No. 875,784. PATENTED JAN. 7, 1908.

S. O. COWPER-COLES.

APPARATUS FOR THE MANUFACTURE OF COPPER ELECTROTYPES.

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Fig. 1.

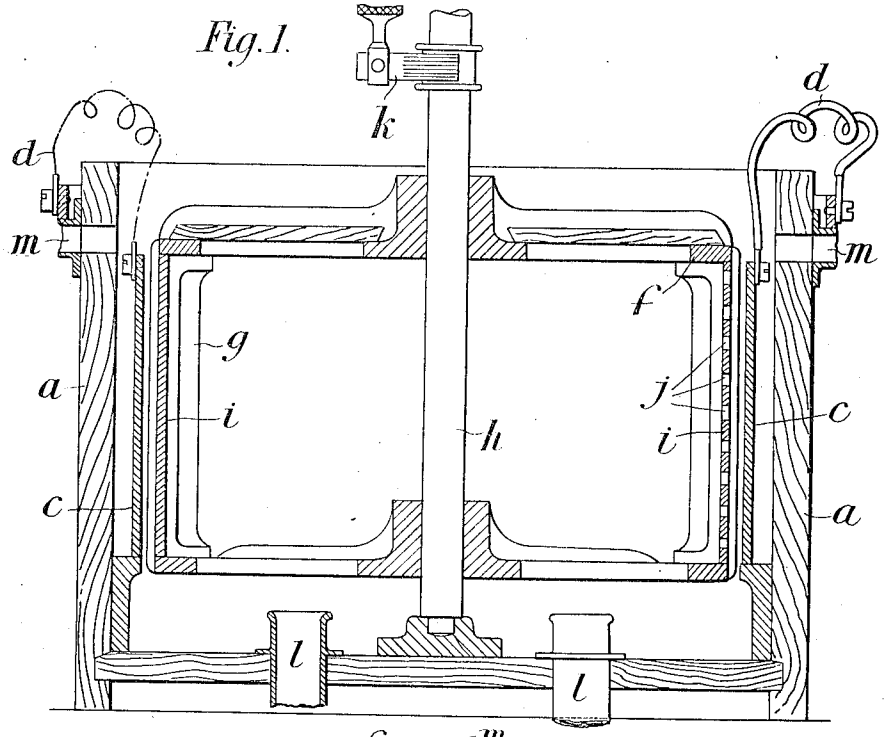
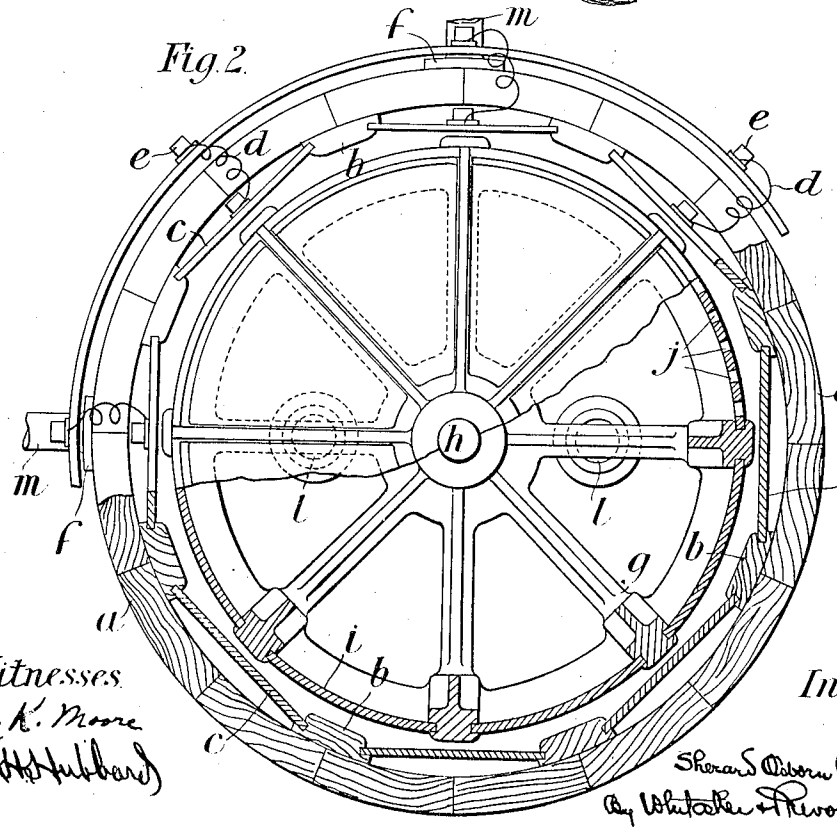



Fig. 2.




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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR THE MANUFACTURE OF COPPER ELECTROTYPES.

No. 875,784. Specification of Letters Patent. Patented Jan. 7, 1908.

Application filed March 5, 1906. Serial No. 304,324.

*To all whom it may concern:*

Be it known that I, SHERARD OSBORN COWPER-COLES, a subject of the King of Great Britain, residing at Grosvenor Mansions, Victoria street, Westminster, London, England, have invented new and useful Improvements in Apparatus for the Manufacture of Copper Electrotypes, of which the following is a specification.

This invention has for its object a method and means for rapidly producing electrotypes or copper shells for printing or other purposes.

According to my invention I make use of a vat preferably circular and the interior of which is fitted with a framework of wood or other suitable material adapted to receive the trays or cases filled with wax or other suitable composition forming the cathodes upon which the impressions are made for electro-typing. A frame is suspended in the center of the vat in such a manner that it can be rotated, the said frame carrying the anodes of the metal which it is desired to deposit, and being advantageously perforated to permit of the free circulation of the electrolyte or set at an angle with open spaces between. The electrolyte is introduced through the bottom or center of the vat by means of a pump and is projected by centrifugal force into the molds on which the metal is to be deposited so as to remove any air bubbles that may be retained in the recesses thereof. In order to free the electrolyte from suspended matter it is also advantageously forced by the pump through a filter.

To enable the invention to be fully understood I will describe it by reference to the accompanying drawings, in which:—

Figure 1 is a vertical section of apparatus for manufacturing copper electrotypes constructed according to the invention. Fig. 2 is a sectional plan view thereof.

*a* is the vat which is shown of circular form and *b* is the interior framework of wood with which the said vat is furnished, this framework serving to receive the cathodes *c*, *c*; the cathodes are connected by means of the wires *d* to terminals *e* upon insulating brackets *f* mounted upon the outside of the vat *a*.

*g* is the frame which is suspended within the vat *a* upon the central vertical shaft *h* adapted to be rotated by any suitable means and *i*, *i* are the anodes carried by the said frame *g*. These anodes, which are arranged vertically within the frame *g*, are provided with perforations *j*, *j*. Current is supplied to the anodes *i* from the central shaft *h* to which current is furnished by the brush *k*.

*l*, *l* are two (or more) inlet pipes extending up through the bottom of the vat *a* and through which the electrolyte is supplied to the said vat from a pump; the said electrolyte may, as above described, be forced by the pump through a filter before entering the vat *a*.

*m*, *m* are over-flow pipes for the electrolyte from the vat *a*.

The apparatus operates as follows, that is to say, the electrolyte is pumped into the vat *a* through the inlet pipes *l*, *l*, and the frame *g* carrying the perforated anodes *i* is rotated by the upright shaft *h* so that the electrolyte entering the bottom of the vat is forced up into the revolving frame *g* and is projected by centrifugal force through the perforations *j*, *j* in the anodes *g* and is thus caused to sweep rapidly over the whole of the surface of the cathodes *c*, *c* on which the metal is to be deposited, thereby removing any air bubbles that may be retained in the recesses thereof. By causing the electrolyte to circulate in this way not only are all air bubbles removed from the cathodes, as above described, but copper shells are produced free from pin holes at a rapid rate and at a current density varying from 500 to 1000 amperes or more per square foot.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In an apparatus for the electro-deposition of metal the combination with a vat for containing an electrolyte, of a cathode and a perforated anode mounted in said vat and means for continuously forcing the electrolyte through the perforations in the anode perpendicularly toward and against the face of the cathode, substantially as described.

2. In an apparatus for the electro-deposition of metal, the combination with a vat for containing an electrolyte, of a substantially cylindrical cathode stationarily mounted in said vat and a substantially cylindrical and perforated anode rotatably mounted in said vat whereby said electrolyte is agitated, substantially as described.

3. In an apparatus for the electro-deposition of metal, the combination with a vat provided with inlet and outlet ports for an electrolyte, said electrolyte being under pressure, of a cathode stationarily mounted

in said vat, a perforated anode rotatably mounted in said vat and means for rotating said anode, substantially as described.

4. In an apparatus for the electro-deposition of metal, the combination with a vat for containing an electrolyte, of cathodes, means for supporting said cathodes in a substantially cylindrical form in said vat, a frame revolubly mounted in said vat and anodes mounted on said revoluble frame in a substantially cylindrical form, substantially as described.

5. In an apparatus for the electro-deposition of metal, the combination with a vat provided with inlets and outlets for an electrolyte, said electrolyte being under pressure, of cathodes, means for supporting said cathodes in a substantially cylindrical form in said vat, a frame revolubly mounted in said vat, and perforated anodes mounted on said revoluble frame in a substantially parallel form, substantially as described.

SHERARD OSBORN COWPER-COLES.

Witnesses:

WILLIAM JOHN MEEKS,

PERCY READ GOLDRING.