

Nov. 24, 1925.

1,563,041

F. G. PURINTON

ELECTROPLATING APPARATUS

Filed Sept. 7, 1923

2 Sheets-Sheet 1

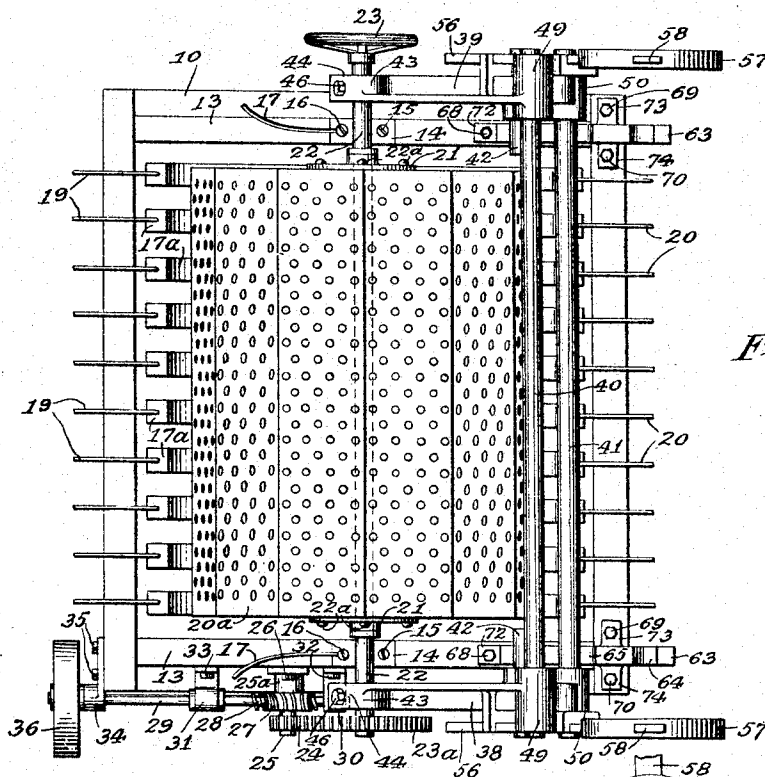


Fig. 1

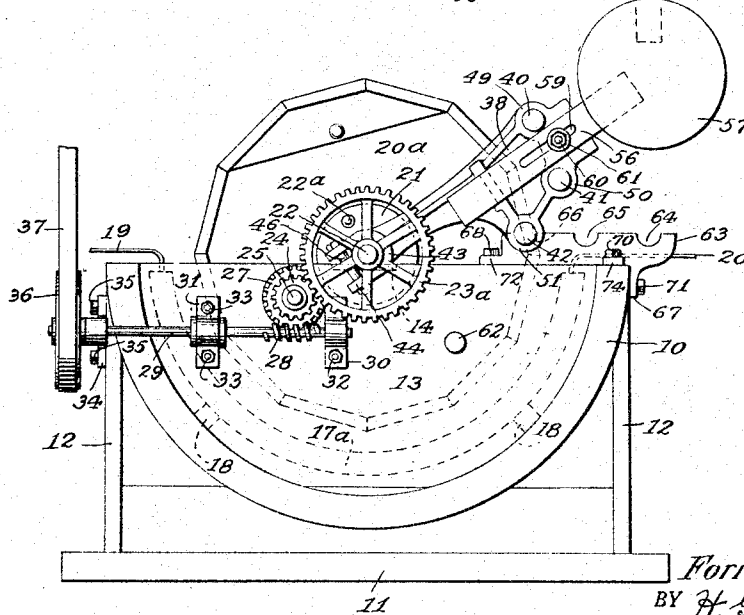


Fig. 2

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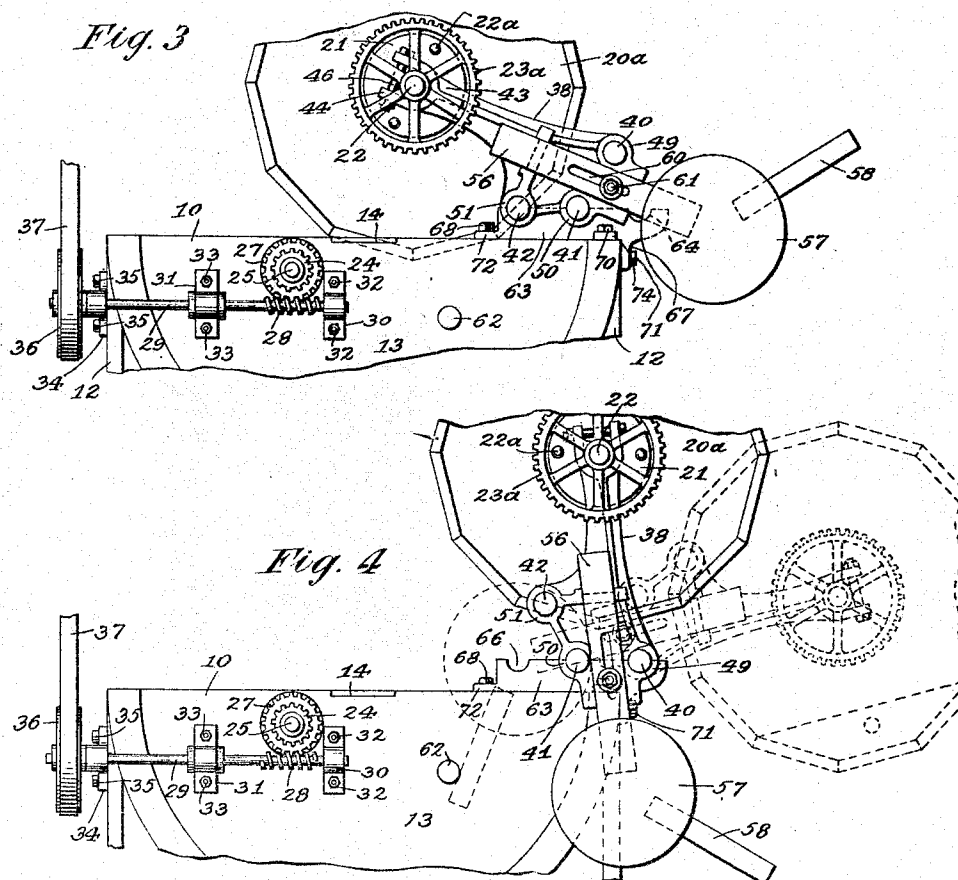
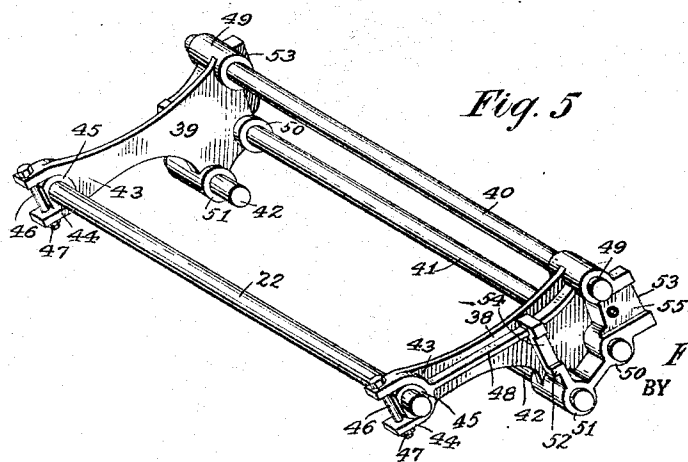
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UNITED STATES PATENT OFFICE.

FORREST G. PURINTON, OF WATERBURY, CONNECTICUT.

ELECTROPLATING APPARATUS.

Application filed September 7, 1923. Serial No. 661,340.

To all whom it may concern:

Be it known that I, FORREST G. PURINTON, a citizen of the United States, and a resident of Waterbury, county of New Haven, and State of Connecticut, have invented certain new and useful Improvements in Electroplating Apparatus, of which the following is a specification.

This invention relates to electroplating and more particularly to an electroplating apparatus employing a rotary barrel or drum within which a large quantity of small articles in bulk are adapted to be tumbled during the plating operation.

One object of this invention is to provide an apparatus of this nature having a plating barrel which may be easily and quickly lowered by a single operator into and raised from the plating tank and moved into draining and dumping positions without the use of gearing, overhead cranes, trolleys, or other complicated mechanism.

A further object is to provide an apparatus of this nature in which the shaft of the plating barrel is supported in a rigid trunnion frame which is adapted to be successively rocked upon a series of fulcrums on the plating tank to move the barrel from plating into draining and dumping positions.

A further object is to provide means for counterbalancing the weight of the barrel and contents so that the barrel will remain in stable equilibrium in any of its operating positions.

A further object is to provide an electroplating apparatus of the above nature which will be relatively simple, cheap to manufacture, easy to manipulate, and very efficient and durable in use.

With these and other objects in view, there has been illustrated on the accompanying drawings one form in which the invention may be conveniently embodied in practice.

Fig. 1 is a top plan view of an electroplating apparatus embodying the principles of the invention, the barrel being shown in plating position.

Fig. 2 is a side elevation of the same.

Fig. 3 is an end view of the apparatus, with parts broken away, and showing the barrel in draining position.

Fig. 4 is an end view of the apparatus, with parts broken away, showing the barrel in intermediate position, and also showing by dotted lines the location of the trunnion

frame and plating barrel in dumping position.

Fig. 5 is a perspective view of the trunnion frame as it appears when detached from the remainder of the apparatus.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout the several views, the numeral 10 indicates a tubular semicylindrical tank for containing the plating solution, said tank being supported by horizontal base members 11 and vertical end members 12. The tank 10 is closed at its ends by a pair of vertical semicircular head members 13 which are provided at their horizontal top portions with a pair of centrally located metallic plates 14 for supporting a barrel shaft, to be hereinafter more fully described. The plates 14 are embedded in the material of the heads so as to lie flush with the top surfaces thereof, and are held in position by a pair of set screws 15 and 16, the set screws 16 also serving as binding posts for a pair of conducting wires 17 leading to the cathode bus bars, not shown. A series of semicircular anodes 17^a, ten in this instance, and preferably rectangular in cross section are located in the semicylindrical tank 10, being supported therein by the longitudinal rectangular strips 18. Each of the anodes 17^a is connected at its ends to a pair of conducting wires 19 and 20 leading to the anode bus bars, not shown.

The articles to be plated are located in a revolving drum or barrel 20^a which may be of any suitable dimensions, but preferably is substantially cylindrical and which is herein illustrated as having the shape of a regular polygon. The barrel 20^a is adapted to rotate in the tank 10, and is adapted to be lowered into said tank until the shaft rests upon the contact plates 14, at which time the barrels will be concentric with the anodes 17^a. The barrel 20^a is provided with a pair of circular metallic end flanges 21, which are rigidly mounted upon a barrel shaft 22, and said flanges are rigidly secured as by bolts 22^a to the barrel heads. The shaft 22 is constructed of metal so that during the plating operation, it will conduct the current from the metallic plates 14 to the cathodes, not shown, which are located inside the barrel or drum. The shaft 22 is provided at one end with a hand wheel 23, by means of which, after the barrel has been

swung to dumping position, it may be rotated so as to bring the barrel into convenient position for removing the plated articles and recharging the barrel with a fresh supply of unplated articles. The shaft 22 is provided on its other end with a large barrel-rotating gear 23^a, said gear being adapted to mesh with a pinion 24 mounted on a stud shaft 25 parallel to the barrel shaft 22. The stud shaft 25 is mounted in a bearing 25^a, the latter being secured to the front head of the tank 10 in any suitable manner as by means of studs 26.

The stud shaft 25 is provided with a worm gear 27 adapted to mesh with a worm 28 located on a worm shaft 29. The worm shaft 29 is rotatably mounted in a pair of straps 30, 31 which are secured to the front head of the tub by means of bolts 32, 33, respectively. The worm shaft 29 extends laterally beyond the left-hand vertical support 12 of the tank, as viewed in Fig. 2, and is mounted at its exterior end in a vertical side bracket 34, said bracket being secured to the left-hand side of the tank, by the bolts 35. A pulley 36 is rigidly mounted on the end of the worm shaft, and is adapted to be operated by a belt 37 in order to rotate the barrel to cause the work to be tumbled during the plating operation.

In order to permit the barrel to be manually rocked out of its plating position into its draining and dumping positions, a pair of trunnion plates 38 and 39 and two trunnions 40, 41, are provided. As most clearly shown in Fig. 5, the plates 38 and 39 and the trunnions 40 and 41 form a rigid structural unit which is capable of assuming any one of four positions of equilibrium corresponding to the plating position, draining position, intermediate position, and dumping position of the barrel. A pair of short trunnions 42 are also provided. Each of the trunnion plates 38 and 39 is reduced in width at one end 43, where it is provided with a yoke 44, said yoke being adapted to surround a flattened collar 45 on the barrel shaft 22. The collars 45 form bearings for the ends of the barrel shaft 22. The yokes 44 are held rigidly in position upon the collars 45 by means of bolts 46 and nuts 47.

Each trunnion frame is provided on its outer face with a longitudinal strengthening rib 48, and also has three enlarged hollow bearing sections 49, 50, and 51 adapted to fit over the ends of the trunnions 40, 41, and 42 respectively, said trunnions being secured in said bearing sections in any suitable manner as by taper pins or set screws, not shown. Each of the trunnion plates 38 and 39 is also provided with a transverse rib 52 and a longitudinal rear projection 53, said transverse rib 52 and rear projection 53 having aligned recesses 54 and 55 located therein to adjustably receive a rectangular

arm 56 connected to a counterweight 57. The counterweight 57 preferably has the shape of a cylindrical disk and is provided with a handle 58 extending from its outer edge for convenience in manipulation. The counterweight arms 56 are slotted intermediate their ends at 59, and are adapted to be held in any adjusted position upon the trunnion plates 38 and 39 by means of cap screws 60 and washers 61. Each head of the barrel is also provided with a projecting stud 62 which form abutments for the handles 58 to serve as a stop for the trunnion units in dumping position.

The trunnion plates are adapted to be supported in a pair of blocks 63, one of which is mounted on the right-hand end of each head of the tank 10. The blocks 63 are provided in their top faces with three aligned semicircular recesses 64, 65, and 66 adapted to form seats for the trunnions 40, 41, and 42 respectively. Each of the blocks 63 is provided with a depending lug 67 and is secured in position upon the tank by means of four screws 68, 69, 70, and 71 passing through attaching ears 72, 73, 74, and the lug 67 respectively.

In operation, when the articles have been sufficiently plated, the operator will grasp one handle 58 of the counterweight 57 in each hand and swing the trunnion unit until the plating barrel moves up out of the tank to the draining position shown in Fig. 3. During this operation, the recesses 65 and 66 of the trunnion blocks 63 will serve as bearings for the trunnions 42 and 41 respectively. After the barrel has been allowed to drain sufficiently, the operator will again grasp the handles 58 and swing the trunnion unit still farther, using the recesses 65 of the trunnion blocks 63 as fulcrums until the trunnion 40 seats in the recess 64. The parts will then be in the intermediate position shown in Fig. 4. When it is desired to move the barrel from the intermediate position to the dumping position, the operator will continue the swinging of the trunnion unit from the full line to the dotted position as shown in Fig. 4. The trunnion unit will then be supported by the recess 64 and the stud 62. The barrel 20 may then be rotated by means of the handle 22 to bring the opening thereof to the bottom after first removing the cover. The plated articles will then fall out by gravity into any suitable receptacle, not shown. The barrel may then be rotated until the opening is at the top, at which time a new charge of unplated articles may be introduced. The cover will then be replaced and the barrel swung back into the plating position, previously described.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood

that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosure, but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

1. In an electroplating apparatus, a plating tank, a frame adapted to rock upon said tank, means to support said frame in equilibrium in separate plating, draining and dumping positions, a rotary plating barrel carried by said frame, a counterweight secured to said frame to counterbalance the weight of said barrel and contents, whereby said barrel will remain in equilibrium in its plating, draining, and dumping positions.

2. In an electroplating apparatus, a plating tank adapted to contain a plating solution, a rocking frame, a support for said frame mounted on said tank, a rotary plating barrel carried by said frame, said frame having three separate positions of equilibrium upon said support corresponding to the plating, draining, and dumping positions of said barrel.

3. In an electroplating apparatus, a plating tank, a trunnion frame adapted to rock upon said tank, said frame comprising a pair of side plates connected by a series of trunnions and a shaft, a rotary plating barrel rotatably mounted upon said shaft, a pair of supports for said plates mounted on said tank, said trunnions and shaft being parallel to each other, said frame being adapted to be supported in equilibrium in a plurality of positions corresponding to the plating, draining, and dumping positions of the barrel.

4. In an electroplating apparatus, a plating tank, a rocking trunnion frame mounted on said tank, a shaft on said frame, a plating barrel mounted to rotate on said shaft, said frame having a plurality of positions of equilibrium corresponding to the three separate plating, draining, and dumping positions of the barrel, said frame being adapted to be manually rocked about said tank, whereby the barrel will be caused to move successively from plating into draining and dumping positions.

5. In an electroplating apparatus, a plating tank adapted to contain a plating solution, a pair of parallel supports mounted upon the top of said tank, each of said supports having a plurality of recesses, a plurality of trunnions adapted to seat in said recesses, said trunnions being connected by a pair of end plates to form a rigid frame, a barrel shaft supported by said plates, a plating barrel mounted on said shaft, where-

by said frame will have a series of positions of stable equilibrium corresponding to the plating, draining, and dumping positions of the barrel.

6. In an electroplating apparatus, a plating tank adapted to contain a plating solution, a pair of parallel supports mounted upon the top of said tank, each of said supports having a plurality of recesses, a plurality of trunnions adapted to seat in said recesses, said trunnions being connected by a pair of end plates to form a rigid frame, a barrel shaft rotatably mounted in said plates, a plating barrel rigidly mounted on said shaft, whereby said frame will have a series of positions of stable equilibrium corresponding to the plating, draining, and dumping positions of the barrel.

7. In an electroplating apparatus, a plating tank adapted to contain a plating solution, a rocking frame adapted to be supported by said tank, a plating barrel carried by said frame, said frame having a series of stable positions corresponding to the three separate plating, draining, and dumping positions of the barrel, and means whereby the electrical circuit of said plating apparatus will be automatically closed when the barrel is in plating position.

8. In an electroplating apparatus, a box-shaped plating tank adapted to contain a plating solution, a frame for said tank comprising a series of vertical supports located on the periphery of said tank, cross pieces connecting said vertical supports at the tops and bottoms thereof, a series of horizontal supporting strips resting upon said bottom cross pieces, and a platform mounted on said supporting strips for supporting said plating tank.

9. In an electroplating apparatus, a framework, a plating tank supported in said framework, a plating barrel adapted to rotate in said tank, a rocking frame adapted to rest in equilibrium on a plurality of fulcrums for supporting said plating barrel in a corresponding plurality of working positions.

10. In an electroplating apparatus, a plating tank adapted to contain a plating solution, an anode, a metallic shaft, a plating barrel mounted thereon, a cathode connected to said shaft, said shaft having its ends extending beyond the heads of said barrel, a pair of contact plates located on the ends of said tank beneath said shaft, whereby the electrical circuit will be complete when said barrel is in plating position, a rocking frame supported by said tank and carrying said barrel, said frame having a plurality of fulcrums, whereby said barrel may be rocked from plating to draining and dumping positions.

11. In an electroplating apparatus, a plating tank adapted to contain a plating solu-

tion, an anode, a metallic shaft, a plating barrel mounted thereon, a cathode connected to said shaft, a pair of contacts located on the ends of said tank beneath said shaft, whereby the electrical circuit will be complete when said barrel is in plating position, a rocking frame supported by said tank, and carrying said barrel, whereby said barrel may be rocked from plating to draining and dumping position.

12. In an electroplating apparatus, a plating tank, an anode in said tank, a plating barrel containing a cathode mounted to rotate in said tank, a trunnion frame for holding said barrel, said frame having a series of supporting trunnions adapted to rest in a series of alined recesses in the sides of said tank, said frame being adapted to be interchangeably shifted manually into plating, draining, or dumping positions at the will of the operator.

13. In an electroplating apparatus, a plating tank, an anode in said tank, a plating barrel containing a cathode mounted to rotate in said tank, a rigid trunnion frame for holding said barrel, said frame having a series of supporting trunnions adapted to rest in a series of alined recesses in the sides of said tank, said frame being adapted to be interchangeably shifted manually into plating, draining, or dumping positions at the will of the operator.

14. In an electroplating apparatus, a plating tank, a trunnion frame adapted to rock upon said tank, a rotary plating barrel carried by said frame and adapted to receive a quantity of articles to be plated, and means for maintaining said barrel in equilibrium

in either plating, draining, or dumping positions.

15. In an electroplating apparatus, a plating tank, a trunnion frame adapted to be rocked about said tank and supported thereby in a series of positions, a barrel rotatably mounted in said frame and adapted to receive a quantity of articles to be plated, and means for counterbalancing the weight of said barrel and plating articles, to permit said barrel to remain in equilibrium in either plating, draining, or dumping positions.

16. In an electroplating apparatus, a plating tank, a rocking frame supported upon said tank, said frame comprising a pair of rigidly connected side plates, a shaft mounted to rotate in said side plates, a rotary plating barrel mounted on said shaft, said frame being adapted to be supported in equilibrium in a plurality of positions corresponding to the plating, draining, and dumping positions of the barrel.

17. In an electroplating apparatus, a plating tank adapted to contain a plating solution, a rocking frame adapted to be supported by said tank, a plating barrel carried by said frame, barrel-rotating means, means for driving said barrel-rotating means, said barrel-rotating means being adapted to be automatically disengaged from said driving means when said barrel is raised out of plating position and to be automatically engaged therewith when said barrel is lowered into plating position.

In testimony whereof, I have affixed my signature to this specification.

F. G. PURINTON.