G. O. MORRISON & W. THOMPSON.

SECTIONAL REINFORCING ELECTROPLATING MACHINE.

APPLICATION FILED JUNE 2, 1916.

1,220,260.

Patented Mar. 27, 1917.

2 SHEETS—SHEET 1.

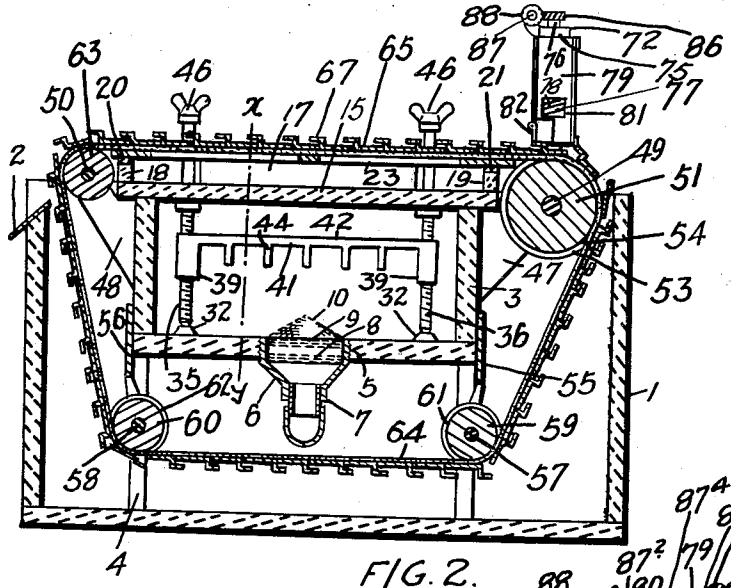


FIG. 2.

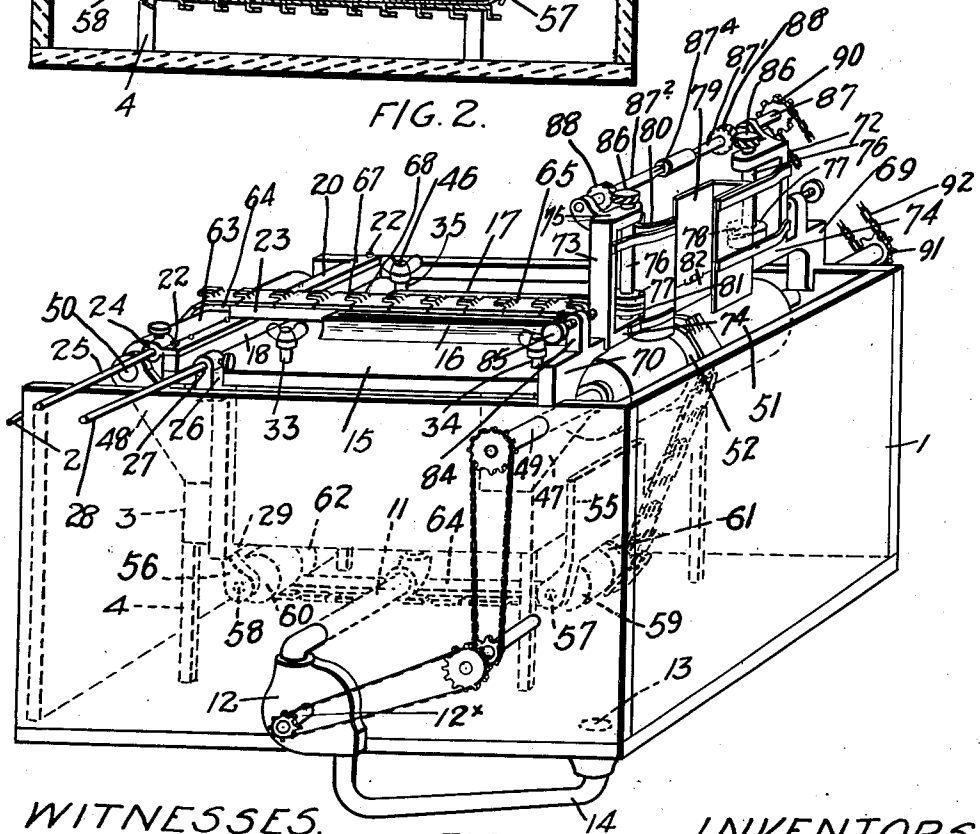


FIG. 1.

WITNESSES.

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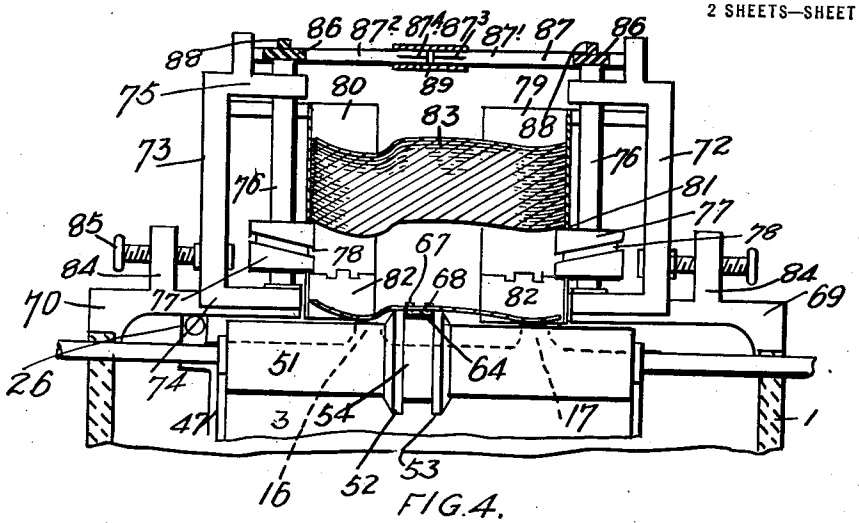


FIG. 4.

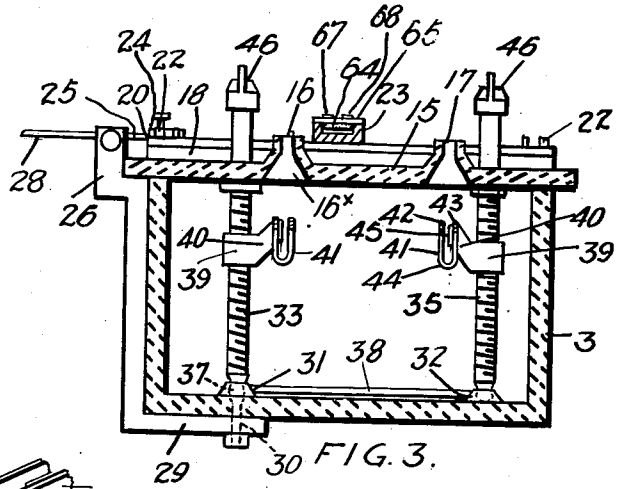


FIG. 3.

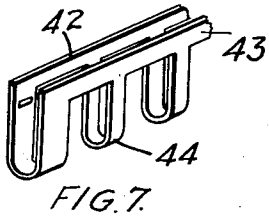


FIG. 7.

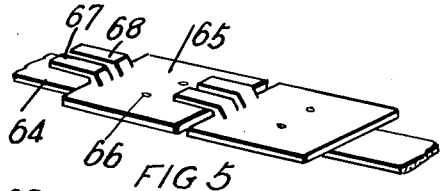


FIG 5



FIG. 6.

WITNESSES.

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UNITED STATES PATENT OFFICE.

GEORGE OSMAN MORRISON AND WILFRED THOMPSON, OF TORONTO, ONTARIO, CANADA.

SECTIONAL REINFORCING ELECTROPLATING-MACHINE.

1,220,260. Specification of Letters Patent. Patented Mar. 27, 1917.

Application filed June 2, 1916. Serial No. 101,337.

To all whom it may concern:

Be it known that we, GEORGE OSMAN MORRISON and WILFRED THOMPSON, both of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Sectional Reinforcing Electroplating-Machines, of which the following is the specification.

Our invention relates to improvements in sectional reinforcing electro-plating machines and the object of the invention is to provide a continuous automatic machine for reinforcing the electro-plating of the sections subject to wear on the back pieces of table silver and such a machine as will be economical both as to the consumption of the electrolytic solution and the labor involved, which will have a maximum capacity, in which the piece to be plated is exposed for a minimum length of time and thereby prevents the solution eating into the metal of the spool around the section plated and the consequent formation of a ridge around such section, which will allow of the piece being machine burnished for the purpose of finishing, by which the section plated will have a longer wearing quality, in which any thickness of plating can be given to such section and in which it is assured that every piece is plated equally without any liability of any piece being missed and it consists essentially of the following arrangement and construction of parts as hereinafter more particularly explained.

Figure 1, is a general perspective view of our machine.

Fig. 2, is a longitudinal section through Fig. 1 taken at one side of the conveyer belt.

Fig. 3, is a cross sectional view on line *x*—*y* Fig. 2.

Fig. 4, is an enlarged detail elevation of an automatic feeding device.

Fig. 5, is an enlarged perspective detail of a portion of the feeding belt.

Fig. 6, is a longitudinal sectional view through Fig. 5.

Fig. 7, is an enlarged perspective detail of one end portion of one of the anode members.

In the drawings, like letters of reference indicate corresponding parts in each figure.

1 indicates a receptacle or tank having an inclined spillway 2 extending across the tank at one end thereof. 3 indicates an inner tank supported within the outer tank 1 upon suitable legs 4 so as to provide a space for the solution all around and beneath the inner tank. 5 indicates an orifice formed in the bottom of the inner tank 3 in which is secured an inverted conical member 6 having a depending cylindrical portion 7. The conical member 6 forms a retainer for gauze screens 8 and 9 and conical screen 10 through which the solution passes into the inner tank 3 for the purpose of distributing the flow and taking away the momentum thereof so as to prevent it spouting up directly from the inlet orifice. 11 indicates a pipe connection extending from the cylindrical portion 7 of the conical member 6 horizontally through the wall of the outer tank 1. 12 indicates a rotary pump of any suitable design connected to the pipe 11 so as to pump the liquid thereinto. 13 indicates the outlet from the outer tank 1 which is connected by a pipe connection 14 to the rotary pump 12. 15 indicates a cover for the inner tank 3 in which are formed two longitudinally slotted spouts 16 and 17, the base of the interior of each spout being flared outwardly at 16× in order to allow of the free upward flow of the solution through the spout. 18 and 19 indicate cross pieces secured to the upper face of the cover 15 at each end thereof and on which are adjustably secured the metallic bars 20 and 21. The bars 20 and 21 are secured to the cross pieces 18 and 19 by set screws 22 located at each end thereof. By turning these set screws either one end or other of the bars may be raised up so as to give the bar more or less of a longitudinal tilt as required. 23 indicates a guide channel member secured at each end to the bars 20 and 21. 24 indicates a tubular boss formed integral with the bar 20 and forming the binding post connection for the cathode terminal 25.

26 indicates a bracket bar secured to the wall of the inner tank 3 and extending vertically thereof. The upper end is provided with a suitable orifice 27 into which extends the circuit terminal 28 for the anode. The lower end of the bracket has a right angular extension 29 which passes beneath the tank 3 and is provided with a bolt 30 extending through the bottom of the tank 3 so as to form a metallic conducting connection to the interior of the tank. 31 and 32 indicate

sockets suitably secured to the bottom of the tank 3 in proximity to each end thereof, there being a pair of sockets 31 on one side of the tank and a pair of sockets 32 on the opposite side of the tank, a socket 31 and 32 being at one end of the tank and a socket 31 and 32 at the opposite end of the tank. 33, 34, 35 and 36 indicate spindles having threaded lower portions and terminating at their lower ends in ball portions 37 fitting within the sockets 31 and 32, a socket and ball of the spindle 33 being in contact with the upper end of the bolt 30. 38 indicates a bar connecting one of the sockets 31 with one of the sockets 32. 39 indicate internally threaded sleeves screwed upon each of the spindles 31 and 32. Each sleeve 39 is provided with an upwardly projecting portion 40 to which are secured the anode members 41. The anode members comprise a pair of parallel bar portions 42 and 43 connected together by cross strips 44, the cross strips 44 being bent into U-form as clearly shown in Fig. 3. The anode member 41 is secured to the upwardly projecting portions 40 by means of a screw 45 or by any other suitable means allowing the threaded spindle to be adjusted individually and independently. Each of the spindles 33 is provided at its upper end with a wing nut 46 by which the spindle may be turned so as to adjust the anode member vertically thereon.

47 and 48 indicate brackets secured respectively to each end of the inner tank 3 at each side thereof so as to extend outwardly therefrom. 49 indicates a shaft journaled in the brackets 47 and 50 indicates a shaft journaled in the bracket 48. 51 indicates the main roller secured to the shaft 49 and provided with annular flanges 52 and 53 forming an annular guiding channel 54 therebetween. 55 and 56 indicate bearing brackets depending from the bottom of each end of the tank 3. 57 and 58 indicate shafts journaled in the brackets 55 and 56. 59 and 60 indicate rollers secured to the shafts 57 and 58 and provided with annular grooves 61 and 62 intermediately of their length. 63 indicates a roller secured to the shaft 50. 64 indicates a belt of rubber or other suitable material which will not be affected by the electrolytic solution. The belt 64 extends around the channel 54 of the roller 51, around the roller 63 and around the rollers 60 and 59. 65 indicate a series of clip plates secured by rivets 66 or by other suitable means to the belt 64. The plates 65 are arranged on the belt so as to be in close proximity one to the other but not so close as to touch one another.

67 and 68 indicate a pair of fingers extending forwardly from each plate 65 so as to overlap the next adjacent plate 65. The spoons or other articles of tableware when fed on to the belt are gripped by the fingers 67 and 68 so as to be pressed against the underlying end of the next adjacent plate.

We will now describe the means by which the spoon or other article of tableware is automatically fed on to the belt 64 so as to be gripped by the fingers 67 and 68 as above described.

69 and 70 indicate bracket members extending inwardly from each side of the outer tank 1 centrally over the ends of the rollers 51. 72 and 73 indicate U-shaped bracket members, the lower arms 74 of which are channeled so as to fit over the bracket members 69 and 70. 76 indicate vertical shafts journaled in the upper and lower arms 74 and 75 of the U-shaped brackets 72 and 73. 77 indicate drums mounted upon the vertical shaft 76 and provided with a spiral groove 78, the groove of one drum 77 extending in one direction and the groove of the other drum 77 in the opposite direction. 79 and 80 indicate vertical guideways suitably secured over the roller 51 at each side of the channel 54, the guideway 80 being in closer proximity to the channel than the guideway 79. Each guideway 79 and 80 is provided with an orifice 81 in the outwardly facing wall thereof through which the inner peripheral portion of each drum 77 extends. 82 indicate hinged flaps forming the lower end of the inner side of each guideway 79 and 80. 83 represents a stack or pile of spoons, the handle end and tip end of the lowermost spoon resting upon the upper edge of the inner peripheral portions of the drums 77.

84 indicates a lug extending outwardly from each of the members 69 and 70. 85 indicates a set screw extending through each of the lugs 84 and is suitably rotatably connected at its inner end to the bracket 72 or 73. By this means the bracket 72 or 73 may be adjusted inwardly or outwardly as desired so as to carry the drums 77 so as to engage the spoons to a greater or less extent as desired.

86 indicates a miter gear secured to the upper end of each spindle 76. 87 indicates a horizontal shaft divided into two members $87'$ and 87^2 on which is secured miter gears 88 engaging with each of the miter gears 86. The inner ends of the members of the shafts $87'$ and 87^2 are squared at 87^3 and 87^4 and fit into a sleeve 89 having a squared interior. By this means a continuous driving connection is formed which will allow of a free movement of the brackets 72 and 73 inwardly or outwardly as desired.

It will be noticed particularly on referring to Fig. 4 that the longitudinally slotted spout portions 16 and 17 are in alinement with the lower portion of the convex back of the spoon bowl and in a line with the lower convex portion of the spoon handle. These, it is well known, are the two parts of a

spoon which are subject to the most wear as they are the parts which are in contact with the surface of the table and are therefore, subject to more rubbing than any other part of the spoon.

The shaft 49 is the main driving shaft and 12× is the shaft of the rotary pump 12. The shaft 12× is driven from the main shaft 49 by a suitable sprocket gear connection capable of speeding up the rotation of the pump 12× in proportion to the rotation of the main shaft 49, the main shaft 49 traveling at a proportionately low rate of speed to the travel of the pump shaft 12×. The shaft 87 is provided with a sprocket gear 90 and the opposite end of the shaft 51 is provided with a sprocket gear 91 connected by a sprocket chain 92 to the sprocket 90.

Having described the principal parts involved in my invention I will briefly describe the operation of the same.

The pile of spoons 83 is placed in the vertical guideways 79 and 80 with the tip portion of the bowl resting on the upper edge of the inner peripheral portion of one of the drums 77 and the extreme end of the handle resting upon the same portion of the other drum 77. As the shaft 87 is rotated the miter gears 86 and 88 turn the spindles 76 in opposite directions so that the upper end of the spiral groove 78 of each drum simultaneously engages with the tip of the bowl and the end of the handle of the lowermost spoon separating it from the pile and carrying it downward into position so that the base portion of the handle in proximity to the bowl of the spoon rests upon one of the clip plates 65 secured to the belt 64. The belt 64 is driven to revolve continuously when the spoon is brought into this position. The spoon is therefore, carried beneath the forwardly projecting fingers 67 and 68 of the next adjacent plate 64. As the next adjacent plate travels upwardly around the roller 51, the fingers 67 and 68 engage the spoon thereby pressing the handle of the spoon down against the underlying portion of the next adjacent plate 65. The spoon is then carried forwardly. Simultaneously with this operation the pump 12 is driven from the shaft 49 and the electrolytic solution circulated so as to be drawn through the outlet orifice 13, through the pipe 14, pump 12, pipe 11 into the inner receptacle 3 and is forced upwardly through the slotted spouts 16 and 17. The solution then passes downwardly from the spouts and returns to the main tank 1 over the top 15 of the inner tank 3. As the spoons are carried forwardly as above described the sections of the spoon to be treated are brought over the spouts 16 and 17. As soon as they are brought over the spouts and the liquid comes in contact therewith electrolytic action takes place, the circuit passing from the anode terminal 27 through the bracket 29, the bolt 30, and spindle 33, to the anode 41, to the electrolytic liquid and then through the spoon itself through which the circuit passes to the plates 65, channel 23, bar 20 and to the terminal 24.

It will thus be seen that as the spoons are carried forward over the spouts that new solution is continuously coming into contact with the metal of the spoons and thereby lays film upon film of plating upon the spoon.

It will also be noted that as the spoon forms part of the circuit and that the plates 65 are so arranged that the spoon is gripped between the fingers 67 and 68 of one plate overlapping the rear end of the next adjacent plate that the circuit extends through such plates and that it, therefore, would not make any difference whether every plate gripped a spoon or whether only one of the plates gripped a spoon the circuit would remain unbroken in either case and the operation would be uninterrupted, and that, therefore, there would be no tendency of any of the spoons being missed.

It will also be noted that by continuously circulating the liquid a great economy takes place in its consumption and that the operation is, therefore, necessarily very much quicker as the spoon does not have to remain dipped for hours in a solution but is plated by repeated contact of the solution with the article to be plated as the solution bubbles up through the spout portions 16 and 17.

By our device also the spoons are automatically fed into position and it, therefore, dispenses with the labor otherwise involved in arranging and placing the spoons manually in position and setting them so that they will be equally in contact with the electrolytic solution.

What we claim as our invention is:

1. In a sectional reinforcing electroplating machine, a tank designed to hold a suitable electrolyte, cathode and anode members co-acting therewith, means for passing a piece of silverware over the surface of the liquid with the portion to be reinforced in contact therewith, and means for circulating the liquid into contact with such portion.

2. In a sectional reinforcing electroplating machine, a tank designed to contain a suitable electrolyte, cathode and anode members co-acting therewith, means for carrying pieces of silverware over the surface of the liquid, and means for circulating the liquid so as to form ebullitions in contact with the portion of the piece of silverware to be reinforced.

3. A sectional reinforcing electro-plating machine comprising an inner electrolytic tank having an inlet at the bottom, a cover therefor, a slotted outlet mouth formed in the cover, an outer tank, means for circu-

lating the liquid from the outer tank into the bottom of the inner tank and upwardly through the slotted mouth to overflow and return into the outer tank, and means for conveying a piece of silverware longitudinally of the slotted mouth so that the portion to be reinforced is in contact with the overflowing liquid, an anode contacting with the electrolyte and a cathode member contacting with a piece of silverware.

4. A sectional reinforcing electro-plating machine comprising an inner electrolytic tank having an inlet at the bottom, a cover therefor, a slotted outlet mouth formed in the cover, an outer tank, means for circulating the liquid from the outer tank into the bottom of the inner tank and upwardly through the slotted mouth to overflow and return to the outer tank, and means for automatically conveying pieces of silverware successively over the slotted mouth with the portions to be reinforced in contact with the overflowing liquid.

5. A sectional reinforcing electro-plating machine comprising an inner electrolytic tank having an inlet at the bottom, a cover therefor, a slotted outlet mouth formed in the cover, an outer tank, means for circulating the liquid from the outer tank into the bottom of the inner tank and upwardly through the slotted mouth to overflow and return into the outer tank, means for diffusing the upward flow extending from the bottom orifice of the inner tank to the slotted mouth, and means for conveying a piece of silverware longitudinally of the slotted mouth so that the portion to be reinforced is in contact with the overflowing liquid, an anode electrically contacting with an electrolyte and a cathode member electrically contacting with a piece of silverware.

6. In a sectional reinforcing electroplating machine, an electrolytic tank having an inlet at the bottom and a slotted outlet orifice in the top, means for forcing the liquid upwardly through the slotted outlet orifice, an anode member supported in the tank beneath the outlet orifice, a cathode member, and a conveyer for carrying a piece of silverware longitudinally of the slotted orifice and forming an electrical connection between the cathode member and the piece of silverware.

7. In a sectional reinforcing electroplating machine, an electrolytic tank having an inlet orifice at the bottom and a slotted outlet orifice in the top, means for circulating the liquid upwardly through the tank through the slotted orifice, means for conveying a piece of silverware longitudinally of the slotted orifice in contact with the overflowing electrolyte, a cathode member electrically connected through such conveyer to the piece of silverware, and an anode member located within the tank and adjustably supported beneath the outlet slot.

8. In a sectional reinforcing electroplating machine, the combination with a tank designed to hold a suitable electrolyte having a slotted outlet orifice in the top, of an anode member supported within the tank beneath the slot, and means for adjusting the anode member vertically.

9. In a sectional reinforcing electroplating machine, the combination with a tank designed to hold a suitable electrolyte having a slotted outlet at the top and means for forcing the liquid through such slotted outlet, of a pair of threaded spindles supported in the top and bottom of the tank in proximity to each end of the slotted outlet, a sleeve screwed upon each of the threaded spindles, and an anode member supported thereby.

10. In a sectional reinforcing electroplating machine, the combination with a tank designed to hold a suitable electrolyte having a slotted outlet at the top and means for forcing the liquid through such slotted outlet, of a pair of threaded spindles supported in the top and bottom of the tank in proximity to each end of the slotted outlet, a sleeve screwed upon each of the threaded spindles, and an anode member pivotally secured at each end to one of the sleeves.

11. In a sectional reinforcing electro-plating machine, the combination with a tank designed to hold a suitable electrolyte having a slotted outlet at the top, and means for forcing the electrolyte through such slotted outlet, of an automatic conveyer designed to carry pieces of silverware longitudinally of the slot with the portion to be reinforced in contact with the overflowing liquid.

12. In a sectional reinforcing electro-plating machine, the combination with a tank designed to hold a suitable electrolyte having a slotted outlet at the top and means for forcing the liquid through such slotted outlet, of a chute designed to hold pieces of silverware in stack formation, and means for automatically successively separating each spoon from the stack and conveying it longitudinally of the slotted outlet with the portion to be reinforced in contact with the liquid.

13. In a sectional reinforcing electro-plating machine, the combination with an electrolytic tank having a slotted outlet in the top thereof and means for forcing the liquid through such slotted outlet, of a continuously driven endless belt conveyer running parallel with the slotted outlet, and a series of plates secured to the belt and each having fingers extending forwardly over the next adjacent plate between which and the plate

the piece of silverware is designed to be gripped so as to carry the portion to be reinforced longitudinally of the slotted outlet in contact with the overflowing electrolyte.

14. In a sectional reinforcing electro-plating machine, the combination with an electrolytic tank having a slotted outlet in the top thereof and an anode member supported within the tank, of a channel guideway supported parallel to the slotted outlet, a continuously driven belt conveyer extending through the channel guideway, a series of clip plates secured to the belt conveyer and overhanging the sides of the conveyer in contact with the sides of the channel guideway, means carried by each plate for gripping a piece of silverware against the next adjacent plate, and a cathode member in electrical contact with the channel member.

15. In a sectional reinforcing electro-plating machine, the combination with a tank designed to hold a suitable electrolyte having a slotted mouth in the top and means for forcing the electrolyte through such slotted mouth to overflow, of a conveyer extending parallel with the slotted mouth, a pair of chutes supported above the belt at each side thereof, a revolving drum having a spiral groove extending into each chute and on which the ends of a stack of silverware are supported within the chutes, and the groove of which is designed to successively engage each piece of silverware to separate it from the stack and convey it downwardly onto the belt.

16. In a sectional reinforcing electro-plating machine, the combination with a chute designed to hold pieces of silverware in stack formation and an electrolytic tank, of means for automatically separating each piece successively from the stack and conveying it into and out of contact with the electrolyte contained in the tank.

17. In a sectional reinforcing electro-plating machine, the combination with a chute designed to contain pieces of silverware in stack formation and an electrolytic tank, of a pair of revolving drums having means designed to successively engage each piece forming the stack and separate it therefrom and convey it into and out of contact with the electrolyte contained in the tank.

18. In a sectional reinforcing electro-plating machine, the combination with a chute designed to contain pieces of silverware in stack formation and an electrolytic tank, of a pair of revolving drums having a spiral groove, the upper end or mouth of which is designed to successively engage with each piece of silverware to separate it from the stack and carry it into and out of contact with the electrolyte contained in the tank.

19. In a sectional reinforcing electro-plating machine, the combination with an electrolytic tank having a slotted outlet in the top thereof and means for forcing the liquid through such slotted outlet, of a continuously driven endless belt conveyer running parallel with the slotted outlet, and a series of independent clip members carried thereby each having portions overlapping the next adjacent member and designed to grip a piece of silverware between the overlapping portions and carry it longitudinally of the slotted outlet with the portion to be reinforced in contact with the liquid.

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Witnesses:
M. EGAN,
V. LONG.