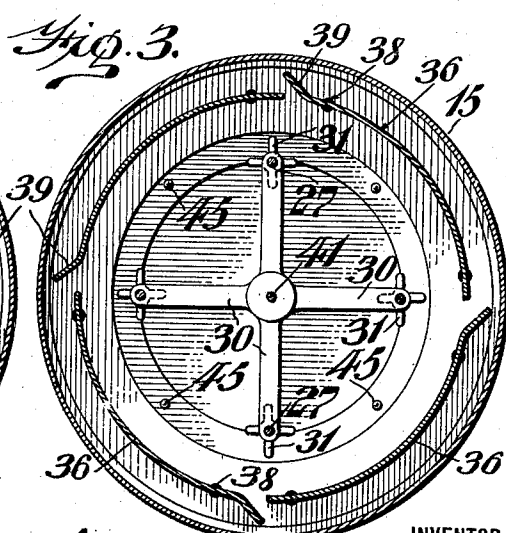
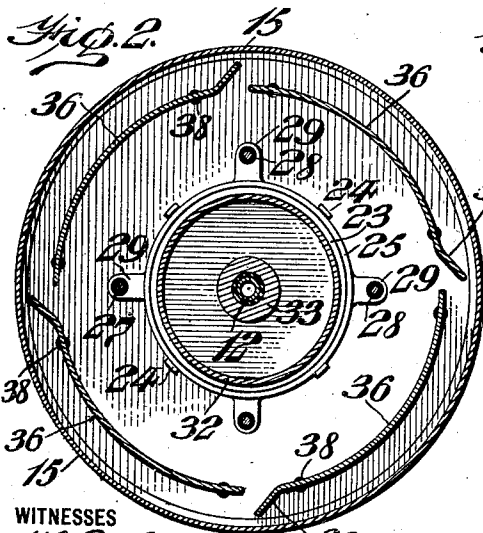
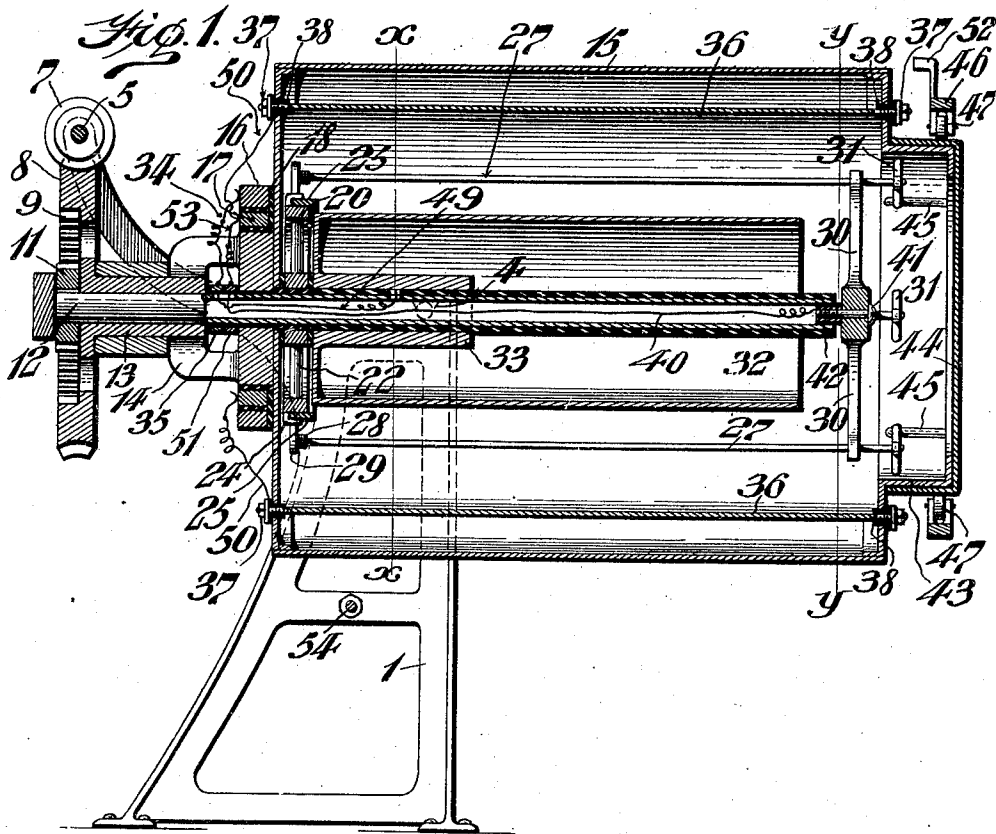


J. W. HEAPHY.
ELECTROPLATING MACHINE.
APPLICATION FILED JUNE 30, 1910.

986,823.

Patented Mar. 14, 1911

3 SHEETS—SHEET 1.



WITNESSES
H. F. Dietrich
L. Donville.

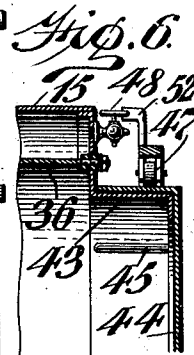
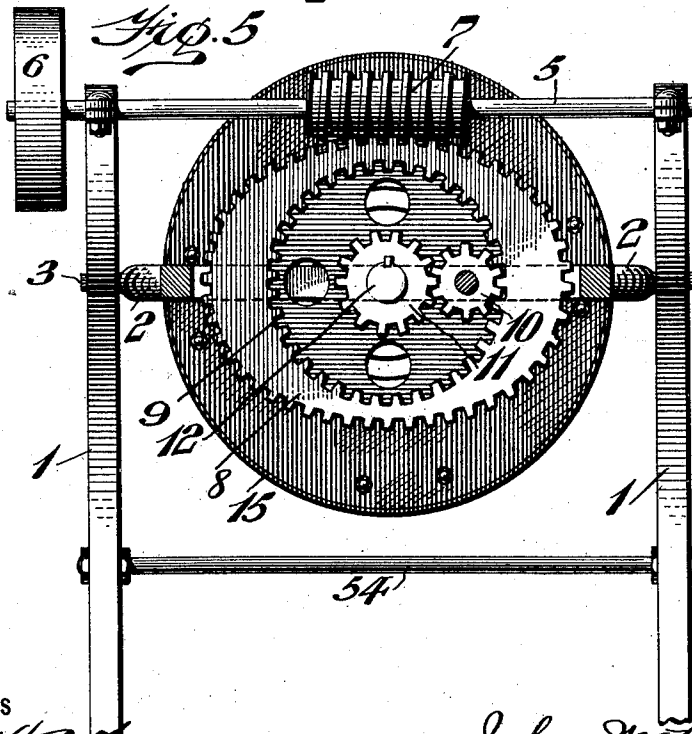
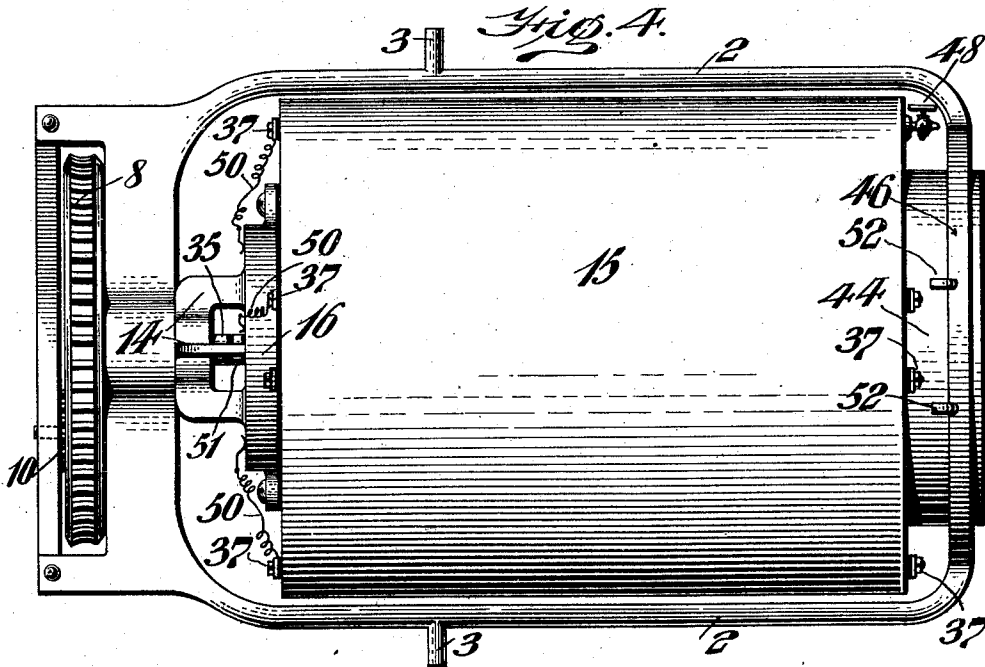
INVENTOR
John W. Heaphy.
BY
Wiedersheim & Fainbault
ATTORNEYS

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3 SHEETS—SHEET 2.



WITNESSES

H. Dietrich
L. Douville.

INVENTOR

John W. Heaphy.
BY *Wiedersheim & Partners*

ATTORNEYS

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3 SHEETS—SHEET 3.

Fig. 7.

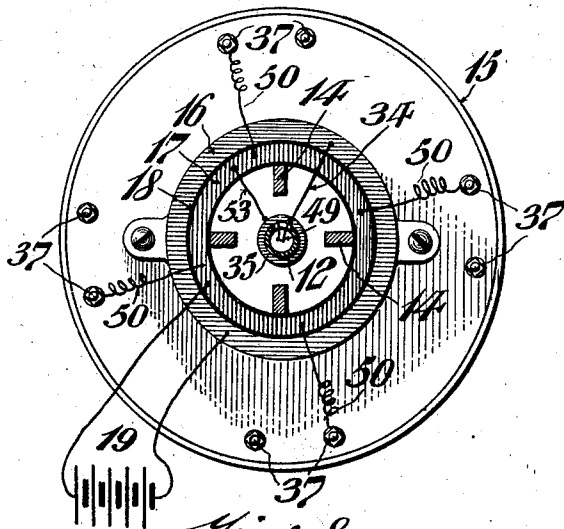
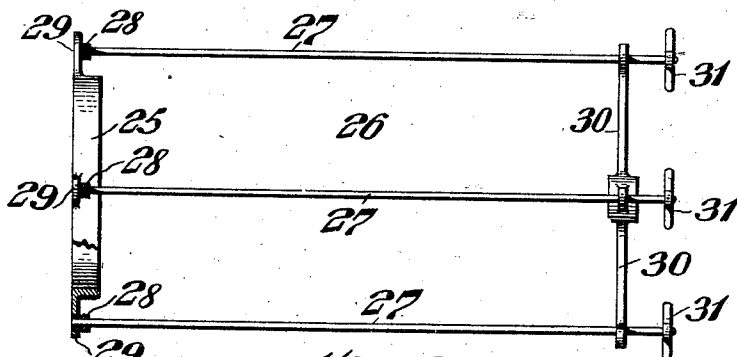
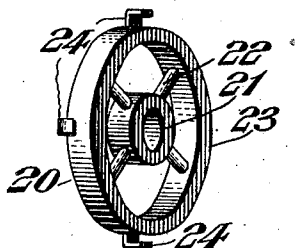


Fig. 8.



WITNESSES

H. H. Dietrich
L. Rouville

Fig. 9. *John W. Heaphy.* INVENTOR
BY *Friedersheim Grant & Co.*

ATTORNEYS

UNITED STATES PATENT OFFICE

JOHN W. HEAPHY, OF PHILADELPHIA, PENNSYLVANIA.

ELECTROPLATING-MACHINE.

986,823.

Specification of Letters Patent.

Patented Mar. 14, 1911.

Application filed June 30, 1910. Serial No. 569,650.

To all whom it may concern:

Be it known that I, JOHN W. HEAPHY, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Electroplating-Machine, of which the following is a specification.

My present invention consists of a novel construction of an electro-plating machine, wherein a very strong current of electricity may be employed and a tough and thick disposition of material rapidly produced, and the deposit is uniform over the entire surface, so that the depression and high lights are evenly covered.

It further consists of a novel electro-plating machine in which the container is kept constantly in motion to insure the active chemical condition of the fluid, a large anode surface being provided and provision being made for constantly changing the position of the article being plated whereby the hydrogen bubbles which form on the work are dislodged and I am enabled to prevent the pulverulent granulated deposit and bluish luster and the work will remain bright and readily respond to the buffing operation.

It further consists of a novel construction of cylinder and rack, novel means for operating the same and novel means for actuating the rack and for electrifying the solution.

It further consists of a novel construction of an anode.

It further consists of novel means for rotating the rack members during the revolution of the rack.

It further consists of a novel manner of mounting the device, whereby the rack may be readily removed when desired.

It further consists of other novel features of construction, all as will be hereinafter fully set forth.

For the purpose of illustrating my invention, I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same will give in practice satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents a sectional elevation of an electro-plating machine embodying my invention. Fig. 2 represents a section on line *x-x*, Fig. 1. Fig. 3 represents a section on line *y-y*, Fig. 1. Fig. 4 represents a top plan view of the cylinder and its housing in detached position. Fig. 5 represents a sectional elevation showing more clearly the operating mechanism. Fig. 6 represents a sectional view of a portion of the machine showing more clearly certain details of construction. Fig. 7 represents an end view of the cylinder, the shaft being shown in section. Fig. 8 represents a perspective view of a portion of the rack employed. Fig. 9 represents a side elevation of the rack in detached position.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates a standard of any desired or conventional type which is suitably adapted to support the frame-work 2, and in the present instance I have shown this as being accomplished by providing the frame-work with the journals or trunnions 3 which engage with the recesses 4 on the standard 1.

5 designates a shaft suitably mounted in the standard 1 and provided with a pulley 6 or its equivalent, whereby the shaft may be driven by any suitable source of power, said shaft having mounted thereon a worm 7 which meshes with a gear 8 preferably elliptical, said gear in the present instance being provided with or having secured thereto the internal gear 9 with which meshes an idler 10, said idler meshing with a gear 11 mounted on a shaft 12, which latter is preferably made hollow.

The journals 3 are located on the frame-work 2 in such a manner that they are out of center longitudinally so that the weight of the revolving mechanism will maintain the gear 8 in proper relation with respect to the worm 7, as will be clearly understood by reference to Figs. 1 and 5. The gear 8 has connected therewith a sleeve 13 which is loosely mounted on the hollow shaft 12 and has secured thereto the brackets 14 which are connected with cylinder 15 in any suitable manner, whereby upon the rotation of the gear 8 the cylinder 15 will be rotated in unison therewith. The end of the cylinder 15 has secured thereto a ring 16 and a commutator comprising ring 17 pref-

erably made of copper which are insulated from each other and from the cylinder 15 by means of the insulation 18. The ring 16 is connected with the positive wire leading

5 to the dynamo or other source of electric supply 19 while the ring 17 is connected to the negative wire leading to the dynamo. 20 designates a member fixedly mounted on the shaft 12 but insulated therefrom and

10 consisting of a hub 21 provided with suitable spokes 22 which are secured to the annulus or rim member 23, the latter having connected therewith the hooks or deflected arms 24 which engage the flanged annulus

15 25 of the rack 26 which is provided with rack bars 27 having one end thereof connected by insulated member 28 with the extensions 29 of the flanged member 25 while the opposite ends thereof pass through and

20 are journaled in the spider 30.

31 designates wheels having a desired number of contact points which coast with devices hereinafter referred to in order to partially rotate the rack bars.

25 32 designates the anode which is provided with a hub 33 which is mounted on but insulated from the shaft 12.

34 designates an electric connection leading from the ring 16 to a collar 35 mounted

30 on but insulated from the shaft 12, it being noted that electrical connection is made from the collar 35 to the anode 32 by means of the electric conduit 49 which connects with the collar 35 and also with the hub

35 33 of the anode 32, the hollow shaft 12 being adapted to permit the wires to pass therethrough.

36 designates a series of cathodes; any desired number being employed but, in the

40 present instance, I have shown for the purpose of illustration, four of these cathodes as being employed each of which is carried by the casing 15 and secured thereto by means of suitable fastening devices 37 provided with insulation 38, whereby the cath-

45 odes 36 are insulated from the casing 15.

50 50 designates an electric connection leading from the cathodes 36 to the ring 17 thence to the collar 51 mounted on but insulated from the shaft 12 it being seen from Fig. 1 that an electric connection 40 is provided leading from the collar 51 and extending through the end of the hollow shaft

55 12 into contact with a pin 41 carried by a spider or support 30 and insulated from the shaft by means of the insulating plug 42. The cathode 36 has one side thereof angularly deflected as will be best understood by reference to Figs. 2 and 3 thereby

60 causing the fluid to be directed inwardly toward the rack 26 during the rotation of the casing or container 15. The outer end of the casing 15 is provided with a reduced neck 43 which is adapted to receive a closure 44 which latter has connected therewith

the pins 45 which are adapted to engage with the contact members 31 to rotate the rack bars 27 to which the work is secured.

The frame 2 is provided at its outer end with an annulus 46 which carries the anti- 70 friction devices 47 herein shown as rollers with which the side of the cover 44 engages during the revolution of the casing 15. A valve 48 of any suitable type is preferably provided in order to provide means for per- 75 mitting escape of gases generated within the casing. The annulus 46 is provided with contact members 52 one of which coacts with the valve 48 to open the same while the next one in order coacts with the valve 80 to close the same, during the revolution of the fluid container 15.

The operation of my device is as follows:—The closure 44 is removed, the rack 26 is withdrawn from the casing, and the 85 solution placed in the fluid container 15. The articles which are to be electro-plated are secured in any desired manner to the rack bars 27 after which the rack is inserted in position so that the annulus 25 will en- 90 gage with the members 24 on the spider or support 20. The machine is then operated, the pulley 6 being driven by any desired actuating means whereupon the driving shaft 5 is rotated and the worm 7 thereon 95 will rotate the gear 8 whereby the fluid container 15 will be rotated in one direction. Owing to the provision of the gears 10 and 11 the hollow shaft 12 will be rotated in a reverse direction to the rotation of the fluid 100 container 15 so that the articles to be electro-plated, which are mounted on the arms 27, will revolve in the solution. The electric circuit from the source of electric supply 19 passes to the rings 16 and 17 and to the 105 anodes 32 and 36, as will be readily apparent from Fig. 1, and to the rack 26 said rack 26 being suitably insulated from the anode 32, as is clearly shown in Fig. 1. When the desired thickness of metal has been de- 110 posited on the articles which are being electro-plated the machine is stopped and the frame or housing 2 may be readily removed from the standards 1 and upon removal of the cover 44 the rack may be bodily removed 115 with the articles which have been plated and then placed in a tumbling bearing or other desired machine wherein the articles may be properly buffed and polished without necessitating removal of the articles from the 120 rack.

By continually changing the position of the articles being plated and by rotating the rack and the container in opposite direc- 125 tions the hydrogen bubbles will be dislodged and a uniform deposition of the metal will be made and since the articles when finished are bright and clear a very slight amount of buffing is necessary.

When the frame 2 is rocked on its fulcrum 130

it will abut against the bar 54 which serves as a stop.

It will now be apparent that I have devised a novel and useful construction of an electro-plating machine which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description and while I have, in the present instance, shown and described a preferred embodiment thereof which has been found in practice to give satisfactory and reliable results, it is to be understood that the same is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. In an electro-plating machine, a casing for the solution, a rack mounted in the casing, cathodes located in the solution, means for rotating the casing and rack in opposite directions, and means for electrically connecting the cathodes and the rack.

2. In an electro-plating machine, a casing for the solution, a rack in the casing, a cathode carried by the casing, an anode carried by the rack, means for rotating the casing and rack in opposite directions and means for electrically connecting the cathodes and the rack.

3. In an electro-plating machine, a casing for the solution, a work support in the casing, cathodes in the casing, means for electrically connecting the support and the cathodes, a valve for the casing, contact members coacting with the valve to actuate the same, and means for rotating the casing.

4. In an electro-plating machine, a casing, a work support therein, an anode in the casing and rotatable in unison with the work support, a cathode carried by the casing, means for electrically connecting the cathodes and the work support, and means for rotating the casing and the work support.

5. In an electro-plating machine, a casing, a work support therein, a plurality of cathodes secured to said casing exteriorly of said support, an anode in the casing, within said support, means for electrically connecting the cathodes and work support, and means for rotating the casing and the work support in opposite directions.

6. In an electro-plating machine, a shaft suitably mounted, a casing on said shaft but insulated therefrom, an anode on said shaft, a rack on said shaft and having a plurality of bars, a cathode carried by the casing but insulated therefrom, means for electrically connecting the cathodes and rack, means for rotating the casing and also the shaft, and means for partially rotating said rack bars during the rotation of the rack.

7. In an electro-plating machine, a shaft

suitably mounted, a spider mounted on said shaft but insulated therefrom, a rack adapted to interlock with said spider and having a plurality of work receiving members, a plurality of cathodes within said casing but insulated therefrom, means for electrically connecting said cathodes and said rack members, means for rotating in opposite directions said shaft and said casing and contact members carried by said casing and coacting with said rack members to change their relative position during the revolution of the rack.

8. In an electro-plating machine, a shaft suitably mounted, a casing mounted upon but insulated from said shaft, a rack mounted upon said shaft, an anode mounted on said shaft but insulated therefrom, cathodes carried by said casing but insulated therefrom, a positive and negative member carried by said casing but insulated therefrom, means for connecting said members with a source of electric supply and with said cathodes and said rack, and driving means for rotating said casing and rack.

9. In an electro-plating machine, a shaft suitably mounted, a casing mounted upon said shaft but insulated therefrom and provided with an open end, a closure for said end, contact members carried by said closure, a rack mounted on said shaft having work supporting members coacting with said contact members, a cathode within said casing, means for electrically connecting said cathode and rack, and means for causing the relative movement of said casing and rack.

10. In an electro-plating machine, a housing, a shaft mounted therein, a casing mounted on said shaft, driving mechanism connected with said casing, a shaft for rotating the same in opposite directions, a work support mounted on said shaft, a cathode in said casing, and means for electrically connecting said cathode and work support.

11. In an electro-plating machine, a housing, a shaft mounted therein, a casing mounted on said shaft, driving mechanism connected with said casing, a shaft for rotating the same in opposite directions, a work support mounted on said shaft, a cathode in said casing, said casing having an open end, a removable cover for said end and an anti-friction device carried by said housing and engaging said cover.

12. In an electro-plating machine, a shaft suitably mounted, a casing mounted on but insulated from said shaft provided with an open end, a closure for said end, stationary contact members, a valve for said casing, a work support in said casing, a cathode within the casing, means for electrically connecting the cathode and the work support, and a valve carried by said casing and actuated by said contact members.

13. In an electro-plating machine, stand-

ards, driving means carried thereby, a housing pivotally supported in said standards, a shaft mounted in said housing, a casing mounted on said shaft but insulated therefrom, a gear secured to said casing and operatively connected with said driving means, transmission mechanism intermediate said gear and said shaft for actuating the latter, a work support mounted on said shaft, an anode mounted on said shaft but insulated therefrom, a plurality of cathodes carried by said casing, and means for electrically connecting said cathodes and said rack.

14. In an electro-plating machine, a shaft suitably mounted, a casing mounted on said shaft, a rack support mounted on said shaft but insulated therefrom, a rack having a plurality of rack members secured to said rack support but insulated therefrom, an anode mounted on said shaft but insulated therefrom, a cathode carried by the casing, means for electrically connecting said cathodes and the rack, and means for rotating said shaft and said casing.

15. In an electro-plating machine, a casing suitably mounted, a work support within said casing, a plurality of cathodes within said casing and insulated therefrom, said cathodes having one side thereof deflected to cause the solution to be directed toward said rack support, means for electrically connecting said rack support and said cathodes, and

means for rotating said casing and said rack support.

16. In an electro-plating machine, a casing for the solution, a rack mounted in the casing, a cathode in the solution electrically connected with the rack, and means for causing relative movement of the rack and casing.

17. In an electro-plating machine, a casing for the solution, a rack mounted in the casing, a cathode in the solution and electrically connected with the rack, and means for causing relative movement of the cathode and rack.

18. In an electro-plating machine, a casing for the solution, a rack within the casing, a cathode within the casing, means for electrically connecting the cathode and rack, and means for rotating the cathode and rack.

19. In an electro-plating machine, a casing for the solution, a rack having a plurality of members mounted in the casing, a cathode in the solution electrically connected with the rack, means for rotating the casing and the rack, and means for automatically varying the relative position of the rack members during the revolution of the rack.

JOHN W. HEAPHY.

Witnesses:

H. S. FAIRBANKS,
C. D. McVAY.