Dec. 7, 1926. 1,609,357

J. HULMER

ELECTROLYTIC PLATING MACHINE

Filed Nov. 19, 1925 4 Sheets-Sheet 1

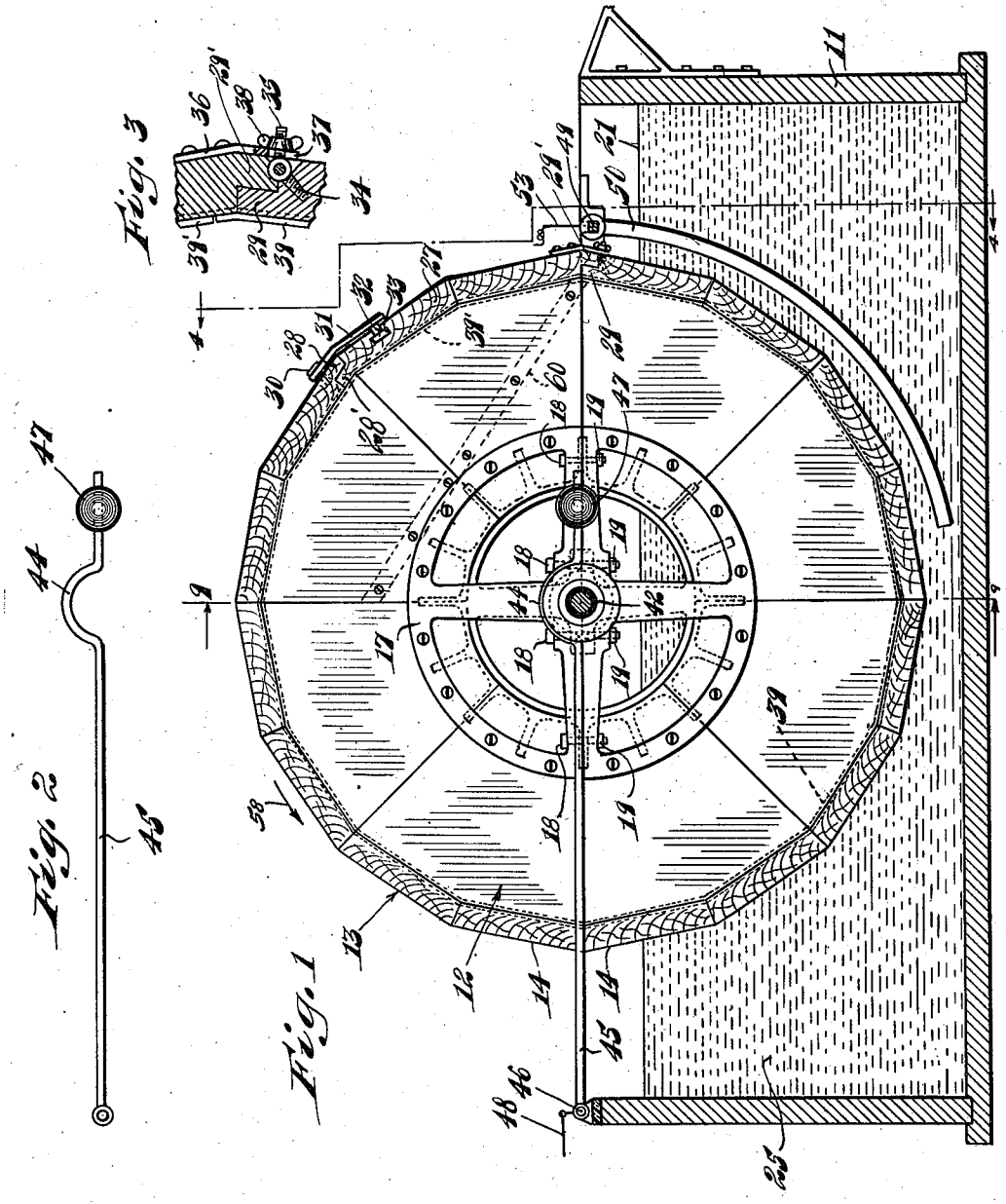


Fig. 1

Fig. 2

Fig. 3

Witnesses:
C. E. Wessels

Inventor:
Josef Hulmer,
By Joshua R. H. Potts
his Attorney.

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J. HULMER

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Fig. 4

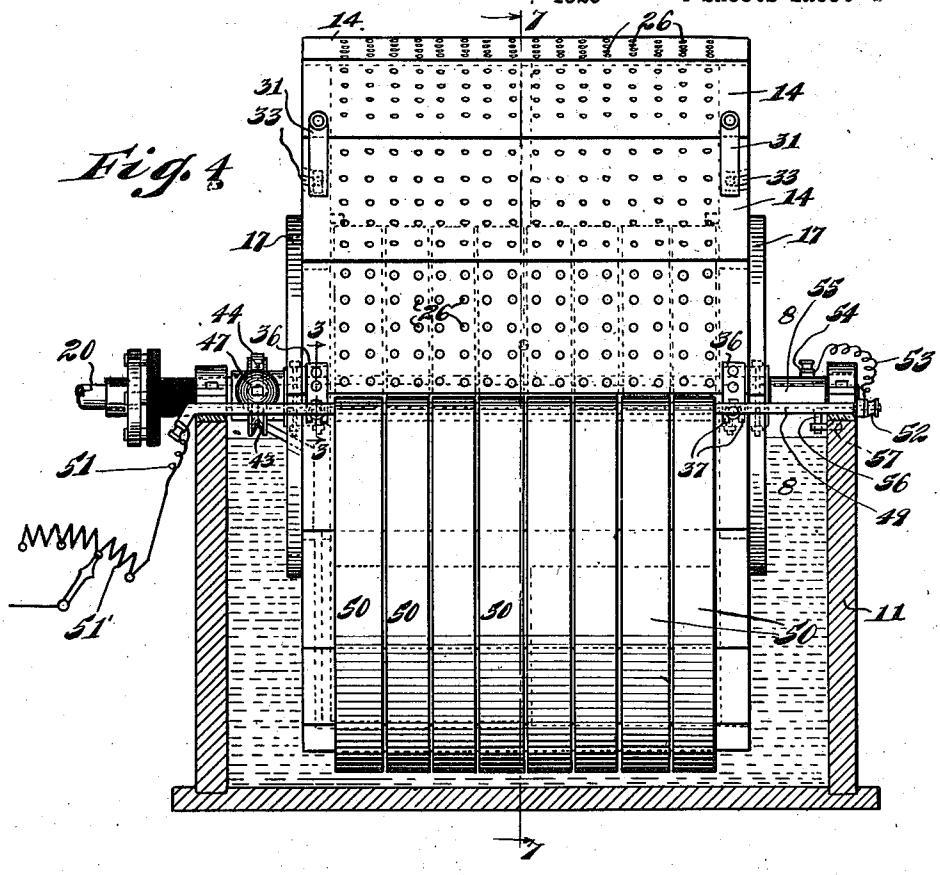


Fig. 5

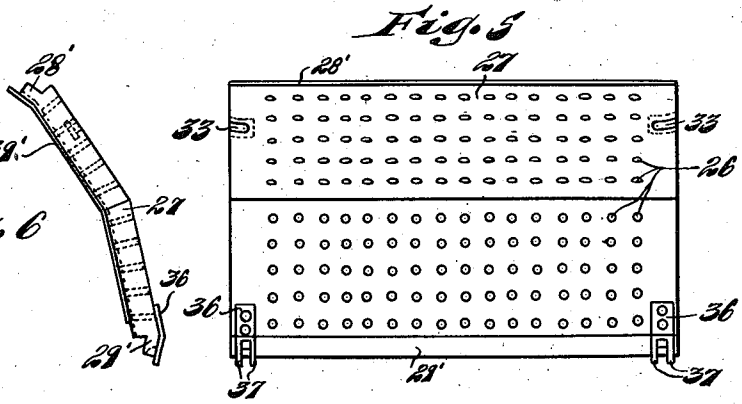


Fig. 6

Witnesses:
C. E. Wessels.

Inventor:
Josef Hulmer,
By Joshua R. H. Potts
his Attorney.

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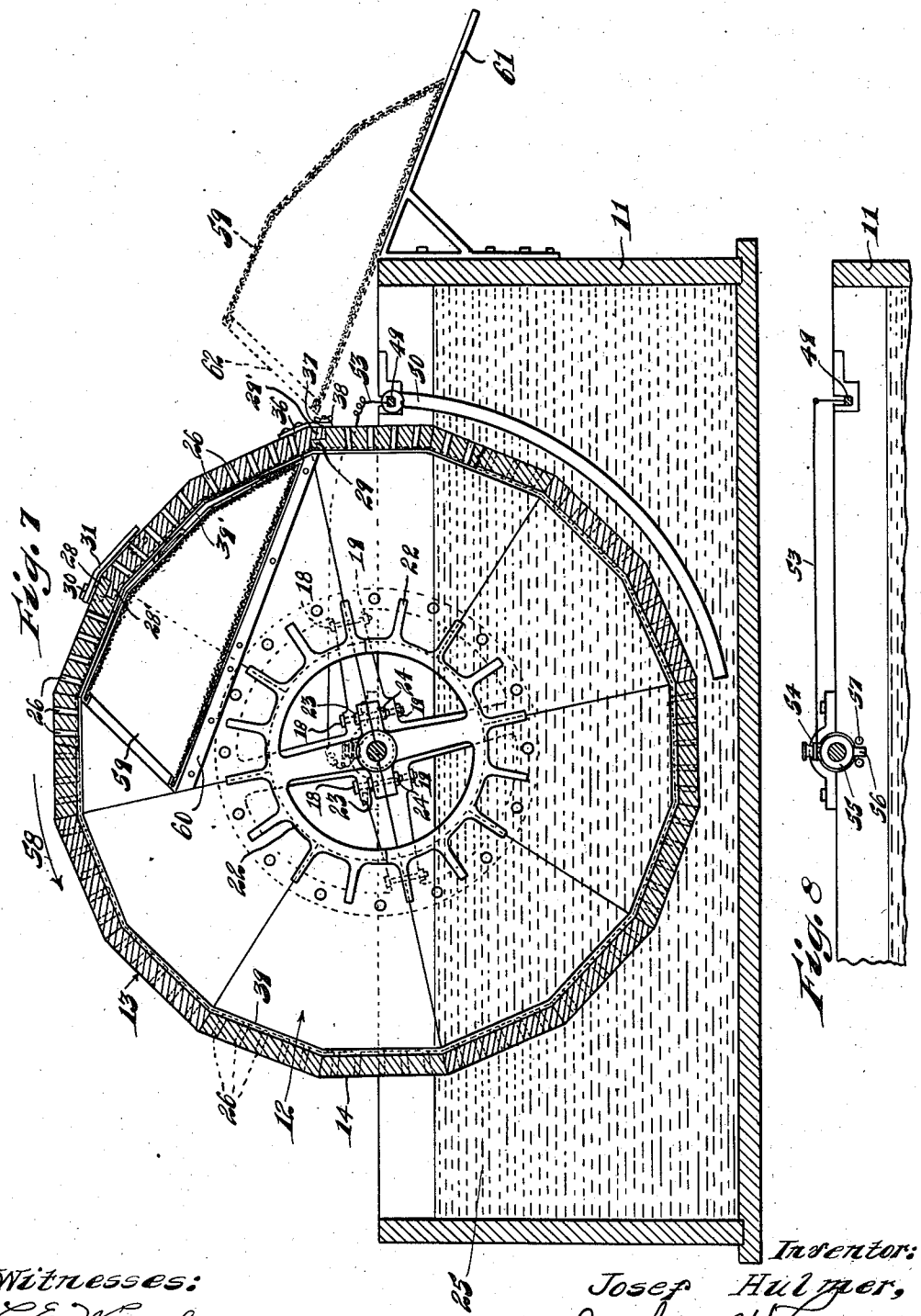


Fig. 7

Fig. 8

Witnesses:
C. E. Wessels
E. Hoof

Inventor:
Josef Hulmer,
By Joshua R. H. Potts
his Attorney.

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J. HULMER

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Fig. 10

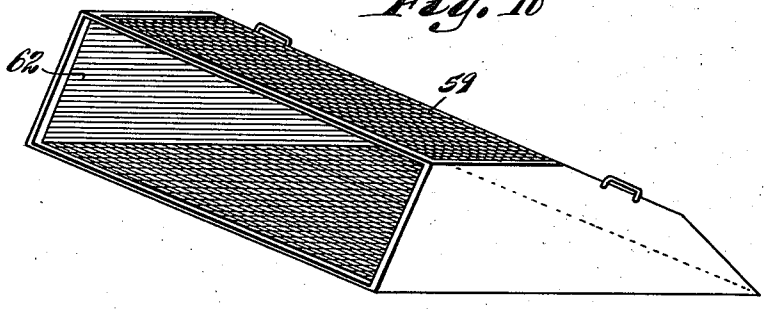
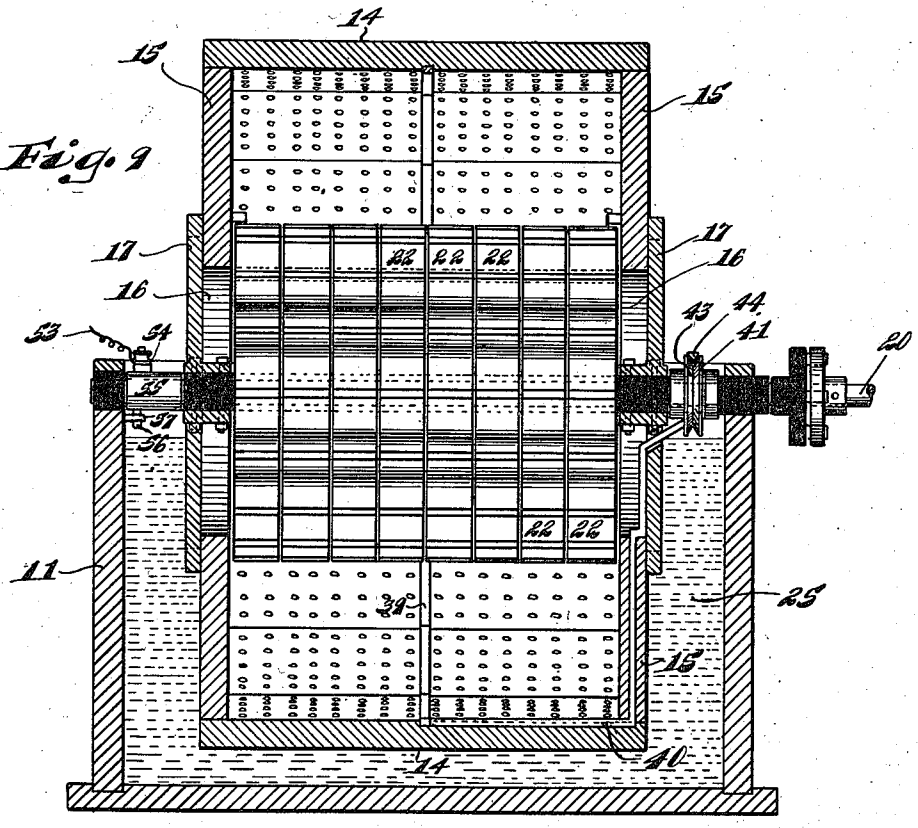


Fig. 9



Witnesses:
C. E. Wessels.

Inventor:
Josef Hulmer,
By Joshua R. H. Potts
his Attorney.

Patented Dec. 7, 1926. 1,609,357

UNITED STATES PATENT OFFICE.

JOSEF HULMER, OF CHICAGO, ILLINOIS.

ELECTROLYTIC PLATING MACHINE.

Application filed November 19, 1925. Serial No. 69,955.

My invention relates to an electrolytic plating machine, and the same has for its main object the provision of an improved machine of this character which will embody certain desired features of simplicity, efficiency and convenience and which will be economical in manufacture and durable in use.

Other objects will appear hereinafter.

The invention consists in the combination and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which,

Fig. 1 is a longitudinal section through the solution tank and an end elevation of a tumbling barrel;

Fig. 2 is a side elevational view of a weighted conductor arm;

Fig. 3 is an enlarged sectional view taken substantially on the line 3—3 of Fig. 4 and showing the means employed for securing one side of the lid to the barrel periphery;

Fig. 4 represents a cross section taken substantially on line 4—4 of Fig. 1, and showing the outside anodes and tumbling barrel in end elevation;

Fig. 5 is a top plan view of the lid detached from the barrel;

Fig. 6 is an end view of the lid;

Fig. 7 represents a central longitudinal section taken substantially on the line 7—7 of Fig. 4; this view also showing in broken lines how the article cage may be positioned for ready insertion into the tumbling barrel;

Fig. 8 is a fragmentary sectional view taken substantially on the line 8—8 of Fig. 4 and showing how the sleeve conductor is held in operative position on the shaft;

Fig. 9 is a central cross section taken substantially on the line 9—9 of Fig. 1, and,

Fig. 10 is a perspective view of the article cage.

The preferred embodiment of my invention, as illustrated in the accompanying drawings, includes a solution tank 11, made of wood or other material suitable for containing the plating solution, and a tumbling barrel, denoted generally by the numeral 12, mounted upon the solution tank so as to turn through the solution within the tank. To better obtain the desired tumbling action, the periphery 13 of the barrel is not a smooth circle but consists of angularly connected cross strips as 14. The opposed ends 15 of the barrel have relatively large central openings 16, as best depicted in Fig. 9. Secured to each end 15 of the barrel is a bushing in the form of a two-part clamping wheel 17 adapted to be clamped by means of bolt and nut structures 18 and 19 upon a power receiving shaft 20 which is operatively mounted in suitable bearings provided in the solution tank 11 above the tolerance line 21 for the solution.

Inside anodes in the form of two-part clamping wheels 22 are clamped upon the shaft 20 within the barrel by means of suitable bolt and nut structures 23 and 24. By making the anodes in the form of two-part clamping wheels, they may be quickly attached to and as quickly removed from the shaft 20, which comprises an electrical conducting medium. Being thus fixed to the shaft, the inside anodes 22 turn with the barrel through the plating solution 25 contained in the solution tank 11, as best indicated in Fig. 1. According to an important feature of the present invention, the periphery 13 of the tumbling barrel is provided throughout with closely associated perforations 26 so that the plating solution may readily pass to the interior of the barrel during rotation thereof. In this connection, it is also to be noted that the provision of the end openings 16 and of the wheel-like bushings 17 permits the plating solution to pass through the ends of the barrel.

For the insertion and removal of the articles to be plated, and as well for the application and removal of the anodes 22, the periphery 13 of the tumbling barrel is provided with a removable lid 27 which also contains the perforations 26. In the construction shown, the removable lid 26 constitutes a part of the periphery 13 and is interengaged with the peripheral walls defining the space or doorway occupied by the lid. Thus, the periphery as one terminal wall has an outside projecting flange 28, and with the opposite terminal wall has an inside projecting flange 29. The lid is made with cooperating flanges 28′ and 29′, adapted respectively to overlap the flanges 28 and 29 of the barrel periphery. As a means for effectively securing the lid in position so that it will support the weight of the tumbling articles, the terminal of the periphery 13 is provided with a pivot pin 30 on which is

swingably mounted a catch plate 31 provided with a headed pin 32 receivable in an arcuate undercut slot 33 extending inwardly of the lid from the outer edge thereof, as best shown in Fig. 4. Two such catch plates 31 are provided for securing one edge of the lid to the barrel periphery. The means for securing the opposite end of the lid to the barrel periphery are best illustrated in Fig. 3, from which it will be seen that I provide hinge connected screws 34 and 35; the screw 34 being threaded into the barrel periphery 13 while the screw 35 projects outwardly of the barrel. The lid 27 is furnished with a plate 36 having a yoked end 37 adapted to straddle the pin 35 to which the wing into 38 may be applied for firmly securing the parts in position. As illustrated in Fig. 4, two such connecting plates 36 are provided on the lid 27.

In the present construction, the cathode is denoted by 39 and extends entirely around the inner side of the barrel periphery 13; the cathode consisting of a strip which is partly countersunk in the angularly connected strips 14 comprising the barrel periphery and which is partly raised above the inner surfaces thereof where it may be engaged by the articles tumbled within the barrel. Preferably and as shown, the cathode strip 39 extends entirely around the inner periphery of the barrel, its ends terminating at the doorway for the lid 27. A similar cathode strip 39′ is fixed to the inner face of the lid 27 and is adapted to comprise an electrical bridge for connecting the broken cathode strip 39, upon the application of the lid. Leading from cathode strip 39 is a conducting strip 40 (Fig. 9) which extends through, first, the periphery of the barrel, then within a side 15 of the barrel and finally out through the adjacent central opening 16 to be connected with a disk conductor 41 which is mounted upon the shaft 20 to turn therewith, but is insulated from the shaft by an insulation ring 42 (Fig. 1). The conducting disk 41 has a V-shaped circumferential groove 43 in which rests a conformingly shaped bow 44 formed on a conducting arm 45 which is pivoted at 46 to an end of the solution container 11. Beyond the bowed portion 44, the conductor arm 45 is provided with a weight 47, whereby suitably to maintain the bowed portion in proper contact with the conductor disk 41. To the conductor arm 45 is attached the end of a conducting wire 48 which leads back to the source of electric current.

Suitably supported in the sides of the solution container 11 above the solution tolerance line 21 is a conductor bar 49 which serves as the means for supporting outside anodes 50 made in the form of curved places which are held pendent in the plating solution so as to curve about the periphery of the tumbling barrel. Under this arrangement the solution inflowing through the perforations of the barrel periphery will carry plating material from the outside of the barrel to the articles tumbled about therein.

To the conductor bar 49 is attached a supply wire 51 which leads from a rheostat 51′ for regulating the current, said rheostat being suitably connected with a source of current. To the bar 49 is also attached a terminal 52 from which a conducting wire 53 leads to a terminal 54 on a sleeve 55 which surrounds the shaft 20. In this manner, the inside anodes 22 are connected electrically with the outside anodes 50. Since the conductor bar 49 is stationary, it is necessary for the sleeve 55 to be held in stationary contact with the revolving shaft 20. To this end, the sleeve 55 is provided with a projecting post 56 which is engaged between the ends of a bifurcated arm 57 attached to the solution tank (Fig. 8).

As indicated by the arrows shown in Figs. 1 and 7, the tumbling barrel, in the present construction, turns from left to right or in a direction upwardly of the curved outside anodes 50, so that the articles disposed within the barrel for plating will be carried to various heights in the zone directly opposite said outside anodes whence they tumble back toward the lowest point or zone of the revolving barrel. Under this arrangement, the plating solution inflows through the perforations 26 to the articles to be plated, in addition to an outflowing of the plating solution from the inside anodes 22. During the turning of the tumbling barrel, the articles subjected to the plating operation are continually tumbled against each other and as well against the cathode 39 by which the current leads from the electrolyte through the conducting rod 40, disk 41 and weighted arm 44 and thence back to the source of electrical supply.

According to an important feature of my present invention, I provide an article cage 59 which is adapted to be inserted in the tumbling barrel upon the removal of the lid 26, and which is adapted upon one revolution of the tumbling barrel, to receive automatically for removal from the barrel all of the articles therein contained. With this end in view, I fix to the inner faces of the ends 17 suitable rib members 60 which extend inwardly from the edge of the doorway for the lid 26. This arrangement is such that when the lid is removed the article cage 59 may be moved directly from a suitably inclined platform 61 in through the doorway and on to the end ledges 60. As best represented in Fig. 7, the top of the article cage is made to form substantially

with the contour of the barrel periphery. The forward end of the article cage is open as at 62; it being noted that, under this arrangement, the said open end 62 faces the direction of the barrel's rotation so that the articles will tumble thereinto as the cage turns upwardly with the barrel. Through the use of this cage, therefore, all of the articles, when they have been plated, may be quickly and readily removed from the barrel.

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

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An electrolytic plating machine including a solution tank; a rotatable shaft on the tank; a tumbling barrel carried by the shaft for turning through the solution within the tank; a cathode arranged on the inner periphery of the barrel; and anodes carried by the shaft and comprising separable clamping wheels.

2. An electrolytic plating machine including a solution tank; a rotatable shaft on the tank; a perforated tumbling barrel carried by the shaft for turning through the solution within the tank; anodes arranged in the tank outside the barrel; cathodes arranged on the inner periphery of the barrel; and removable anodes in the form of two-part clamping wheels secured to said shaft within the barrel.

3. An electrolytic plating machine including a solution tank; a tumbling barrel associated with the tank and characterized by having a perforated periphery to insure the passing of the solution therethrough; a removable lid forming part of the periphery of the barrel; anodes arranged inside and outside the barrel on opposite sides of the perforated periphery; a cathode strip extending around the inner periphery of the barrel from one side of the lid to the opposite side thereof; and a bridging cathode strip carried by said lid.

4. In an electrolytic plating machine, the combination with a tumbling barrel rotatably mounted to turn through the plating solution and having a peripheral doorway, between its ends, retaining strips extending inwardly of the ends of the barrel from the doorway; an article cage adapted to be entered through the doorway and to be reposed on said end retaining strips, and a door for the doorway constituting part of the periphery of the barrel and adapted to hold the article cage in place.

5. In combination with a tumbling barrel rotatably mounted upon a tank to turn through the solution therein, a removable lid forming part of the periphery of the barrel; a cathode strip arranged on the inner periphery of the barrel to be engaged by the articles within the barrel during the tumbling action thereof, said cathode strip terminating at opposite sides of the lid; a cathode strip on the lid to bridge the distance between the terminals of the first cathode strip; ribs extending inwardly of the barrel from the lid and an article cage adapted to be entered through the space occupied by the lid when the lid is removed, and to rest on said ribs, said cage having an open end facing the direction of movement of the barrel to receive the artciles as they tumble to the lowest point therein.

6. In combination with a tumbling barrel rotatably mounted upon a tank to turn through the solution therein, a power receiving shaft mounted on the tank; bushings in the form of clamping members on the ends of the barrel receiving said shaft; anodes clamped to the shaft within the barrel and a cathode strip extending around the inner periphery of the barrel.

7. In combination with a tumbling barrel rotatably mounted upon a tank to turn through the solution therein, a power receiving shaft mounted on the tank; bushings in the form of clamping wheels on the ends of the barrel receiving said shaft; anodes in the form of clamping wheels clamped to the shaft within the barrel; a cathode strip extending around the inner periphery of the barrel; and an anode plate in the tank curving about the barrel, the periphery of the barrel being closely perforated throughout for the inflowing of the plating solution.

8. In combination with a tumbling barrel rotatably mounted upon a tank to turn through the solution therein; a power receiving shaft mounted upon the tank; bushings in the form of clamping wheels on the ends of the barrel receiving said shaft; a cathode strip extending around the inner periphery of the barrel; anode plates in the tank curving about the barrel, the periphery of the barrel being closely perforated throughout for the inflowing of the plating solution; and anodes in the form of two-part clamping wheels clamped to the shaft within the barrel.

9. In combination, a solution tank; a conductor shaft rotatably mounted thereon; a tumbling barrel; bushings in the form of clamping wheels on the ends of the barrel receiving said shaft; anodes in the form of clamping wheels clamped to the shaft within the barrel; said barrel having its periphery closely perforated for the passing of the so-

lution and provided with a doorway for the application and removal of the anodes; a lid adapted to be interengaged with the walls of said doorway; a cathode strip extending around the inner periphery of the barrel; a bridging cathode strip carried by the lid; an anode plate in the tank curving about the outer periphery of the barrel; a sleeve loosely surrounding the shaft and held in fixed position; an electrical connection between said anode plate and sleeve; a conducting wheel turning with the shaft but insulated therefrom and an electrical connection between said cathode strip and said conducting wheel.

In testimony whereof I have signed my name to this specification.

JOSEF HULMER.