Feb. 22, 1927.

1,618,199

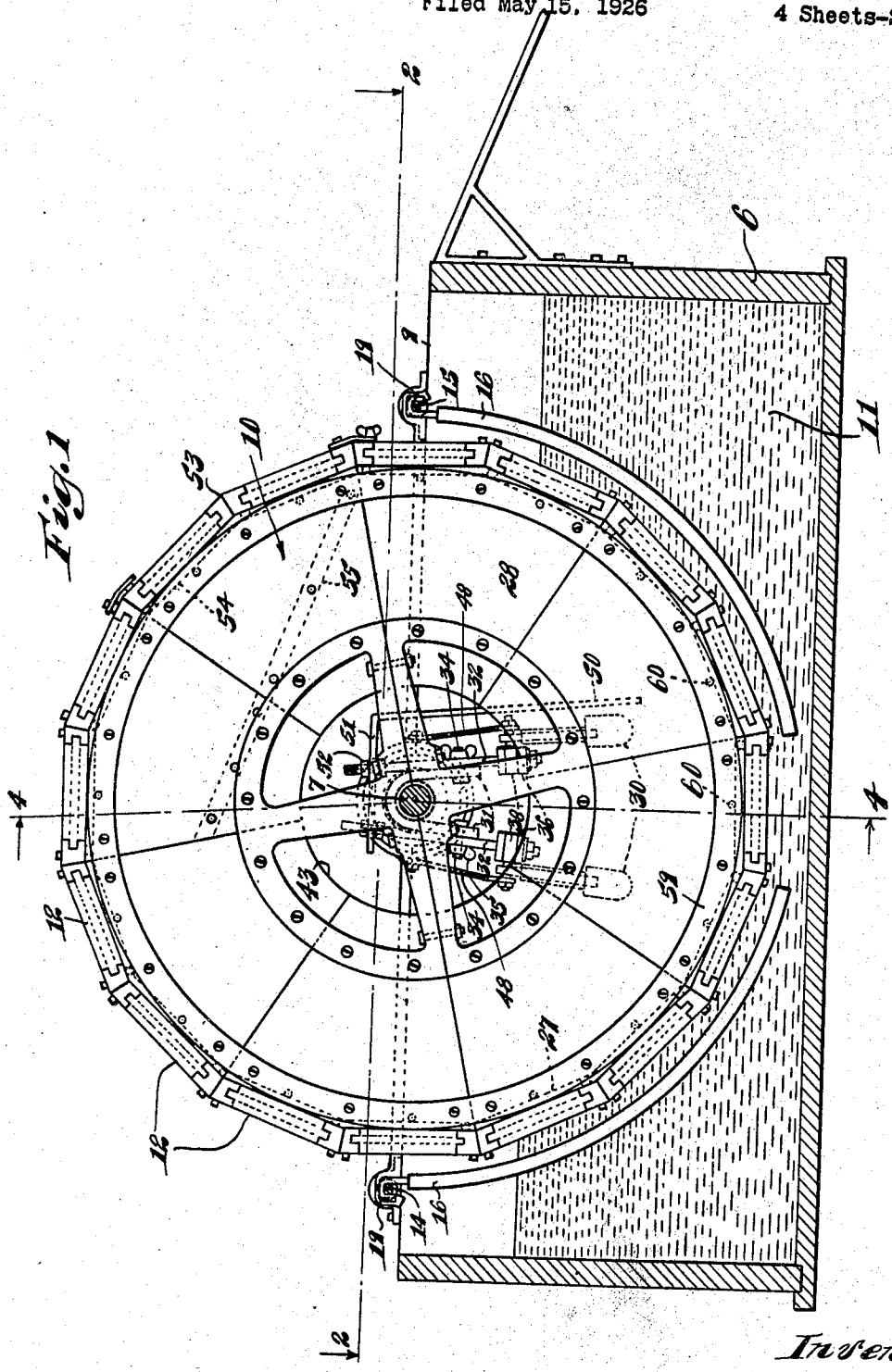
J. HULMER ET AL

ELECTROLYTIC PLATING MACHINE

Filed May 15, 1926

4 Sheets-Sheet 1

Fig. 1



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ELECTROLYTIC PLATING MACHINE

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4 Sheets-Sheet 2

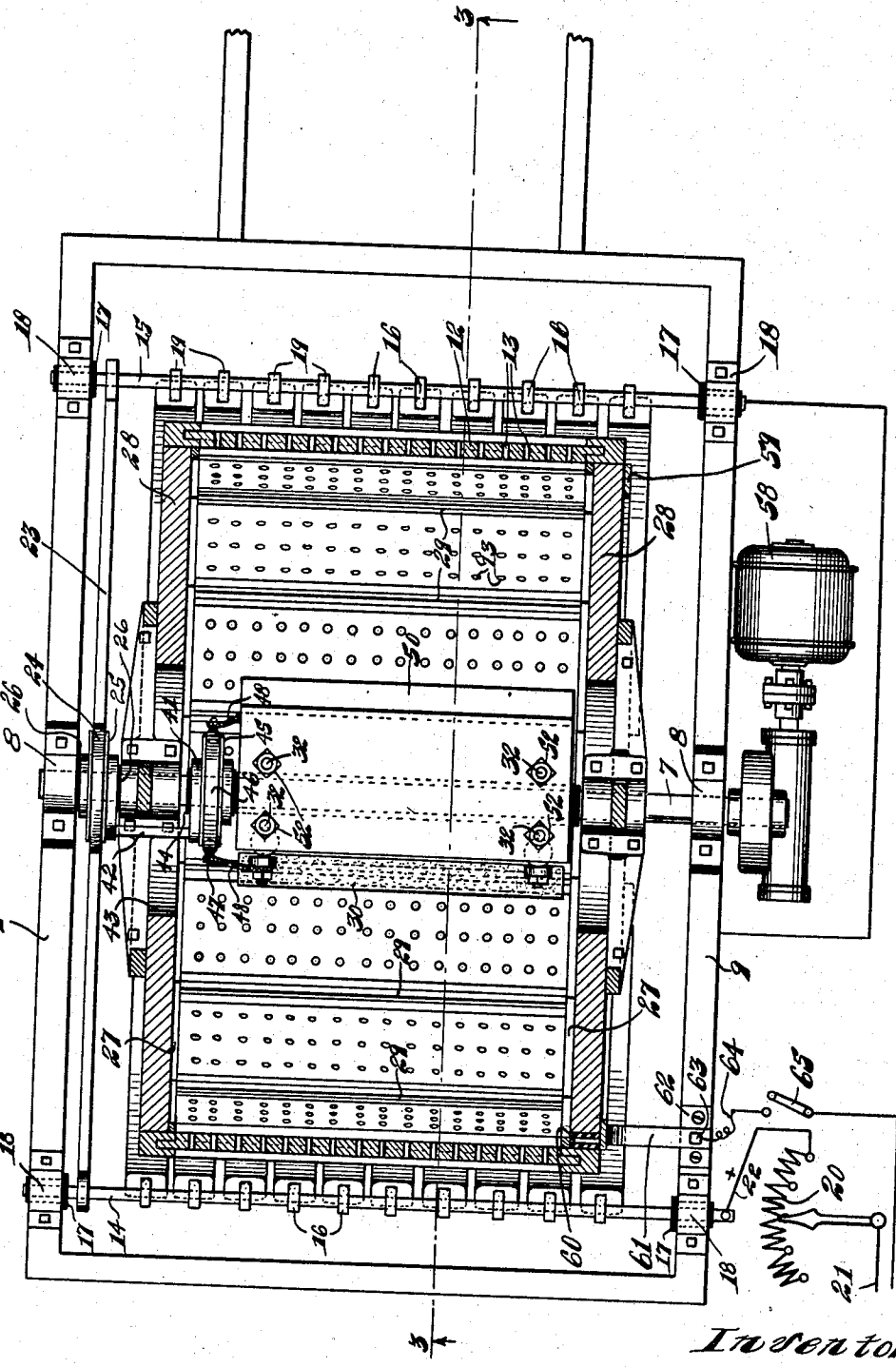


Fig. 2

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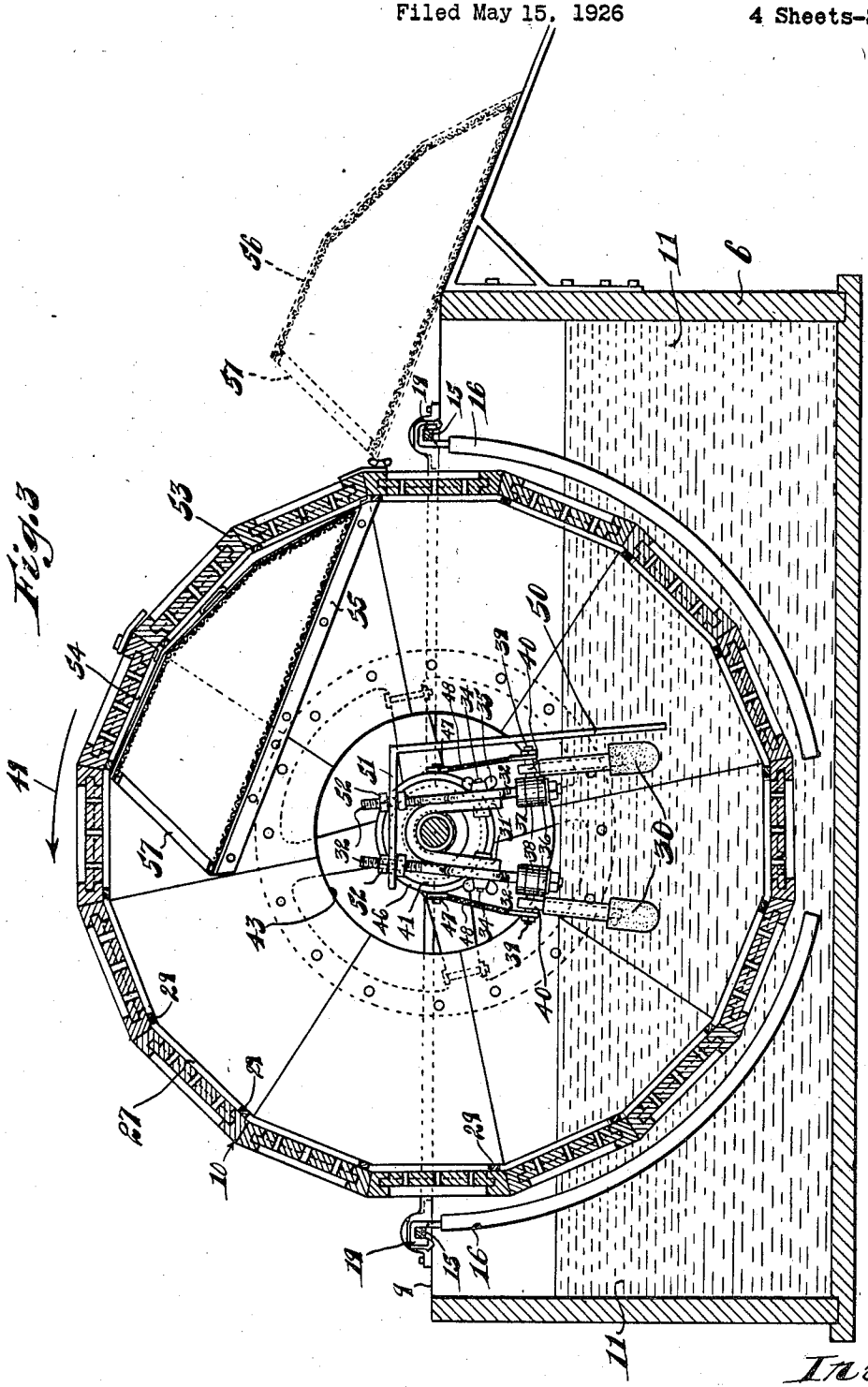
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ELECTROLYTIC PLATING MACHINE

Filed May 15, 1926 4 Sheets-Sheet 3

Fig. 3



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ELECTROLYTIC PLATING MACHINE

Filed May 15, 1926 4 Sheets-Sheet 4

Fig. 4

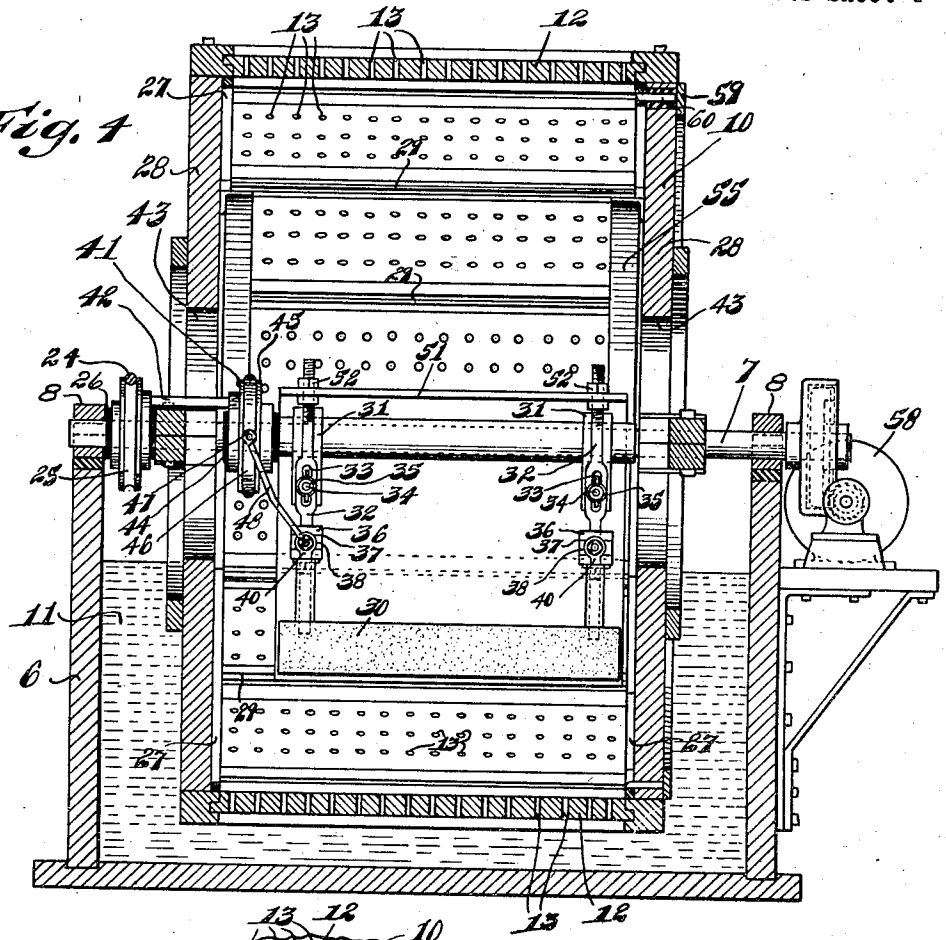
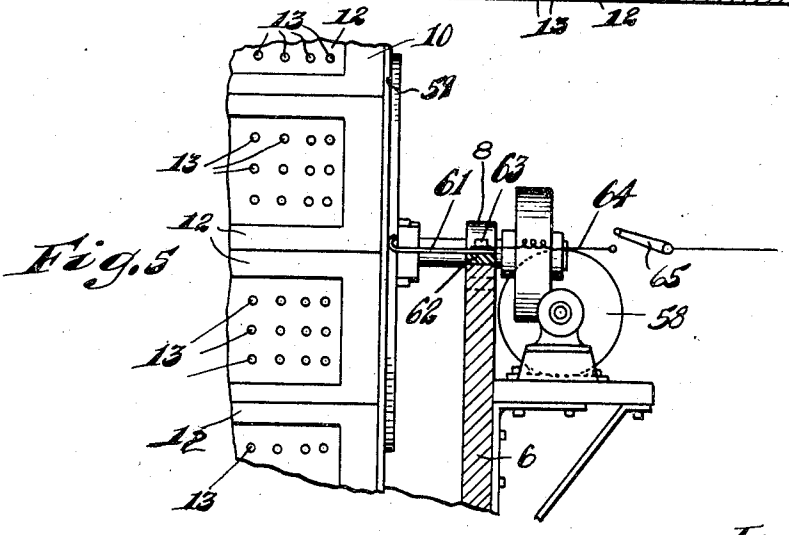


Fig. 5



Witnesses:
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Patented Feb. 22, 1927. 1,618,199

UNITED STATES PATENT OFFICE.

JOSEPH HULMER AND KASPAR JONAS, OF CHICAGO, ILLINOIS.

ELECTROLYTIC PLATING MACHINE.

Application filed May 15, 1926. Serial No. 109,271.

Our invention relates to electrolytic plating machines, and the same has for its main object to improve generally in the construction and arrangement of the parts of a machine of this character.

Other objects of our invention are to provide a power operated machine of this character for plating articles in bulk; and to provide a machine which will be simple in construction and arrangement, efficient and durable in use and which will embody certain desired features of convenience.

Another characteristic consists in the embodiment of features of construction which will admit of the ready adjustment of the position of the anode elements within the power driven tumbling barrel.

Other objects will appear hereinafter.

The invention consists in the combinations 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 represents a longitudinal sectional view through the solution holding tank and an end view of the tumbling barrel, the shaft which supports the barrel upon the tank being shown in section;

Fig. 2 represents a sectional plan view taken substantially on the line 2—2 of Fig. 1;

Fig. 3 represents a vertical section taken substantially on the line 3—3 of Fig. 2;

Fig. 4 represents a vertical cross sectional view taken substantially on the line 4—4 of Fig. 1; and

Fig. 5 represents a fragmentary detail showing the arrangement of the brush contact through which current is passed to the ring conductor arranged on the end of the tumbling barrel.

In the accompanying drawings, wherein we have illustrated the preferred embodiment of our invention, 6 designates a tank for holding the plating solution; 7 designates a driving shaft operatively mounted in suitable bearings 8 arranged upon the top edges 9 of the solution holding tank; and 10 designates a tumbling barrel which is mounted upon the driving shaft 7 to be rotated thereby through the plating solution 11 contained in the tank 6. To better induce a tumbling action upon the part of the articles to be plated, the periphery of the tumbling barrel 10 is composed of angularly connected cross strips 12. So that the plating solution may enter the barrel as the latter turns through the former, the angularly connected cross strips 12 are provided with closely associated perforations 13.

In carrying out our improvements as illustrated in the accompanying drawings, we mount upon the tank 6 suitable bus bars 14 and 15 for carrying anode elements 16 closely adjacent to the periphery of the tumbling barrel. The bus bars 14 and 15 are mounted in suitable insulation 17 arranged in bearing brackets 18 which are bolted upon the top edges of the solution holding tank 6. The bus bars 14 and 15 are made in angular form in cross section (Fig. 3) so that the anode elements 16 may be hung therefrom by means of hooklike heads 19 which are also made in angular form in order to have conforming fit upon the bus bars. Said anode elements 16 are curved longitudinally as shown in order that, when applied to the bus bars, they will curve closely about the periphery of the barrel.

Referring to Fig. 2, 20 designates a rheostat for regulating the current and the same is connected with a suitable source of current through a supply wire 21. From the rheostat 20 a supply wire 22 leads to the bus bar 14 for supplying the current to the anode elements 16 depending therefrom. The current flows from bus bar 14 to bus bar 15 through a conductor bar 23 which is bowed at 24 intermediate its length to rest upon a conductor wheel 25 mounted upon the driving shaft 7 but insulated therefrom by a bushing 26 made of suitable insulating material. Through the conductor bar 23, therefore, current passes from the bus bar 14 to the conductor wheel 25 and as well to the other bus bar 15 for supplying current to the anode elements 16 hung therefrom.

Extending entirely around the inner periphery of the barrel are two spaced cathode strips 27 which are secured in any suitable manner to the angularly connected cross strips 12 where they join the ends 28 of the barrel. Said cathode strips 27 are connected at intervals by cross cathode elements 29 to which the plating solution inflows

through the perforations 13 from the outside anodes 16.

According to an important feature of our present improvements, we provide a pair of inside anode elements 30 which are suspended from the driving shaft 7 in such manner that their positions relatively to the cathodes may be readily varied. To this end, we provide a pair of U hangers 31 mounted to have their loops resting upon the driving shaft 7 and to have their arms straddling the same as clearly shown in Fig. 3. Slidable upon each arm of each of the U hangers is a suitable carrying arm 32 which is provided intermediate its length with an elongated slot 33 for the reception of a bolt element 34 having projection from the associated hanger and adapted to receive a securing wing nut 35. Under this arrangement, each of the carrier arms 32 may be adjusted at will upon this supporting U hanger. Mounted upon the lower extremity of each carrier arm is a cylindrical body 36 made of porcelain or other suitable insulating material. Set in an annular recess 37 provided in each cylindrical body 36 is a metallic ring 38 carrying a projecting terminal pin 39. Mounted upon and depending from each terminal pin 39 is a conductor rod 40. The anode elements 30 are supported on the lower extremities of these conductor rods 40, it being noted that through the foregoing arrangement of adjustable elements one anode element 30 can be suspended within the plating liquid from the U hanger arms extending down from one side of the shaft 7 while the other anode element 30 is similarly suspended in opposed relation within the plating liquid from the arms of the U hangers extending down from the opposite side of said shaft 7. The pair of anode elements 30 are thus suspended from the driving shaft 7 for adjustment towards and away from the path of movement of the cathodes arranged on the periphery of the tumbling barrel.

Current is taken from the conductor wheel 25 located outside the tumbling barrel and passed to a conductor wheel 41 on the inside of the tumbling barrel by means of a conductor bar 42 which extends through the opening 43 provided in the end of the tumbling barrel. Said conductor wheel 41 is made fast with the driving shaft to turn therewith and is mounted upon an intervening bushing 44 of insulating material. Loosely surrounding the conductor wheel 41 and held in position thereon by suitable flanges 45 is a conducting ring 46 provided with two terminal posts 47. Flexible conductors 48 are employed to connect the terminal posts 47 with the pins 39 at the adjacent ends of the suspension structure, whereby to supply current to the two anode elements 30. In the present embodiment, the tumbling barrel revolves in a counter-clockwise direction as indicated by the arrow 49 (Fig. 3). A bulk of articles, placed within the barrel for plating, are naturally carried upwardly in the direction of the rotation of the barrel and then tumbled (or tend to tumble) backwardly toward the low point of the barrel. To prevent the articles from contacting with the anode elements as they tumble downwardly over each other, we preferably provide a shield 50 which depends from a plate 51 secured upon the carrying arms 32 just over the driving shaft 7 by means of nuts 52 which are threaded upon said carrying arms both above and below said plate 51 as clearly illustrated in Figs. 3 and 4. The shield 50 is thus supported for adjustment along with the carrying arms and is also capable of adjustment independently thereof.

53 designates a lid which forms part of the periphery of the tumbling barrel and which is removable in order to provide a suitable opening through which to introduce the articles into the barrel or to remove them therefrom. Attached to this removable lid 53 are cathode sections 54 which form part of the encircling cathode strips 27. Suitably arranged on the inside faces of the barrel ends 28 are ledges 55 for the support of a cage 56 enterable and removable through the peripheral opening for which the lid 53 constitutes the closure. Said cage 56 is open at its inner end 57 so that when it is placed upon the ledges 55 and the barrel revolved the plated articles will tumble into the cage whereby to be removed. By preference the driving shaft 7 is operated by power taken from an electric motor as 58, there being any suitable arrangement of gearing provided to transmit the power from the motor to said driving shaft.

The cathodes serve as the means by which the current is led from the electrolyte, the cathode strips 27 being connected for this purpose wih an outside ring conductor 59 by means of spaced apart pin conductors 60 which extend transversely through the barrel end as clearly shown in Fig. 2. Both the ring conductor 59 and the pin conductors 60 are suitably insulated from the barrel. Arranged to wipe the ring conductor 59 is a brush 61 which is supported upon the top edge of the tank by means of an insulation plug 62. Said brush conductor has a terminal post 63 with which is connected a return wire 64 which leads back to the source of power and in which is incorporated a suitable control switch 65.

The current may be traced through the rheostat 20, supply wire 22, bus bar 14 and thence to the anode 16 depending there-

from. From said bus bar 14 the current passes over the conductor bar 23 to the other bus bar 15 and anode 16 depending therefrom. Current is also taken from the conductor arm 23 by the conductor wheel 25 and passes through the conductor bar 42, conductor wheel 41, conductor ring 46, terminals 47, flexible conductors 46, terminal pins 39, and conductor rods 40 to the anodes 30. The return from the cathodes is effected through the conductor pins 60, conductor ring 59, brush 61 and negative return wire 64.

While we have illustrated and described the preferred form of construction for carrying our invention into effect, this is capable of variation 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 claims.

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

1. An electrolytic plating machine including a solution holding tank; a shaft rotatably supported in the tank and carrying a perforated tumbling barrel for rotation through the solution contained therein; stationary U-shaped hangers bearing on the shaft with their arms depending on opposite sides thereof; and means arranged on said arms for carrying anodes in the solution within said tumbling barrel, substantially as described.

2. An electrolytic plating machine including a shaft rotatably supported on the tank and carrying a perforated tumbling barrel for rotation through the solution contained therein; non-rotatable hanger means having bearing on the shaft within the barrel; a depending conductor insulatively carried by the hanger means; an anode carried by the conductor; and a supply wire extending to and connected with said conductor, substantially as described.

3. In an electrolytic plating machine, the combination with a perforated tumbling barrel shaft supported for rotation through plating solution, of non-rotatable hanger means having bearing on the shaft within the barrel; a depending conductor insulatively carried by the hanger means and supporting an anode; a conductor wheel carried by but insulated from the shaft; an electrical connection between said wheel and depending conductor; and a conductor which forms part of a supply line electrically engaging said wheel, substantially as described.

4. In an electrolytic plating machine, the combination with a perforated tumbling barrel shaft supported for rotation through plating solution, of non-rotatable hanger means having bearing on the shaft within the barrel; a depending conductor insulatively carried by the hanger means and supporting an anode; a pair of conductor wheels carried by but insulated from the shaft, one being inside the barrel and the other being outside the same; a supply line leading to the outside wheels; an electrical connection between said wheels; and an electrical connection between the inside wheel and said depending conductor, substantially as described.

5. An electrolytic plating machine including a solution holding tank; a shaft rotatably supported on the tank and carrying a perforated tumbling barrel for rotation through the solution contained therein; stationary U-shaped hangers bearing on the shaft with their arms depending on opposite sides thereof; carrying arms arranged on the hanger arms and extending above and below the same; a shield supported on the upper ends of the carrying arms; and means on the lower ends of said arms for suspending an anode in the solution within the barrel; substantially as described.

6. An electrolytic plating machine including a solution holding tank; a shaft rotatably supported on the tank and carrying a perforated tumbling barrel for rotation through the solution contained therein; non-rotatable hanger means having bearing on the shaft within the barrel; carrying arms adjustable on the hanger means; depending conductors having insulative support on the carrying arms and carrying anodes; supply lines leading to said conductors; and a shield for the anodes supported on the carrying arms, substantially as described.

7. The combination with a perforated tumbling barrel supported for rotation through plating solution, of cathode elements in continuous arrangement around the inner periphery of the barrel; non-rotatable hanger means having bearing on the shaft within the barrel; carrying arms associated with the hanger means; anode elements having depending support on said carrying arms; said carrying arms being adjustable on the hanger means to vary the position of the depending anodes relatively to the path of movement of the cathode elements, substantially as described.

8. The combination with a perforated tumbling barrel shaft supported for rotation through plating solution, of cathode elements in continuous arrangement around the inner periphery of the barrel; non-rotatable hanger means having bearing on the shaft within the barrel; carrying arms associated with the hanger means; anode elements having depending support on said carrying arms; said carrying arms being adjustable on the hanger members to vary the position of the depending anodes relatively to

the path of movement of the cathode elements; and a shield arranged on and adjustable with the carrying arms for protecting the anode elements, substantially as described.

9. In combination, a solution holding tank; a perforated tumbling barrel; a driven shaft supporting said barrel for rotation through the solution in the tank; cathode elements in continuous arrangement around the inner periphery of the barrel; anode elements in the tank curving about the barrel; means for supporting anode elements from said shaft within the barrel and comprising non-rotatable hangers having bearing on said shaft; carrying arms adjustably associated with said hangers; depending conductors attached to but insulated from said carrying arms and supporting the anode elements; and electrical connections between the anode elements in the tank and the adjustably supported anode elements within the barrel, substantially as described.

10. In combination with a perforated tumbling barrel, a driven shaft supporting the barrel for rotation; and means for adjustably suspending anode elements from said shaft comprising U-hangers straddling said shaft and having their loop portions bearing thereon; carrying arms having sliding contact with the arms of the U-hangers; means for securing the carrying arms to the arms of the U-hangers in adjusted position; insulation pieces on the carrying arms; and conductor elements mounted on and depending from said insulation pieces for carrying the anode elements, substantially as described.

In witness whereof we have signed our names to this specification.

JOSEPH HULMER.
KASPAR JONAS.