(No Model.)

M. G. FARMER.

ELECTROLYTIC APPARATUS FOR FORMING COPPER INGOTS.

No. 426,789. Patented Apr. 29, 1890.

Fig. 1

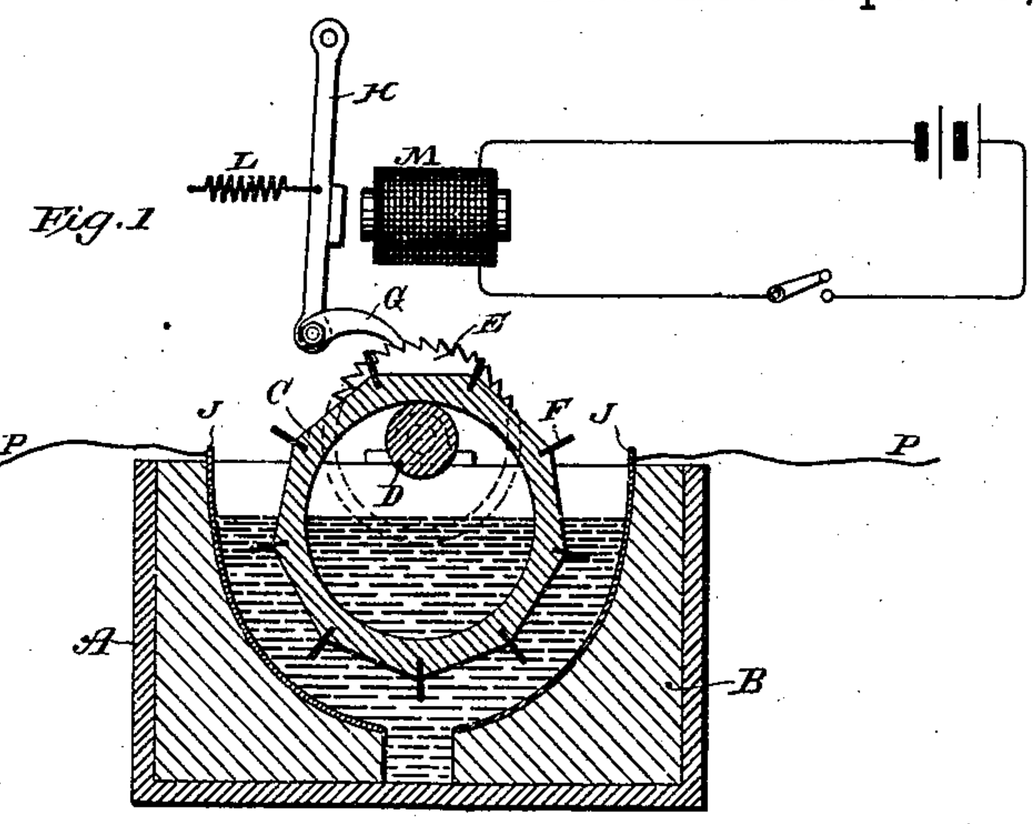


Fig. 2

Fig. 3

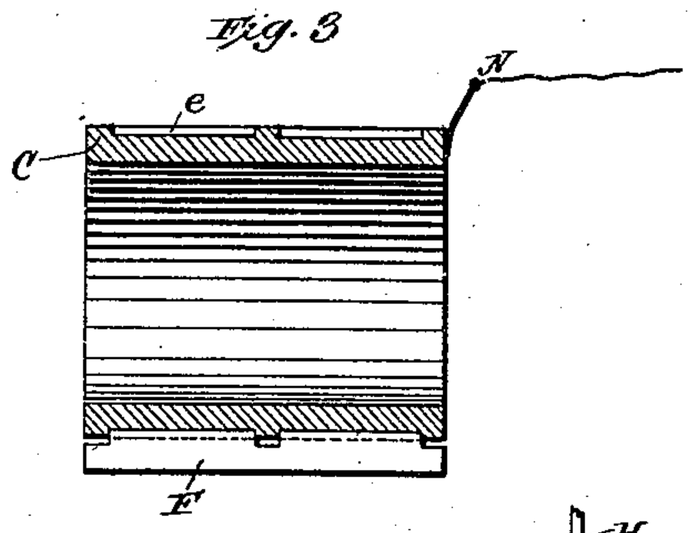
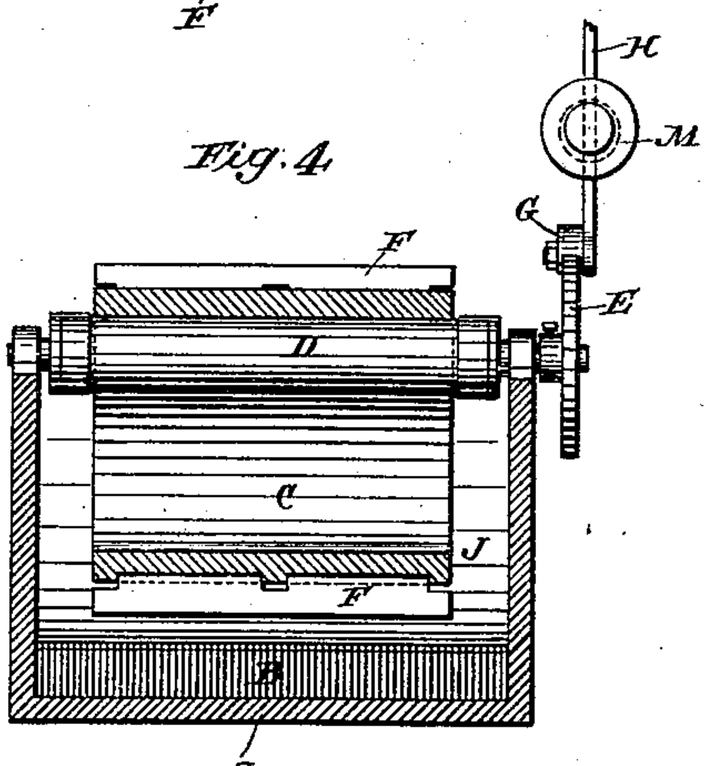


Fig. 4



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UNITED STATES PATENT OFFICE.

MOSES G. FARMER, OF ELIOT, MAINE.

ELECTROLYTIC APPARATUS FOR FORMING COPPER INGOTS.

SPECIFICATION forming part of Letters Patent No. 426,789, dated April 29, 1890.

Application filed July 29, 1889. Serial No. 318,993. (No model.)

To all whom it may concern:

Be it known that I, MOSES G. FARMER, a citizen of the United States, residing at Eliot, in the county of York and State of Maine, have invented certain new and useful Improvements in Electrolytic Apparatus for Forming Copper Ingots, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

This invention is an improvement in electrolytic apparatus for the deposition of copper ingots from copper matte or impure copper, and comprises one or more stationary anodes and a revolving cathode of approximately cylindrical form.

The improvements which form the subject of this invention reside in the following features: In lieu of using a cathode with a true cylindrical surface, I form the said cathode with a polygonal depositing-surface and employ insulating-divisions between the several facets, so that square ingots of copper will be formed thereon. I also provide for the deposition of connecting-bands between the several ingots, whereby they are held together and to the surface of the cathode. I further provide for an intermittent movement of rotation of the cathode, employing for this purpose an electro-magnetic step-by-step device for imparting such movement to the cathode.

In the accompanying drawings I have illustrated the essential details of the construction of my improved apparatus. Figure 1 is a vertical cross-section of the complete apparatus. Fig. 2 is a detached view of one of the insulated divisions above referred to. Fig. 3 is a central longitudinal section of the cathode. Fig. 4 is a longitudinal section of the apparatus.

A is the tank or vat, such as is commonly used in apparatus of this kind.

J J are the anodes of impure copper, preferably bent to conform generally to the shape of the cathode. These anodes I sometimes support upon blocks B B, which are of insulating material and serve to fill up the spaces in the tank A.

Above the surface of the solution is mounted a roller D and upon this is supported the cathode. This cathode is generally cylindrical in shape, and is cast or otherwise built up of an alloy of lead and antimony. The interior surface of this cylinder or hoop, which rests upon the roller D, is trued by turning to a smooth cylindrical face. The exterior surface of the hoop is polygonal in shape and may have any desired number of facets. Along the angles or divisions between the several facets of the exterior surface grooves *e* are formed, into which strips of wood or other insulating material F are inserted when the device is to be used. The copper will be deposited upon this cathode C in the form of independent ingots approximately square; but in order to avoid the liability of any of the ingots stripping off from the cathode I form notches *c c* at the ends of the strips F, and generally a central notch *d*, so that when the strips F are inserted in the grooves in the cathode C the connection between the metallic surfaces of the several facets of the polygonal cathode will be connected by the metal under the notches in the strips F. The ingots deposited on the cathode will therefore be connected by strips or bands of copper deposited under or through the notches *c d*. The ingots may readily be separated by cutting these strips. If desired, the grooves *e* may only extend along such portions of the cathode as it is desired to insulate, as indicated in Fig. 3. The portions of the cathode which are not to receive a metallic deposit are coated with insulating material, as is usually done. In order to include the cathode in the circuit, one of its ends may be left bare, and a brush or strip N, forming one terminal of the generator-circuit, caused to bear thereon. The other wires of the circuit P P are connected to the anodes. I prefer to impart to this cathode a slow intermittent movement, for which purpose I secure to the axle of the roller G a ratchet-wheel E. In connection with this wheel I employ a pivoted armature H, having a retractile spring L and carrying a pivoted pawl G, that engages with the teeth of the ratchet. This armature I move by an electro-magnet M, the circuit of which may be closed at desired intervals by hand or by any well-known form of automatic circuit-closer.

By this apparatus I am enabled to produce economically and easily pure copper ingots

of better shape for transportation and commercial uses than in the ordinary way, and by adapting the construction of cathodes herein described to the revolving form of cathode I secure all the advantages of the latter.

It will be understood that the surfaces of the cathode which are not designed to receive a deposit are insulated in the usual manner.

What I claim is—

1. In an electrolytic apparatus, the combination, with the anodes supported in a solution in a tank or vat, of a revolving cathode mounted in said solution, the exterior surface of said cathode being polygonal or made up of a number of plain facets.

2. The combination, with the anodes, of a hollow cathode-hoop having a cylindrical interior and polygonal exterior surface, a roller above the solution upon which the cathode is hung, and means for turning the roller, as set forth.

3. The combination, with a cathode having a polygonal exterior surface and provided with insulating-divisions at the angles of said surface, of means for supporting the cathode in the solution, and an electro-magnetic step-by-step motor for imparting motion to the cathode through its supports, as set forth.

4. The combination, with a cathode having a polygonal exterior or depositing surface, of insulating-strips fitted into grooves formed along the angles of the said surface and separating the plane faces of the cathode, as set forth.

5. The combination, with a cathode having a polygonal exterior or depositing surface, of insulating-strips fitted into grooves along the angles of said surface and formed with notches exposing for deposition portions of the cathode between the several faces, as described.

6. The combination, with a hollow cathode having a cylindrical inner and polygonal outer surface, of insulating-strips formed with notches and fitted into grooves in the outer surface of cathode and dividing said surface into separate depositing-surfaces, as set forth.

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