June 1, 1971 C. R. CAMPANA 3,582,526

ELECTROPLATING BARREL

Filed Dec. 15, 1967

Fig. 1.

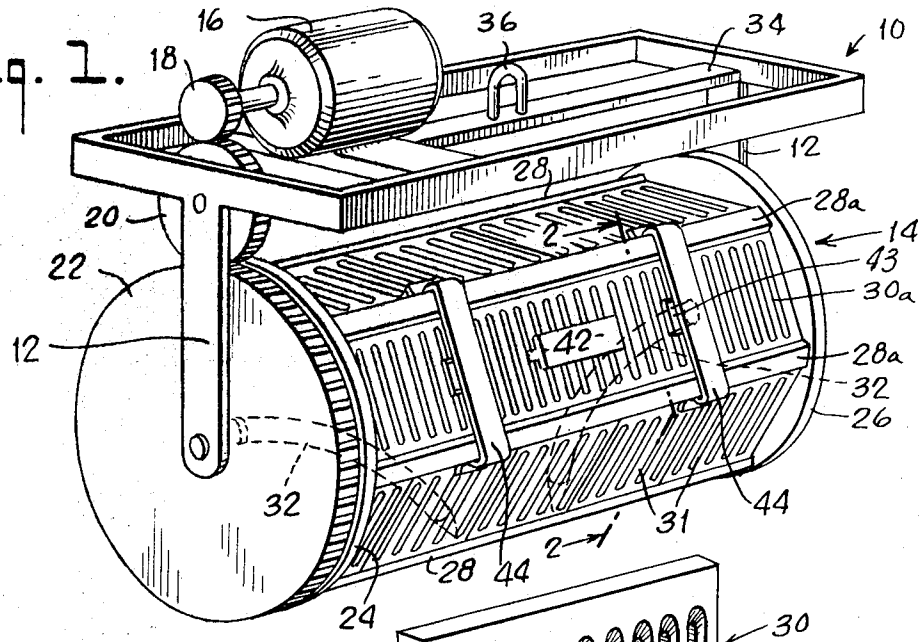
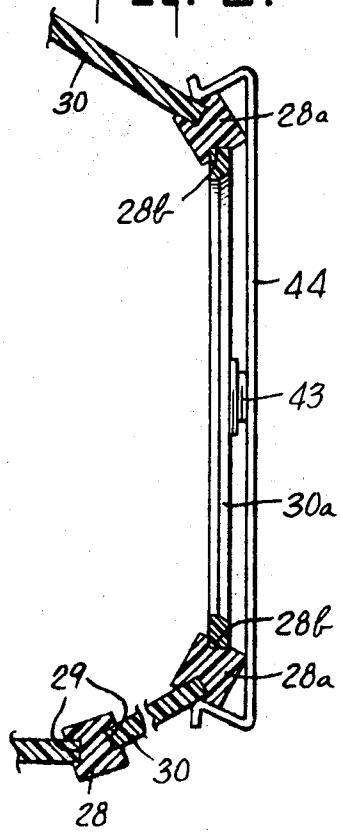


Fig. 2.



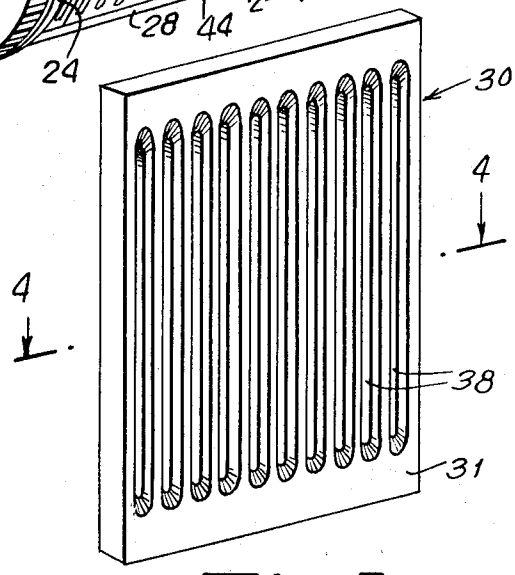


Fig. 3.

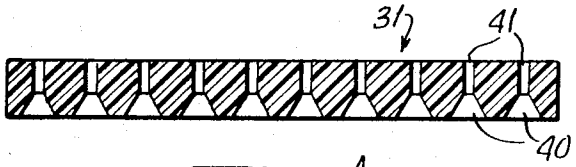


Fig. 4.

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ELECTROPLATING BARREL

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U.S. Cl. 204—213 6 Claims

ABSTRACT OF THE DISCLOSURE

An electroplating barrel adapted for mounting rotatably within a tank of a plating solution, said barrel comprising side panels and end walls defining a chamber within which bulk quantities of small workpieces may be electroplated, the panels being formed with slots therethrough of greater width at the outer surface of the wall of the barrel than at the inner surface of said wall, whereby upon rotation of the barrel a concentrated plating solution in the tank is adapted to freely enter within the barrel to maintain therein a desired density of the plating solution to compensate for and replace the metal deposited on the workpieces from said solution.

The present invention relates to an electroplating barrel and aims to provide certain improvements therein.

Electroplating barrels as heretofore proposed and currently in use depend upon a multiplicity of perforations in the wall of the barrel or in panels constituting such wall for the flow of current and circulation of the plating solution from the tank into the barrel. Where such perforations are relatively large to permit free circulation of the plating solution, small workpieces to be plated in the barrel may fall through such perforations. Where the perforations are made of small diameter, the flow of current and the circulation of solution from the tank into the barrel are restricted. Also if the perforations are made of large diameter, the wall of the barrel or of the panels must be made relatively thick to sustain the weight of the workpieces to be plated and as a concomitant of such greater thickness, the length of the perforations is increased, thereby impeding the passage of current and the circulation of plating solution, thus decreasing the efficiency of the plating operation.

The primary object of the present invention is to provide a novel electroplating barrel which overcomes the deficiencies of the prior art constructions having perforated barrel walls.

A further object of the invention is to provide an improved electroplating barrel which eliminates the provision of perforations in the wall thereof and the concomitant limitations resulting from such perforations.

A still further object of the invention is to provide an electroplating barrel which is exceedingly simple in construction and of high efficiency in operation.

The foregoing and other objects of the invention, not hereinbefore specifically enumerated I accomplish by providing an electroplating barrel comprising a plurality of side panels and two end walls defining a chamber, the panels being of unique form in that they are substantially flat and have slots therethrough which are of greater width at the outer surface of the wall of the barrel than at the inner surface of said wall. Preferably the slots are of substantially V-shape or Y-shape in transverse section.

The invention will be better understood from the detailed description which follows when considered in connection with the accompanying drawing wherein:

FIG. 1 is a perspective view of a plating barrel embodying my invention, the barrel being shown in its environmental setting;

FIG. 2 is a transverse sectional view of the plating barrel taken along the plane of the line 2—2 of FIG. 1;

FIG. 3 is a perspective view of a panel element constituting a portion of the wall of the plating barrel;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 3.

Referring first to FIG. 1 of the drawing there is shown a typical environmental arrangement of a plating barrel and the mounting thereof in use currently in the electroplating industry. The principal parts of such typical arrangement consist of a framework **10** which has a pair of depending legs **12** which rotatably supports an electroplating barrel **14** adapted to be driven by an electric motor **16** through a gear train **18, 20, 22.** As is conventional, the barrel is a polygonal container, herein shown as hexagonal, formed of end walls **24** and **26,** a plurality of rails **28** and panels **30** suitably held in said rails between said end walls. The gear **22** is fixedly connected to the end wall **24** and through a central opening in the gear **22** and in the end wall **24** and from the end wall **26** extend a pair of flexible danglers or cathode members **32** of a length to normally make contact with the workpieces in the barrel as the latter is rotated. To lower the barrel into and raise it from a tank containing a plating solution, the framework **10** is provided with a cross beam **34** to which is affixed a ring **36** for engagement by a suitable hoist. Electrical connections (not shown) are made with the motor **16,** the cathodes **32** and the anodes to complete the electrical circuit for carrying out the plating operation as the workpieces are tumbled as the barrel **14** is rotated. As thus far described the construction and arrangement of parts maye be considered as conventional and per se are not part of my invention.

The novelty of the present invention resides in the unique construction of the plating barrel **14** wherein the panels **30** are rectangular substantially flat members formed of suitable synthetic material, such as polypropylene, methylmethacrylate and the like, which is not electrically conductive nor adversely affected by the plating solution. The panels are slidably mounted in mortise grooves **29** in the rails **28** and are held in said grooves by the end walls **24, 26** in a conventional manner. The panels are formed with slots **38** therethrough which are of greater width at the outer surface of the wall of the barrel than at the inner surface of said wall. Preferably the slots extend transversely to the axis of the barrel and at the outer surface of the wall of the barrel, for at least a portion of their depth, are substantially V-shape in transverse section with the sides of the V directed inwardly toward each other from said outer wall surface. As shown in the drawing these slots are Y-shape in transverse section which as will be obvious have a V-portion **40** and a stem portion **41.** Preferably the dimensions of the slots at the V-portion thereof at the outer surface of the barrel wall are between three and six times as wide as at the inner surface of said wall. Where the slots are of Y-shape, the V-portion of the slots at the outer surface of the wall of the barrel are between three and six times as wide as the stem portion of the slots with the V-portion and stem portion of approximately the same depth.

For gaining access to the interior of the barrel to charge and remove the workpieces therefrom, one of the panels **30** is formed as a door **30*a*** which may be positioned and withdrawn radially from the barrel. To accomplish this the grooves or rabbets **28*b*** in the rails **28*a*** which accommodate the door are slightly different from the grooves **29** in that one of the grooves is a right angular rabbet groove. The door **30*a*** is formed with a central outward projecting handle **42** which serves to manually insert and remove the door and also with spacing blocks **43** for engagement by spring clips **44** to hold the door in locked position.

It is also preferable that the panels, other than the door panel, be made as sub-panels **31** of rectangular form mounted in end-to-end abutting relation in the grooved rails **28** to permit easy change-over of such sub-panels to accommodate different size workpieces in the barrel or for replacement of any individual sub-panel in the event of wear or damage thereto from any cause.

The advantages accruing from the present invention because of the large open areas in the panels provided by the slots, as opposed to conventional perforations, is that more highly concentrated solution from the tank is able to freely enter the barrel and carry with it the metal in solution to provide a desired density of the plating solution within the barrel for better electrodeposition of metal on the workpieces. Faster and more uniform deposition of metal is assured since high voltages can be used because of the rapid solution exchange rate and the exposure of the work load to the unimpeded current flow which results from the open slots. Production runs with the barrel of the present invention on a comparative basis with conventional perforated barrels have shown an increase in the deposition rate up to 300%.

Although I have shown and described a preferred embodiment of my invention, it is to be understood that details of the panel construction may be varied within the range of mechanical and engineering skill without departing from the spirit of the invention as hereinafter claimed.

What I claim is:

1. An electroplating barrel in the form of a polygonal container, comprising a pair of end walls, grooved retainers connecting said walls and flat panel elements of less length than the retainers slidably mounted in end-to-end abutting relation in said grooved retainers and defining a chamber within which bulk quantities of small workpieces may be electroplated, each panel element having an array of parallel slots extending substantially across one dimension thereof, said slots being of greater width at the outer surface of each panel than at the inner surface thereof.

2. An electroplating barrel according to claim **1**, wherein the slots in the panels at the outer surface of the wall of the barrel for at least a portion of their depth are substantially V-shape in transverse section with the sides of the V's directed inwardly toward each other from said outer wall surface.

3. An electroplating barrel according to claim **2**, wherein the slots are substantially Y-shape in transverse section.

4. An electroplating barrel according to claim **2**, wherein the V-portion of the slots at the outer surface of the barrel wall are between three and six times as wide as at the inner surface of said wall.

5. An electroplating barrel according to claim **3**, wherein the V-portions of the Y-slots at the outer surface of the wall of the barrel are between three and six times as wide as the stem portion of the Y-slots.

6. An electroplating barrel according to claim **5**, wherein the V-portion of the slots and the stem portion thereof are of approximately the same depth.

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