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ROTATABLE BARREL FOR USE IN ELECTROPLATING OF A PLURALITY OF ARTICLES

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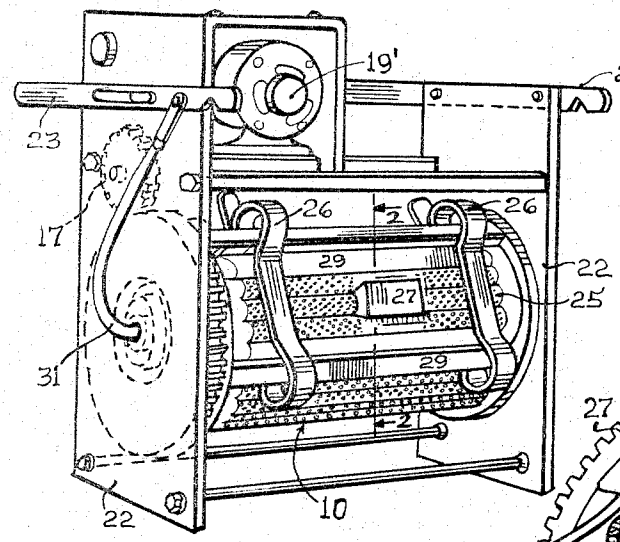


Fig. 1.

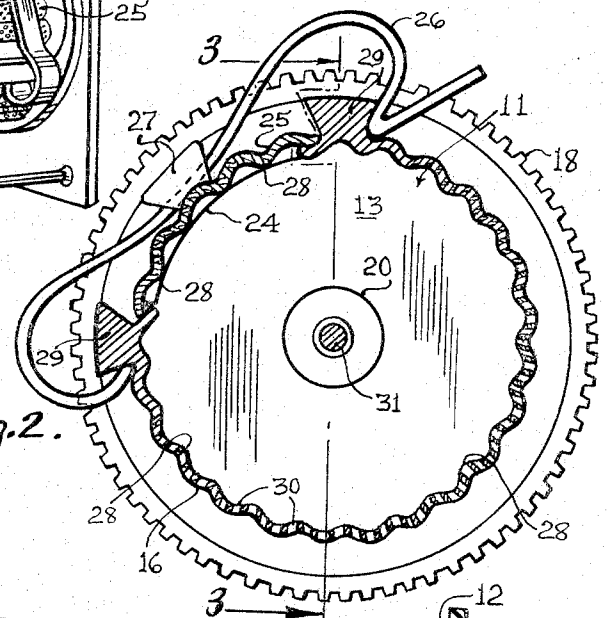


Fig. 2.

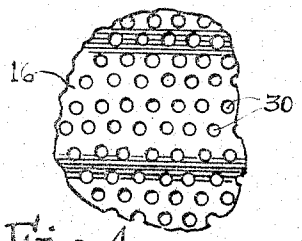


Fig. 4.

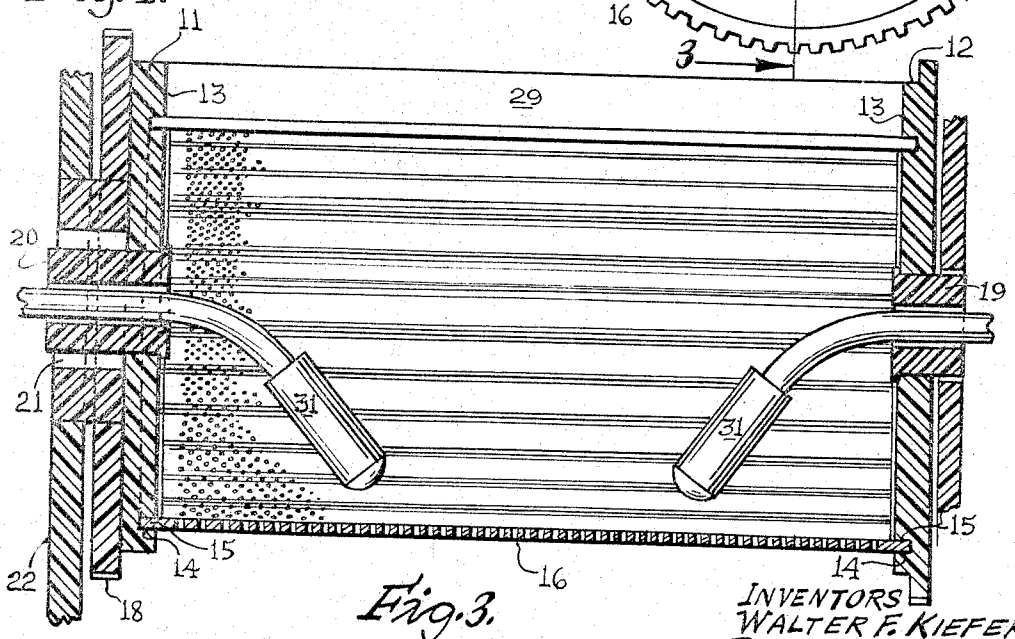


Fig. 3.

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ROTATABLE BARREL FOR USE IN ELECTROPLATING OF A PLURALITY OF ARTICLES

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ABSTRACT OF THE DISCLOSURE

An electrical plating rotating barrel constructed of a one piece plastic cylindrically shaped corrugated perforation wall mounted between supporting end plates. The corrugation provides closely spaced elongated strengthening ribs on the inner surface of the wall forming a circular inner surface which aids in the tumbling action of the workpieces within the barrel in the direction of rotation of the barrel during the plating process. A removable corrugated perforated door is provided for the barrel with the door arcuated so as to form a continuation of the circular inner surface of the barrel and through which workpieces may be introduced into the barrel for electroplating.

Our invention relates to new and useful improvements in a rotatable barrel for use in electroplating of a plurality of articles.

Our invention has for its salient objects the provision of a plating barrel which is simple in design and construction; durable in operation, one which restrains the deflection of the workpieces to be plated under the separating stresses imposed thereon by the weight and tumbling action of such workpieces; one which may be economically manufactured; one wherein the workpieces will follow the direction of rotation of the barrel, as distinguished from dropping from an elevated point within the barrel at the bottom thereof; one wherein the solution is constantly redistributed and agitated during the rotation of the barrel; one which will have a greater capacity than the usual six or more sided barrel; one in which the critical areas of the barrel which constantly come into contact with the workpieces is substantially strengthened.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

FIG. 1 is a perspective view of a plating apparatus illustrating our improved plating barrel associated therewith;

FIG. 2 is a sectional detail view taken substantially on line 2—2 of FIG. 1;

FIG. 3 is a sectional detail view taken substantially on line 3—3 of FIG. 2;

FIG. 4 is a fragmentary side elevational view of the cylindrical wall of the barrel shown in FIG. 1.

The several objects of our invention are accomplished by the preferred form of construction shown in the accompanying drawings wherein our improved plating barrel is indicated generally at **10**. Such barrel includes end plates **11** and **12**. The confronting sides **13** of the end plates **11** and **12** are each provided with a circular groove **14** which receives the edge portion **15** of the cylindrical side wall **16** of the barrel. The cylindrical wall **16** is of a thickness best suited for the intended purpose.

Secured in any suitable manner to the end wall **11** is a gear **18**. The gear **18** operatively meshes with a driving gear **17** which in turn is driven by a suitable electric motor **19'** in a manner well-known in the art. The end wall **12** has a bearing sleeve **19** fixedly secured thereto. The end wall **11** has a similar bearing sleeve **20** secured thereto. These bearing sleeves **19** and **20** project into bearing openings **21** formed in side plates **22** of a supporting structure for the barrel **10**. Hanger bars **23** are carried by the end plates **22** and rest upon the top edge of a tank containing plating solution and in which solution the barrel **10** is submerged. While the type of supporting structure illustrated in the drawings is of a portable type, it is to be understood that our invention is not to be thus limited, as our improved plating barrel may be used in connection with an overhanging supporting frame mechanically operated to lift the plating barrel from submerged position in the solution tank, such arrangement being shown in U.S. Patent 3,084,916, dated Apr. 9, 1963.

The cylindrical wall **16** is provided with an opening **24** removably closed by a door plate **25** latched in position by suitable latch bars **26** as shown in FIG. 2, the door plate **25** being provided with a suitable handle **27** to facilitate removal of the same with respect to the opening **24**. The cylindrical wall **16**, as well as the door plate **25**, is corrugated to provide horizonally extending spaced tumbling ribs **28** each curved transversely in cross section. The entire area of the door plate **25** and of the cylindrical wall **16**, with the exception of the latching heads **29**, is perforated as at **30** to permit the flow of solution into, through, and from the barrel **10** when the same is submerged and rotated in the fluid contained within a tank (not shown).

As shown schematically in FIGS. 2 and 3, the perforation **30** extends in diverging directions with respect to each other outwardly radially from the axis of the barrel. By such an arrangement, when the barrel **10** is rotated in the solution, the diverging perforations will in effect cause self-pumping the solution into and from the barrell through such perforations, thus causing a continuous flowing action of the solution which thoroughly mixes the same within as well as without the barrel, with the result that a more efficient plating operation is accomplished.

As shown in FIGS. 1 and 3, there are projected through the bearing sleeves **19** and **20** the usual electrodes **31** which may be adjusted with respect to each other for the most efficient plating operation.

In use, a number of workpieces to be plated are confined in the barrel, being placed therein through the opening **24**, after the door plate **25** is latched in closed position with respect to the opening **24**. The barrel is then submerged in a solution contained in a tank such as that shown in Patent 2,673,076, dated Mar. 23, 1954. Through the operation of the motor **19**, the barrel is caused to rotate. In actual practice, we have found that as the barrel rotates, the workpieces will follow the direction of rotation of the barrel and will not be bounced therein or caused to drop to the bottom as would result in the case where the barrel is formed hexagonally in cross section and provided with substantially spaced apart tumbling ribs.

We have also found by actual experience that by the unique formation of the perforations in the cylindrical wall of the barrel as well as in the door plate, the solution is pumped into the barrel as it is rotated and is also ejected therefrom, thus resulting in a constant agitation of the solution and a continuous supply of the same within the barrel. This continuous supply of solution in the barrel results in a more efficient plating operation.

By forming corrugations in the side wall of the barrel in the direction of its long axis, the barrel is strengthened so as to restrain the deflection of the workpieces under the separating stresses imposed thereon by the weight and tumbling action of such workpieces.

It is intended that the barrel be formed of such material as will best serve the purpose, and in this connection it is suggested that the material be formed of high tensile strength plastic, which we have found to be the best material for continuous processing of workpieces through the operations of electrolytic cleaning, rinsing, acid treatment, and plating. When formed of such material, the weight of the plating barrel is also reduced to a minimum.

It is preferably intended that the sheet making up the side wall **16** of the barrel be a flat sheet which is corrugated before being rolled into cylindrical form, after which, by any preferred operation, such as drilling or the like, the corrugations are drilled so that each provides a plurality of perforations as illustrated in FIG. 4, with the perforations of each corrugation diverging outwardly with respect to each other radially from the long axis of the barrel.

The plating barrel of our invention is perforated all the way around except at the door opening, giving approximately 30% more holes in the corrugated round barrel than can normally be drilled in a hexagonal plating barrel, and still maintain its rigidity. Experience has established that the more holes (open area) in a plating cylinder, the faster the deposit of metal.

A plating barrel constructed in accordance with our invention herein described, will be capable of accomplishing the several salient objects of our invention. We have found by actual experience that the same is highly efficient in use and economical in manufacture.

While we have illustrated and described the preferred form of construction for carrying iur invention into effect, this is capable of variations and modification without departing from the spirit of the invention. We therefore do not wish to be limited to the precise details of construction set forth, but desire to avail ourselves of such variations and modifications as come within the scope of the appended claim.

Having thus described our invention, what we claim as new and desire to protect by Letters Patent is:

A rotatable plating barrel for use in electrolytically plating workpieces, wherein the improvement in the barrel comprises:

(a) an elongated cylindrical perforated wall corrugated throughout its length,

(b) spaced end plates having formed in their confronting faces circular grooves conforming to the cross section corrugations of said wall to receive the opposite ends of said corrugations for connecting and supporting said wall between said plates to form a closed end perforated corrugated walled barrel,

(c) said corrugation of said wall providing closely spaced elongated strengthening ribs on the inner surface of the wall forming a substantially circular inner surface aiding the tumbling action of the workpieces within said barrel in the direction of rotation of said barrel,

(d) said barrel having an opening formed therein between said end plates through which workpieces are introduced into said barrel, and

(e) a removable perforated door corrugated throughout its length for closing said opening,

(f) the perforations in said cylindrical wall and said door in each of the corrugations thereof formed to extend radially from the axis of said barrel and diverging with respect to each other to effect a self-pumping action of the electrolytic fluid into and out of said barrel when the same is rotated.

References Cited

UNITED STATES PATENTS

1,779,971	10/1930	Horn	204—213
2,120,478	6/1938	Amundsen	204—11
2,491,925	12/1949	Lazaro	204—213
2,640,025	5/1953	Lazaro	204—213
2,741,463	4/1956	Colclesser	259—89

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