June 26, 1923. 1,460,137

H. A. MYERS

METHOD OF PLATING METALS

Filed March 6, 1922

FIG-1—

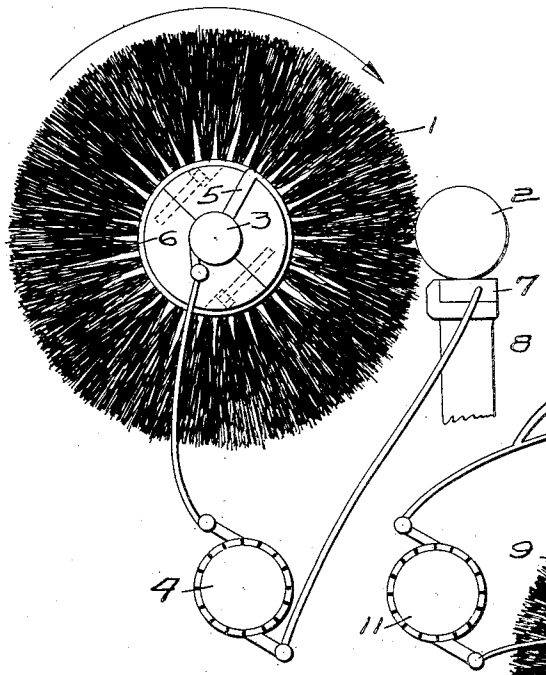


FIG-2—

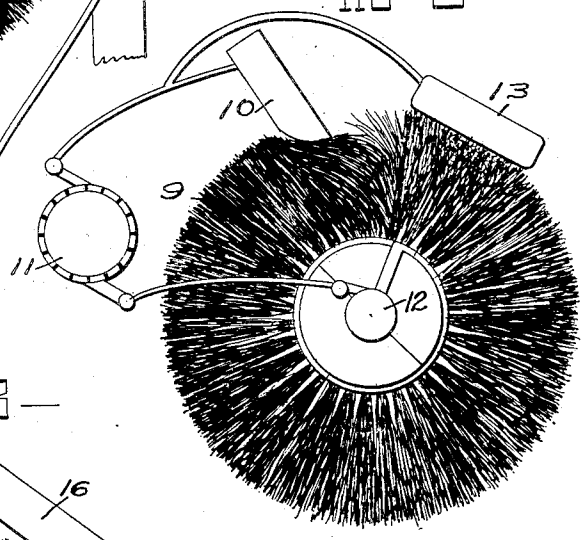
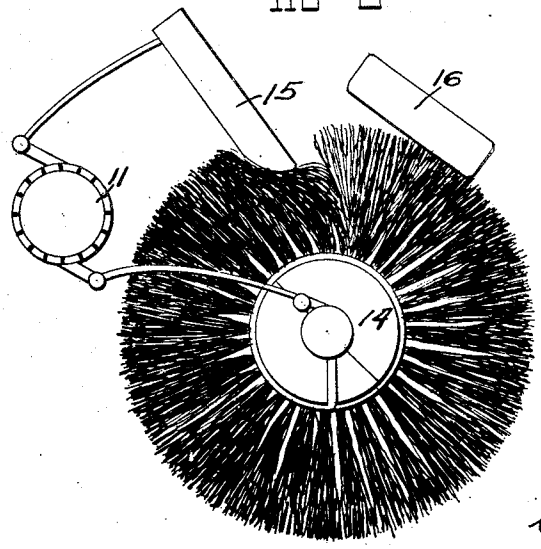


FIG-3—



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UNITED STATES PATENT OFFICE.

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METHOD OF PLATING METALS.

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To all whom it may concern:

Be it known that I, HUBERT A. MYERS, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have made an Invention Appertaining to Methods of Plating Metals; 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, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention has for its object to easily and efficiently metal plate or coat surfaces of bodies. It particularly has for its object to provide a method of plating or coating bodies by melting and welding the plating or coating metal to the surface of the body. The plating or coating metal may be melted in advance of its deposition on the body, or it may be melted during contact of a carrier of the plating or coating metal with the body. In the preferred method of depositing the metal, the metal is continuously melted and at the same time brushed or burnished by the metal carrier while it is continuously, and preferably rotatably, moved over the surface of the body. The plating or coating metal may be heated by any suitable means, as by its own resistance to an electric current, or the resistance of air, as by arcs formed between an electric conductor and the plating or coating metal, or as by both the resistance of the metal and air, such as the contact resistance between a conductor and the plating or coating metal. Preferably the plating or coating metal constitutes a part of the carrier, and the metal of the carrier is welded by an electric current as it is moved on the surface of the body.

The invention may be conducted by means of apparatuses or devices of different forms. To illustrate a practical application of the invention I have shown conventionally two or three arrangements of parts wherein my invention in the method of plating or coating metals may be conducted, and which is described hereinafter.

Figure 1 of the drawings illustrates a disc or cylindrical wire brush having wires formed of the plating or coating metal and located in an electric circuit in which the object to be coated is also connected. Fig. 2 illustrates the apparatus for applying a low melting metal to the object. Fig. 3 illustrates an apparatus for depositing the plating or coating metal on the object and brushing the object while the metal is still in a substantially molten state.

In the figures, 1 is a disc or cylindrical wire brush having wires or strips of the metal that is to be deposited on the object 2 to be plated. The brush may be secured in any suitable manner to a shaft 3 that is electrically connected to a source of current supply, such as that indicated at 4, and is also electrically connected to the wires of the brush in any suitable manner, such as by the bands 5 and 6, the band 6 being placed in contact with the wires. The object 2 is also connected with the source of current supply. It may be connected through a contact 7 that is supported on a suitable standard 8. The contact 7 is suitably insulated and is connected to the source of current supply 4. The circuit through the wires of the brush and the object 2 is completed when the object is placed on the contact 7 and is brought into contact with the ends of the wires 1.

The brush is rotated, preferably, at a high speed, such as 2,000 or 3,000 revolutions per minute. The current through the apparatus may be direct or alternating and may be induced by various potentials. I have found, however, that it is preferable to operate the apparatus with a direct current having a potential of about thirty volts and as the resistance of the circuit is low the amperage will be correspondingly high.

The wires also may be greatly varied in size and may partake of different shapes, cross-sectionally, and may be formed of any material that it is desired to plate the object with, such as brass, nickle, copper, lead, etc. The thickness or diameter of the wire may be that of twenty-five or forty-five B. and S. gauge, the object, however, being to make the wires sufficiently flexible so that they will not unduly scratch or mar the surfaces of the object or the plating. The particles of molten metal formed by the heat produced by the contact resistance is welded onto the surface of the object as the wires are drawn over the surface of the object.

In Fig. 2 is illustrated a modification of the invention wherein the wires 9 of the brush may be formed of a metal having a

melting point above that of the plating metal. They are first passed over a bar or block 10 formed of the plating metal. The wires 9 are connected in the circuit of the source of supply 11 through the shaft 12 in the same manner that the wires 1 are connected to the source of supply. The block 10 is also connected to the source of current supply 11. The current is completed when the block 10 is brought into contact with the wires 9. The metal of the block 10 is melted and is carried by the ends of the wires to the object 13 that is also placed in contact with the ends of the wires. The ends of the wires having received the metal from the object 10, the metal is brushed over the object 13. The object 13 may also be connected to the source of current supply so that the circuit through the wires 9 is also closed through the object 13. Thus the molten metal located on the ends of the wires is deposited and electrically welded to the object 13, as the brush is rotated.

The block 10 and the object 13 may be supported by anv suitable means, the illustration being diagrammatic in character.

In the form of the invention shown in Fig. 3 the wires of the brush 14 also have a melting point above that of the metal with which the object is plated. The block 15 is formed of the metal to be deposited on the object 16 and the block 15 is pressed against the wires as the brush 14 is rotated so as to press the wires of the brush away from the object 16 until they have been drawn from beneath the block 15, whereupon the particles will be deposited by the movement of the ends of the wires against the object 16. At the same time the object 16 may be depressed or placed in contact with the wires of the brush 14, and thus the surface is brushed as the metal is deposited and while the plating metal is still in a molten state. By this means the metal is smoothed over the surface of the object.

I have thus provided a method of producing an exceedingly well finished or polished coating rendered integral with the object, by a simple and efficient method and means, whereby objects of all kinds may be rapidly and easily plated or coated with metal, either for purposes of protection or for decorative or æsthetic purposes.

I claim:

1. The method of metal plating an object, which consists in electrically melting and welding particles of the metal to the surface of the object, and smoothing, by rubbing the surface as the metal is deposited.

2. The method of metal plating an object, which consists in electrically melting and welding particles of the metal to the surface of the object, and brushing the surface of the plating as the metal is deposited.

3. The method of metal plating an object, which consists in electrically melting and welding particles of the metal from the ends of a plurality of closely positioned wires onto the surface of the object.

4. The method of metal plating an object, which consists in electrically melting and welding particles of the metal from the ends of a pluralitv of closely positioned wires onto the surface of the object, and moving the ends of the wire over the surface of the object.

5. The method of metal plating an object, which consists in electrically melting and welding particles of the body having the metal while the body is in contact with the surface of the object, and drawing the body over the object while maintaining continuous contact therewith.

6. The method of metal plating an object, which consists in electrically melting and welding particles of the body having the metal while the body is in contact with the surface of the object, and drawing the body over the object while maintaining continuous contact therewith, and as the metal is deposited on contiguous areas of the object.

7. The method of metal plating an object, which consists in melting the metal by resistance to an electric current as the metal is smoothed over the surface by continuous contact with the object of a body containing the metal and moving over the object.

8. The method of metal plating an object, which consists in melting the metal of a metal brush by resistance to an electric current as it is brushed on the object.

9. The method of metal plating an object, which consists in melting the metal of a metal brush by the resistance of contact between the metal and the member, and brushing the metal over the object by the brush.

10. The method of metal plating an object, which consists in melting the plating metal by the resistance of contact of the ends of a plurality of closely positioned wires, and depositing the metal on the object.

11. The method of metal plating an object, which consists in melting the plating metal by the resistance of contact of the ends of a pluralty of closely positioned wires, and smoothing the metal over the surface of the object.

12. The method of metal plating an object, which consists in melting the plating metal by the resistance of contact of the ends of a plurality of wires moving over the object, and conveying it by the wires to and over the surface of the object.

13. The method of metal plating an object, which consists in melting the plating metal by the resistance of contact of the ends of moving wires, and conveying it by the

wires to and over the surface of the object, and maintaining the temperature of the metal by the resistance of contact of the wires with the object.

14. The method of metal plating an object, which consists in melting the metal at the surface of the body containing the metal and smoothing the metal over the surface of the object by movement of the body against and over the surface of the object.

15. The method of metal plating an object, which consists in electric melting and welding particles of the metal of a wire brush to the surface of the object while the wires of the brush are drawn over and in contact with the surface of the object.

In testimony whereof, I have hereunto signed my name to this specification.

HUBERT A. MYERS.