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Description

This invention relates to a continuous electroplating bath having a radial cell containing consumable electrodes which are progressively renewed to correct changes in thickness of the electrodes caused by dissolution of the electrodes into the electrolyte.

In general, radial type electrolytic cells are used in, for example, continuous zinc plating lines for metal strips such as cold rolled thin plates. In order to carry out high speed electrolytic operation with much higher efficiency in this case, the cells comprise large diameter rotating drums for current supply and the lower halves of the drums are immersed in an electrolyte in the cell. A metal strip to be plated is trained over the immersed lower halves so that it passes into and out of the cell, during which electric current is supplied from anodes arranged in opposition to the strip and spaced therefrom to provide gaps therebetween in the radial direction of the drums.

Such an arrangement is advantageous for plating only one surface of a strip without plating the other surface thereof. Since, however, great electric power is required for a large scale plant including such electrolytic cells, it is essential to maintain the gaps as small as possible so as to eliminate ineffective or superfluous consumption of power.

There are two types of electroplating. In one case, the anodes are insoluble and, in the other, the anodes are soluble electrodes. Particularly, the latter case is simple to maintain because the metal component is continuously replenished from the anodes and is useful particularly to obtain thick plating coatings with large electric power because there is less gas production at the electrodes.

In this case, however the anodes tend to dissolve as the plating proceeds so they become thinner and the gaps progressively enlarge thereby increasing the electric resistance and decreasing the current density and therefore progressively decreasing the plating deposition. Accordingly in a plating system using soluble electrodes, the enlarged gaps must be successively corrected in response to the consumption of the electrodes with the lapse of time.

In DE—A—2165329 there is shown an electroplating bath wherein the anode is a consumable electrode and means is provided to displace it radially towards the rotating drum so as to compensate for the enlargement of the gap caused by dissolution of the anode.

In order to successively correct the gaps, it has been proposed to arrange an assembly of arcuate consumable electrodes side by side partially surrounding the current supply rotating drums in the electrolyte bath in a manner such that the consumable electrodes are progressively moved along generatrices of the cylindrical rotating drums. The consumable electrodes are moved along guides having gradients so as to cause them to approach the drums as they are consumed to maintain the gaps constant. The guides serve to supply current for the anodes consisting of the consumable electrode groups. Such guides are sometimes referred to as "electrode supports".

In this manner, new consumable electrodes are supplied on one side of the current supply rotating drums and the old consumed electrodes are removed on the other side of the drums as the consumable electrodes progressively move along, thereby successively renewing the assembled electrodes while correcting the gaps between the electrodes and the strips to be plated.

In this case, the electrode support is generally mainly made of a graphite rod having a fairly large square cross-section (approximately 450 × 450 mm) for fulfilling conditions required for such plants, i.e. corrosion-resistance to the electrolyte, low overvoltage and low cost.

As the above renewal of the anodes is frequently effected, it causes wear on the surfaces of the electrode supports, which is due to simple mechanical friction but is accelerated by slight arc discharge between the surfaces of the supports and the consumable electrodes, local overvoltage and the like, with the result that there is an increase in the gaps between the anodes and the strip to be plated in the proximity of the bottom of the electrolyte bath, while the upper ends of the anodes in the vicinity of the surface of the electrolyte bath approach the rotating drums and this would cause a short-circuit accident if suitable precautions were not taken.

If the electrode supports are not accurately positioned at the bottom of the electrolyte bath, the gaps cannot be properly maintained while the consumable electrodes are being renewed. Accordingly, the electrode supports have been supported on stationary bases rigidly mounted on the bottom of the bath by support troughs having core members of (L-shaped) angle steels upwardly opening as shown in Figs. 1a and 1b of the accompanying drawing. A metal strip 3 passes along lower halves of drums 1 immersed in electrolyte T. The bath includes an assembly of anodes 3 which consists of groups of consumable electrodes 3' arranged side by side in opposition to metal strip 2 with gaps G relative thereto in the radial direction of the rotating drums 1. As shown in the drawing, the anodes 3 are arranged on opposite sides of the rotating drums 1 upstream and downstream of the running direction of the metal strip 2 and are anchored on support surfaces 6 of electrode supports 5 with the aid of protrusions 4 formed on the outer surfaces of the consumable electrodes 3' so as to permit the electrodes 3' to be moved in succession along the support surfaces of the electrode supports. The electrode supports 5 are securely supported by support troughs 8 on the stationary bases 9 rigidly mounted on the bottom of the bath.

In this case, however, even if the electrode supports 5 determining the gaps relative to the anodes 3 are properly positioned, gaps G' and G''

in the proximity of the ends of the anodes 3 become relatively narrow as shown in Figs. 2a and 2b, as a result of the plating of metal strips 2 and 2′ of different width.

It is therefore a general object of the present invention to provide a continuous electroplating bath having an improved electrode support which is adjustable to keep the proper gaps between the metal strip to be plated and the progressively replenished anodes during electrolytic operation.

It is another object of the present invention to provide an electroplating bath having an electrode support wherein anodes are supported on, support troughs fixed to stationary bases, the support troughs being tiltable to compensate for the wearing of the electrode supports so as to maintain the proper gaps between the steel strip to be plated and the anodes which are progressively replenished during electrolytic operation.

It is a further object of the present invention to provide an electroplating bath having an electrode support device including an adjustable suspending means therefor whereby the gaps between the metal strip to be plated and the anodes can be corrected to meet electrolytic conditions thereby eliminating edge-overcoating of the strip.

According to one aspect of the present invention there is provided a continuous electroplating bath which comprises a current supply rotatable drum having a lower part immersed in electrolyte and about which a metal strip to be plated is trained so as to pass through the electrolyte, electrode supports having support surfaces and supported by a support trough mounted on a stationary base, an assembly of arcuate consumable electrodes arranged side by side along generatrices of said rotating drum and successively movable along said support surfaces whereby new consumable electrodes may be supplied at one end of the assembly and consumed electrodes may be removed from the other end of the assembly, and adjusting means for adjusting the gaps between said metal strip and said consumable electrodes characterised in that said adjusting means is provided by said support trough being rotatably mounted for tilting about said base and being fixed thereto by adjusting bolts whereby said support surfaces of said electrode support can be adjustably tilted so as to adjust said gaps.

According to another aspect of the present invention, there is provided a continuous electroplating bath which comprises a current supply rotatable drum having a lower part immersed in electrolyte and about which a metal strip to be plated is trained so as to pass through the electrolyte, electrode supports having support surfaces and supported by a support trough mounted on a stationary base, an assembly of arcuate consumable electrodes arranged side by side along generatrices of said rotating drum and successively movable along said support surfaces whereby new consumable electrodes may be supplied at one end of the assembly and consumed electrodes may be removed from the other end of the assembly, and adjusting means for adjusting the gaps between said metal strip and said consumable electrodes characterised in that said adjusting means comprises hanging members supporting each of said electrode supports and extending upwardly from the surface of the electrolyte and extending downwardly beyond the surface of the electrolyte each member having a part in sliding engagement with a guide extending in a direction substantially parallel to a radius of said current supply rotating drum whereby sliding movement of the part with respect to the guides adjusts said gaps.

For a better understanding of the invention and to show how it may be carried out reference will now be made, by way of example, to the accompanying drawings in which:—

Fig. 1a is a side view of a radial cell type electroplating bath of the prior art;

Fig. 1b is a front elevation of the bath shown in Fig. 1a;

Figs. 2a and 2b are schematic partial views for explaining the occurrence of edge-overcoating due to increases in width of the metal strips to be plated;

Fig. 3 is a perspective view of an electroplating bath in accordance with the present invention;

Figs. 4a and 4b are different sections through a part of the support means for the electrodes of the bath of Fig. 3;

Fig. 4c is a sectional view taken along line IVc—IVc in Fig. 4b;

Fig. 4d is a side elevation as viewed in the direction shown by arrows IVd—IVd in Fig. 4b;

Fig. 5a is a side elevation of a part of the bath of Fig. 3; and

Fig. 5b is an end view of the part shown in Fig. 5a.

Referring to Fig. 3 the electroplating bath comprises rotating drums 1 for supplying electric current. A metal strip 2 passes along the lower halves of the drums 1 below the surface of the electrolyte (not shown for clarity). Anodes 3 consists of groups of consumable electrodes 3′ arranged side by side in opposition to and spaced from the metal strip to provide gaps extending in radial directions with respect to the rotating drums 1. As shown in the drawing, the anodes 3 are arranged on opposite sides of an axis of the rotating drums 1 upstream and downstream of the running direction of the strip 2 and are anchored on a pair of electrode supports 5, fixed substantially in parallel with the axis of the drums 1, with the aid of protrusions 4 formed centrally on the outer surfaces of the consumable electrodes 3′ so as to permit the electrodes 3′ to be moved in succession along the axial direction of the electrode supports 5. Each of the consumable electrodes 3′ is in the form of a generally arcuate zinc casting. Each electrode support 5 has an electrode support surface 6 immediately below the protrusions 4 of the consumable electrodes 3′ for supporting the outer surfaces of the electrodes 3′.

In order to correct increases in the gaps due to consumption of the anodes held on the upper edge of the electrode supports, new consumable electrodes 3'' are supplied into the electroplating bath on both sides of the drums 1 and all the consumable electrodes 3' are moved along by pushing the new electrodes with pushers 7. The waste electrodes 3''' which have been pushed out are then taken from the bath. In this manner, the anodes 3 are always renewed for successively correcting the amount of the anodes which have been consumed over a period of time. In this case, each electrode support is slightly angularly arranged relative to a generatrix of the rotating drum with a gradient corresponding to the consumed amount of the consumable electrode 3' during the time taken for a new electrode 3'' to become a waste electrode 3'''. The electrode support 5 is supported with such a gradient on a support trough 8 at the bottom of the bath, which is in turn held by a stationary base 9.

In this embodiment, each stationary base 9 is suspended in the electrolyte bath by the inclining lifts 11 of adjusting devices 10 arranged outside the electrolyte bath and including inclining lift guides 12.

The arrangement shown in Fig. 3 includes bearings 13 for the drums 1, a motor 14 for driving the drums 1, a reduction gear 15, a current collector ring 16, cathode bus bars 17, current supply bars 18 for the electrode supports 5, anode bus bars 19 and rectifiers 20.

In order to stably support each electrode support 5, which is made of a large square bar, the support trough 8 comprises a core member 21 made of L-sectioned steel arranged so that its L-shaped groove faces upwardly and a corrosion-resistant coating such as a rubber lining 22 on the L-shaped groove and the stationary base 9 comprises a trough-shaped core member 23 and a rubber lining 24 applied thereto as shown in Figs. 4a and 4b.

As shown in Figs. 4a and 4c, the support trough 8 is provided in the vicinity of its ends with a pair of arcuate projection pieces 25 extending downward towards and engaging with the trough-shaped stationary base 9 and lined with a rubber lining so as to permit the support trough 8 to be rotated about the axis of the electrode support 5. Connecting core members 26 serve to connect ends of the arcuate projection pieces 25 to the support trough 8 at its upper edges and have a length longer than the width of the arcuate projection pieces 25 as shown in Fig. 4d. Each connecting core member 26 is formed with a pair of bolt apertures 27. On the other hand, the stationary base 9 is provided with a pair of ears 28 on both sides adjacent each arcuate projection piece 25. The support trough 8 is fixed to the stationary base 9 by means of adjusting bolts 30 with nuts 31 passing through, and fastening between, notches 29 formed in the ears 28 and the bolt apertures 27 of the connecting core members 26. Reference numeral 32 denotes reinforcing core members for the stationary base 9 as shown in Fig. 4b.

With the above arrangement, when the support surface 6 of the electrode support 5 has been worn off as shown by a phantom line 6' in Fig. 4a, the inner adjusting bolt 30 shown at the right in Fig. 4b is loosened and, on the other hand, the outer adjusting bolt 30 shown at the left is tightened to rotate the support trough 8 in the direction shown by arrow 33, so that the worn surface 6' is returned to the position of the surface 6 to easily eliminate the unevenness of the gaps at the upper and lower ends of the consumable electrode 3' due to the wearing of the surface of the electrode support.

Referred back to Fig. 3 the base 9 with the support trough 8 for the electrode support 5 is suspended in the electrolyte bath by the inclining lifts 11 as above mentioned. An end piece 40 at each end of the base 9 is provided with two clevis 11a and 11b connected by pins 42' to lower bifurcated ends of a hanging member 42. The hanging member 42 is movable in the direction of the inclining lift or translation guide 12 with the aid of a lower edge 44 of a hanging portion 43 upwardly extending above the surface (not shown) of the electrolyte and further downwardly extending beyond the upper edge of the bath. Reference numeral 46 denotes an operating wheel for the purpose.

As shown in Figs. 5a and 5b, the operating wheel 46 is fixedly keyed to an end of a worm shaft in a worm gear box 48 mounted on a bracket 47 fixed by welding to a sidewall w of the electrolyte bath. The lower edge 44 of the hanging portion 43 is connected by a pin 50' to, and embraced by, an end piece 50 of a screw threaded stem 49 actuated by a worm and a worm gear in mesh with each other in the gear box 48. On the other hand, the lower edge 44 of the hanging portion 43 is provided with a slider 51 having an inverted T-shaped cross-section slidably guided by a translation guide 52 provided on a bracket 53 fixed to the sidewall w of the bath. There is preferably provided an indicator 54 for indicating the sliding distance of the slider 51 and having a pointer 55.

The sliding direction of the slider 51 and hence of the hanging portion 43 is arranged to be parallel to the radial axis of the current supply rotating drums 1 including the center of the electrode support 5 as shown in Fig. 5b, so that the distance between the anode 3 and the metal strip 2 can easily be adjusted without causing any unevenness in the gaps at upper and lower portions of the anode.

In the adjusting operation, the ends of the electrode supports 5 are separately adjusted so as to change the gradients relative to generatrices of the current supply rotating drums 1. Such an adjustment enables the electroplating apparatus to be easily applicable to metal strips of various widths and the consumable electrodes 3' to be effectively utilized so as to lower the unit price of the anodes.

As seen be seen from the above description, according to the invention, it is therefore possible

to simply and easily prevent failures due to unevenness of the gaps at the ends of consumable electrodes resulting from unavoidable irregular wear on the support surfaces of the electrode supports caused by the replenishing operation involving successive movement of the consumable electrodes along the electrode supports during the electrolytic operation to progressively replenish the consumable electrodes in a radial cell type electrolyte bath. According to the invention, moreover, the gaps between the assembled electrodes and the metal strip to be plated can be externally adjusted according to the width direction of the strip to meet the electrolytic conditions, thereby eliminating edge-overcoating which would occur when the width of the strip is increased and making proper the rate at which the electrodes are consumed until wasted thereby lowering the unit price thereof.

While the invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those skilled in the art that the foregoing and other changes in form and details can be made therein without departing from the scope of the invention as defined in the following claims.

Claims

1. A continuous electroplating bath comprising a current supply rotatable drum (1) having a lower part immersed in electrolyte and about which a metal strip (2) to be plated is trained so as to pass through the electrolyte, electrode supports (5) having support surfaces (6) and supported by a support trough (8) mounted on a stationary base (9), an assembly of arcuate consumable electrodes (3') arranged side by side along generatrices of said rotating drum (1) and successively movable along said support surfaces (6) whereby new consumable electrodes (3'') may be supplied at one end of the assembly and consumed electrodes (3''') may be removed from the other end of the assembly, and adjusting means for adjusting the gaps between said metal strip and said consumable electrodes characterised in that said adjusting means is provided by said support trough (8) being rotatably mounted for tilting about said base and being fixed thereto by adjusting bolts whereby said support surfaces (6) of said electrode support (5) can be adjustably tilted so as to adjust said gaps.

2. A bath as claimed in claim 1, wherein said support trough (8) comprises a core member (21) made of L-sectioned steel which is arranged so that its L-shaped groove is upwardly directed and which has a corrosion-resistant coating (22), and said stationary base (9) comprises a trough-shaped core member (23) having a lining (24) applied thereto.

3. A bath as claimed in claim 2 or 3, wherein said support trough (8) is provided in the vicinity of its ends with a pair of arcuate projection pieces (25) engaging with the trough-shaped core member (23) of said base (9) and with connecting core members (26) connecting the ends of said arcuate projection pieces (25) to said support trough (8) at its upper edges, said arcuate projection pieces (25) and said connecting core members (26) being lined with corrosion-resistant coatings, and said base (9) is provided with a pair of ears (28) adjacent the arcuate projection pieces (25) of said support trough (8), each ear (28) being formed with a notch (29) for fixing said support trough (8) onto said base (9) by means of said adjusting bolts (30) and nuts (31) extending between said notches (29) and apertures (27) formed in said connecting core members (26).

4. A continuous electroplating bath comprising a current supply rotatable drum (1) having a lower part immersed in electrolyte and about which a metal strip (2) to be plated is trained so as to pass through the electrolyte, electrode supports (5) having support surfaces (6) and supported by a support trough (8) mounted on a stationary base (9), an assembly of arcuate consumable electrodes (3') arranged side by side along generatrices of said rotating drum (1) and successively movable along said support surfaces (6) whereby new consumable electrodes (3'') may be supplied at one end of the assembly and consumed electrodes (3''') may be removed from the other end of the assembly, and adjusting means for adjusting the gaps between said metal strip and said consumable electrodes characterised in that said adjusting means comprises hanging members (42) supporting each of said electrode supports (5) and extending upwardly from the surface of the electrolyte and extending downwardly beyond the surface of the electrolyte each member having a part (44) in sliding engagement with a guide (12) extending in a direction substantially parallel to a radius of said current supply rotating drum whereby sliding movement of the part (44) with respect to the guides (12) adjusts said gaps.

5. An electroplating bath as claimed in claim 4, wherein said adjusting means further comprises, for each hanging member part (44), an operating wheel (46) keyed to an end of a worm shaft in mesh with a worm gear in a worm gear box (48) mounted on a bracket (47) fixed to the electrolyte bath, a screw threaded stem (49) driven by the worm gear and having an end piece 50 connected to said part (44) of the hanging member (42), and a slider (51) having an inverted T-shaped cross-section provided on said part (44) and slidably guided on said guide (12).

Patentansprüche

1. Bad zum kontinuierlichen Elektroplattieren, mit einer rotierbaren Stromzuführtrommel (1), deren unterer Teil in Elektrolyt getaucht ist und um die eine zu plattierende Metallbahn (2) derart geführt ist, daß sie durch den Elektrolyten hindurchgeht, Elektrodenhaltern (5), die Halteflächen (6) aufweisen und von einem auf einer stationären Basis (9) montierten Haltetrog (8) gehalten sind, einem Satz von bogenförmigen Verzehrelek-

troden (3'), die Seite an Seite längs der Erzeugenden der rotierenden Trommel (1) angeordnet und sukzessive längs der Halteflächen (6) bewegbar sind, wodurch an einem Ende des Satzes neue Verzehrelektroden (3'') zuführbar und verbrauchte Elektroden (3''') vom anderen Ende des Satzes entfernbar sind, und mit einer Einstelleinrichtung zum Einstellen der Spalte zwischen der Metallbahn und den Verzehrelektroden, dadurch gekennzeichnet, daß die Einstelleinrichtung durch den Haltetrog (8) gebildet ist, der zum Schwenken um die Basis drehbar montiert ist und durch Einstellschrauben an der Basis befestigt ist, wodurch die Halteflächen (6) des Elektrodenhalters (5) einstellbar geschwenkt werden können, um die Spalte einzustellen.

2. Bad nach Anspruch 1, bei dem der Haltetrog (8) ein Kernteil (21) aus Stahl mit L-förmigem Querschnitt aufweist, der so angeordnet ist, daß seine L-förmige Nut nach oben gerichtet ist, und der eine korrosionsresistente Beschichtung (22) hat, und die stationäre Basis (9) einen trogförmigen Kernteil (23) aufweist, der mit einem Belag (24) versehen ist.

3. Bad nach Anspruch 2 oder 3, bei dem der Haltetrog (8) in der Nähe seiner Enden ein Paar bogenförmiger Vorsprungsteile (25) aufweist, die an das trogförmige Kernteil (23) der Basis (9) und an Verbindungskernteile (26) angreifen, welche die Enden der bogenförmigen Vorsprungsteile (25) an den oberen Kanten des Haltetrogs mit dem Haltetrog (8) verbinden, wobei die bogenförmigen Vorsprungsteile (25) und die Verbindungskernteile (26) mit korrosionsresistenten Beschichtungen ausgekleidet sind und die Basis (9) in der Nähe der bogenförmigen Vorsprungsteile (25) des Haltetroges (8) ein Paar Ohren (28) aufweist, an denen jeweils eine Aussparung (29) ausgebildet ist, um den Haltetrog (8) mittels der Einstellschrauben (30), sich zwischen den Aussparungen (29) erstreckender Muttern (31) und in den Verbindungskernteilen (26) ausgebildeter Öffnungen (27) auf der Basis (9) zu befestigen.

4. Bad zum kontinuierlichen Elektroplattieren, mit einer rotierbaren Stromzuführtrommel (1), deren unterer Teil in Elektrolyt getaucht ist und um die eine zu plattierende Metallbahn (2) derart geführt ist, daß sie durch den Elektrolyten hindurchgeht, Elektrodenhaltern (5), die Halteflächen (6) aufweisen und von einem auf einer stationären Basis (9) montierten Haltetrog (8) gehalten sind, einem Satz von bogenförmigen Verzehrelektroden (3'), die Seite an Seite längs der Erzeugenden der rotierenden Trommel (1) angeordnet und sukzessive längs der Halteflächen (6) bewegbar sind, wodurch an einem Ende des Satzes neue Verzehrelektroden (3'') zuführbar und verbrauchte Elektroden (3''') vom anderen Ende des Satzes entfernbar sind, und mit einer Einstelleinrichtung zum Einstellen der Spalte zwischen der Metallbahn und den Verzehrelektroden, dadurch gekennzeichnet, daß die Einstelleinrichtung Hängeteile (42) aufweist, die jeden der Elektrodenhalter (5) halten und sich von der Elektrolytoberfläche aufwärts und sich unter die Elektrolytoberfläche hinaus abwärts erstrecken, wobei jedes Teil ein Teilstück (44) hat, das in Gleiteingriff mit einer Führung (12) steht, welche sich in einer im wesentlichen zu einem Radius der rotierbaren Stromzuführtrommel parallelen Richtung erstreckt, wodurch die Gleitbewegung des Teilstücks (44) in Bezug auf die Führungen (12) die Spalte einstellt.

5. Elektroplattierbad nach Anspruch 4, bei dem die Einstelleinrichtung ferner für jedes hängende Teilstück (44) aufweist: ein Bedienungsrad (46), das mit einem Ende einer Schneckenwelle verkeilt ist, die mit einem Schneckenrad in einem Schneckentriebgehäuse (48) in Eingriff steht, das an einem mit dem Elektrolytbad verbundenen Träger (47) befestigt ist, eine Gewindestange (49), die von dem Schneckenrad angetrieben ist und ein Endstück (50) aufweist, das mit dem Teilstück (44) des hängenden Teils (42) verbunden ist, und ein Gleitteil (51) mit umgekehrt T-förmigem Querschnitt, das an dem Teilstück (44) vorgesehen und gleitbar an der Führung (12) geführt ist.

Revendications

1. Bain galvanoplastique fonctionnant en continu, comprenant un tambour rotatif (1) d'alimentation en courant présentant une partie inférieure immergée dans de l'électrolyte et autour de laquelle une bande métallique (2) à galvaniser est entraînée de manière à traverser l'électrolyte, comprenant des supports d'électrodes (5) présentant des surfaces de support (6) et soutenus par une auge de support (8) montée sur un socle fixe (9), comprenant un ensemble d'électrodes consommables arquées (3') disposées côte-à-côte le long de génératrices dudit tambour rotatif (1) et déplaçables successivement le long desdits surfaces de support (6), de sorte que des électrodes consommables neuves (3'') peuvent être fournies à une extrémité de l'ensemble, et que les électrodes consommées (3''') peuvent être enlevées à l'autre extrémité de l'ensemble, et comprenant des moyens de réglage pour régler les jeux entre ladite bande métallique et lesdites électrodes consommables, caractérisé en ce que lesdits moyens de réglage sont fournis par le fait que ladite auge de support (8) est montée rotative en inclinaison autour dudit socle et est fixée à ce dernier par des boulons de réglage, de sorte que lesdites surfaces de support (6) dudit support d'électrode (5) peuvent être inclinées de manière réglable afin de régler lesdits jeux.

2. Bain selon la revendication 1, dans lequel ladite auge de support (8) comprend un élément central (21) réalisé en acier profilé en L qui est disposé de telle sorte que sa rainure en forme de L est dirigée vers le haut et qui présente un revêtement (22) résistant à la corrosion, et dans lequel ledit socle fixe (9) comprend un élément central en forme d'auge (23) sur lequel est appliquée une garniture (24).

3. Bain selon la revendication 1 ou 2, dans lequel ladite auge de support (8) est munie au

voisinage de ses extrémités d'une paire de pièces arquées en saillie (25) coopérant avec l'élément central en forme d'auge (23) dudit socle (9) et avec des éléments centraux d'assemblage (26) assemblant les extrémités desdites pièces arquées en saillie (25) à ladite auge de support (8) à ses bords supérieurs, lesdites pièces arquées en saillie (25) et lesdits éléments centraux d'assemblage (26) étant garnis de revêtements résistants à la corrosion, et dans lequel ledit socle (9) est muni d'une paire d'oreilles (28) voisines desdites pièces arquées en saillie (25) de ladite auge de support (8), chaque oreille (28) étant munie d'un encoche (29) formée pour fixer ladite auge de support (8) sur ledit socle (9) au moyen desdits boulons (30) et écrous (31) de réglage s'étendant entre lesdites encoches (28) et des ouvertures (27) formées dans lesdits éléments centraux d'assemblage (26).

4. Bain galvanoplastique fonctionnant en continu, comprenant un tambour rotatif (1) d'alimentation en courant présentant une partie inférieure immergée dans de l'électrolyte et autour de laquelle une bande métallique (2) à galvaniser est entraînée de manière à traverser l'électrolyte, comprenant des supports d'électrodes (5) présentant des surfaces de support (6) et soutenus par une auge de support (8) montée sur un socle fixe (9), comprenant un ensemble d'électrodes consommables arquées (3') disposées côte-à-côte le long de génératrices dudit tambour rotatif (1) et déplaçables successivement le long desdits surfaces de support (6), de sorte que des électrodes consommables neuves (3''') peuvent être fournies à une extrémité de l'ensemble, et que les électrodes consommées (3''') peuvent être enlevées à l'autre extrémité de l'ensemble, et comprenant des moyens de réglage pour régler les jeux entre ladite bande métallique et lesdites électrodes consommables, caractérisé en ce que lesdits moyens de réglage comprennent des éléments de suspension (42) soutenant chacun desdits supports d'électrodes (5) et s'étendant vers le haut depuis la surface de l'électrolyte et vers le bas au-delà de la surface de l'électrolyte, chaque élément présentant une partie (44) en liaison coulissante avec un guide (12) s'étendant dans une direction sensiblement parallèle à un rayon dudit tambour rotatif d'alimentation en courant, de sorte que le mouvement de coulissement de ladite partie (44) par rapport aux guides (12) régle lesdits jeux.

5. Bain galvanoplastique selon la revendication 4, dans lequel ledits moyens de réglage comprennent en outre, pour chaque partie (44) d'élément de suspension, un volant d'actionnement (46) claveté à une extrémité d'un arbre de vis sans fin s'engrenant avec un engrenage de vis sans fin dans une boîte à vis sans fin (48) montée sur un support (47) fixé sur le bain d'électrolyte, une tige filetée (49) entraînée par l'engrenage à vis sans fin et présentant une partie terminale (50) assemblée à ladite partie (44) de l'élément de suspension (42), et un coulisseau (51) présentant une section en forme de T inversé prévu sur ladite partie (44) et guidé en coulissement sur ledit guide (12).

FIG_1a
PRIOR ART

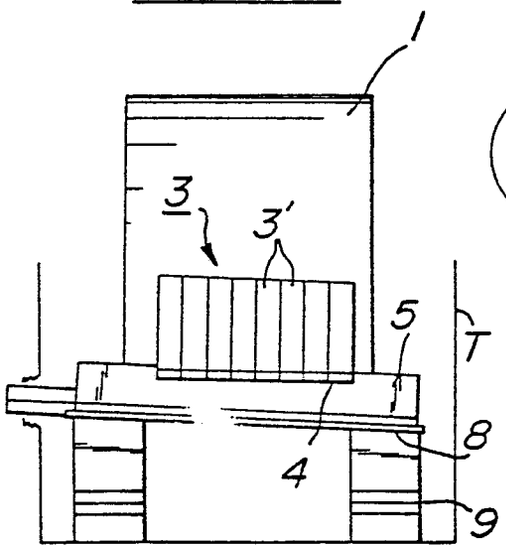


FIG_1b
PRIOR ART

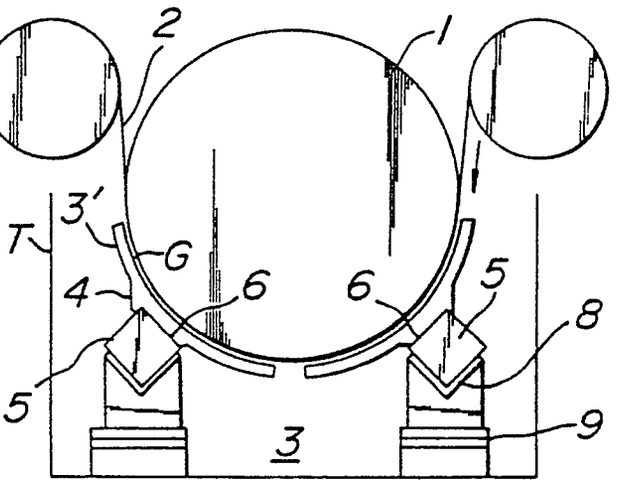


FIG_2a
PRIOR ART

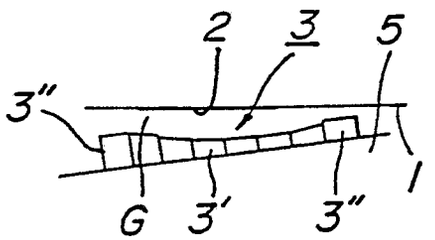
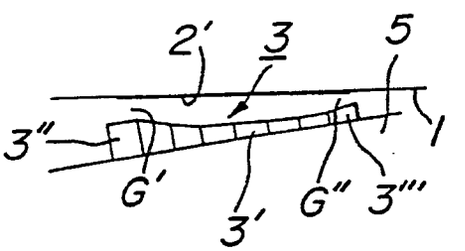
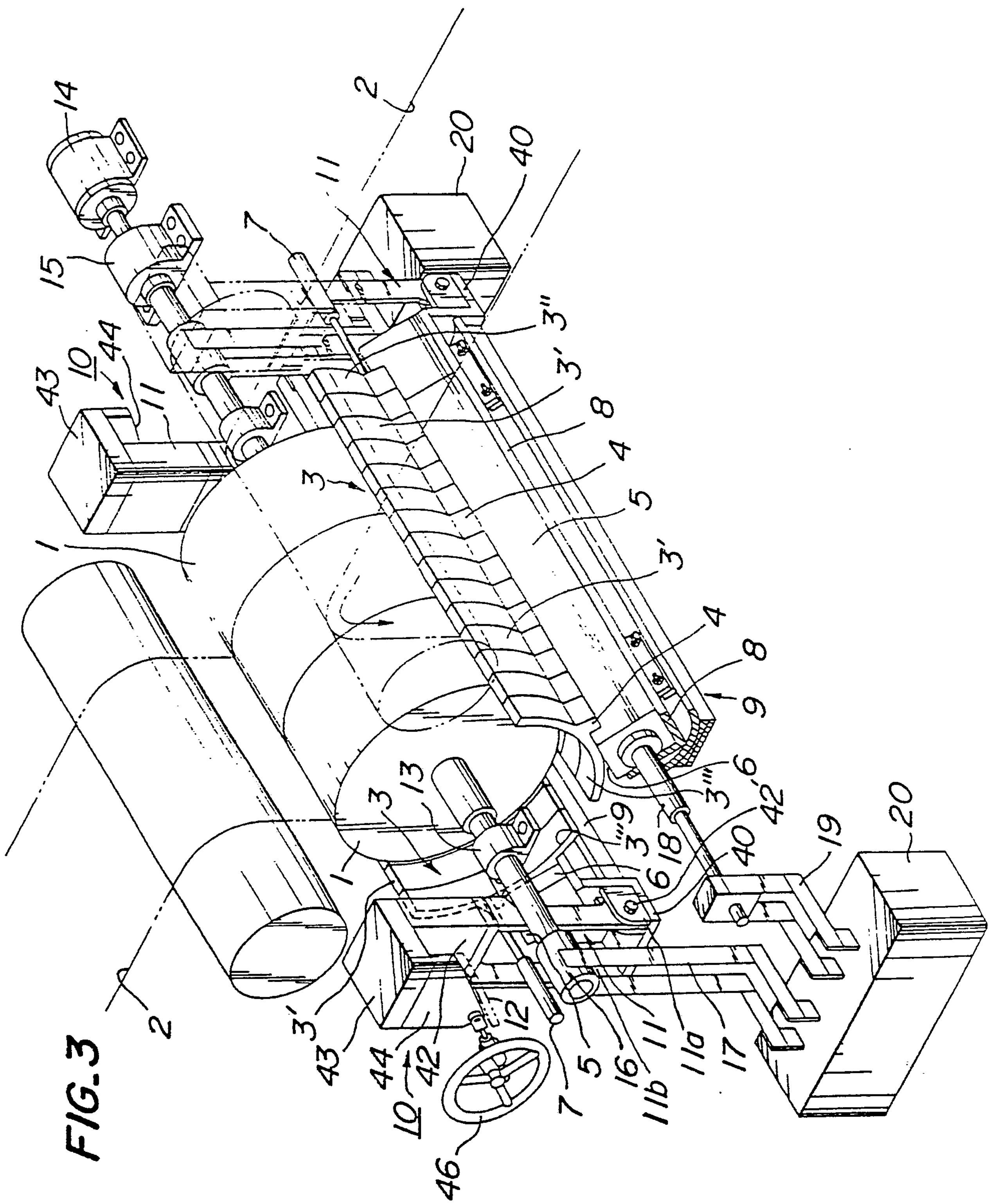


FIG_2b
PRIOR ART





14
15
2
20
40
11
7
3"
3'
8
4
5
3
1
9
6
3'''
18
42
19
13
12
44
43
10
46
16
17
11a
11b

FIG_3

FIG.4a

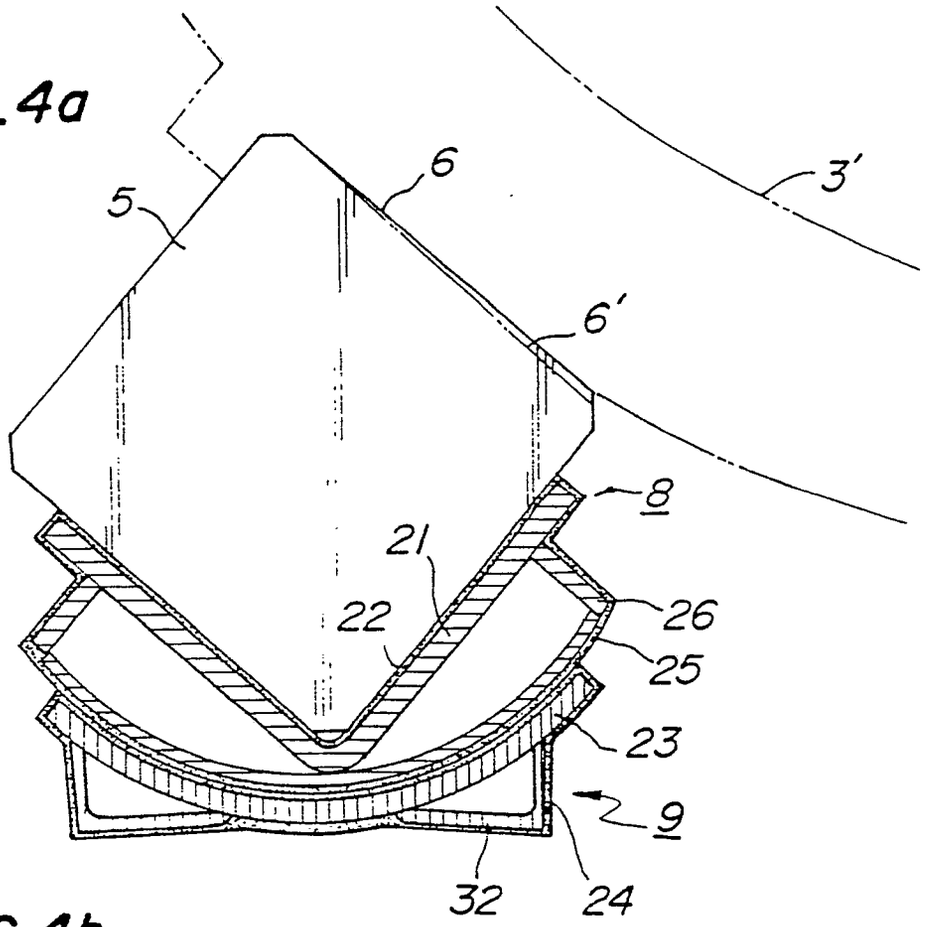

5
6
3'
6'
8
21
22
26
25
23
9
32
24

FIG.4b

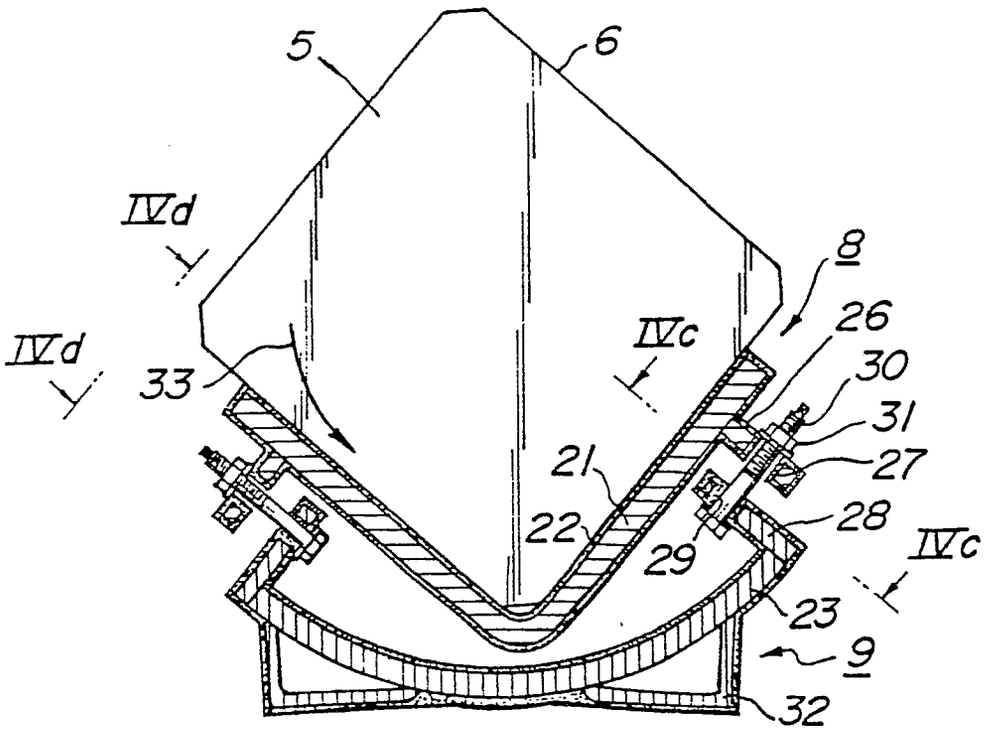

5
6
IVd
IVd
33
8
IVc
26
30
31
27
21
22
28
29
IVc
23
9
32

FIG_4c

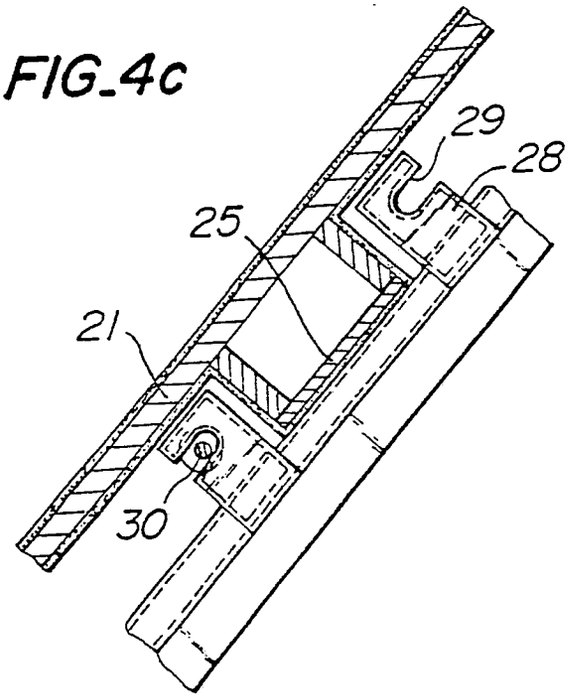


FIG_4d

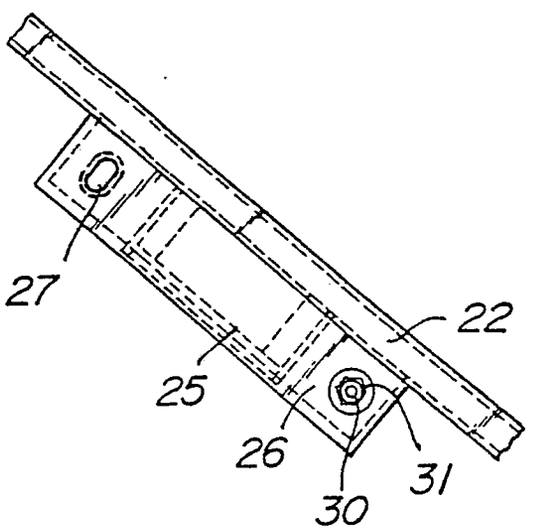


FIG_5a

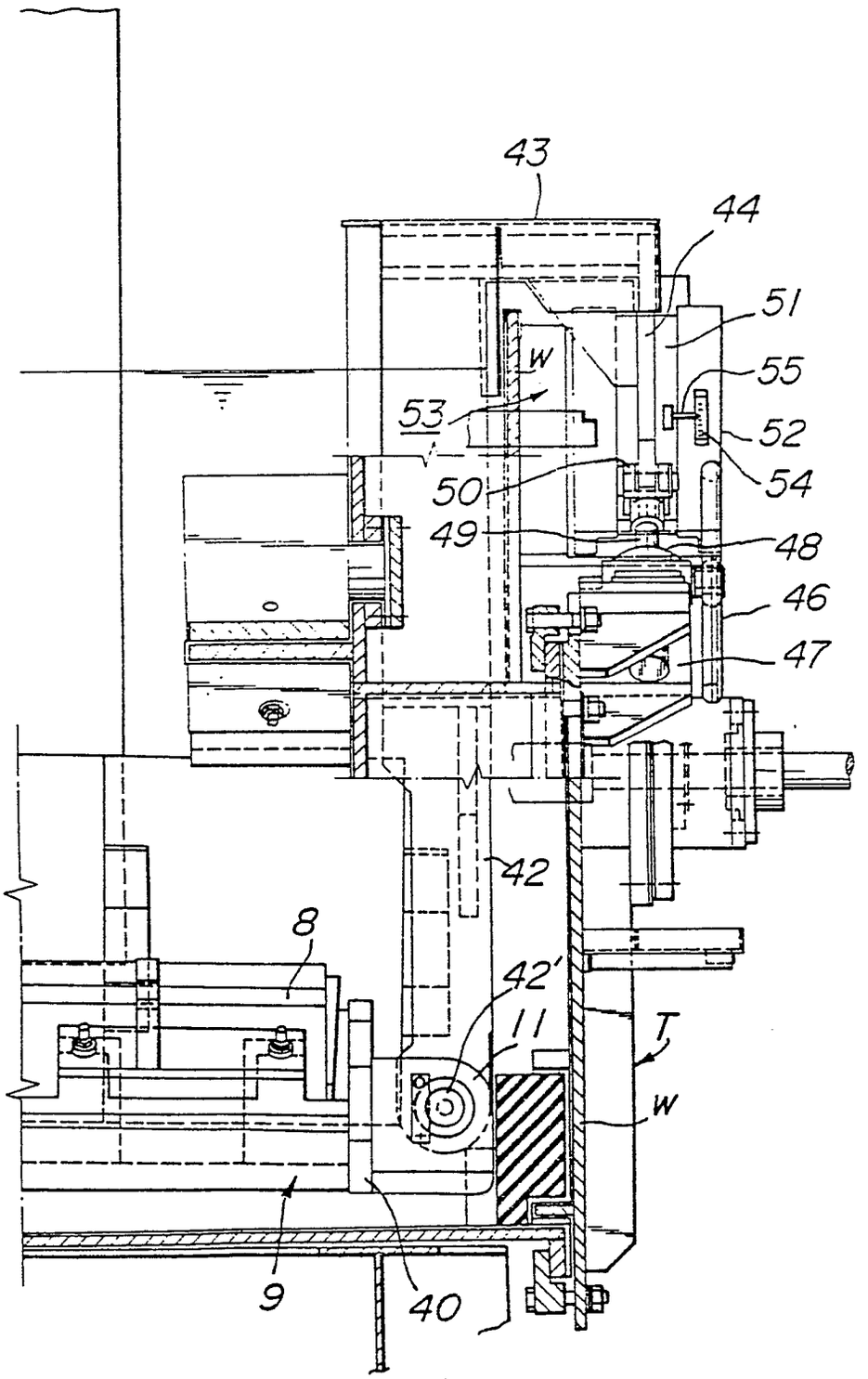


FIG.5b