

Description

The invention relates to a process of electrolytically manufacturing perforated material by depositing a metal from an electrolytic bath upon a matrix with apertures and connected as the cathode in said electrolytic bath, wherein the electrolytic bath is subjected to a forced flow through the cathode apertures and the electrolysis is continued until the required total thickness of metal has deposited.

Such a process is known from US—A—2.260.893 wherein an electrolytic bath is subjected to a forced flow through the apertures of a metal cathode comprising longitudinal channels.

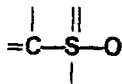
A similar process is known from GB—A—1.199.404 wherein an electrolytic bath is subjected to a forced flow through the pores of a foam structure which has been rendered electrically conductive.

Plating and Surface Finishing vol. 66, December 12, 1979 Schaer et al "Electro forming accelerated by forced solution flow" pages 36 to 38 discloses the forced flow of electrolytic bath but the starting material is not provided with apertures.

Moreover, U.S. Patent 2.226.384 describes a process of forming a screen by electrolytically depositing a metal upon a screen skeleton formed in a first stage. The screen formed by electrolytically depositing a metal on the screen skeleton can be removed, if required, by previously applying a stripping means, e.g. beeswax to the screen skeleton. The disadvantage of all these known processes is that during the electrolytic deposition the lands as present in the matrix or screen skeleton grow in all directions, so that the screen material as finally obtained present small passages with lands of substantially circular cross-section.

It is an object of the present invention to provide a process which does not present these disadvantages and wherein more particularly, the growth of deposited metal on the matrix or screen skeleton is effected solely or practically solely in one or two directions perpendicular to the matrix so that the original dimensions of the apertures in the matrix or screen skeleton are fully maintained in the final material, a screen.

This object is attained according to the invention, in that the matrix is a screen matrix and the electrolytic bath containing an organic compound comprising at least one unsaturated bond, not belonging to a



group, and presenting the properties of a second class brightener, is made to flow at a speed of at least 0,005 m/sec., at least during part of the electrolytic metal deposition, through the apertures in the screen matrix.

By means of the process according to the

invention, it is more particularly, possible to manufacture metal screens with or without the incorporation of the matrix, which screens combine maximum passage with maximum strength in any degree of fineness as required in practice, the apertures in the screen material increasing in size only towards one side, so that, when they are used as filter medium, there is little risk of clogging, contrary to processes in which there is a growth of the matrix in every direction.

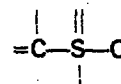
More particularly it has been found that with a forced flow of bath liquid through the apertures in the matrix it is possible, by using certain minimum speeds of the liquid, to achieve a condition in which metal deposition from the electrolytic bath occurs solely or practically solely, in one or two directions perpendicular to the matrix so that the apertures do not become smaller.

The electrolytic bath is advantageously made to flow through the matrix apertures at a speed of 0.05 to 1 m/sec. Preferably, the flow is into the direction of the anode and parallel to a perpendicular to the anode and cathode.

It has been particularly found that at certain speeds of the electrolytic bath it is possible to adjust the cathode to a current density at which there is no deposition of metal on the side of the matrix being remote from the anode.

It is not always necessary to maintain the forced flow of electrolytic bath through the cathode apertures for the entire period of the electrolytic deposition as the deposition of metal in the apertures of the matrix may be prevented by applying a forced flow of electrolytic bath during just a very short time at the start of the electrolysis.

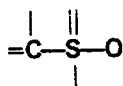
According to the process of the invention, optimum results are obtained when the electrolytic bath contains an organic compound containing at least one double or triple bond not belonging to a



group, in the form of butynediol or ethylene cyanohydrin having a double or triple carbon—carbon bond. This is very surprising as butynediol is known as a compound presenting a levelling action as appears from "Het Ingenieursblad" 45, 282 (1976) whilst in the invention this compound acts in a completely different way.

Finally the invention relates to perforated material produced by depositing metal from an electrolytic bath upon a matrix with apertures and connected as cathode, wherein the electrolytic bath has been subjected to a forced flow through the cathode apertures and the electrolysis has been continued until the required total thickness of metal has been deposited, characterized in that the matrix is a screen matrix and the electrolytic

bath containing an organic compound comprising at least one unsaturated bond, not belonging to a



group, and presenting the properties of a second class brightener, has been made to flow at a speed of at least 0.005 m/sec., at least during part of the electrolytic metal deposition, through the apertures in the screen matrix. The use of these measures can be demonstrated by physical and chemical methods.

It has been found that the shape of the land produced during electrolysis by means of a process according to the invention is controlled almost entirely by the following parameters:

1. Quantity and type of organic compound used, more particularly a brightener of the second class;
2. The current density on the cathode; and
3. The speed of the liquid through the apertures in the matrix,

Although it is not possible to satisfactorily explain the above effects it is assumed that the flow of liquid and the organic compound used or one or more decomposition products thereof, results, at those places where the speed of the liquid exceeds a specific value, in a boundary layer which cannot only prevent the deposition of metal, but also completely counteract it in the process according to the invention.

Within certain limits, the required speed of the bath liquid through the apertures appears to be inversely proportional to the concentration of the said organic compound presenting the properties of a second class brightener.

It has additionally been found that with a given concentration of the organic compound presenting the properties of a second class brightener and a given speed of the liquid it is possible to find at the cathode a current density at which there occurs just no metal deposition on that side of the matrix being remote from the anode. With a constant concentration of said organic compound, when the speed of the bath liquid is increased through the cathode-connected matrix towards the anode, the current density on the cathode is also increased without there being any metal deposition on the side remote from the anode. It will be clear that the formation of screens by a deposit of metal on just one side of a matrix is of great importance technologically.

It has been particularly found that the deposition of metal in the matrix apertures is completely prevented by a forced flow of liquid during a very short period, of e.g. one minute or less, at the start of the electrolysis, which then lasts for a total period of 45 minutes, for example. During the remainder of the electrolysis the

forced flow of liquid can be reduced or even completely stopped.

This effect can be used in order to obtain all kinds of required shapes of land sections in the matrix without the dimensions of the apertures becoming smaller than those of the matrix.

Depending upon the type of organic compound presenting the properties of a second-class brightener, the desired effect in the form of total prevention of metal deposition in the plane of the matrix by adapting the parameters in the form of current density and organic compound concentration, appears to occur at liquid speeds of 0.005 m/sec. as measured on the effective open surface of the matrix. From these calculations it appears that the Reynolds number in the aperture in the matrix is then much less than 2,100.

The process according to the invention is generally carried out with electrolytic bath liquid speeds comprised between 0.05 and 1 m/sec.

Although the action of the organic compounds in the form of second-class brighteners according to the invention is not restricted to nickel baths, most industrial application are in the application of nickel and nickel alloys.

Any metal can be used for the matrix, e.g. copper, while stainless steel is excellent as a matrix material for the production of nickel screens. Obviously nickel can also be used as matrix, in which case a matrix may be provided with a layer of beeswax as a stripping means in order to enable the resulting screen to be removed from the matrix at a later stage.

The invention also comprises screen material, e.g. cylindrical screen material, obtained by using the process according to the invention.

The invention will now be explained with reference to an embodiment by means of the drawing, wherein:

Fig. 1 is a matrix shown schematically;

Fig. 2 shows the final material obtained by electrolytic deposition of a metal in case of normal growth of the deposited metal in all directions in accordance with the prior art.

Fig. 3 is a vertical section through a bath for applying the process according to the invention.

Figs. 4 to 10 illustrate different sections of screen material obtained by means of the process according to the invention.

Fig. 3 shows an apparatus for executing the process according to the invention, with which it is possible to maintain a substantially constant speed of flow of the liquid in all the apertures of the cathode-connected matrix 11 in the electrolytic bath, even in the case of large surfaces of 1 m², for example.

To this end, the electrolytic bath is provided with a first chamber 1 to which the bath liquid is supplied in an evenly divided state chamber 1 being separated from the cathode-anode chamber 3 by one or more perforated partitions 2, having a number of small apertures such, that there is only a slight pressure head difference required, e.g. 5 to 10 mm, in order to produce the required flow.

Advantageously, anode 8 comprises one or more flow passages so that the bath liquid can flow through the anode at uniform speed as considered over the entire area of the anode.

An anode 8 with a flow passing through it is manufactured, for example, by securing two pieces of titanium gauze 10 parallel to each other and parallel to the surface of cathode 11 which is to be treated as the matrix, and by filling the space between the two pieces of titanium gauze with small pieces of the required anode material 6.

In this way there is no disturbance of the required uniform flow of the bath liquid through the matrix arranged as cathode.

The forced flow of bath liquid is provided by pump 9.

If desired, it may be advantageous to separate the anode-cathode chamber from the chamber from which the liquid is pumped away, by means of a perforated wall 7, and an overflow partition, which latter can, for example, be provided with a special weir to measure the quantity of circulating bath liquid.

To secure the cathode 11, a cathode fixing means 4 is provided which can be connected to a cathode of an electric source.

To secure anode 8, an anode fixing means 5 is provided, which can be connected to the anode of an electric source.

The cathode fixing means 4 in this case acts as the cathode connecting element and the anode fixing means 5 as the anode connecting element.

The installation as shown may also be provided with a cathode current density adjustment and control means 13.

It will be obvious that in order to manufacture cylindrical screens the flow will be in an appropriately adapted direction through a vertically disposed cylindrical matrix material, while the anode will also be constructed in an appropriately adapted cylindrical shape. It is also possible to use a radial flow from the periphery of the cathode to the centre, using an appropriate arrangement of the anode and cathode.

In the case of a cylindrical matrix, it may also be advantageous to mount the same rotatably around a horizontal axis and to suspend it partially in the bath liquid.

The invention will now be explained with reference to some examples.

Example I

A beeswax-coated nickel screen plate 11 is disposed vertically as the cathode in a known nickel bath, containing 80 mg of 2-butyne-1,4-diol per litre of bath liquid. The screen plate comprises apertures in the form of slots 120 μm in width.

A nickel anode 8 is disposed parallel to and at a distance of 60 mm from the cathode 11.

A pump 9 provides a flow of liquid such, that the bath liquid flows through the screen plate apertures and towards the anode at a speed of 1 m/sec.

The d.c. current is 5 A/dm², measured on the total unilateral surface of cathode 11.

The bath liquid temperature is 60°C.

After 60 minutes, the resulting end product has a land section as shown diagrammatically in Fig. 4. The nickel material as deposited can be removed in the form of a screen 12.

Under the same conditions as above, an identical portion of screen plate was used and the liquid speed was reduced to 0.16 m/sec.

After 60 minutes the resulting end product had a section as shown diagrammatically in Fig. 5.

Example II

Using the same nickel bath as above, the 2-butyne-1,4-diol concentration is increased to 160 mg/l. At a current density of 5 A/dm² and with a liquid speed of 1 msec., the product obtained after electrolysis for 60 minutes comprises a land section as shown diagrammatically in Fig. 6.

A fresh matrix plate is then fitted and under the same conditions the speed of the liquid is reduced to 0.16 m/sec., resulting in a product with a land section as shown diagrammatically in Fig. 7.

After a new screen plate had been fitted, the above conditions were maintained, but the current density was increased to 10 A/dm² and the electrolysis period reduced to 30 minutes. The end product as obtained comprised sectional lands as shown in Fig. 8.

Example III

0.3 ml of a solution of hydroxypropionitrile as organic compound with an unsaturated bond is added to a nickel bath per litre of bath liquid. 2 G. of the sodium salt of benzene metadisulphonic acid are also added per litre of bath liquid.

A portion of matrix plate as described in the previous tests is subjected to an electrolysis for 30 minutes at a liquid flow of 0.16 m/sec. and a cathode current density of 10 A/dm², the bath liquid temperature being 60°C.

The land section of the resulting end product is shown diagrammatically in Fig. 9.

Example IV

A stainless steel piece of screen gauze with apertures in the form of slots of 120 μm wide is placed in a nickel bath to which 80 mg of 2-butyne-1,2-diol has been added.

Using a current density of 5 A/dm² and a liquid speed of 0.16 m/sec., the end product obtained after 60 minutes has the land section shown diagrammatically in Fig. 10.

Part A represents the stainless steel matrix while the hatched part represents the area deposited by electrolysis.

Parts A and B are readily separable by applying a blade to a corner point, whereupon part A is reused for the same process.

Example V

The preceding test is repeated with a cylindrical cathode having 120 μm wide apertures.

The horizontally disposed cathode used as

matrix is rotated and partially suspended in the liquid.

The product obtained after 60 minutes has the same properties as the one as shown in Fig. 10.

Claims

1. A process of electrolytically manufacturing perforated material (12) by depositing a metal from an electrolytic bath upon a matrix (11) with apertures and connected as the cathode in said electrolytic bath, wherein the electrolytic bath is subjected to a forced flow through the cathode apertures and the electrolysis is continued until the required total thickness of metal has deposited, characterized in that the matrix is a screen matrix and the electrolytic bath containing an organic compound comprising at least one unsaturated bond, not belonging to a



group, and presenting the properties of a second class brightener, is made to flow at a speed of at least 0,005 m/sec., at least during part of the electrolytic metal deposition, through the apertures in the screen matrix (11).

2. A process according to claim 1, characterized in that the electrolytic bath is made to flow at a speed of 0,05 to 1 m/sec.

3. A process according to claim 1 or 2, characterized in that the flow of electrolytic bath is directed towards the anode (8) and parallel to a perpendicular to the anode (8) and cathode (11).

4. A process according to claims 1 to 3, characterized in that the forced flow of the electrolytic bath is applied at the start of the electrolysis.

5. A process according to claims 1—4, characterized in that the electrolytic bath is made to flow through the apertures in the cathode (11) for a period of less than 10% of the total electrolysis time.

6. A process according to claims 1—5, characterized in that the forced flow of electrolytic bath is maintained for one minute at the start of the electrolysis in the case of a total electrolysis time of 45 minutes.

7. A process according to claims 1—6, characterized in that the cathode current density is adjusted to and maintained at a predetermined value.

8. A process according to claim 1, characterized in that said compound presenting the properties of a brightener of the second class is a butyne diol and/or an ethylene cyanohydrin.

9. A process according to claims 1—8, characterized in that the matrix (11) is given a surface treatment so that the electrolytically deposited material can be removed as a screen (12).

10. A process according to claims 1—9, characterized in that the forced flow of electrolytic bath is perpendicular to the cathode.

11. A process according to claim 1—10, characterized in that the matrix is a cylindrical matrix.

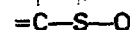
12. Perforated material (12) produced by depositing metal from an electrolytic bath upon a matrix (11) with apertures and connected as cathode wherein the electrolytic bath has been subjected to a forced flow through the cathode apertures and the electrolysis has been continued until the required total thickness of metal has been deposited, characterized in that the matrix is a screen matrix and the electrolytic bath containing an organic compound comprising at least one unsaturated bond, not belonging to a



group, and presenting the properties of a second class brightener, has been made to flow at a speed of at least 0,005 m/sec., at least during part of the electrolytic metal deposition, through the apertures in the screen matrix (11).

Patentansprüche

1. Verfahren zur elektrolytischen Herstellung eines perforierten Materials (12) durch Abscheidung eines Metalls aus einem elektrolytischen Bad auf einer Matrix (11) mit Öffnungen, die als Kathode in dem elektrolytischen Bad angeschlossen ist, wobei das elektrolytische Bad einer erzwungenen Strömung durch die Kathodenöffnungen unterworfen wird und die Elektrolyse fortgesetzt wird, bis die erforderliche Gesamtdicke an Metall abgeschieden worden ist, dadurch gekennzeichnet, daß die Matrix eine Gittermatrix ist und daß das elektrolytische Bad, enthaltend eine organische Verbindung mit mindestens einer ungesättigten Bildung, die nicht zu einer



Gruppe gehört und die Eigenschaften eines Aufhellers zweiter Klasse aufweist, mit einer Geschwindigkeit von mindestens 0,005 m/s während mindestens eines Teils der elektrolytischen Metallabscheidung durch die Öffnungen in der Gittermatrix (11) hindurchströmen gelassen wird.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das elektrolytische Bad mit einer Geschwindigkeit von 0,05 bis 1 m/s strömen gelassen wird.

3. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Strom des elektrolytischen Bades auf die Anode (8) und parallel zu einer Senkrechten zu der Anode (8) und der Kathode (11) gerichtet wird.

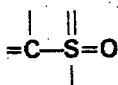
4. Verfahren nach den Ansprüchen 1 bis 3, dadurch gekennzeichnet, daß das erzwungene Strömen des elektrolytischen Bades beim Start der Elektrolyse angewendet wird.

matrix is rotated and partially suspended in the liquid.

The product obtained after 60 minutes has the same properties as the one as shown in Fig. 10.

Claims

1. A process of electrolytically manufacturing perforated material (12) by depositing a metal from an electrolytic bath upon a matrix (11) with apertures and connected as the cathode in said electrolytic bath, wherein the electrolytic bath is subjected to a forced flow through the cathode apertures and the electrolysis is continued until the required total thickness of metal has deposited, characterized in that the matrix is a screen matrix and the electrolytic bath containing an organic compound comprising at least one unsaturated bond, not belonging to a



group, and presenting the properties of a second class brightener, is made to flow at a speed of at least 0,005 m/sec., at least during part of the electrolytic metal deposition, through the apertures in the screen matrix (11).

2. A process according to claim 1, characterized in that the electrolytic bath is made to flow at a speed of 0,05 to 1 m/sec.

3. A process according to claim 1 or 2, characterized in that the flow of electrolytic bath is directed towards the anode (8) and parallel to a perpendicular to the anode (8) and cathode (11).

4. A process according to claims 1 to 3, characterized in that the forced flow of the electrolytic bath is applied at the start of the electrolysis.

5. A process according to claims 1—4, characterized in that the electrolytic bath is made to flow through the apertures in the cathode (11) for a period of less than 10% of the total electrolysis time.

6. A process according to claims 1—5, characterized in that the forced flow of electrolytic bath is maintained for one minute at the start of the electrolysis in the case of a total electrolysis time of 45 minutes.

7. A process according to claims 1—6, characterized in that the cathode current density is adjusted to and maintained at a predetermined value.

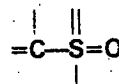
8. A process according to claim 1, characterized in that said compound presenting the properties of a brightener of the second class is a butyne diol and/or an ethylene cyanohydrin.

9. A process according to claims 1—8, characterized in that the matrix (11) is given a surface treatment so that the electrolytically deposited material can be removed as a screen (12).

10. A process according to claims 1—9, characterized in that the forced flow of electrolytic bath is perpendicular to the cathode.

11. A process according to claim 1—10, characterized in that the matrix is a cylindrical matrix.

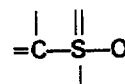
12. Perforated material (12) produced by depositing metal from an electrolytic bath upon a matrix (11) with apertures and connected as cathode wherein the electrolytic bath has been subjected to a forced flow through the cathode apertures and the electrolysis has been continued until the required total thickness of metal has been deposited, characterized in that the matrix is a screen matrix and the electrolytic bath containing an organic compound comprising at least one unsaturated bond, not belonging to a



group, and presenting the properties of a second class brightener, has been made to flow at a speed of at least 0,005 m/sec., at least during part of the electrolytic metal deposition, through the apertures in the screen matrix (11).

Patentansprüche

1. Verfahren zur elektrolytischen Herstellung eines perforierten Materials (12) durch Abscheidung eines Metalls aus einem elektrolytischen Bad auf einer Matrix (11) mit Öffnungen, die als Kathode in dem elektrolytischen Bad angeschlossen ist, wobei das elektrolytische Bad einer erzwungenen Strömung durch die Kathodenöffnungen unterworfen wird und die Elektrolyse fortgesetzt wird, bis die erforderliche Gesamtdicke an Metall abgeschieden worden ist, dadurch gekennzeichnet, daß die Matrix eine Gittermatrix ist und daß das elektrolytische Bad, enthaltend eine organische Verbindung mit mindestens einer ungesättigten Bildung, die nicht zu einer



Gruppe gehört und die Eigenschaften eines Aufhellers zweiter Klasse aufweist, mit einer Geschwindigkeit von mindestens 0,005 m/s während mindestens eines Teils der elektrolytischen Metallabscheidung durch die Öffnungen in der Gittermatrix (11) hindurchströmen gelassen wird.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das elektrolytische Bad mit einer Geschwindigkeit von 0,05 bis 1 m/s strömen gelassen wird.

3. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Strom des elektrolytischen Bades auf die Anode (8) und parallel zu einer Senkrechten zu der Anode (8) und der Kathode (11) gerichtet wird.

4. Verfahren nach den Ansprüchen 1 bis 3, dadurch gekennzeichnet, daß das erzwungene Strömen des elektrolytischen Bades beim Start der Elektrolyse angewendet wird.



5. Verfahren nach den Ansprüchen 1 bis 4, dadurch gekennzeichnet, daß das elektrolytische Bad durch die Öffnungen in der Kathode (11) für einen Zeitraum von weniger als 10 % der gesamten Elektrolysezeit strömen gelassen wird.

6. Verfahren nach den Ansprüchen 1 bis 5, dadurch gekennzeichnet, daß der erzwungene Strom des elektrolytischen Bades beim Start der Elektrolyse eine Minute lang aufrechterhalten wird für den Fall einer gesamten Elektrolysezeit von 45 min.

7. Verfahren nach den Ansprüchen 1 bis 6, dadurch gekennzeichnet, daß die Kathodenstromdichte auf einen vorgegebenen Wert eingestellt und bei diesem gehalten wird.

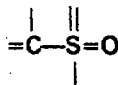
8. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die Verbindung, welche die Eigenschaften eines Aufhellers zweiter Klasse aufweist, ein Butindiol und/oder ein Ethylencyanohydrin ist.

9. Verfahren nach den Ansprüchen 1 bis 8, dadurch gekennzeichnet, daß die Matrix (11) einer Oberflächenbehandlung unterzogen wird, so daß das elektrolytisch abgeschiedene Material in Form eines Gitters (12) entfernt werden kann.

10. Verfahren nach den Ansprüchen 1 bis 9, dadurch gekennzeichnet, daß der erzwungene Strom des elektrolytischen Bades senkrecht zur Kathode verläuft.

11. Verfahren nach den Ansprüchen 1 bis 10, dadurch gekennzeichnet, daß die Matrix eine zylindrische Matrix ist.

12. Perforiertes Material (12), hergestellt durch Abscheidung von Metal aus einem elektrolytischen Bad auf einer Matrix (11) mit Öffnungen und die als Kathode geschaltet ist, wobei das elektrolytische Bad einer erzwungenen Strömung durch die Kathodenöffnungen unterworfen worden ist und die Elektrolyse fortgesetzt worden ist, bis die erforderliche Gesamtdicke an Metall abgeschieden ist, dadurch gekennzeichnet, daß die Matrix eine Gittermatrix ist und daß das elektrolytische Bad, enthaltend eine organische Verbindung mit mindestens einer ungesättigten Bindung, die nicht zu einer

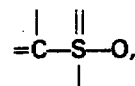


Gruppe gehört und die Eigenschaften eines Aufhellers zweiter Klasse aufweist, mit einer Geschwindigkeit von mindestens 0,005 m/s mindestens während eines Teils der elektrolytischen Metallabscheidung durch die Öffnungen in der Gittermatrix (11) hindurchströmen gelassen wird.

Revendications

1. Un procédé de fabrication d'un matériau perforé (12) par voie électrolytique en déposant un métal à partir d'un bain électrolytique sur une matrice (11) dotée d'ouvertures et connectée comme cathode audit bain électrolytic, dans

lequel le bain électrolytique est soumis à une mise en circulation forcée à travers les ouvertures de la cathode et l'électrolyse se continue jusqu'à ce que l'épaisseur métallique totale requise soit déposée, caractérisé en ce que la matrice est une matrice d'écran et que le bain électrolytique contenant un composé organique comprenant au moins une liaison insaturée n'appartenant pas à un groupe



et présentant les propriétés d'un brillanteur de deuxième classe, est mis en circulation à une vitesse d'au moins 0,005 m/s, au moins pendant une partie du dépôt métallique par voie électrolytique, à travers les ouvertures dans la matrice d'écran (11).

2. Un procédé selon la revendication 1, caractérisé en ce que le bain électrolytique est mis en circulation à une vitesse de 0,05 à 1 m/s.

3. Un procédé selon la revendication 1 ou 2, caractérisé en ce que l'écoulement du bain électrolytique est dirigé vers l'anode (8) et parallèlement à une perpendiculaire à l'anode (8) et à la cathode (11).

4. Un procédé selon les revendications 1 à 3, caractérisé en ce que la mise en circulation forcée du bain électrolytique est appliquée au départ de l'électrolyse.

5. Un procédé selon les revendications 1 à 4, caractérisé en ce que le bain électrolytique est mis en circulation à travers les ouvertures dans la cathode pendant une période de moins de 10% de la durée totale de l'électrolyse.

6. Un procédé selon les revendications 1 à 5, caractérisé en ce que la mise en circulation forcée du bain électrolytique est maintenue pendant 1 minute au départ de l'électrolyse dans le cas d'une durée totale d'électrolyse de 45 minutes.

7. Un procédé selon les revendications 1 à 6, caractérisé en ce que la densité de courant de la cathode est réglée et maintenue à une valeur prédéterminée.

8. Un procédé selon la revendication 1, caractérisé en ce que ledit composé présentant les propriétés d'un brillanteur de deuxième classe est un butynediol et/ou une cyanhydrine éthylène.

9. Un procédé selon la revendication 1 à 8, caractérisé en ce que la matrice (11) reçoit un traitement de surface de telle façon que le matériau déposé par voie électrolytique peut être enlevé sous la forme d'un écran (12).

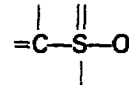
10. Un procédé selon les revendications 1 à 9, caractérisé en ce que la mise en circulation forcée du bain électrolytique est perpendiculaire à la cathode.

11. Un procédé selon la revendication 1 à 10, caractérisé en ce que la matrice est une matrice cylindrique.

12. Matériau perforé (12) produit par déposition



métallique à partir d'un bain électrolytique sur une matrice (11) présentant des ouvertures et connecté comme cathode, où le bain électrolytique a été soumis à une mise en circulation forcée à travers les ouvertures de la cathode et où l'électrolyse s'est continuée jusqu'à ce que l'épaisseur métallique total requise ait été déposée, caractérisé en ce que la matrice est une matrice d'écran et le bain électrolytique contenant un composé organique comprenant au moins une liaison insaturée, n'appartenant pas à un groupe



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et présentant les propriétés d'un brillant de deuxième classe, a été mis en circulation à une vitesse d'au moins 0,005 m/s, au moins au cours d'une partie du dépôt métallique par voie électrolytique, à travers les ouvertures de la matrice d'écran (11).

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