

(No Model.)

M. G. FARMER.
APPARATUS FOR FORMING SHEETS OF NICKEL OR OTHER METAL BY
ELECTROLYSIS.

No. 381,004.

Patented Apr. 10, 1888.

Fig. 1.

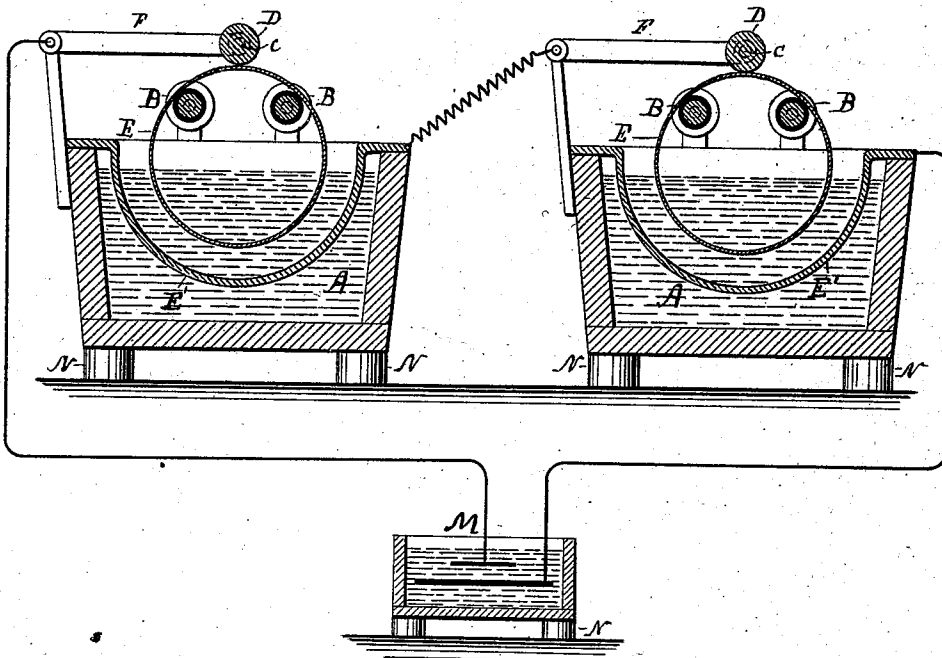
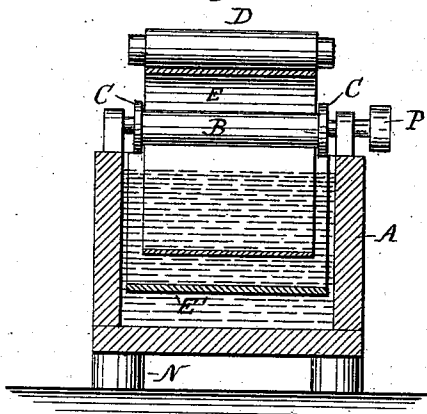


Fig. 2.



WITNESSES:

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APPARATUS FOR FORMING SHEETS OF NICKEL OR OTHER METAL BY ELECTROLYSIS.

SPECIFICATION forming part of Letters Patent No. 381,004, dated April 10, 1888.

Application filed October 17, 1887. Serial No. 252,529. (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
5 invented certain new and useful Improvements in Apparatus for Forming Sheets of Nickel or other Metal by Electrolysis, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention consists in a novel device or apparatus for producing sheets of nickel or other metal of any desired dimensions and quality by the agency of electrolysis.

In practicing my invention I make use of
15 two or more tanks, which I connect in series, as will be hereinafter explained. In each tank I support as an anode, in a proper solution, a bent or curved sheet of metal, and above it, as a cathode, I support a ring or hoop of copper
20 or brass on insulating bearings. This hoop I cause to revolve in the solution. By passing a current from the anode to the hoop I deposit the metal upon the hoop to the desired thickness, and I then strip it off in sheets. This may
25 be readily done by varnishing the inner surface of the hoop, so that no metal may adhere thereto, and by preparing the outer surface of the hoop so that the deposited metal will not cling to it. This may be done in many ways
30 well known in the art, as by rubbing it with powdered plumbago.

This apparatus and the particular method of using it pursued by me in forming the metal sheets will be better understood by reference
35 to the accompanying drawings.

Figure 1 is a vertical central section of a depositing plant comprising two tanks and a generator of current. Fig. 2 is a vertical cross-section of one of the tanks.

40 A A are boxes or tanks of the kind usually employed in electro-depositing metals. All the tanks being alike, I shall describe but one. Above the tank are rollers B B, two in number, mounted in suitable bearings, from which
45 they may be readily raised, and are arranged to turn freely therein. These rollers are made of wood, stone, or any like material, and are covered with cloth, such as canvas. They are provided with heads or flanges C C, and one
50 is provided with a pulley, P, by which it is

rotated by any suitable source of power. These rollers serve as a guide for a hoop or ring, E, which is used in each tank. The hoop E is a thin strip or sheet of brass or copper bent into circular shape and soldered to form a band or
55 ring with a smooth and even surface. Either a series of metal disks on a spindle or a metallic cylinder, D, is supported over the tank by a pivoted lever, F, carrying bearings c c, in which it turns freely. 60

Under the hoop E is a curved band or piece, E', of the metal to be dissolved. This band forms the anode of the tank, and is connected to the positive pole of the generator or the pivoted lever and cylinder of another tank, as
65 the case may be.

As above stated, the inner surface and edges of the hoop are painted or varnished, and the other peripheral surface prepared to receive a deposit of metal. The tank is then nearly
70 filled with a proper solution and the current directed from a battery or generator, M, from the band E' to the hoop E through the solution. I run several tanks in series, and for
75 this purpose connect the lever F (which is of metal or contains a conductor in electrical connection with the hoop E) of one tank with the plate E' of the next.

As a specific example of the dimensions and character of one of these tanks, the following
80 will be found to give good results: Use a sheet of brass or copper making a hoop a little over fifteen inches in diameter, fourteen inches wide, and about one-sixteenth of an inch thick. The tank may be seventeen or eighteen inches
85 square by ten or more deep. The rollers may be three or four inches in diameter and somewhat longer than the width of the hoop. One or both of the rollers B may be driven by power at a slow rate of speed—say one revolution per
90 minute; but it will generally be sufficient to rotate one for imparting movement to the hoop E.

The invention is more particularly designed to produce sheets of nickel, and when using
95 this metal I immerse in the tank a sheet of nickel of a curvature of, say, eight or nine inches radius, and so that its center shall be a few inches below the upper edge of the tank. I nearly fill the tank with some solution of 100

nickel that is desired as a depositing solution—such as the double sulphate or the double nitrate of nickel and ammonia—and pass the current through the tanks successively while the hoops are revolving.

In order that there may be as little leakage or escape of current as possible, I use under the tanks, and generator as well, blocks or supports, N, of some good insulating material. To secure good results the insulation must be such that the loss of current from the vats shall be so small that the current will be within less than ten per cent. of the same amount in each cell of the series. By such means only can the same amount of metal be deposited in each one by a series of tanks connected up as shown. The number of tanks to be run in series will be varied, of course; but the rule is to use that number in series which will give, with the electro-motive force furnished and the resistance encountered, that strength of current which gives the desired quality of deposited metal.

In some cases I varnish a narrow streak across the hoop, so as to produce a break in the deposited sheet of metal, and in this way I avoid the necessity of cutting across the sheet.

The two principal and important features of this invention, it will be observed, are the means of supporting the cathode by rollers on both sides of the hoop for the purpose of preventing the oscillations of the same to or

away from the anode; second, having the disks or rollers that convey the current from the hoops hung on a pivot or axle, so that they or it may be readily turned aside for taking out or putting in a hoop.

What I claim is—

1. In a depositing-tank, the combination of a curved plate immersed in the solution and forming the anode, a cathode ring or hoop having a peripheral conducting-surface mounted above said plate, and supporting and steadying rollers on opposite sides of the ring or hoop, as set forth.

2. The combination, in a depositing tank or vat, of a curved anode sheet or plate immersed in the solution, a cathode ring or hoop having a peripheral conducting-surface, two supporting-rollers inside of the hoop, and an outer pivoted steadying and conducting roller resting on its periphery, as set forth.

3. The combination, in an electrolytical tank or bath, with a fixed anode, of a hoop or cylinder of metal for receiving a deposit, two insulated rollers forming bearings for said hoop, a contact cylinder or roller carried by a pivoted lever and bearing upon the hoop above the supporting-rollers, and means for rotating the hoop in the bath, as set forth.

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Witnesses:

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