P. T. SEALEY.

MECHANICAL PLATING APPARATUS.

APPLICATION FILED FEB. 20, 1915.

1,181,349.

Patented May 2, 1916.

4 SHEETS—SHEET 1.

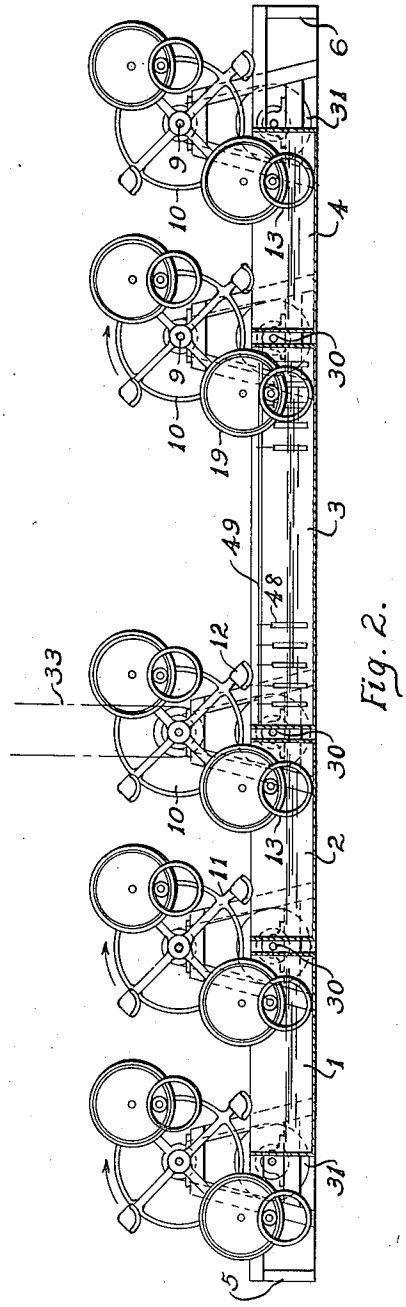


Fig. 2.

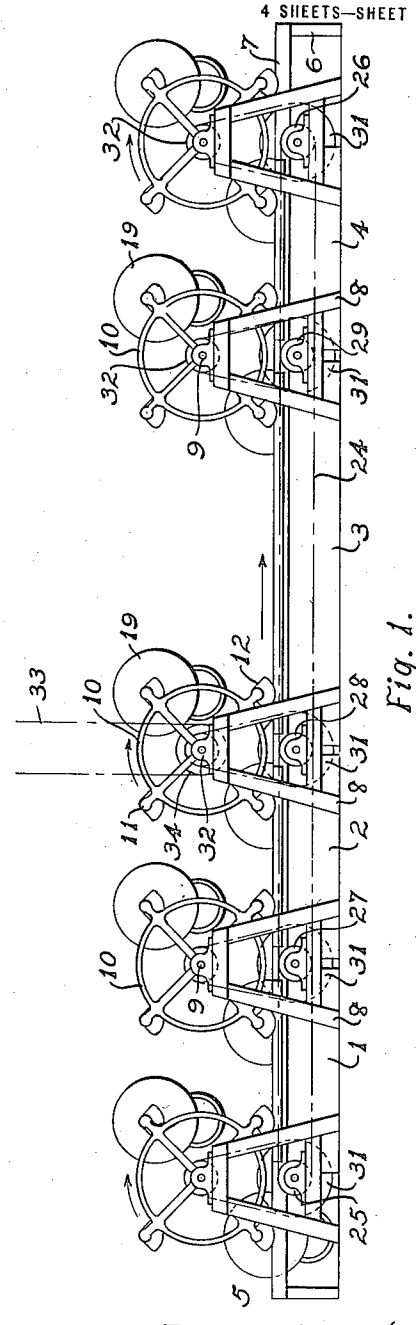


Fig. 1.

WITNESSES:

John D. Kittredge

A. L. Eq

Percy T. Sealey

INVENTOR.

BY

ATTORNEY

P. T. SEALEY.

MECHANICAL PLATING APPARATUS.

APPLICATION FILED FEB. 20, 1915.

1,181,349.

Patented May 2, 1916.

4 SHEETS—SHEET 2.

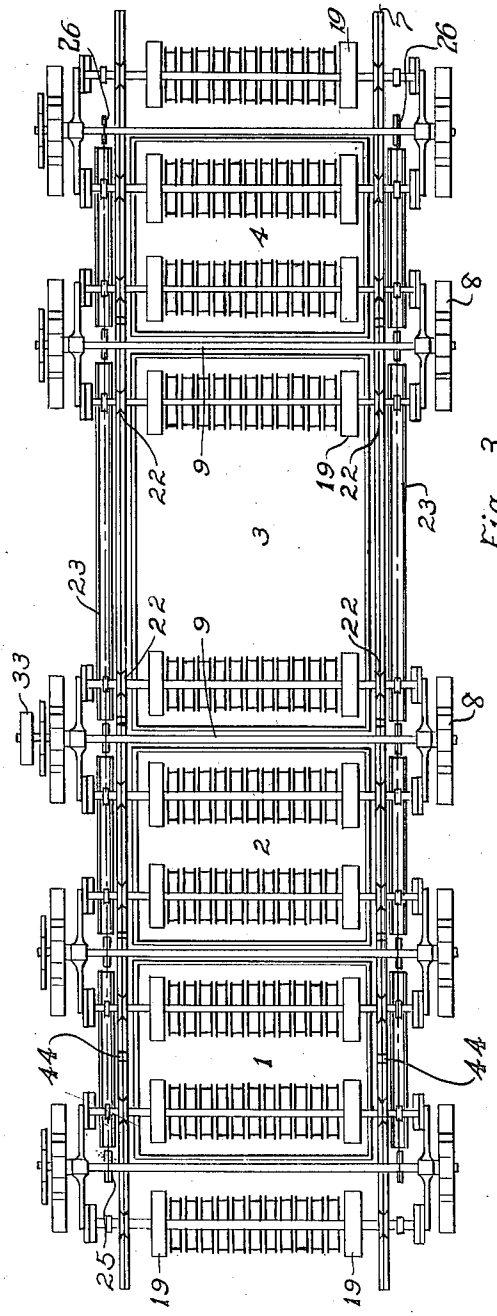


Fig. 3.

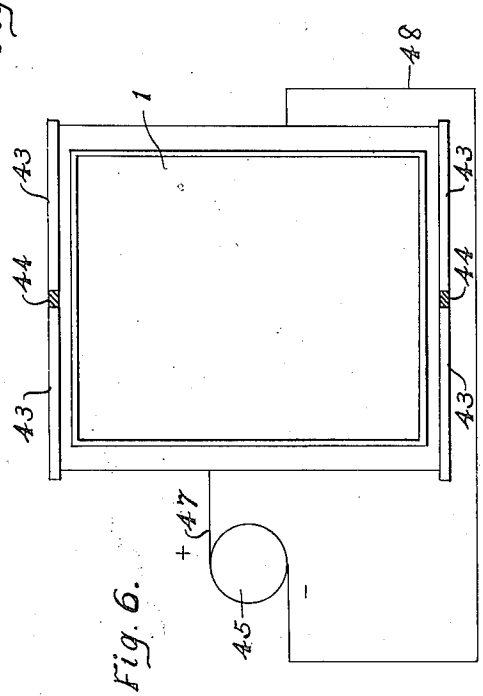


Fig. 6.

WITNESSES:

John W. Kittredge

C. L. Ely

Percy T. Sealey.

INVENTOR.

BY

ATTORNEY

P. T. SEALEY.

MECHANICAL PLATING APPARATUS.

APPLICATION FILED FEB. 20, 1915.

1,181,349.

Patented May 2, 1916.

4 SHEETS—SHEET 3.

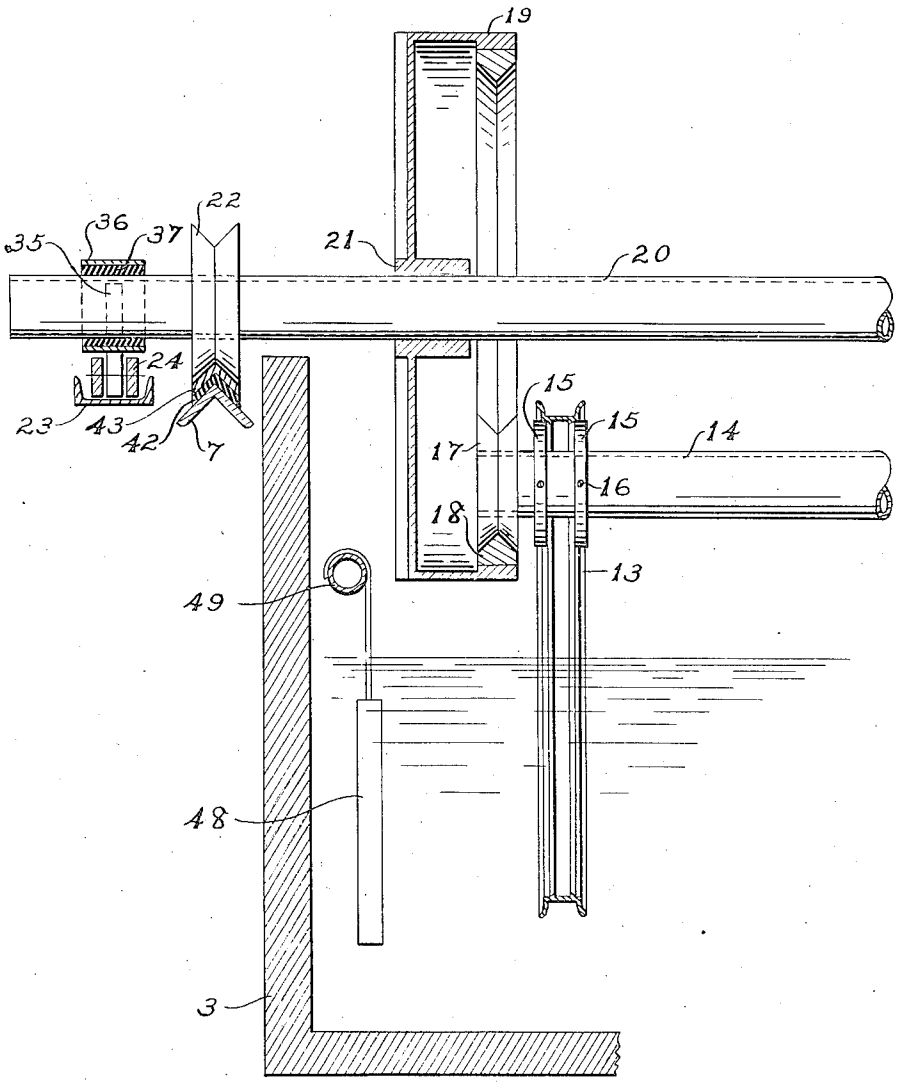


Fig. 4.

WITNESSES:

John W. Kittredge
A. L. Ey

Percy T. Sealey.
INVENTOR.

BY C. C. Linthicum
ATTORNEY

P. T. SEALEY.

MECHANICAL PLATING APPARATUS.

APPLICATION FILED FEB. 20, 1915.

1,181,349.

Patented May 2, 1916.

4 SHEETS—SHEET 4.

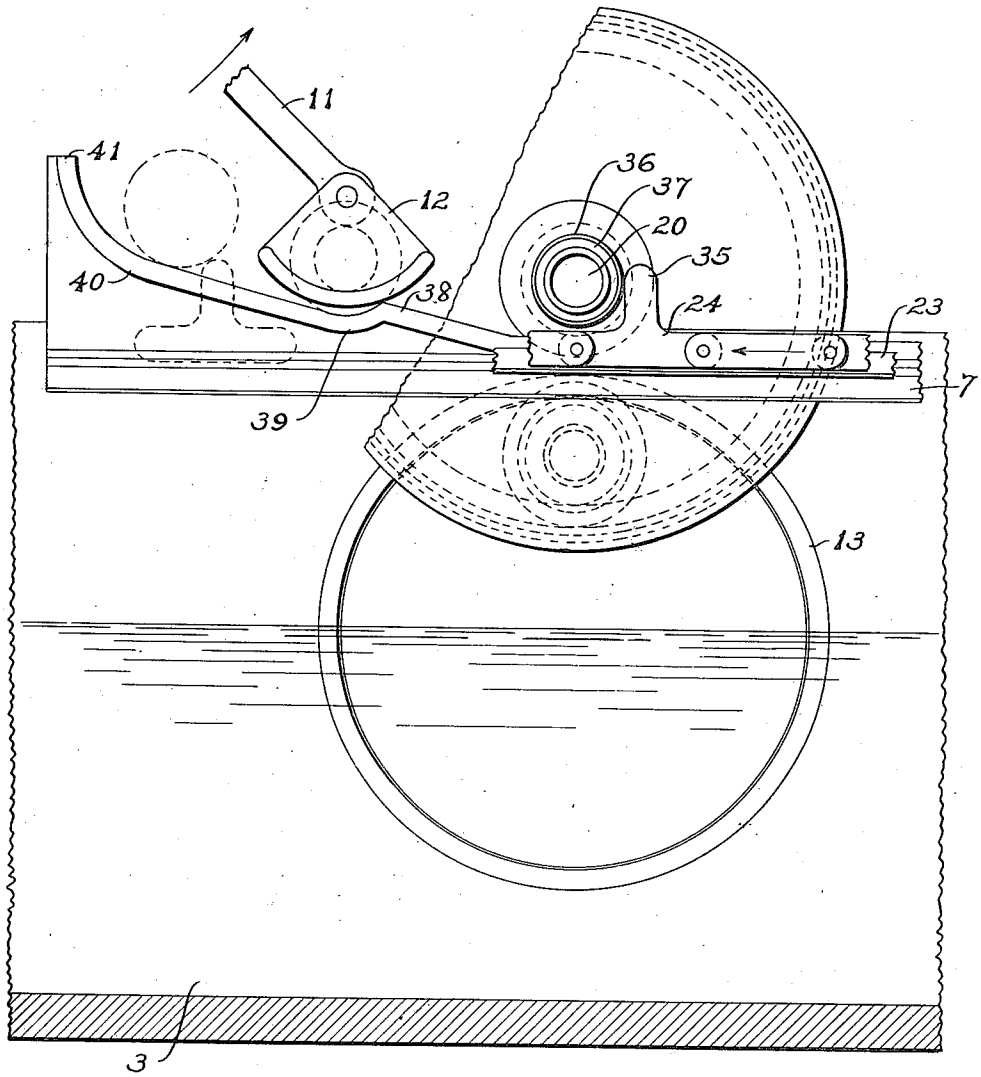


Fig. 5.

WITNESSES:

John W. Kittredge

A. L. Ely

Percy T. Sealey
INVENTOR.

BY C. C. Linthicum
ATTORNEY

UNITED STATES PATENT OFFICE.

PERCY T. SEALEY, OF AKRON, OHIO, ASSIGNOR TO THE FIRESTONE TIRE AND RUBBER COMPANY, OF AKRON, OHIO, A CORPORATION OF OHIO.

MECHANICAL PLATING APPARATUS.

1,181,349. Specification of Letters Patent. Patented May 2, 1916.

Application filed February 20, 1915. Serial No. 9,549.

To all whom it may concern:

Be it known that I, PERCY T. SEALEY, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Mechanical Plating Apparatus, of which the following is a specification.

My invention relates to machines for electro-plating articles continuously, and more particularly, for electro-plating annular objects, such as tire rims, though it is not limited to the treatment of these articles specifically.

The objects of my invention are to provide a machine for carrying on the processes incident to electro-plating, without the necessity of handling articles from the time they are placed in the machine, until they are discharged. In order to do this, it has been the aim of my invention to provide means for pickling, washing, electroplating, and finally washing the articles.

It has also been one of the objects of my invention to provide means for rotating the article while under treatment, and while rotated in the pickling and electroplating tanks, to maintain the electric circuit through the tanks and articles, in order that the pickling and plating may be carried out uniformly over the entire surface of the article.

Another object of my invention has been to provide a pickling tank in which the pickling operation is performed with the aid of electrolytic action, which electrolytic action is reversed in polarity while the rims are in the pickling solution.

These and other advantages will be readily understood by reference to the accompanying drawings, which show a preferred embodiment of my invention, in which—

Figure 1 is a side elevation of the entire machine for carrying on the electroplating process. Fig. 2 is a longitudinal section thereof. Fig. 3 is a plan view. Fig. 4 is an enlarged section of the electro-plating tank, showing one of the rims immersed in the solution. Fig. 5 is an enlarged side elevation of a tank near the transfer wheels. Fig. 6 is a diagrammatic view of the pickle tank, showing the means for reversing polarity.

In the various views, like reference numerals indicate like parts.

My apparatus includes a series of tanks shown as four in number, in which the various operations incident to the electro-plating are carried out. These tanks are numbered 1, 2, 3 and 4, and in them are carried out respectively, the pickling, washing, electroplating and washing.

Arranged at the receiving and delivery end of the row of tanks and spaced therefrom are uprights 5 and 6 on which are supported inverted V-shaped rails 7, which rails extend along the row of tanks a little below the upper edge of the tanks and serve as supports for the articles under treatment, as will be explained later. Arranged at the end of each tank and extended above it are a series of pairs of standards 8, the standards of a pair being arranged opposite to each other, and supporting transverse rotating shafts 9, carrying transfer wheels 10, having radially extending arms 11. In the ends of the arms 11, are mounted to swing freely segment shaped lifters or hooks 12.

The annular articles shown as rims 13 are placed over shafts 14 and positioned on adjustable collars 15, secured to the shaft 14 by set screws 16, the purpose of the adjustment being to allow for the treatment of rims of different widths. The rims come to rest with the collars in the outside rabbets formed on the interior surface of the rims, and are thus prevented from coming in contact with one another. This construction also allows rivets projecting inwardly from the rim to pass over the shafts 14, in their rotation, as will be explained. The shafts 14 have secured thereto at the ends, rollers 17 with grooved peripheries adapted to roll on V-shaped ribs 18 disposed about the inner surface of large wheels 19, secured to shafts 20 by means of hubs 21. Near the ends of the shafts 20 are secured grooved wheels 22, which are located outside of the walls of the tanks and rest upon the rails 7. The arrangement shown permits the shafts 20 to pass over the tanks while the shafts 14 are below the upper edges and inside the tanks, the rims hanging thereform being thus suspended in the various solutions, the levels of which are

kept below the periphery of the wheels 19. By this arrangement it will be seen that if the shafts 20 are rolled along the rails 7, a rotary motion will be imparted through the wheels 19 and shafts 14 to the rims during their travel through the solutions.

The longitudinal travel of the rim carriers is effected by the following means: On both sides of the tanks outside of the rails 7 are arranged alined channel irons 23 in which travel endless chains 24, which pass around sprocket wheels 25 and 26, arranged at each end of the series of tanks and intermediate sprocket wheels 27, 28 and 29 secured to shafts 30 passing between the tanks. On the shafts of the sprocket wheels 25 and 26, and on each shaft 30 is secured large sprocket wheel 31, which drives smaller sprocket wheels 32 secured to shafts 9 carrying the transfer wheels. The whole apparatus is driven from a source of power by a belt 33 passing around pulley 34 on the shaft 9.

Made integral with certain of the links of the chain 24 at regular intervals are fingers 35 which are adapted to bear against steel collars 36 secured to the ends of the shaft 20, but insulated therefrom by an intervening layer 37 of non-conducting material. The fingers 35 push the rim carriers along on the rails 7, and thus conduct them along the various tanks. At the end of each tank the rail 7 is inclined upward as at 38, (see Fig. 5) then downward slightly as at 39 to form a pocket, then upward again as at 40, finally terminating in a stop 41. The pockets 39 are positioned at the intersection of the rail 7 with the arc described by the lifters 12 in the rotation. The rotation of the transfer wheels 10 is so timed with relation to the travel of the chain 24 that ordinarily the lifters 12 will arrive opposite the pockets 39 at the same time that the rim carrier reaches there. If, however, owing to any cause such registry of the action of the chain and transfer wheels is not maintained, the additional incline 40 and stop 41 is provided to allow the chain 24 to pass under the rim carrier shaft 20 whereupon the shaft will roll back in position in the pocket 39. Two more sets of arms 11 are provided on the transfer wheels than are necessary to carry rims over from one tank to the next, my purpose in this being to allow for missing connections with the regular transfer hooks, whereupon the intermediate ones will perform the work. The speed of travel of this lifter 12 is much greater than the speed of travel of the fingers 35, so as to provide for the contingency mentioned, and also to cut down the time during which the rims are in the air, it being desirable to cut this down as much as possible to avoid the oxidizing action of the air upon the rims.

The supporting rail 7 carries on its upper surface opposite the pickling and electroplating tanks, an insulating layer 42 and a layer of conducting metal 43. In pickling I make use of electrolytic action to aid the action of the pickling, and it is advisable to change the polarity during the operation. The scheme which I employ for doing this is illustrated diagrammatically in Fig. 6. In this figure it will be noticed that the conductor 43 is broken about midway of the tank by inserts 44 of insulating material. One pole of a direct current generator 45 is connected to one of the sets of conductors 43, while the other pole is connected to the other set of rails by wire 48. By this means the current is maintained from the generator through the wire 47 rails 43, through the rim carrier and rims, through the pickling solution across to the other set of rims and their carriers to the other rails 43 and back to the generator by the wire 48. By this means it will be seen that the polarity is reversed in the tanks and the electrolysis is done without using the tank as part of the circuit, which is advantageous, owing to the tendency of the current to aid the pickling solution eating away the tanks.

In the electro-plating tank I suspend the anodes 48 from longitudinal pipes 49. The circuit through the electro-plating tanks is provided from the anodes 48 through the solution to the rims, from the rims to the shaft 14 and roller 17 to the ribs 18. From there is passes through the wheels 19 to the shaft 20, roller 22 and conductor 43.

From the above description it is believed that the operation of my apparatus will be readily understood. Rim carriers previously loaded with a set of rims are placed on the rails 7 at the receiving end of the apparatus in such position that they will register with the upward moving lifters on the transfer wheels. These lifters pick up the rim carriers and lower them on the rails 7 with the rims suspended in the pickling solution. Traveling fingers on the chain take up the rim carriers and advance them through the pickling tanks where the pickling operation is carried on as described until they reach the incline 38. At this point the next transfer wheel picks up the rim carriers, lifts them out of the pickling tank and lowers them on the rails 7 with the rims suspended in the washing tank 2. Here the rims will be washed and prepared for the electro-plating. The chains 24 advance the rims and carriers to the next transfer wheel, which places the rims in the electro-plating tank. When the rims reach the end of the tank they are picked up by the next set of transfer wheels which place them in the last washing tank, from which they are transferred by the last set of wheels to the rails 7 at the delivery end, from

where they are taken by operators for drying and finishing.

It will be noted particularly that during the entire travel of the rims through the tank, they are given a continuous rotation by the mechanism described, and shown more particularly in Fig. 4, thus insuring an even treatment of the rims throughout.

In the pickling tank instead of using the direct current generator and conductor rails, as shown in Fig. 6, I may obtain the change in polarity by the use of an alternating current generator, connected to the rim and returned through the solution. This arrangement will give a rapid and continuous change in polarity.

It will be apparent to those skilled in the art that considerable change might be made in the construction of the various parts which I have described, without departing from the spirit and scope of my invention, and without sacrificing any of the advantages thereof.

What I claim is:

1. In an electroplating apparatus, the combination with a series of tanks, holders out of contact with the bath for articles to be treated, means for transferring said holders to and from said tanks, and means for rotating the articles on their own axes while under treatment.

2. In an electroplating apparatus, the combination with a series of tanks, holders out of contact with the bath for articles to be treated, means for transferring said holders to and from said tanks, means for advancing the holders along said tanks, and means for rotating the articles on their own axes while under treatment.

3. In an electroplating apparatus, the combination with a series of tanks, one of said tanks being an electroplating tank, holders for articles to be treated, means for transferring said holders to and from said tanks, and means for rotating the articles into and out of the baths in the tanks.

4. In an electroplating apparatus, the combination with a series of tanks, comprising a pickling tank and an electroplating tank, holders for articles to be treated, means for transferring said holders to and from said tanks, and means for rotating the articles into and out of the baths in the tanks.

5. In an electroplating apparatus, the combination with a series of tanks, comprising a pickling tank, a washing tank, and an electroplating tank, holders out of contact with the baths for articles to be treated, means for transferring said holders to and from said tanks, and means for rotating the articles on their own axes while in the tanks.

6. In an electroplating apparatus, the combination with a series of tanks, comprising a pickling tank and washing tank, an electroplating tank and a washing tank in the order named, holders for articles to be treated, means for transferring said holders to and from said tanks, and means for rotating the articles into and out of the baths in the tanks.

7. In an apparatus for treating articles, a tank adapted to contain a pickling solution, conductors adapted to be electrically connected to the articles under treatment in such a manner that the current will pass through the articles and the solution, means for rotating the articles into and out of the pickling solution and means for reversing the polarity of the articles while in the tank.

8. In an apparatus for treating articles, a tank adapted to contain a pickling solution, holders for the articles under treatment adapted to suspend the articles in contact with the pickling solution, conductors adapted to be electrically connected with the articles under treatment in such manner that the current will pass through the articles and the solution, means for rotating the articles into and out of the pickling solution, and means for reversing the polarity of the articles while in the tank.

9. In an apparatus for treating articles, a tank adapted to contain a pickling solution, holders out of contact with the solution for the articles under treatment adapted to suspend the articles partially immersed in the solution, means to present all parts of the article to the solution, and conductor rails along said tank and adapted to support the said article holders.

10. In an apparatus for treating articles, a tank adapted to contain a pickling solution, holders out of contact with the solution for the articles under treatment adapted to suspend articles, partially immersed and rotate the articles in the solution so that all parts of the articles will be subjected to the solution, conductor rails along said tank adapted to support said article holders, means for returning the current through the pickling solution.

11. In an apparatus for treating articles, a tank adapted to contain a pickling solution, holders rotatively supporting the articles under treatment partially suspended in the solution, rails along the sides of the pickling tank, the said holders resting on the rails, an electric current generator, a conductor leading from one side of the generator and connected to one end of the rails, another conductor connected to the other side of the generator, connected to the other end of said rails, and an insulating medium dividing the said rails.

12. In an apparatus for treating articles, a tank adapted to contain a pickling solution, holders rotatively supporting the articles under treatment suspended in the solu-

tion, rails along the side of the pickling tank, the said holders resting on the rails, an electric current generator, a conductor leading from one side of the generator and connected to one end of the rails, another conductor connected to the other side of the generator leading to the other end of said rails, and insulating medium dividing the said rails, and means for advancing said holders along said rails.

13. In an apparatus for treating articles, a tank adapted to contain a pickling solution, holders supporting the articles partially suspended in the solution, rails along the sides of the pickling tank, the said holders resting on the rails, an electric current generator, a conductor leading from one side of the generator and connected to one end of the rails, another conductor leading from the other side of the generator connected to the other end of said rails, an insulating medium dividing the said rails, means for advancing said holders along said rails, whereby the polarity of the articles is reversed while in the pickling solution, and means for rotating the articles while in the pickling solution.

14. In an apparatus for electroplating articles, an electroplating tank adapted to contain an electroplating bath, an anode, a holder out of contact with the electroplating bath for supporting articles in the bath, means for rotating the article into and out of the bath, and means for advancing the holders along the tank.

15. In an apparatus for electroplating articles, an electroplating tank, adapted to contain an electroplating bath, an anode, a holder out of contact with the electroplating bath for suspending articles to be electroplated in the bath, means for rotating the article while in the bath, and means for advancing the holders along the tank.

16. In an apparatus for electroplating articles, an electroplating tank adapted to contain an electroplating bath, an anode, a rotating holder for suspending articles to be electroplated in the bath, means for rotating the holder and the article on the holder while in the bath, and means for advancing the holder along the tank.

17. In an apparatus for electroplating articles, an electroplating tank adapted to contain an electroplating bath, an anode, a holder for suspending the articles to be electroplated immersed in the bath, means for rotating the articles on said holder, and means for advancing the article through the tank.

18. In an apparatus for electroplating articles, an electroplating tank adapted to contain an electroplating bath, anodes, a holder for suspending the articles to be electroplated partially immersed in the bath, means for rotating the articles on said holders, transfer devices for raising and lowering said holders in and out of said tank, and means for establishing an electric current from said anode through the bath and articles.

19. In an apparatus for electroplating articles, an electroplating tank adapted to contain an electroplating bath, a traveling holder for suspending a number of articles to be electroplated immersed in the bath, means for rotating the articles on said holders and devices for guiding the articles while being rotated.

20. In an apparatus for electroplating annular objects, the combination of a tank for holding an electroplating bath, means for rotating the objects about their axes comprising a rotating holder having an axis different from that of the holder which transmits its rotation to the objects, and means for advancing the holder along the tank.

21. In an apparatus for electroplating annular objects, the combination of the tank for holding an electroplating bath, holders for the objects above the bath, means for advancing the holders in a direction parallel to the planes of the objects, and means for rotating the objects while being advanced in the same plane.

22. In an apparatus for electroplating annular objects, the combination with anodes, a tank for holding an electroplating bath, a means for establishing a current from said anode through the bath and articles, a holder for the said articles comprising a shaft about which said articles are rotated, means for rotating the shaft, and means for advancing shaft along the electroplating tank.

23. In an apparatus for electroplating annular objects, the combination with anodes, a tank for holding an electroplating bath, means for establishing a current from said anodes through the bath and the articles, a holder for said articles comprising a shaft around which said articles are placed, a wheel on which said shaft is rotatably supported, a second shaft for said wheel, and means for supporting said second shaft for travel over said tank.

24. In an apparatus for electroplating annular objects, the combination with anodes, a tank for holding an electroplating bath, rails outside of and along said tank, a shaft supported on said rails, and shafts for supporting said objects loosely suspended from said first named shaft, said rails forming the electrical return from said anodes.

25. In an apparatus for electroplating annular objects, the combination with anodes, a tank for holding an electroplating bath, rails outside of and along said tank, a shaft supported on said rails, means for rolling

said shaft along said rails, wheels secured to said shaft, shafts for holding said articles below said first named shaft supported by said wheels, said shafts, wheels and rails constituting the return for the current from said anodes.

26. In an apparatus for electroplating annular objects, the combination with anodes, a tank for holding an electroplating bath, rails outside of and along said tank, a shaft supported on said rails, means for rolling said shaft along said rails, wheels secured to said shafts, shafts for holding said articles supported to roll along the inside of said wheels, said shafts, wheels and rails constituting return for the current from said anodes.

27. In an apparatus for electroplating rims, the combination with anodes, a tank for holding an electroplating bath, rails outside of and along said tank, a shaft supported on said rails, means for rolling said shaft along said rails, wheels secured to said shafts, shafts for holding said rims hung over it, said rim holding shaft adapted to roll along the inside of said wheels, means on said article holding shafts adapted to support and guide said rims, said shafts, wheels and rails constituting return for the current from said anodes.

28. In an electroplating apparatus, an electroplating tank, holders for articles to be electroplated, means for rotating articles on their own axes into and out of the electroplating bath while being electroplated, means for advancing articles through the electroplating tank and means for maintaining the electric circuit during the travel of said articles.

29. In an electroplating apparatus, an electroplating tank, holders for the objects to be electroplated, said holders being out of contact with the electroplating bath, means for advancing the holders through the tank and means to immerse all parts of the objects in the electroplating bath.

30. In an electroplating apparatus, an electroplating tank, means for holding articles and rotating them so that all parts may be electroplated, means for advancing the articles through the tank, and a conductor electrically connected with the article holders, the holders being at all times out of contact with the electroplating bath.

31. In an electroplating apparatus the combination with a tank, holders for articles to be treated, means for transferring said holders to and from said tank, and means for rotating the articles into and out of the electroplating bath.

32. In an apparatus for treating articles, a pickling tank, means for advancing the articles through the picking tank, and conductors adapted to be connected with the articles and means for reversing polarity of the articles effective upon advance of the articles through the tank.

33. In an apparatus for treating articles, a pickling tank, means for suspending and moving the articles within the pickling tank, conductors adapted to be connected with the articles, and means for reversing the polarity of the articles while in the tank by movement of the articles.

34. In apparatus of the character described, the combination of a tank, a support outside of the tank, a rotatable shaft about which articles to be treated are rotated carried by said support, and means for imparting relative movement to the support and the shaft, the rotation of the articles being derived from said relative movement.

PERCY T. SEALEY.

Witnesses:
S. BONSTEDT,
A. L. ELY.