

(No Model.)

E. EMERSON.

APPARATUS FOR FORMING SHEET METAL BY ELECTRO DEPOSITION.

No. 371,256.

Patented Oct. 11, 1887.

Fig. - 1.

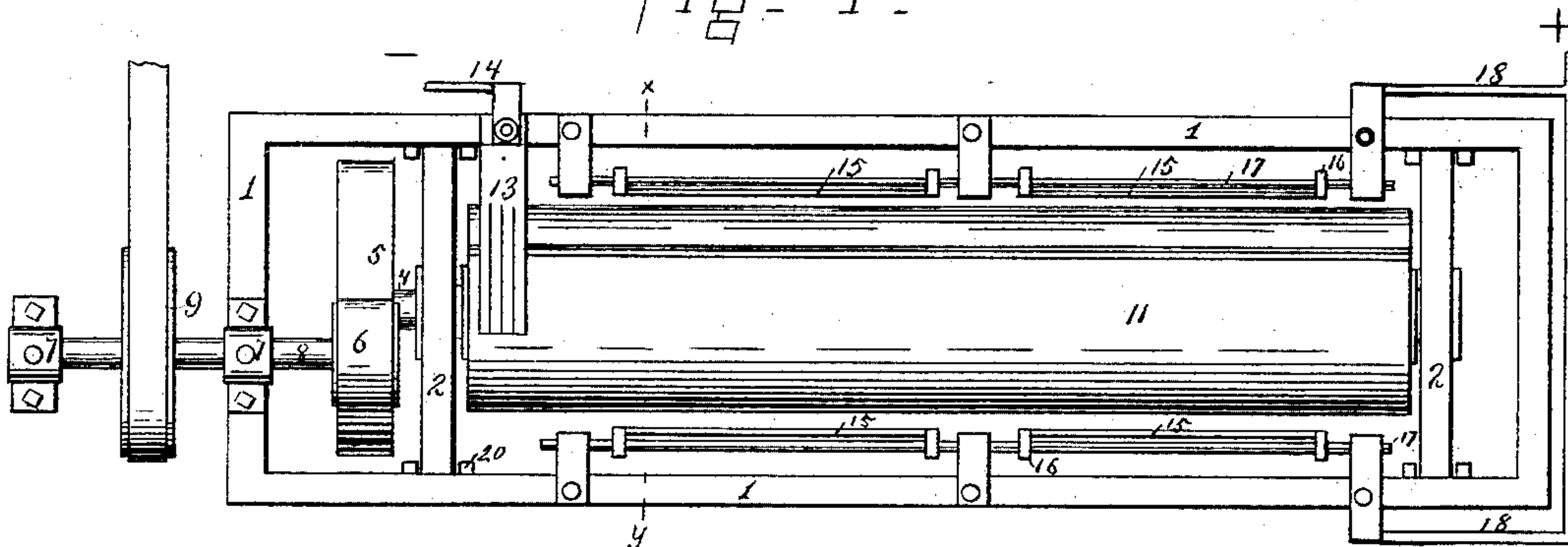


Fig. 2.

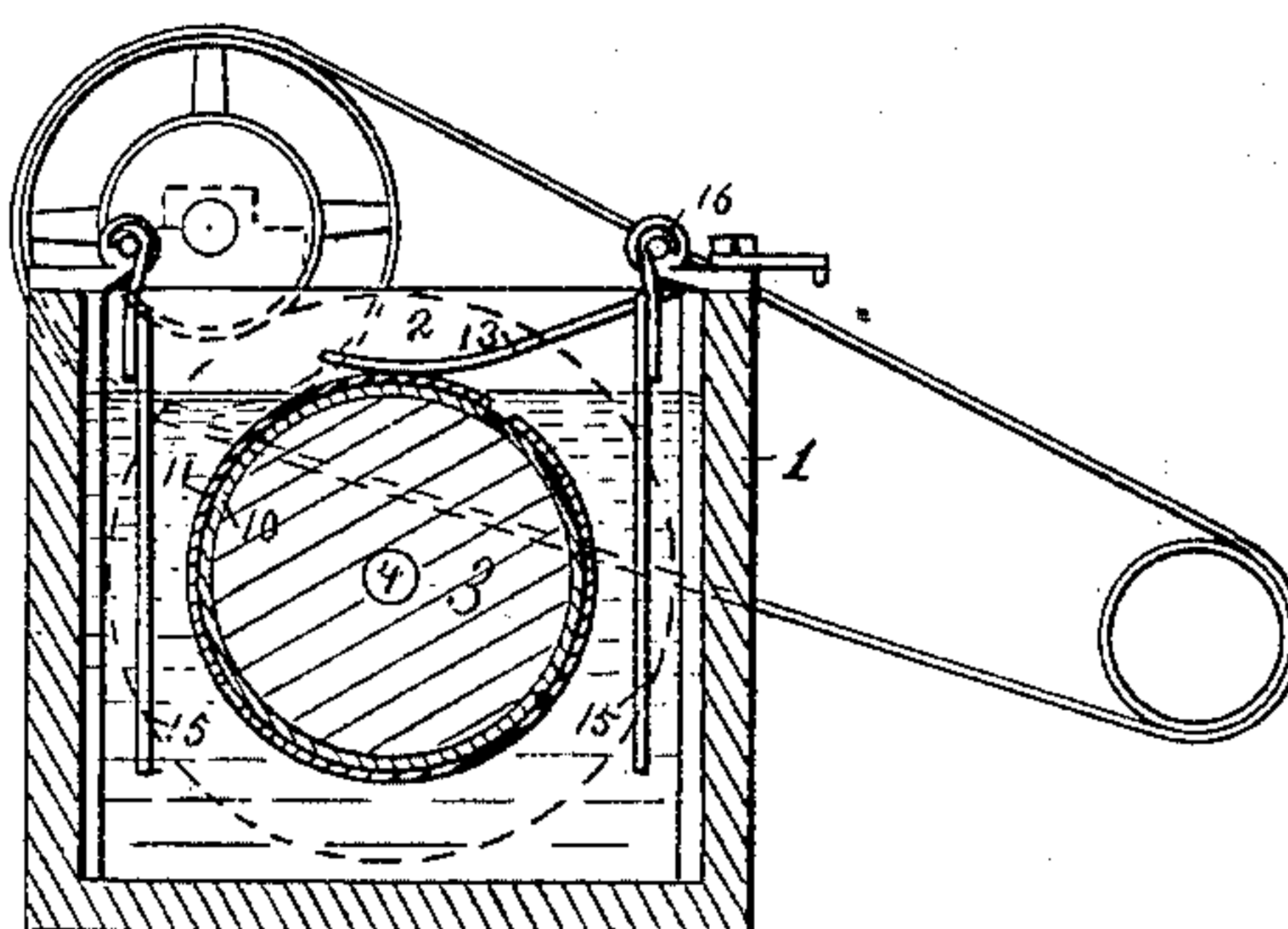
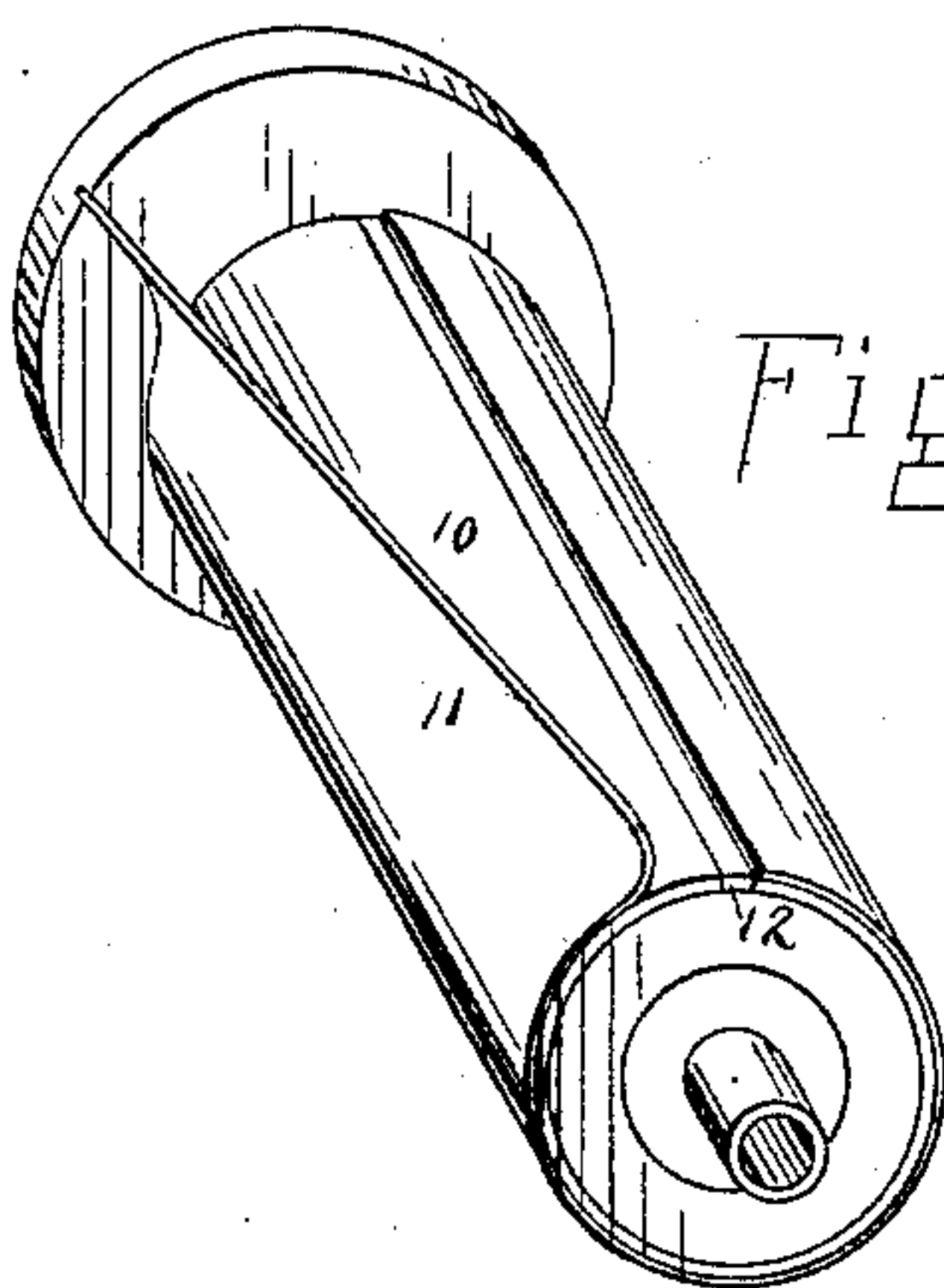


Fig. 3.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR FORMING SHEET METAL BY ELECTRO-DEPOSITION.

SPECIFICATION forming part of Letters Patent No. 371,256, dated October 11, 1887.

Application filed October 11, 1886. Serial No. 215,827. (No model.)

To all whom it may concern:

Be it known that I, ELISHA EMERSON, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Apparatus for Forming Sheet Metal by Electro-Deposition, of which the following is a specification.

The object of my invention is to produce by electro-deposition sheet metal free from flaws and impurities and of uniform density and thickness.

My invention comprises an apparatus for electro-depositing in which an original or initial cathode is used simply for the purpose of receiving the deposit, and it is so coated with graphite or other suitable material that the deposited metal may be removed therefrom in sheets and the cathode used over again. This cathode I make in the form of a cylinder, and I provide means for moving it on its axis while the metal is being deposited, so as to bring each part in succession opposite the anodes and prevent by its continual change of position the formation of flaws.

My invention will be further described with reference to the accompanying drawings, in which—

Figure 1 is a plan view of an electro-depositing vat fitted with my improvements. Fig. 2 is a cross section of the same on the line $x y$, Fig. 1. Fig. 3 is a view in perspective of the cathode removed from the bath, showing the deposited sheet partially removed.

In an ordinary electro-plating vat, 1, I place two transverse partitions, 2 2, held in place by guides 20, so that they can be removed together with the cathode which they support. The cathode proper, or, as I shall term it, the "initial" or "original" cathode, is formed of a metal cylinder, 10, supported on a wooden core, 3, having shafts 4, journaled in partitions 2 2, so that it can be rotated on its axis while in the bath. The cathode should be so weighted as to just float, or nearly so, in the electrolyte, so as to reduce the friction on the journals to a minimum.

The cathode is rotated through the medium of a friction-wheel, 5, mounted on one of the shafts 4, and driven from a friction-wheel, 6,

receiving its motion through shaft 8 and belt and pulley 9 from any suitable source of power. The manner of moving the cathode may evidently be varied indefinitely; but I have shown what I consider at present to be the best way.

The cathode is covered with graphite or other suitable coating, so as to prevent the deposit from adhering to it, and it is then immersed in the electrolyte deep enough to be nearly covered. A small part of the surface is allowed to remain above the liquid, so as to facilitate inspection of the deposit and removal of any particles of dirt, &c.

The cathode proper is parted from end to end, as at 12, and the slot between the edges filled in with pitch, so as to prevent the formation of a continuous deposit. The cutting of the sheet previous to removal is thereby obviated.

A suitable metallic contact-brush, 13, is made to bear upon one end of the cathode and maintains a sliding connection therewith. It is connected through conductor 14 to the negative pole of the generator.

The anode is formed, as usual, of plates 15, hung by hooks 16 from longitudinal bars 17, connected through conductor 18 to the positive pole of the generator.

By means of any suitable source of power a slow rotary motion is given to the cathode and the current passed through until a sheet of the desired thickness is formed, when the motion is stopped, the current turned off, and the shaft 8, friction-wheel 6, and contact-brush 13 moved out of the way, after which the cathode, together with its supporting-partitions 2 2, may be lifted clear of the bath and drained and washed free from the electrolyte. The deposited sheet may then be readily removed by taking hold of it at one of its edges and it will be found to be free from flaws of any kind and ready for the market without rolling or other further treatment.

The soundness of the product and its freedom from flaws are due to the fact that there is a sound smooth metal cathode to deposit upon, to the constant change of position of the cathode during the deposition, to the fact that the deposit is not strained during its formation, and to the facility afforded for inspection

of the whole surface of the sheet as the cathode rotates.

I am aware of the patent of M. G. Farmer, No. 335,905, dated February 9, 1886, and also of the patents of Wilde, No. 193,204, dated July 17, 1877, and Appleton, No. 313,569, dated March 10, 1885, and I therefore claim nothing shown or described therein. The patent to Farmer shows a traveling band-cathode upon which it is designed to deposit sheet metal which is to be afterward stripped off. It is impossible to form very thick sheets upon such an apparatus. With the apparatus herein described sheets of any thickness may be formed and currents of almost any strength may be used without injury to the deposit. The patents to Wilde and Appleton describe rotating cathodes; but their cathodes were not permanent as such, and were not adapted to receive a deposit of sheet metal to be afterward stripped off.

I am also aware of the patent to Outer-

bridge, No. 198,209, dated December 18, 1877, wherein is described a process of making gold and silver leaf by depositing upon a fusible or dissolvable base, and I therefore limit my claim to the particular apparatus which I have invented for making electro-deposited sheet-copper.

Having thus described my invention, what I claim is—

In an apparatus for forming sheet metal by electro-deposition, the combination of the containing-vat, an inflexible permanent initial cathode of cylindrical shape having a surface to which the deposit will not adhere, and supported on its axis in the vat, and mechanism for rotating it on said axis, substantially as set forth.

ELISHA EMERSON.

Witnesses:

WALTER H. KNIGHT,
CHAS. H. SMITH.