coil is connected to the clamps 3 and 4. 8 are the leads from the source of power. 9 are the relay contacts. 10 is the relay with contact points normally open. 11 is a battery or current supply for operating the relay 10. 12 is the fusing ma-

terial. 13 is a drum or spool of conducting material containing the fusing material and connected to one pole of the battery or source of current supply in the relay circuit. 14 are the leads from the transformer to the clamps. 15 are the leads of the relay circuit.

The parts 1 and 2 which are to be united are held in physical and electrical contact in clamps 3 and 4, respectively, which are insulated from each other at 5. The clamps 3 and 4 are connected to a secondary low voltage coil of a step-down transformer energized through a high voltage primary coil 7 which is in turn energized from the source of power through the leads 8. The primary circuit is opened and closed by a switch at 9 operated by a relay coil 10 energized by a battery or source of current supply 11 electrically connecting the clamp 4 and the material to be fused 12, which is wound on a spool 13 made of conductive material and electrically connected with the relay circuit.

The method of operation is as follows:

The parts 1 and 2 which are to be united are clamped in the clamps 3 and 4 so that their junctions will form an electric contact. At the starting of this operation the switch at 9 is open and the transformer 6 and 7 consequently is receiving no energy. The fusing material 12 is next brought in contact with the parts to be united at the joint whereupon the relay circuit is closed and relay 10 is energized and closes the switch at 9 completing the circuit in the primary coil. This allows the high voltage current to flow through the primary coil 7 of the step-down transformer and induces a low voltage current to flow through the secondary coil 6, the leads 14, the clamps 3 and 4 and the parts to be united 1 and 2. The closing of the fusing circuit causes the temperature of the parts to be united 1 and 2 to be raised to a point sufficient to melt the fusing material 12, causing it to flow into the joint between the parts 1 and 2. This melting away of the fusing material throws it out of contact with clamp 4, thereby breaking the relay circuit through relay 10, which throws out the switch at 9 breaking the primary circuit, thereby allowing the parts 1 and 2 to cool and the fusing material to solidify in the joint between them.

It will be noted that when the circuit is

broken at 9 through the action of the relay 10 the flow of high voltage current through the primary coil of the transformer 7 is cut off which in turn also cuts off the flow of the low voltage current through the secondary coil 6 and consequently stops all further heating or rise of temperature in the parts to be united:

Various changes can be made in the arrangements without departing from the spirit of my invention, I, therefore, do not desire to be strictly limited to the details shown and described.

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

1. An electric soldering apparatus including a secondary circuit, and a supplemental circuit including the solder to control the energization of the secondary circuit.

2. An electric soldering apparatus consisting of a primary circuit, a secondary circuit, and a circuit, including the solder for controlling the energization of the other two circuits.

3. An electric soldering apparatus comprising a primary circuit, a secondary circuit, a switch in one of said circuits, and means independent of said circuit and including the solder for operating the switch.

4. In an electro-soldering device, a secondary circuit, including the objects to be united, a controlling circuit, including the solder for governing the action of the secondary circuit.

5. An apparatus of the class described, consisting of a primary circuit, a secondary circuit, a controlling circuit, including the solder, and means operated by the controlling circuit to open the primary circuit when the solder is melted.

6. An electric soldering apparatus, consisting of a primary circuit, a switch in the

primary circuit, a relay coil operating said switch, a secondary circuit, and means, including the solder, for energizing the relay coil.

7. An electric soldering apparatus, consisting of a primary circuit, a switch in said primary circuit, a secondary circuit in inductive relation to said primary circuit, and a controlling circuit, including the solder, and a relay coil, for operating the switch whereby the relay coil is energized when the controlling circuit is closed.

8. An electric soldering device, comprising a primary circuit, a switch in said circuit, said switch being normally open, a relay coil for operating said switch, a secondary circuit, said secondary circuit including the parts to be united, and a controlling circuit, including the solder, for energizing the relay coil and closing the normally open switch in said primary circuit.

9. An electric soldering apparatus, consisting of a primary circuit, a switch in said circuit, said switch being normally open, a relay coil for closing the normally open switch, a secondary circuit, said secondary circuit including the parts to be united, and a controlling circuit, including the solder, said solder being placed in contact with the parts to be united at the contact of said parts, whereby the melting of the solder will cause the solder to move from said contact, breaking the controlling circuit and opening the relay coil and switch in the primary circuit.

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

FREDERICK A. COSTELLO.

Witnesses:

PITT H. HERBERT,
ROBT. S. CALLENDER.