

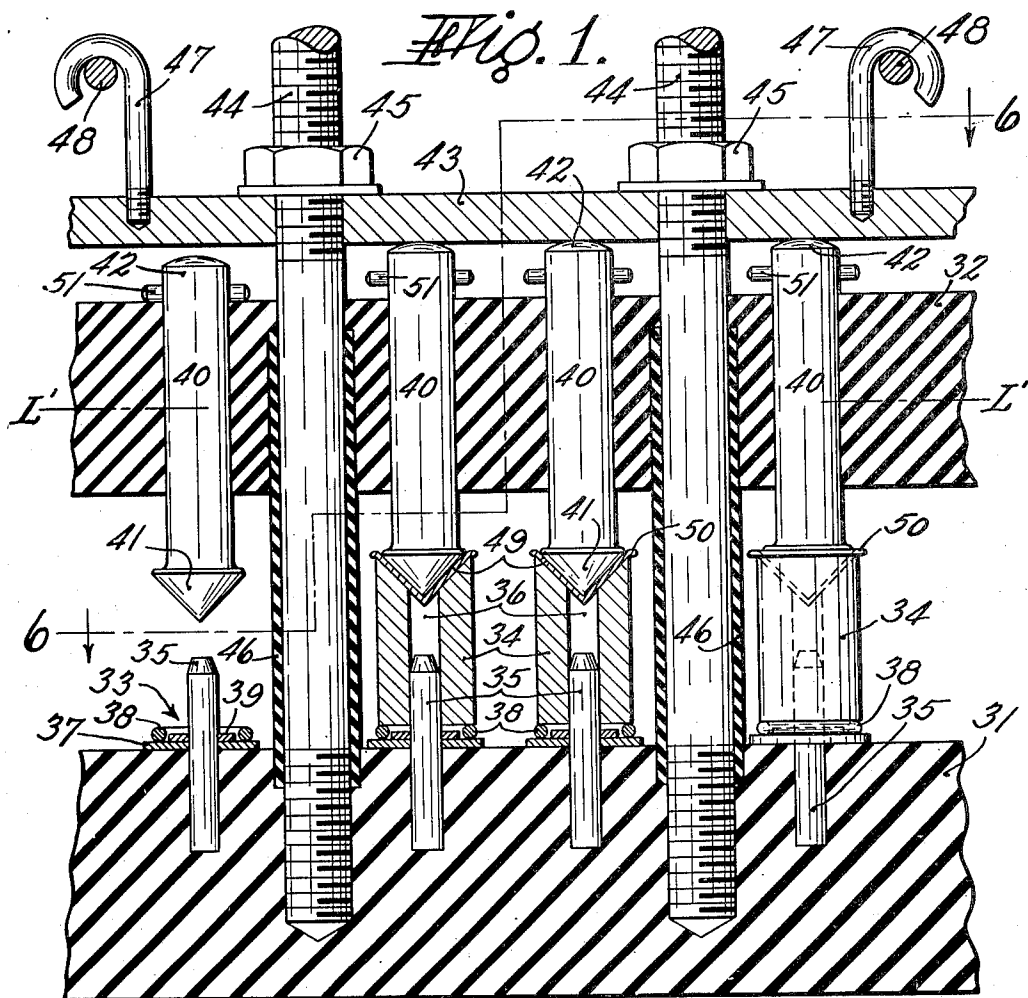
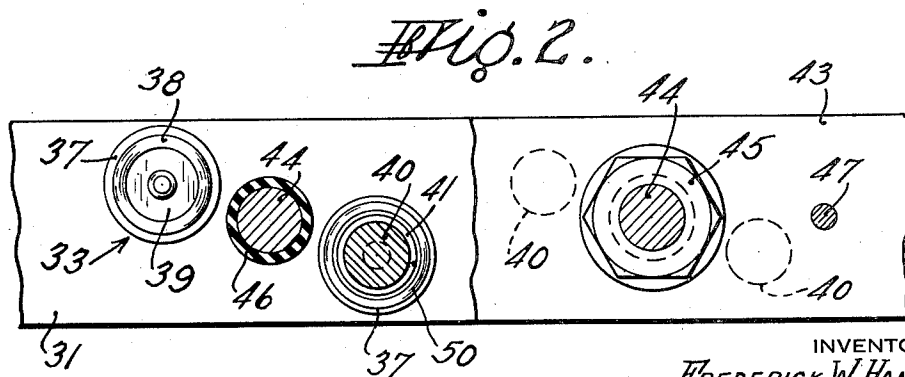
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ELECTROPLATING APPARATUS

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ELECTROPLATING APPARATUS

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1 Claim. (Cl. 204—297)

This invention relates to an electrode rack for suspending a batch of articles for treatment in an electrolytic bath.

An object of the invention is the construction of such a bracket as will accomplish a two-fold purpose, one of which is to provide convenient means for assembling together as a united electrode structure a large batch of separated articles, and for suspending the same in the bath for receiving their desired electrolytic action; and secondly, to provide durable means associated with the bracket assembly which will effectively confine the electrolytic action of the bath to such portions or areas of the articles as it is desired to plate or have otherwise acted upon.

A particular advantage of the present improvement will be found in the plating of relatively small articles, wherein it is desired to plate the side portions only and to keep the end portions free of plate. In the case of small hollow articles for instance, means are provided to block up the ends by sealing devices which prevent the intrusion of the electrolyte into the interior of the articles. Such sealing devices moreover may be of such character as to present easily platable edges adjacent the corners of the article, which exposed edges will rob, so to speak, the adjacent corners of the article of excessive plating or treeing which would otherwise take place.

The use of the present improved apparatus greatly facilitates the plating or other electrolytic treatment of articles in mass production, in that a great number of similarly shaped small articles which would be inconvenient and expensive to handle in separate operation or on separate hangers, may be grouped together, quickly mounted in a single bracket with a proper space between them for the uniform access thereto of electrolyte and action thereon at uniform current densities whereby when suspended in the bath the treatment of each article will be substantially uniform. It is also possible when the articles are relatively small and suitably shaped to mount columns of said articles in end to end relation within said bracket as part of a unitary electrode structure whereby the holding capacity of the bracket may be greatly increased.

As heretofore mentioned an important feature of the present invention resides in the arrangement for conveniently restricting the electrolytic action to such portions of the articles as may be desired.

In the drawing which shows the preferred embodiment of the invention,

Fig. 1 is a longitudinal sectional view of the

bracket with certain parts thereof in side elevation; and

Fig. 2 is a top view of the same in part horizontal section along line 6—6 of Fig. 1.

It will be understood that the bracket may be of any convenient length suitable to the bath in which it is to be used and that usually it will be used to carry a large batch of small articles, but that certain of the principles of the invention are equally applicable to its employment in holding a single article.

Referring to the bracket as shown there is a base rail 31 and top rail 43 connected by metal tie bolts 44 having screw threaded lower ends fastened in the base rail 31 and nuts 45 at the upper ends for adjustably spacing the rails apart. The tie bolts 44 are sheathed by sleeves of resist material 46 so as to prevent any electrolytic action upon said portions of the bolts 44 as are immersed in the bath, the liquid level of which is indicated by the dotted line L'—L'. As herein shown the top rail 43 is preferably of conducting metal and the bottom rail 31 of insulating electrolytic resist material. However, the bottom rail may likewise be of conducting metal for current if desired, in which case it would be in electrical connection with the top rail through the tie bolts 44. Closely beneath the top rail 43 and above the bottom rail 31 is a carrier member 32 through which the aforesaid tie bolts are extended and this carrier member is also preferably of insulating electrolytic resist material.

The articles to be plated or otherwise treated in the bath as shown are small cylindrical articles, indicated at 34, having hollow cores 36 and with flat lower ends and conically concave upper ends. For the purpose of holding such shaped articles in the bracket the lower rail 31 is provided with a series of separate base mountings indicated generally at 33 and each comprising a centering pin 35 projecting upwardly from the base rail 31 for entering the hollow cores 36 of the articles. The base mountings 33 are arranged in staggered relation at alternate sides of the longitudinal center line of the rail 43. The purpose of this is to provide a more stable arrangement than if the base mountings were all on a single center line. In the latter arrangement a clamping pressure of the studs upon interposed gauges might tend to buckle them from a vertical line whereas in the arrangement shown there is a sufficiently wide foundation for the clamped gauges so as to prevent any tendency toward buckling. The pins 35 are each surrounded by an anvil washer 37 upon which is superimposed a

soft metal sealing ring 38, preferably of copper, which is of a diameter adapted to fit the lower peripheral corner of the article 34. A positioning washer 39 is preferably located within said ring 38 to prevent displacement of the same.

As shown in Fig. 2, the lower cylindrical end of the article 34 rests against the sealing ring 38 and is pressed firmly down against the same by the clamping means about to be described whereby the electrolyte of the bath will be excluded from the space beneath this lower end of the article. The copper sealing ring 38 located as shown and because it is of easily platable material, will rob the lower corners of said article from being excessively plated. It is well known that sharp corners of an article tend to take a plate faster than flat surfaces, with a tree-like growth which is objectionable on the finished article. This is avoided by the special construction of the present sealing devices.

Carried in the carrier member 32 with a close sliding fit are several electrode studs 40 having a lower tapered end 41 to conform to the contour of the upper end of the article 34 and arranged to fit therein for firmly pressing the article down upon its base mounting. Each of the several electrode studs 40 is positioned in vertical alignment with one of the base mountings 33. Preferably interposed between the lower end 41 of said electrode stud and the concave upper end of the article 34 is a conically shaped sealing pad 49 of soft metal such as lead, which when the stud is forced down, effectively seals the upper end of the said article from the intrusion of electrolyte. The outer end or rim 50 of said sealing pad also provides a ridge adjacent the upper corner of the article 34 to provide a clean cut surface area and plate along this upper corner.

These electrode studs 40 are of conducting material such as stainless steel and extend through the carrier member with their upper ends 42 protruding therefrom and rounded over as shown for abutment against top rail 43. The rail 43 is a strong rigid bar of conducting material such as stainless steel and serves as a bus bar for conducting current to all of the studs 40, the upper ends 42 of said presser studs being held in firm electrical contact with the top rail as shown.

Hanging hooks 47 are secured in a suitable manner to the top rail 43 and serve to support the bracket and all parts therefrom from suitable cross rods such as 48. A current connection from a suitable supply, not shown, is made to the bus bar 43. Usually the bracket with its articles to be plated will act as the cathode of the bath but

may also be connected as an anode, depending on the work to be done.

From the foregoing it will be appreciated that in using the bracket, the top rail 43 may be opened up by loosening the nuts 45 far enough to separate the lower end 41 of the studs 40 from the base rail 31 so as to place the articles 34 therebetween. Thereupon the studs are fitted into the recessed upper ends of said articles 34 and the nuts 45 are screwed tightly down to clamp the studs 40 against the articles with a firm enough pressure to seal the ends of the article from intrusion of electrolyte. The strain of the clamping pressure is transmitted directly from the rail 43, through the studs 40 to the articles on their base mountings. The carrier member 32 is subjected to no heavy strain and is in position largely for the purpose of aligning and guiding the presser studs. Cotter pins 51 may be provided for the upper ends of the studs 40 to retain them in the carrier member 32 when the rails are opened up for assembling the articles therein.

By means of the sealing devices at both the upper and lower ends of the articles illustrated in this form of bracket, the electrolytic action is effectively confined to the sides of the articles for plating the same as desired.

I claim:

30 An electrode rack for suspending a batch of separated articles in an electrolytic bath comprising in combination a base block of insulating material having thereon a plurality of base mountings each adapted to receive an article to be treated in said bath, a current-carrying top rail, tie bolts for connecting said top rail to said base block, sleeves of insulating material on said tie bolts, an intermediate block of insulating material carried on said tie bolts below said top rail, a plurality of current-carrying electrode studs carried in said intermediate block for relative vertical movement therein, each of said studs being arranged in vertical alignment with a corresponding base mounting and having its lower end adapted to engage the upper end of an article positioned on said corresponding base mounting for current connection therewith, and means on said tie bolts for vertically adjusting the said top rail to bring the same to bear against the upper ends of said several electrode studs in said carrier member for clamping the articles in position between the lower ends of said electrode studs and said base mountings.

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