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54 **A profile for electrolytic treatment and a method for manufacturing the same.**

57 The present invention relates to a profile for electrolytic treatment, as an electroplating bath and to a method for manufacturing the profile. The profile is an essentially spherical anode piece (4), which is

cut off during forming from an object formed by one-stage and which object is made of the anode material and is longer than the diameter of the anode piece (4), to be produced, as a wire or a bar.

**EP 0 378 711 A1**

## A PROFILE FOR ELECTROLYTIC TREATMENT AND A METHOD FOR MANUFACTURING THE SAME

The present invention relates to a profile for electrolytic treatment as well as to a method for manufacturing the same, particularly with respect to a ball-shaped anode piece to be treated in an electroplating bath.

In electroplating baths, the object to be plated is electrically coupled to a negative pole, and the material serving as the anode is coupled to the positive pole. Both soluble and non-soluble anode materials are used in electroplating techniques. Copper-plating, nickel-plating, zinc-plating, tin-plating, lead-plating and silver-plating nearly always employ soluble anodes.

Objects of various shapes have been employed as the soluble anodes, among them rolled slabs, pressed flat bars and oval-shaped profiles. These shapes have each their own advantages and limitations, but they are still widely used. However, in mass-scale electroplating, the current tendency is towards cage anodes made of titanium or of some other non-soluble material, which cage anodes are filled with pieces of the plating metal.

Generally the filler pieces of the cage anodes have been sections cut off a wire, the diameters whereof are usually 8 mm, 12 mm, 25 mm and 45 mm. The length of one single piece is generally equal to the diameter thereof, or often 1,5 times the diameter.

While cutting a filler piece for a cage anode off a wire, the piece becomes sharp-edged and it often contains a deflection towards the shearing surface as well as a burr along the shearing seam. The edgy shape and the burr mean that the pieces are not freely flowing, but their feeding into the anode cage becomes difficult. Thus in the anode cage they may be caught in the cage net and cause arching, so that only the top part of the cage is filled with anodes.

The anode piece made of wire can also be cut on a direct shearing surface, so that the obtained piece is practically cylinder-shaped. This manufacturing method requires a lot of strength and is slow, and the flowing properties of the cylinder are not sufficiently good for automatic feeding machines.

The globular shape of a cage anode is near to the ideal shape with respect to its flowing properties, and ball-shaped anodes have long been used in electroplating techniques, particularly in zinc-plating and cadmium-plating, these metals being easily formable into balls. In nickel-plating, small ball-shaped pellets are generally used.

The production of balls to be used as anodes of wire is as such known in the prior art, for example from the EP patent 48794. In this method, a piece is cut off the wire, the said piece being a

cylinder with a straight shearing surface, which is then pressed into a ball. The method produces balls with a good shape, but its weakness is that a strong cold-working takes place during the pressing. Particularly when made of an extrusion wire with small crystals, this kind of structure becomes passive, which can be observed by means of anode polarization measurements. In practice it has also been noticed that the passivized surface layer may remain without dissolving and fall off the ball to the anode sludge. Moreover, an anode film is not easily formed on the powerfully worked smooth anode surface, although this film is important particularly when starting a new electroplating bath.

The object of the present invention is to remove some of the drawbacks of the prior art and to achieve an improved profile to be used in electrolytic treatments, this profile being for instance an essentially ball-shaped anode piece, as well as to realize a method for manufacturing the anode piece, when the production material is suited to be used in anodes, being for instance a metal or a metal alloy. The essential novel features of the invention are apparent from the appended patent claims.

According to the invention, an anode piece suited for electrolytic treatment, such as an electroplating bath, is made of some anode material and cut off an object essentially smaller in diameter than the anode to be produced, for example of a wire or a bar, so that in order to form the desired profile, the anode piece is cut of the object essentially simultaneously to the working of the anode piece. The working of the anode piece is advantageously carried out by one-stage rolling.

In the production of the profile of the present invention, such as an essentially ball-shaped anode piece, the good properties of the piece anode are advantageously maintained, and combined to the additional advantages of the ball-shaped anode. In the method of the invention, the anode piece is cut off an essentially long object advantageously in between two rotating grooved rolls, so that the piece in question is simultaneously worked to the desired shape. By adjusting the design of the roll grooves, the profile can also be given a shape other than essentially globular.

The advantage of the method of the present invention, as compared for example to the production of a profile by means of pressing, is that the profile to be produced is subjected to lesser working than before. Thus for instance the good dissolution properties of the anode, as well as the anode film forming capacity, are maintained. Moreover, by employing the method of the invention,

particularly the production of small anode pieces can be made essentially quicker.

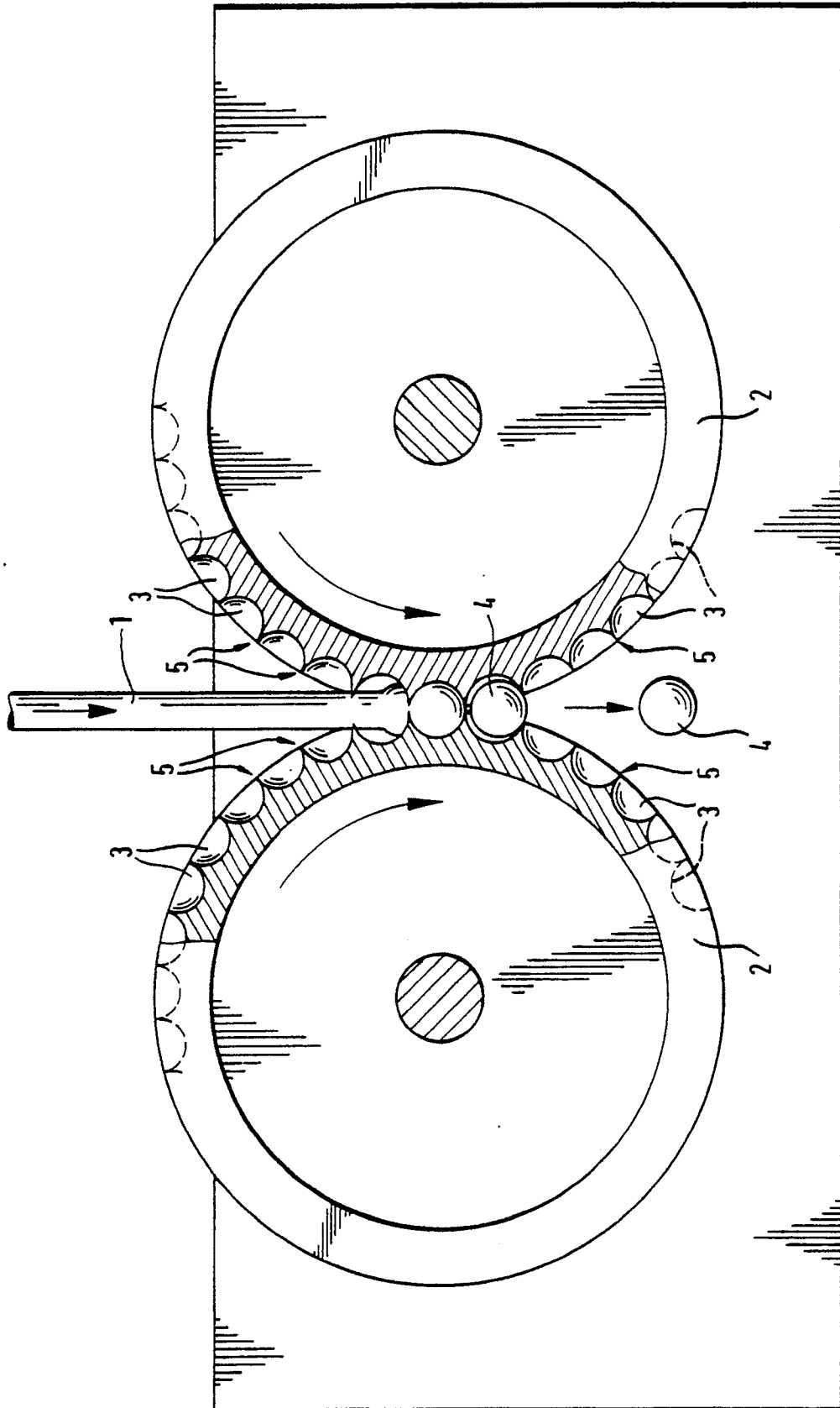
The invention is described in more detail below, with reference to the appended drawing, which is a side-view illustration of a preferred embodiment of the invention seen in cross-section.

According to the drawing, the wire 1 made of some anode material is inserted between the rolls 2, on the outer circumference whereof there are formed grooves 3 in order to work the profile 4 into the desired shape. The junction 5 of two adjacent grooves is formed, so that in connection with the working carried out by means of the rolls 2, the profile 4 is cut off the wire 1 which is essentially longer than the profile.

Although the above specification describes only one preferred embodiment of the invention, it is naturally obvious that the invention can be largely modified within the scope of the appended patent claims.

### Claims

1. A profile suited for electrolytic treatment, such as an essentially ball-shaped anode piece suited for an electroplating bath, **characterized** in that the anode piece (4) is formed of an object (1) worked through a one-stage working process and composed of some anode material, as well as being essentially longer than the diameter of the anode piece (4) to be produced.
2. The profile of claim 1, **characterized** in that the object (1) is a wire.
3. The profile of claim 1, **characterized** in that the object (1) is a bar.
4. A method for manufacturing a profile for electrolytic treatment, such as an essentially ball-shaped anode piece suited for an electroplating bath, **characterized** in that the anode piece (4), composed of some anode material, is separated from an object (1) essentially longer than the diameter of the anode piece (4) to be produced, essentially simultaneously with the working of the anode piece (4).
5. The method of claim 4, **characterized** in that the anode piece (4) is cut off the object (1) on the junction surface (5) of the roll grooves.
6. The method of claim 4, **characterized** in that the working of the anode piece (4) is carried out by means of rolling.





| DOCUMENTS CONSIDERED TO BE RELEVANT   |  |  |   |
|---|--|--|---|
| Category  | Citation of document with indication, where appropriate, of relevant passages  | Relevant to claim                              | CLASSIFICATION OF THE APPLICATION (Int. Cl.5) |
| A   | US-A-4 576 701 (T. MEGURO)<br>* Claims 1,3; figure 1(c) *<br>---               | 1,3,4,6  | C 25 D 17/12                                  |
| D,A   | EP-A-0 048 794 (HOLL & CIE GmbH)<br>* Claims 1-3; page 4, lines 14-24 *<br>--- | 1,4  |   |
| A   | US-A-2 801 556 (H.W. GRONEMEYER)<br>* Claims 1,2; figures 6,7 *<br>---         | 1-6  |   |
| A   | CH-A- 264 946 (ILARIO PROPERZI)<br>* Claims; figure 1 *<br>-----               | 1-6  |   |
|   |  |  | TECHNICAL FIELDS<br>SEARCHED (Int. Cl.5)      |
|   |  |  | C 25 D<br>B 21 K                              |
| The present search report has been drawn up for all claims  |  |  |   |
| Place of search<br>THE HAGUE  |  | Date of completion of the search<br>11-07-1989 | Examiner<br>DE ANNA P.L.                      |
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