March 31, 1931. J. J. WHALIN 1,798,994

ELECTROPLATING APPARATUS

Filed Jan. 4, 1929 2 Sheets-Sheet 1

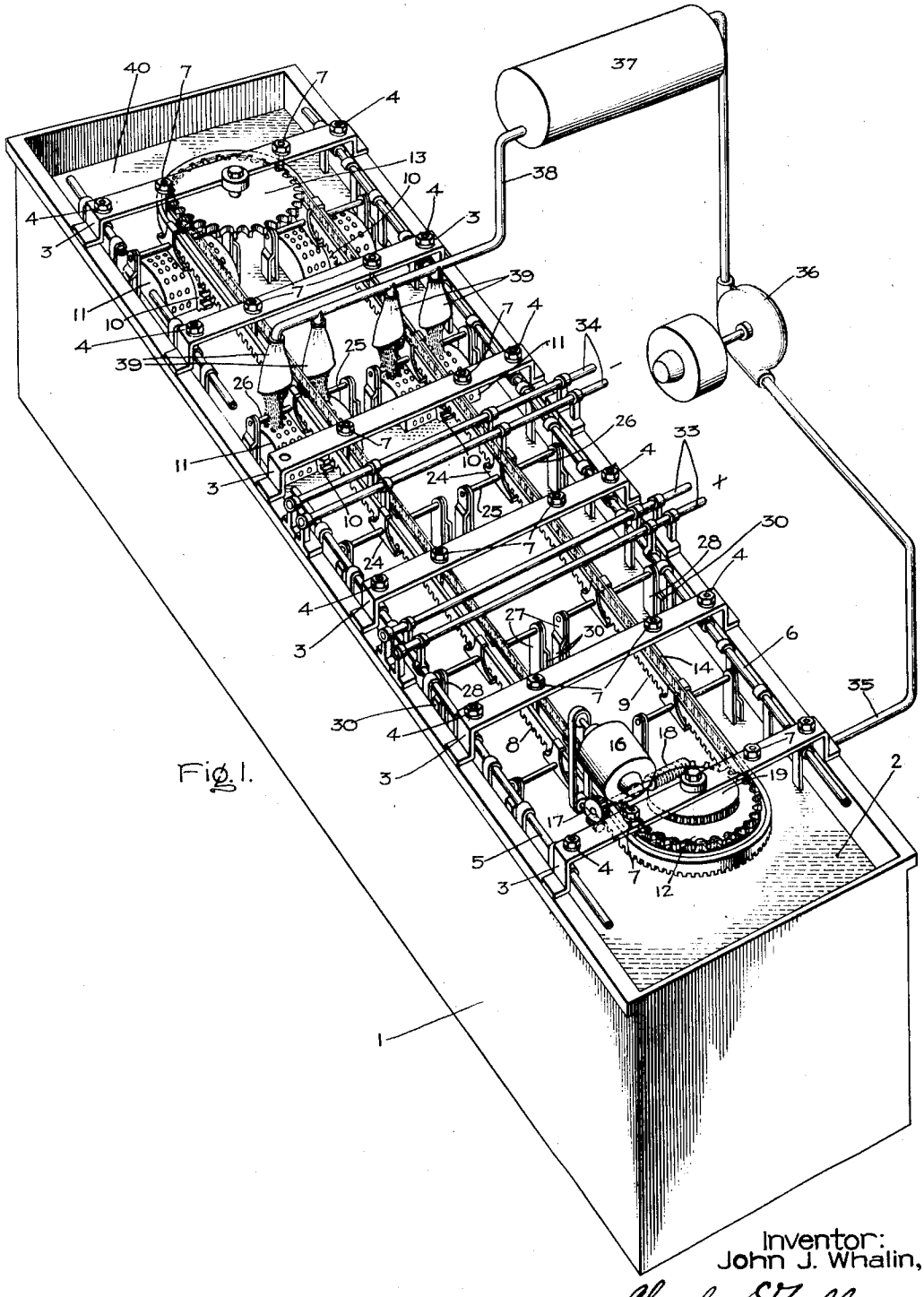

Fig. 1.

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Fig. 2.

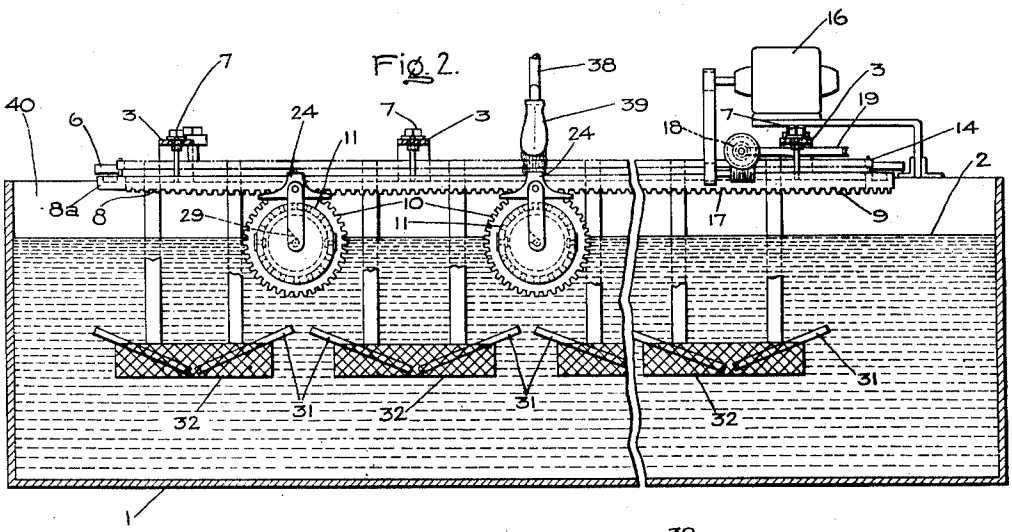


Fig. 3.

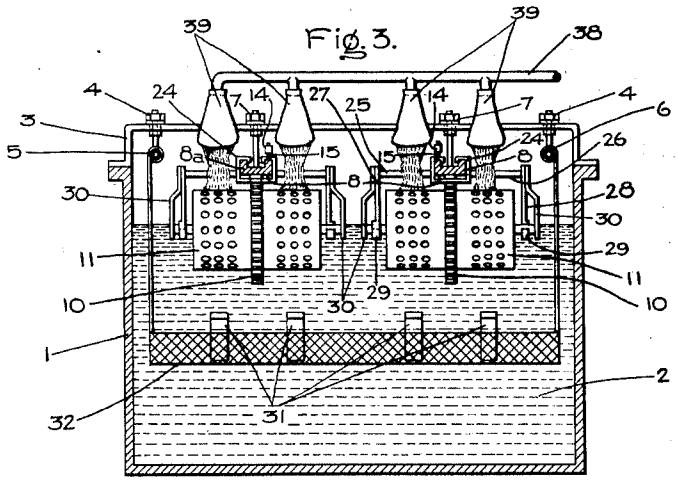
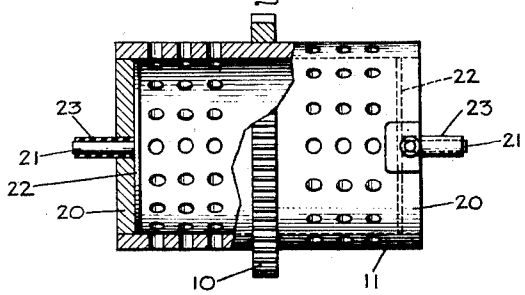


Fig. 4.



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Patented Mar. 31, 1931 1,798,994

UNITED STATES PATENT OFFICE

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ELECTROPLATING APPARATUS

Application filed January 4, 1929. Serial No. 330,297.

The present invention relates to electroplating apparatus and more particularly to to electroplating apparatus in which rotatable barrels mounted in the electrolyte carry the articles to be plated.

It is among the objects of the present invention to eliminate the costly and laborious methods heretofore employed in still plating and to reduce the time heretofore required to electroplate materials with the usual large standard barrels. A further object of the invention is to provide a barrel plating apparatus in which the barrels not only rotate but travel through the electrolyte thereby keeping the solution constantly agitated and producing a very uniform plate.

The novel features which I believe to be characteristic of the invention are set forth with particularity in the appended claims. The invention itself however will best be understood from reference to the following specification when considered in connection with the accompanying drawings in which Fig. 1 is a perspective view of an electroplating apparatus embodying the features of my invention; Fig. 2 is a cross sectional view taken lengthwise through the tank disclosed in Fig. 1; Fig. 3 is a cross sectional view of the electroplating tank; while Fig. 4 is a view partly in elevation and partly in section of a plating barrel employed in carrying my invention into effect.

Referring more particularly to the drawing, I have indicated at 1 an electroplating tank filled with a suitable electrolyte 2. The tank may be made of metal or wood depending upon the electrolyte employed. A plurality of metal supports 3 are mounted crosswise on the tank and spaced lengthwise thereof. At opposite sides of the tank these supports carry insulated bolts 4 which in turn carry the busbars 5 and 6. At the central portion of the tank similar insulated bolts 7 carry an endless grooved rail or rack 8 provided on its lower or under side with gear teeth 9 adapted to engage gears 10 on plating barrels 11. At one end of the plating tank the lower side of the rail is smooth, as indicated at 8*a* in Fig. 2.

Sprocket wheels 12 and 13 are mounted at opposite ends of the tank 1 and engage an endless chain 14 which is provided with supports 15 adapted to slide on the inner side of the rail 8, as indicated in Fig. 3. Sprocket 12 is driven from an electric motor 16 through shafts 17 and 18 and a worm gear 19 which is mounted on the same shaft as the sprocket wheel 12.

The perforated barrels or containers 11 and the gears 10 are made of a phenolic resinous condensation product or other suitable material. The containers have removable end portions 20 which are provided with short metal shafts 21 secured to circular metal plates 22 which are in contact with the inner side of the end portions 20. Shafts 21 are each mounted in insulating sleeves 23 in order to prevent deposition of metal thereon during the plating process.

A plurality of brackets 24, substantially U-shaped in cross section, are mounted on the endless rail 8 and secured in any suitable manner to the supports 15 on the chain 14 so as to be movable therewith. Ordinarily, the brackets 24 are provided with openings through which the supports 15 on the chain 14 extend. Short shafts 25 and 26 are secured to opposite sides of each bracket 24 and provided at the outer ends thereof with hangers 27 and 28 which have supporting hooks 29 at their lower ends to accommodate the shafts 21 on the plating barrels 11. Spring contact members 30 are also mounted on the end portions of the shafts 25 and 26 and bear against the outer end portions of the shafts 21. Hooks 29 on hangers 27 and 28 are reversely associated with one another, i. e., the open portion of one hook faces one end of the plating tank, while the open portion of the other hook faces the opposite end of the tank, providing in this manner an arrangement whereby the plating barrel by a slight sidewise movement may be removed from the supporting hooks while in motion. The anode material comprises metal bars 31 which are mounted so as to rest on the edge and bottom of baskets 32 and to extend in a longitudinal direction in the plating tank. This disposition of the anode material brings it very close to the work to be

plated and maintains the anode material at an approximately constant distance from a large portion of the work to be plated. The baskets 32 are suspended from the busbars 5 and 6 which are mounted on opposite sides of the tank. Current is supplied to the electrodes through leads 33 and 34 which are connected to busbars 5, 6 and rail 8 respectively.

To provide for the removal of sludge or other solid materials from the plating solution, a pipe 35 is connected with the bottom of the tank 1. A motor driven pump 36 delivers the plating solution and sludge from the bottom of the plating tank to an auxiliary tank 37 which is connected by a pipe 38 to a series of filters 39 extending across one end of the tank 1.

In operation, the electric motor 16 drives the endless chain 14 through the system of gearing disclosed in Fig. 1. As the endless chain moves in a longitudinal direction, it carries along with it the brackets 24, mounted on grooved contact track 8, and the shafts 25 and 26 secured thereto, thereby rotating the plating barrels 11 on the stationary rail or rack 8. As the barrels travel around to the end 40 of the tank the gears 10 come to the smooth portion 8*a* of the rack 8 and the barrels 11 cease to rotate and are removed from the tank, the plated articles removed and new material inserted in its place.

With the arrangement disclosed, I have found that the combined motion of rotation and translation given to the barrels keeps the electrolyte constantly agitated, produces a very uniform plate on the articles in the barrels and that the provision of a smooth portion 8*a* on the underside of rack 8 permits unloading of the plating barrel at one point without interfering with the operation of the system.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In electroplating apparatus, a tank for the electrolyte, a perforated container mounted therein and adapted to contain articles to be plated, a gear secured to said container, a stationary rack mounted on the tank and provided with gear teeth adapted to engage said gear, and means for moving said container on said rack.

2. In electroplating apparatus, a tank for the electrolyte, a perforated container mounted therein adapted to contain articles to be plated, a gear secured to said container, a stationary rack engaging said gear, supporting means for said container, said means being mounted on said rack, and means for moving said supporting means to thereby rotate the plating barrel.

3. In electroplating apparatus, a tank for the electrolyte, a container provided with a gear mounted in the electrolyte, means for supporting said container, said means including an endless rail provided with gear teeth engaging said gear, and means for rotating said container on said gear.

In witness whereof, I have hereunto set my hand this 2nd day of January, 1929.

JOHN J. WHALIN.