

1,108,145.

J. T. DANIELS.
ELECTROPLATING APPARATUS.
APPLICATION FILED MAR. 10, 1913.

Patented Aug. 25, 1914.

3 SHEETS-SHEET 1.

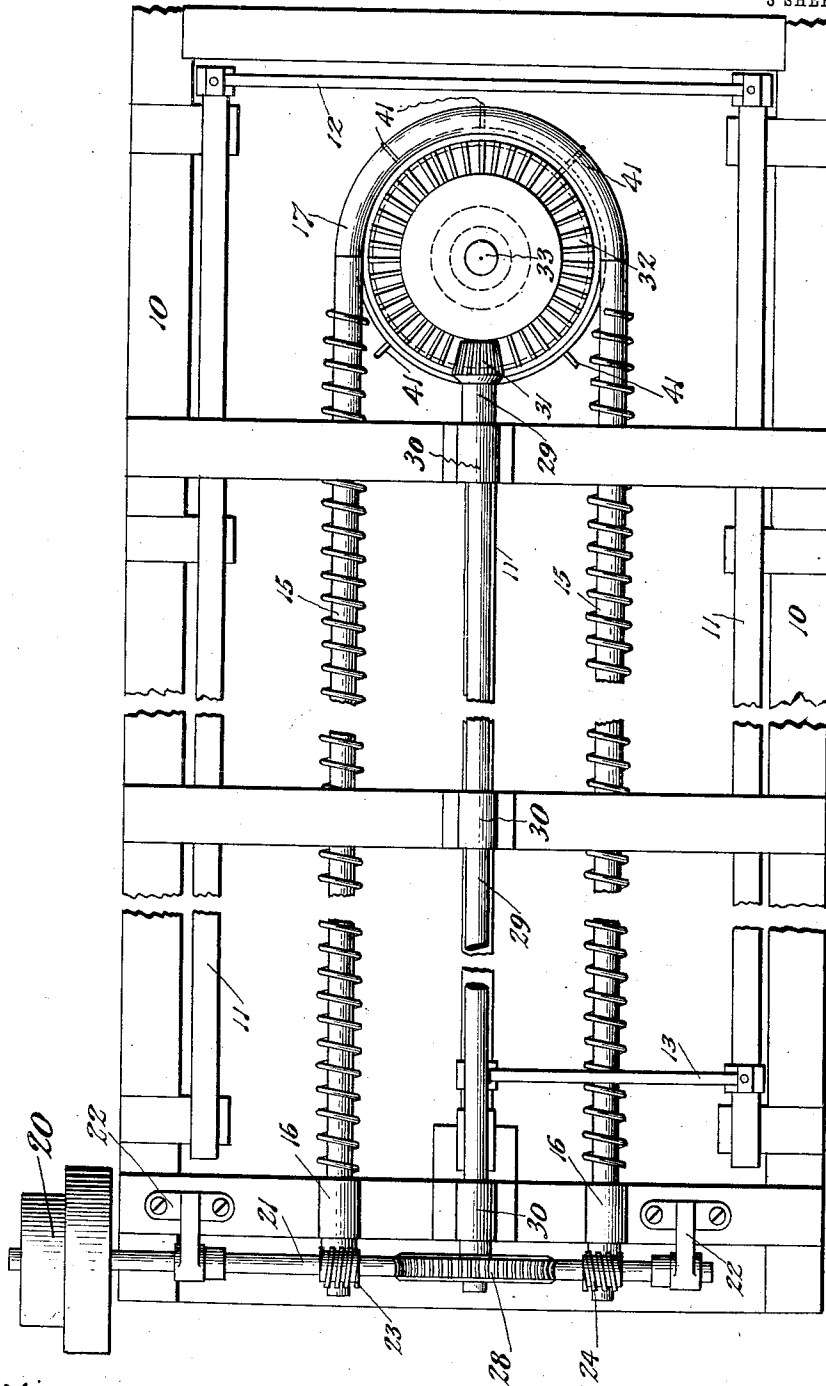


Fig. 1.

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3 SHEETS-SHEET 2.

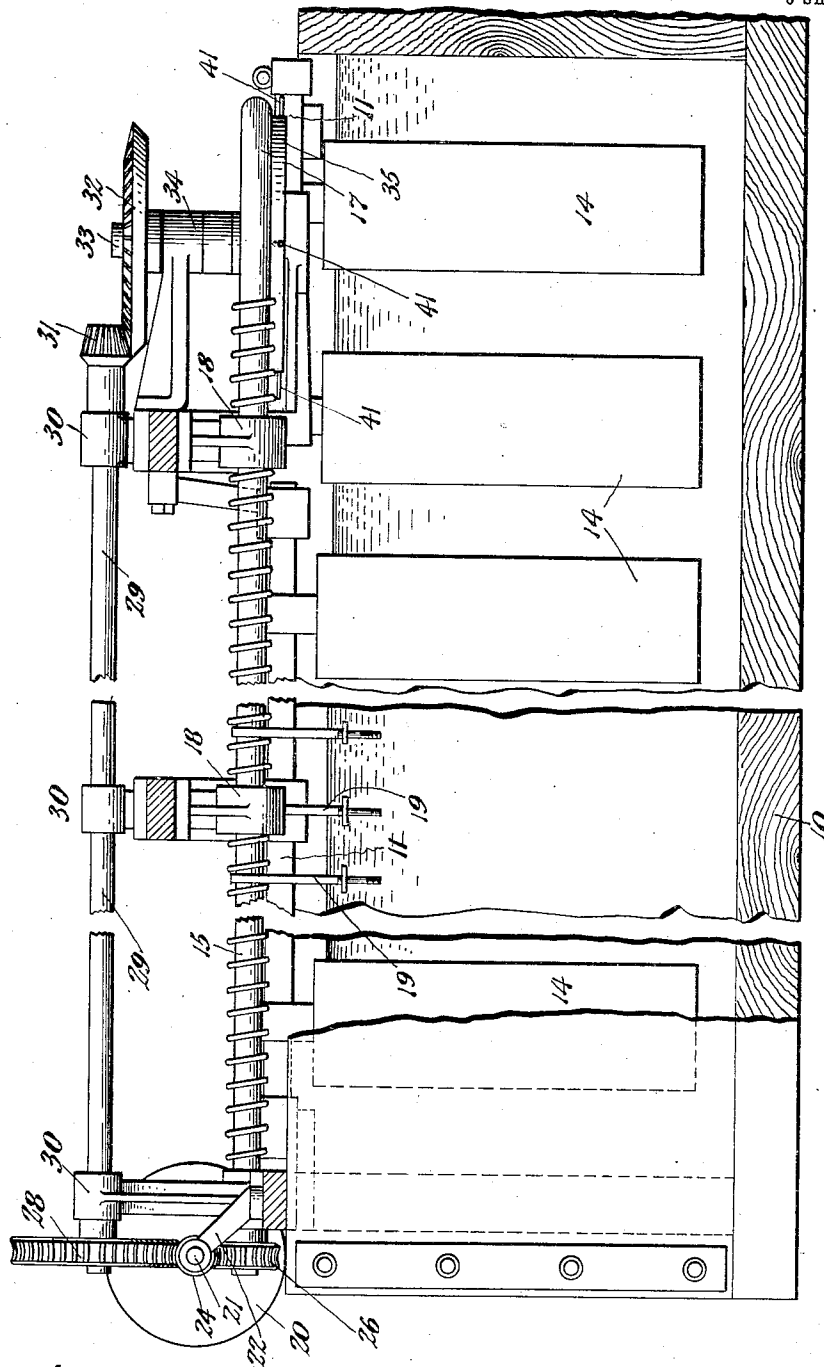


Fig. 2.

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3 SHEETS-SHEET 3.

Fig. 3.

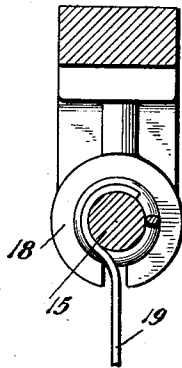


Fig. 4.

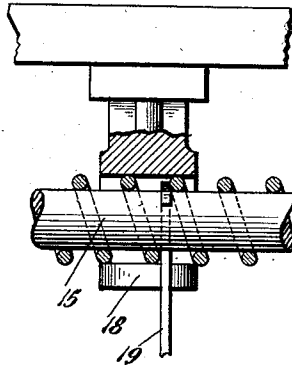


Fig. 5.

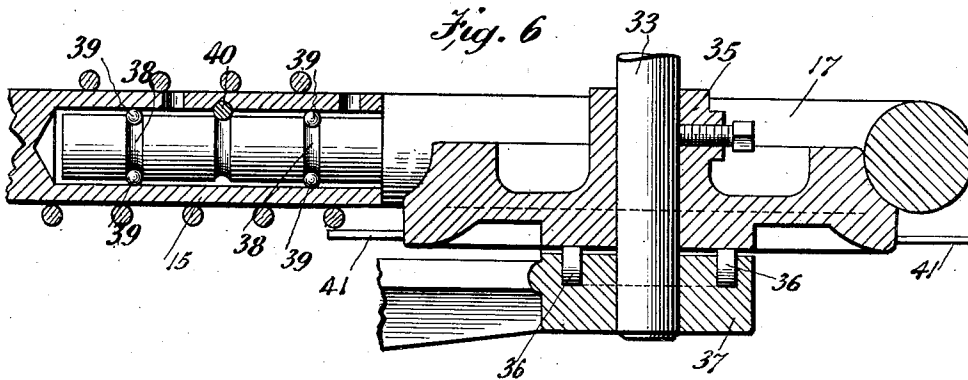
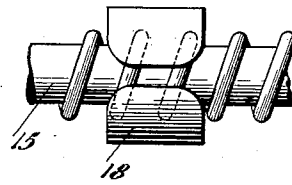
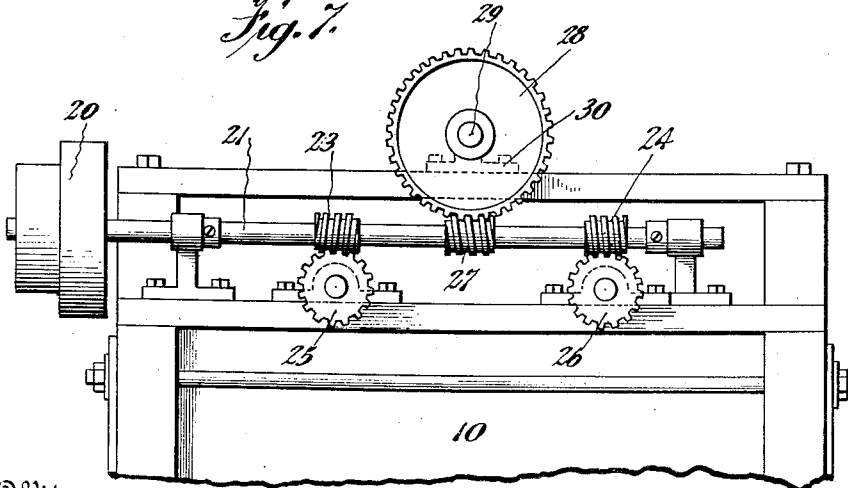


Fig. 7.



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UNITED STATES PATENT OFFICE.

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ELECTROPLATING APPARATUS.

1,108,145.

Specification of Letters Patent.

Patented Aug. 25, 1914.

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To all whom it may concern:

Be it known that I, JOHN T. DANIELS, a citizen of the United States, and a resident of Newark, county of Essex, New Jersey, have invented certain new and useful Improvement in Electroplating Apparatus, of which the following is a full and clear specification.

My invention relates to apparatus for subjecting articles to electro deposition or other electro-chemical or chemical action.

Certain features of my invention are peculiarly related to electrolytic action in which the current must be passed through the articles being treated. It has heretofore been proposed to mechanically convey the articles to be plated through the electro plating bath. The purpose of such apparatus is to secure uniformity of plating and economy of operation.

The present invention seeks to provide certain improvements in the apparatus for these purposes.

The objects of my present invention are more especially to improve the support and conveyance of the articles through the bath so as to increase the efficiency or economy of operation, and I accomplish these objects by providing an intermediate support or bearing for the conveyer rods or screws and by subdividing the conveyer or screw into a plurality of lengths successively traversed by the article carriers, and by providing mechanism for transferring the article carriers from one length of the conveyer rod or screw to another.

An apparatus in which the principles of my invention are embodied is shown by way of example in the accompanying drawing, in which—

Figure 1 is a top plan view of the apparatus; Fig. 2 is a side elevation of the apparatus with portions broken away; Figs. 3, 4 and 5 are respectively transverse and longitudinal sections and underneath plan of the intermediate support for the conveyer screws; Fig. 6 is a vertical section of the transfer apparatus and Fig. 7 is an end elevation showing the driving mechanism for the conveyer screws.

In apparatus herein shown 10 indicates the vat for containing the bath, and

11 the longitudinal anode rods interconnected by transverse conductors 12 and 13. In the present embodiment of my invention I show 3 anode rods 11, comprising two outer and one intermediate. The anodes 14 are hung on the anode rods 11, thereby subdividing the entire bath into two longitudinally extending lanes or spaces, through which successively it is designed to convey the articles to be plated. The number of lanes or spaces thus formed may of course be varied to suit requirements, by corresponding variations in the construction of the apparatus, but the construction and arrangement herein shown will be sufficient to illustrate the invention.

For conveying the articles through the spaces to either side of the inner line of anode rods I provide conveyer screws 15 extending longitudinally of the vat and disposed above the level of the bath, one on either side of the intermediate line of anode plates. The conveyer screws 15 may be constructed in any desired manner, but I have herein shown them as constructed of rods or shafts, on which are disposed conveyer coils. The conveyer screws are journaled at one end in suitable bearings 16, and at the other end on a stationary curved rod 17, as will be clearly shown. Intermediate of their two ends the rods are supported at suitable intervals by the intermediate supports or bearings 18, which as illustrated in Figs. 3, 4 and 5 are bifurcated to permit the passage of the cathode hangers 19, as clearly shown. For driving the two conveyer screws in opposite directions power is applied to belt pulley 20 fixed on shaft 21 suitably journaled in bearings 22 and carrying worm sections 23 and 24 of opposite pitch, which mesh with worm gears 25 and 26 respectively of the two conveyer screws. A worm section 27 is also provided on shaft 21 which operates a worm gear 28 fixed on longitudinal shaft 29 journaled in bearing 30. The other end of shaft 29 carries a bevel gear 31, which meshes with the bevel gear 32 fixed on a vertical shaft 33, which is journaled in a bearing 34 suitably mounted on the framework of the apparatus. Vertical shaft 33 has secured to it, as illustrated more clearly in Fig. 6, a transfer disk or wheel

35, which runs on roller bearings 36 mounted in a supporting arm 37 of the framework. The supporting arm 37 provides a bearing or guide for the lower end of vertical shaft 33 as shown. The transfer disk or wheel 35 is herein shown as having its periphery formed with an annular concave surface, conforming in radius with the stationary curved rod 17 above referred to, whereby the curved rod receives support. The curved rod serves as a transfer rod or support while the cathode hangers are being transferred from one conveyer screw to another, as will be shown. The two ends of the transfer rod thus constituted are reduced and provided with annular peripheral grooves 38, forming ball races for ball bearings 39, and a pin race for the key pin 40. The adjacent ends of the conveyer screws 15 are bored to fit over the reduced ends of the transfer rod 17, as clearly shown in Fig. 6, so as to bear on the ball bearings 39. The key pin 40 above referred to is inserted through a perforation near the end of the conveyer screw, whereby the transfer rod is retained in position upon the transfer disk 35.

Transfer disk 35 carries a series of radial fingers 41 which project outwardly from its periphery in a plane beneath the plane of the coils of the conveyer screws, which coils terminate within the vertical circumferential plane of fingers 41, but not in the path of the fingers.

The operation of the apparatus will now be apparent. The cathode hangers bearing the articles to be plated are hung upon the conveyer screws 15 at suitable intervals while the screws are rotating, and the hanger thus progresses on one of the conveyer screws toward the transfer rod 17 passes freely through the opening at the bottom of the intermediate supporting bearings 18, and when it arrives at the termination of the coil on the conveyer screw, it is engaged by one of the transfer fingers 41 of the rotary transfer disk 35. The hanger is thereby carried from the end of one conveyer screw onto the transfer rod 17 and finally delivered to the end of the other conveyer screw at a point where it will be engaged by the coil of the conveyer screw and started on its return through the bath. The negative terminal of the current is connected with the conveyer screws 15, so that the articles carried by the cathode hangers 19 become the cathode in the bath and are plated. The articles to be plated may be of such weight as to tend to distort the conveyer screws, but by the provision of the intermediate supporting bearings such tendency is rendered ineffective.

In the apparatus shown and described the articles to be plated are introduced and removed from the same end of the vat and in

order to maintain the cathode surface area substantially uniform in the electroplating operation, it is advisable to avoid variations in the number of the articles being plated. By the arrangement shown the maintenance of uniformity in this respect is facilitated as the operator standing at one end of the vat introduces a new article for each plated article withdrawn. The rheostat can therefore be adjusted in starting up operations to suit the particular requirements, but after the number of articles in the vat has reached full capacity no further regulation of the rheostat is necessary. The plating thus conducted is of highly uniform character and is independent of the judgment of the operator, as the conditions determining the character of the plating are mechanically controlled.

What I claim is:

1. In electrolytic apparatus the combination with a plurality of electrically conductive supporting and conveying screws, and electrically conductive hangers supported on and conveyed by said screws; of means for transferring said hangers from one of said conveyer screws to another, and means for supplying electric current to said supporting and conveying screws.

2. In electrolytic apparatus the combination with a vat, a plurality of electrically conductive supporting and conveying screws, electrically conductive hangers supported upon and conveyed by said screws and means for driving said conveyer screws; of means for transferring said hangers from one of said screws to another, and means for supplying electric current to said screws.

3. Apparatus of the character described, comprising in combination a tank adapted to contain a bath, conveyer screws mounted on said tank above the bath, hangers carried by said conveyer screws and extending into the bath, means for rotating said screws to effect the conveying operation, and means for transferring said hangers from one of said screws to another.

4. Apparatus of the character described, comprising in combination a tank adapted to contain a bath, a pair of conveyer screws mounted on said tank above the bath, hangers carried by said screws and extending into the bath, a stationary curved transfer rod connected with said conveyer screws, and a transfer wheel journaled on an axis perpendicular to the plane of the conveyer screws and transfer rod and provided with transfer fingers for moving the hangers from one of said conveyer screws to the other by way of said transfer rod.

5. Apparatus of the character described, comprising in combination a tank adapted to contain a bath, a pair of conveyer screws mounted on said tank above the bath,

hangers moved thereby, means for rotating
said screws to effect the moving operation,
a stationary curved transfer rod connected
with said conveyer screws, a transfer wheel
5 journaled on an axis perpendicular to the
conveyer screws and transfer rod and pro-
vided with transfer fingers for moving the

hangers from one of said conveyer screws to
the other by way of said transfer rod.

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