July 5, 1927. 1,634,849

E. B. POWELL

ELECTROPLATING MACHINE

Filed July 16 1926 2 Sheets-Sheet 1

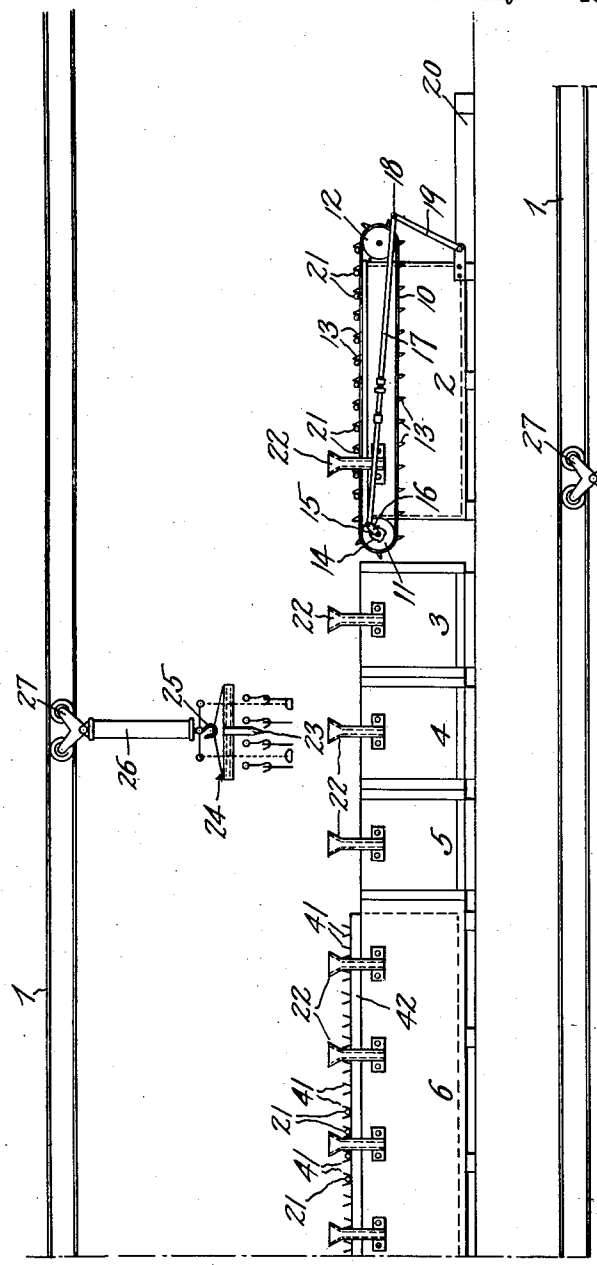


Fig. 1.

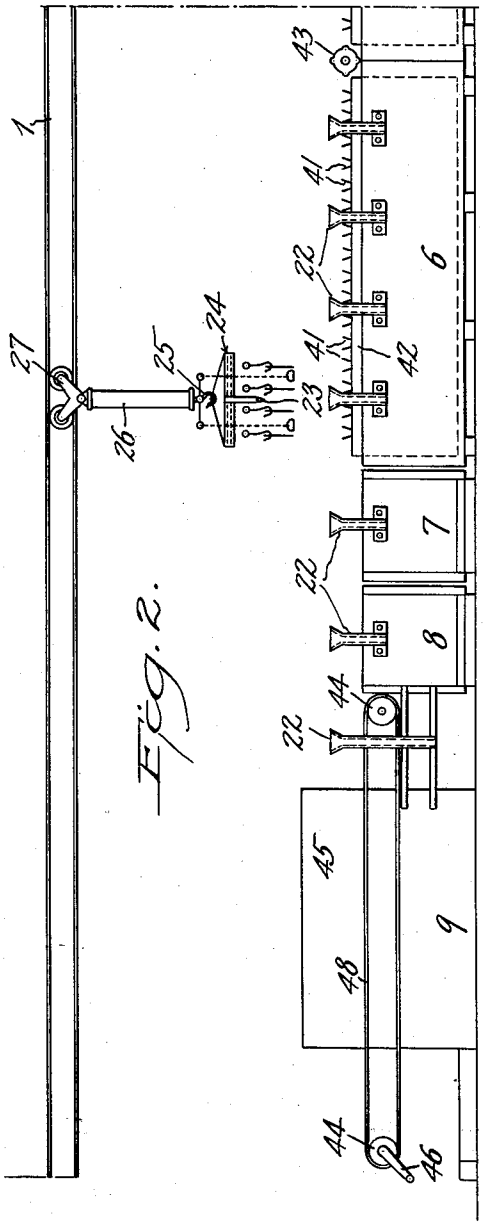


Fig. 2.

WITNESS

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Fig. 3.

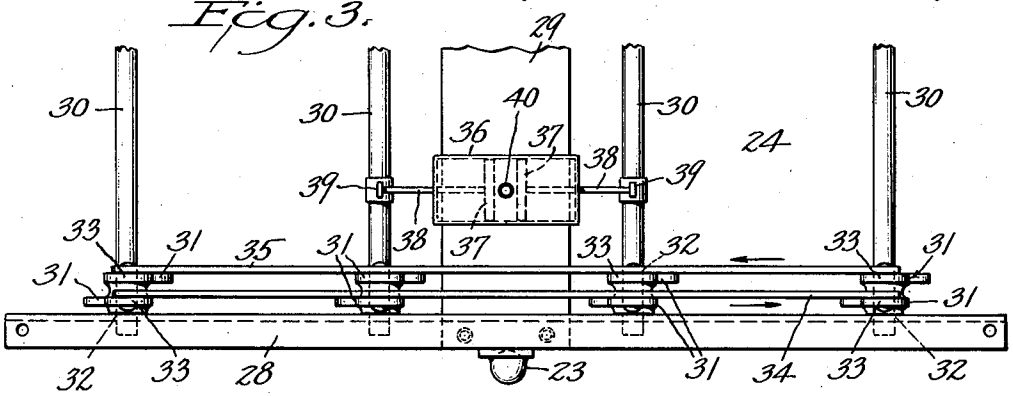


Fig. 4.

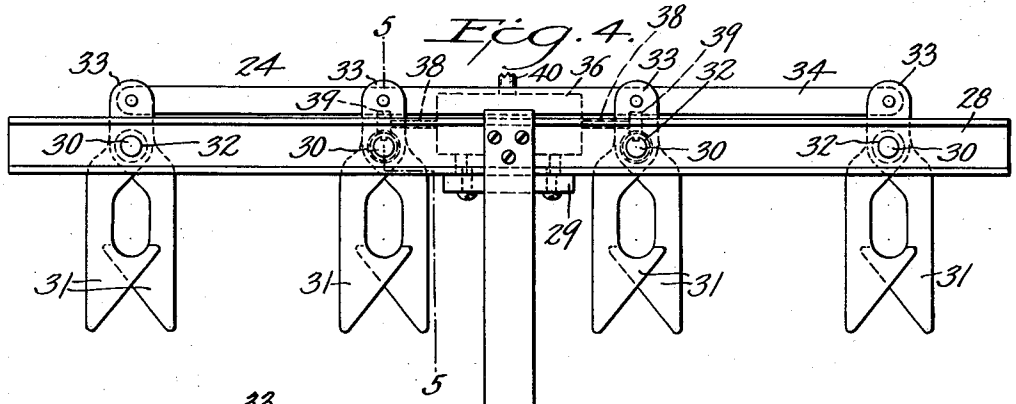


Fig. 5.

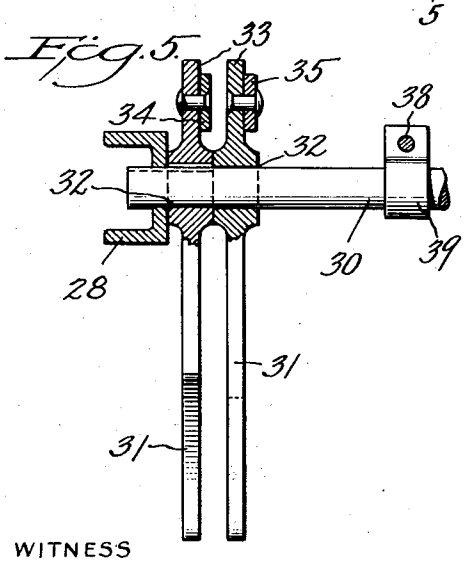
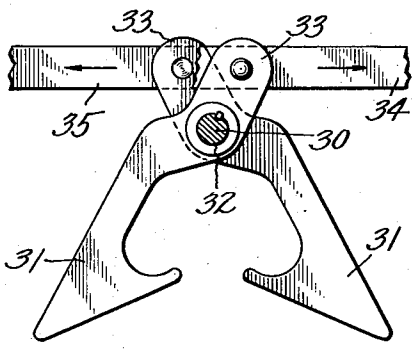


Fig. 6.



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UNITED STATES PATENT OFFICE.

EVERTON B. POWELL, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE HANSON & VAN WINKLE COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ELECTROPLATING MACHINE.

Application filed July 16, 1926. Serial No. 122,900.

This invention relates to electroplating machines, in which means are provided for mechanically transferring articles to be plated from one tank to another as, for example, from cleaning tanks to plating tanks and thence to rinsing tanks.

The invention has for its object, the combination of apparatus which will facilitate these operations and economize the time required for introducing articles to the tanks and removing them therefrom. The invention comprises various combinations whereby article-supporting racks may be handled in groups, and the invention involves means for lifting the racks in groups and depositing them in the tanks in groups with registering devices on the tanks for guiding the supporting mechanism so that the racks, when lowered into the tanks, will occupy definite positions. The invention further comprises means for supplying the racks in groups to the transfer mechanism and for removing them in groups after the plating operation has been completed. Other details of the invention will appear from a description of the accompanying drawing, in which

Figure 1 represents the supply end of an electroplating machine involving my invention.

Figure 2 represents the delivery end of the same machine.

Figure 3 is a plan view of one-half of the transferring mechanism.

Figure 4 is a side elevation of the same.

Figure 5 is a section on line 5—5 of Figure 4.

Figure 6 is a detail view of the rack tongs.

Referring first to Figures 1 and 2, the numeral 1 indicates a supporting rail mounted preferably over the center line of the tanks. Below the rail are placed the tanks in the following order: a cleaning tank 2, a rinsing tank 3, a brushing tank 4, a rinsing tank 5, a plating tank 6, a rinsing tank 7, another rinsing tank 8, and a drying box 9.

The cleaning tank 2 has arranged on each side a sprocket chain conveyor 10, supported at each end by sprocket wheels 11 and 12, and provided at spaced distances with prongs 13. One of the sprocket wheels as, for example, 11, has mounted on its shaft a ratchet wheel 14 against which a pawl 15 operates, the pawl being carried by a rocking arm 16 which in turn is moved back and forth by a reciprocating rod 17 that is pivoted at 18 to a supporting rocker arm 19. The proportions of the parts are such that upon an operator stepping onto platform 20 and pressing against a transverse rod connecting the pivotal points 18 from one side of the machine to a similar apparatus on the other side, he will operate the pawl and ratchet wheel to step the chain 10 forward a distance of for example one, two or more prongs, according to the number of racks which the operator can handle at one time and for which the step by step mechanism has been designed. The operator may then place that many more racks in the cleaning tank. These racks have transverse round rods 21 which extend the full width of the tank and rest upon the chain 10 in front of each prong. At the delivery end of the cleaning tank are two guides or sockets 22, one on each side, and these are adapted to guide plungers 23 on carrier 24. The carrier 24 is suspended from the hook 25 of an air hoist 26 that has a truck 27 running on the rail 1. The carrier 24 is shown in detail in Figures 3 to 6 and comprises the guides 23, which are fastened to two side channels 28 that are spaced apart equal to the width of the tanks. These channels are united by a cross beam 29. Extending between the channels and supported thereby are four shafts 30. These serve to support tong arms 31 which are mounted pivotally thereon at 32. These tong arms have hooks at their lower extremities with inclined lower faces so that when lowered onto rack rod 21, they will be spread apart thereby and then close underneath it or they may be positively operated. This is accomplished by having their upper extremities 33 (see Fig. 6) pivoted to two separate reciprocating bars 34, 35. The bar 34, for example, is connected to all the right hand tong arms and the bar 35 to the left hand tong arms. By this means, all the tong arms can be opened or closed simultaneously. To operate these tongs, I provide an air cylinder 36, having pistons 37 and piston rods 38, the latter being connected to crank arms 39 to the two middle shafts 30. These two shafts have keyed to them respectively right and left tong arms 33 so that when air is admitted to the cylinder through pipe 40 and the pistons thereby pushed apart, the tongs will be all opened, to release the rack bars. When the

air is shut off, the tongs will drop back to their first position automatically. The tongs are spaced on the channels 28 at distances apart corresponding with the spacing of the prongs 13 on the chain 10. When, therefore, the carrier 24 is lowered with its plungers 23 over the socket guides 22 on the cleaning tank 2, the said sockets will guide the carrier so that the tong arms 31 will slide down over the four rack prongs 13 next to said socket guides 22. The air hoist 26 being then operated, the carrier is lifted together with four racks free of the cleaner tank. The air hoist with its carriers may now be moved to the next tank 3 and the carrier with its racks lowered again, the socket guides 22 serving again the purpose of guiding the racks to their proper position in the tank. To facilitate the entrance of the guiding rods 23 into the socket guides 22, the ends of the rods and the sockets may be tapered as shown. Without discharging the racks, the carrier may be again lifted and the operation repeated with tanks 4 and 5. When the racks are deposited, however, in the plating tank 6, the tongs may be disconected from the racks by operating the pistons 37 and the air lift and then lift the carrier with the tongs free of the racks, thus enabling the lift and carrier to be moved back to the cleaner tank for another group of racks. When the carrier deposits the racks in plating tank 6, which it may do on any one of the unoccupied spaces, the racks rest between prongs 41, projecting vertically from vibrating cathode bars 42 that are reciprocable endwise by means of a cam 43 (see Figure 2). Prongs 41 open outward so as to facilitate the guiding of the rack bars between them. In removing the racks from the plating tank, a similar air hoist and carrier is used and the racks being first dipped in tank 7 and then in tank 8, are finally deposited with the aid of guide sockets 22, onto a delivery chain 48 mounted on sprocket wheels 44 in front and rear of the dryer box 45. The receiving operator by turning the crank 46 one revolution will bring the sprocket chain forward a space of four racks, which he can then remove as they will now be outside of the dryer box. It will be seen from the above description that the apparatus provides for the handling of groups of racks or articles to be plated by means of registering devices on the transfer mechanism and on the tanks and feeding mechanism corresponding in functions with the requirements of the group transfer. In this way any reasonable number of racks may be handled simultaneously with the result that the transferring mechanism and the operator function with considerable economy of time.

I claim:—

1. In an electroplating machine, the combination of a tank, a fixed longitudinal track mounted over the same, a truck on said track, an elevator on said truck, a cathode carrier adapted to be raised and lowered by said elevator and provided with a plurality of cathode hangers, and vertical guiding means on the carrier and at intervals along the tank for guiding the carrier as it is lowered by the elevator, whereby a plurality of articles may be placed simultaneously in the tank in definite positions in various locations.

2. In an electroplating machine, the combination of a tank, a fixed longitudinal track mounted over the same, a truck on said track, an elevator on said truck, a cathode carrier adapted to be raised and lowered by said elevator and provided with a plurality of cathode hangers, and vertical guiding means on the carrier and at intervals along the tank for guiding the carrier as it is lowered by the elevator, whereby a plurality of articles may be placed simultaneously in the tank in definite positions in various locations, with means arranged in definite relation to the guiding means to hold the individual articles when so lowered.

3. In an electroplating machine, the combination comprising a tank, an overhead rail, a cathode carrier and elevator adapted to travel along said rail, a plurality of definitely spaced cathode hangers on the carrier, vertical guides on the carrier and adjacent the tank for guiding the cathodes into the tank, and means on the carrier for simultaneously opening the cathode hangers to release articles suspended therefrom.

4. In an electroplating machine, the combination comprising a tank, an overhead rail, a cathode carrier and elevator adapted to travel along said rail, a plurality of definitely spaced cathode hangers on the carrier, each hanger having pivoted tongs with beveled lower edges, vertical guides on the carrier and adjacent the tank for guiding the cathodes into the tank, and means on the carrier for simultaneously opening the cathode hangers to release articles suspended therefrom.

5. In an electroplating machine, the combination comprising a tank, a fixed longitudinal track mounted above the tank, a truck adapted to travel on said track, an elevator mounted on said truck, a cathode carrier adapted to be raised and lowered by said elevator, said carrier being provided with a plurality of cathode hangers, horizontal conveying means for assembling a plurality of cathode racks into groups corresponding in arrangement with the cathode hangers, fixed vertical guides longitudinally spaced adjacent the tank and the assembling means and vertical guides on the carrier adapted to engage with and be guided by any of the fixed guides whereby a plurality of articles may be lifted as a group from the assem-

bling means and deposited in proper spaced relationship in the tank.

6. In an electroplating machine, the combination comprising a tank, a fixed longitudinal track mounted above the tank, a truck adapted to travel on said track, an elevator mounted on said truck, a cathode carrier adapted to be raised and lowered by said elevator, said carrier being provided with a plurality of cathode hangers, horizontal conveying means for assembling a plurality of cathode racks step by step into groups corresponding in arrangement with the cathode hangers, fixed vertical guides longitudinally spaced adjacent the tank and the assembling means and vertical guides on the carrier adapted to engage with and be guided by any of the fixed guides whereby a plurality of articles may be lifted as a group from the assembling means and deposited in proper spaced relationship in the tank.

7. In an electroplating machine, the combination comprising a tank, a fixed longitudinal track mounted above the tank, a truck adapted to travel on said track, an elevator mounted on said truck, a cathode carrier adapted to be raised and lowered by said elevator, said carrier being provided with a plurality of cathode hangers, means for assembling a plurality of cathode racks into groups corresponding in arrangement with the cathode hangers, fixed vertical guides longitudinally spaced adjacent the tank and the assembling means and vertical guides on the carrier adapted to engage with and be guided by any of the fixed guides, the said guides having tapered ends, whereby a plurality of articles may be placed in the tank, lifted as a group from the assembling means, and deposited in proper spaced relationship in the tank.

EVERTON B. POWELL.