

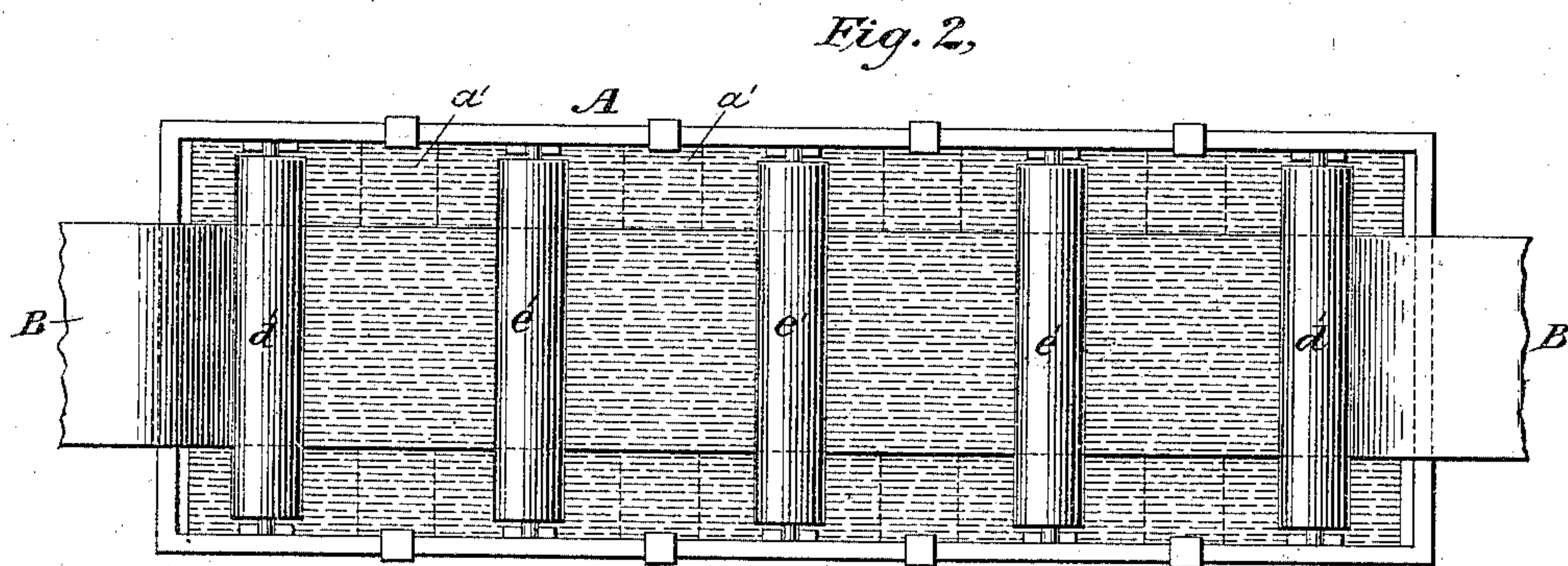
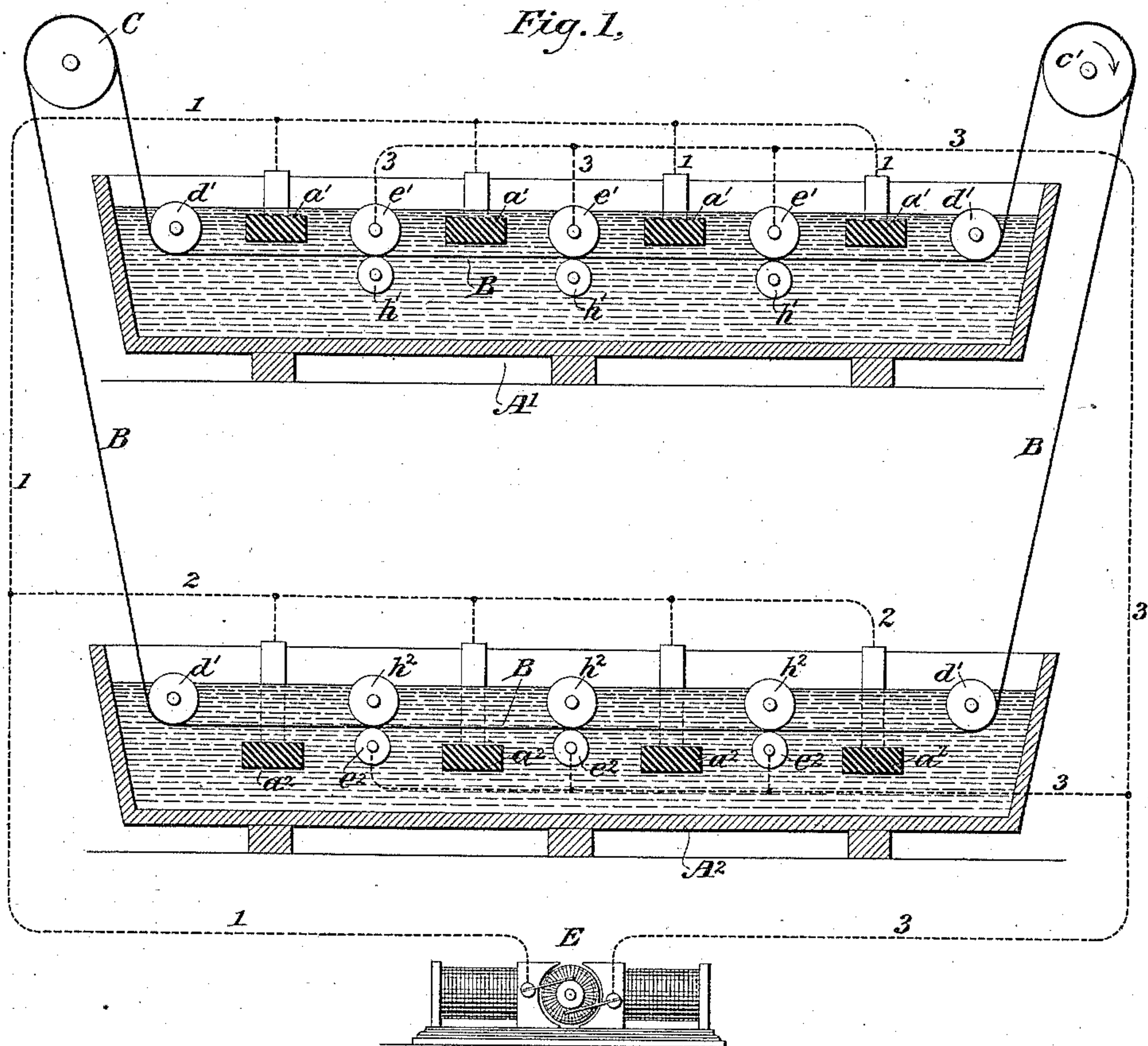
(No Model.)

M. G. FARMER.

APPARATUS FOR FORMING SHEET METAL BY ELECTRO DEPOSITION.

No. 335,905.

Patented Feb. 9, 1886.



Witnesses

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APPARATUS FOR FORMING SHEET METAL BY ELECTRO-DEPOSITION.

SPECIFICATION forming part of Letters Patent No. 335,905, dated February 9, 1886.

Application filed June 13, 1885. Serial No. 168,637. (No model.)

To all whom it may concern:

Be it known that I, MOSES G. FARMER, a citizen of the United States, residing in New York, in the county and State of New York, have invented certain new and useful Improvements in Apparatus for Forming Sheet Metal by Electro-Deposition, of which the following is a specification.

My invention relates to an organization of apparatus for depositing copper and other metals by electrolysis upon a continuous band-cathode, from which it may be removed when of sufficient thickness in sheets; and it is then rolled or otherwise treated for the purpose of giving it the desired form and character.

The invention consists in organizing the apparatus in substantially the following manner: A continuous sheet or belt of conducting material—such, for instance, as brass—is employed for the cathode of an electro-deposition plant. This extends over suitable rollers or drums, one or more of which are driven by steam or other convenient force, and serve to carry the band in a horizontal direction through one or more deposition-vats in succession. Preferably two of these vats are employed. The positive pole of a battery or other suitable source of electricity is connected with a series of strips or plates of the metal to be deposited in each vat. These plates extend in proximity to the cathode-band as it is passing through the corresponding vat. The negative pole of the battery is connected with a series of conducting-rollers, against which the cathode presses as it is passing through the vat. The metal is dissolved from the anode-plates, and taken up by the electrolyte employed, and from that it is deposited upon the cathode. The cathode is passed, respectively, through the vats, and each time receives an additional deposit until the required thickness is attained.

It has been proposed to obtain thin metallic foils by depositing metal upon a suitable vehicle, and then dissolving off the vehicle, and it has also been proposed to galvanize wire by passing lengths of it through deposition-vats and giving it a single coating; but these processes and the apparatus employed therefor differ from that set forth herein.

In another application of even date herewith, Serial No. 168,638, there is shown and

described an apparatus for forming wire by electro-deposition, in some respects resembling that described herein. In that application, however, anode-plates are placed both above and below the wires upon which the deposition is being made.

In the accompanying drawings, illustrating the invention, Figure 1 shows in vertical section an arrangement of two vats, and Fig. 2 is a plan of one of the vats.

Referring to the drawings, E represents any source of electricity—such, for instance, as a dynamo-electric generator; and A' and A² represent two shallow vats in which the electro-deposition is to take place. Across the vat A' there extends a series of bars or plates, a', and likewise a series, a², extends across the vat A². These plates are composed of the metal to be deposited, and constitute the anodes. The positive pole of the battery is connected with the series of conducting-rods a' in the vat A' by a conductor, 1, and with the series a² in the vat A² by the conductor 2. A continuous belt or band, B, of conducting material—such, for instance, as brass or copper—is designed to be passed in a horizontal direction through the vats in proximity to the conducting-plates a'. One side of this belt is preferably coated with a varnish or shellac of non-conducting material, while the other surface is exposed. The belt passes over a drum, C, which may be driven in the direction indicated by the arrow by any suitable force, and it also passes around suitable guiding rollers or wheels, c' c'. Suitable additional rollers, d' d', are employed at the respective ends of the vats, for causing the band to dip into the electrolyte, which it is designed shall be contained in the vat. The electrolyte consists of any suitable solution of copper or the other metal, such as is ordinarily employed in electroplating. In passing through the vat A' the band passes beneath the series of plates a', and its uncoated surface is thus presented to the plates. A series of contact-rollers, e', rest against the upper surface of the band in this vat, and these rollers are connected by a conductor, 3, with the negative pole of the generator E. Suitable supporting-rollers, h', hold the band as it passes through the vat in contact with the rollers e. The rollers e are preferably placed at points between and slight-

ly below the respective anode-plates a' , and they are located at such a sufficient distance therefrom that the greater portion of the current from the generator will pass across from the anodes to the band rather than to the rollers directly. The rollers are of conducting material, and will necessarily become coated to some extent with a deposit of copper or other metal, and thus gradually their size will be increased; but this deposit may be removed as often as is necessary. The band cathode in passing over the rollers enters the vat A^2 with its exposed side beneath and its coated or insulated surface upon the upper side, and is held down by suitable guide-rollers, h^2 , against the contact-rollers e^2 . These latter rollers support the band cathode, and are located upon a higher plane than the anode-plates a^2 . The anodes are beneath the band in this vat.

The connection of the band cathode with the negative pole of the battery is preferably made, as described, through the rollers in the vat, so that the resistance will be as small as possible; but the connection might of course be made with the band outside the vats.

The vats may with convenience be constructed about twenty feet in length and two feet in width and, say, six inches in depth, and the band is moved over them continuously, receiving each time it passes through the vats a slight additional deposit. After a sufficient treatment the metal is stripped from the band in a continuous sheet in length equal to the length of the band. It is then rolled out or otherwise treated as may be required.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, with a source of electricity, of an endless-band cathode, an electrolytic vat, means for causing said cathode to pass, a portion at a time, through the vat in a horizontal direction, a series of anode-plates located upon one side of the band and connected with the positive pole of the generator, and contact-rollers resting against the surface of the cathode presented to the anode-plates and connected with the remaining pole of the battery.

2. The combination, substantially as hereinbefore set forth, with a continuous-band cathode, of one or more electro-deposition vats, means for passing said band cathode, a portion at a time, continuously through said vat or vats in a horizontal direction, and means for depositing metal upon said cathode during its passage, substantially as described.

3. The combination, substantially as hereinbefore set forth, with a source of electricity and a constantly-advancing cathode consisting of a continuous belt of flexible conducting metal, of one or more deposition-vats, a series of contact-rollers in each vat connected with one pole of said generator, and resting against said band, and causing the same to pass continuously through the vat a portion at a time, and a series of anode-plates extending across said vat or vats and connected with the other pole of said generator.

4. The combination, substantially as hereinbefore set forth, with a cathode consisting of an endless band of conducting material having one side coated with a non-conducting material, of one or more electro-deposition vats, means for passing said band, a portion at a time, horizontally through said vats, a source of electricity, means for connecting one pole of said source with said band, and a series of anodes placed in each vat and connected with the other pole of said source of electricity.

5. The combination, substantially as hereinbefore set forth, with two deposition-vats and a series of anodes in each vat, of a band-cathode coated upon one side with a non-conducting material, and means for passing said cathode through said vats above the anodes in one vat and below the anodes in the other vat, and with its conducting-surface toward the anodes in each vat, substantially as described.

In testimony whereof I have hereunto subscribed my name this 3d day of June, A. D. 1885.

MOSES G. FARMER.

Witnesses:

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