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(54) **SEMI-PRODUCT FOR LIGHT TECHNICAL PURPOSE, A METHOD AND AN EQUIPMENT FOR
THE PRODUCTION OF SUCH PRODUCT**

HALBZEUG FÜR BELEUCHTUNGSZWECKE, VERFAHREN UND VORRICHTUNG ZUR
HERSTELLUNG DIESER HALBZEUGE

DEMI-PRODUIT DESTINE A L'ECLAIRAGE, PROCEDE ET EQUIPEMENT DE PRODUCTION
DUDIT PRODUIT

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Description

[0001] The present invention concerns a procedure for producing an intermediate product for lighting purposes, a semi-product for lighting purposes and equipment for producing the semi product for lighting purposes.

[0002] A semi-product for lighting purposes may comprise reflecting elements and possibly exterior elements such as housings, lids, etc. These semi-products comprise sub-components which, together with electrical equipment, may be assembled to form a complete fixture or lamp.

[0003] In connection with the manufacture of lamps or fixtures, it is known to produce a housing and a reflector separately and then to assemble these parts. Such products may be fashioned by a panel-shaped material being surface-treated followed by processing and forming to obtain the desired geometry or vice versa. For such products, lustring and anodising are the most common surface treatments for the reflector part while lacquering is the most common for the exterior part.

[0004] If a fixture is to have a varied or complex surface finish, this may be fashioned, according to the prior art, by using various components which produce the desired lighting and/or aesthetic effects.

[0005] The above methods are, however, labour-intensive and cost-intensive and will also result in the finished product having a high price.

[0006] With the present invention, the above disadvantages can be avoided. Furthermore, semi-products with complex surface finishes may be fashioned without the need to use several components. In accordance with the present invention, it is possible to produce the reflector and the exterior from one component, which results in reduced production costs. Moreover, it is possible to produce reflector elements with a complex surface finish and with completely new lighting properties. Reflectors fashioned in accordance with the present invention will find it easier to meet international requirements and wishes for energy economy.

[0007] The present invention will be described below by means of examples and figures where:

Figure 1 shows an example of a coated substrate before forming,

Figure 2 (a-b) shows examples of reflector elements which may form part of a fixture,

Figure 3 (a-d) shows an example of forming a reflector and fixture housing in one piece.

[0008] Figure 1 shows a substrate 10 of metal, preferably aluminium or an aluminium alloy, which is treated

or coated in fields or stripes with a coating of the desired lighting character. In this example, the substrate's stripes are distributed symmetrically around the centre. Thus the outer stripes 1 may be fashioned from a lacquer which produces the desired aesthetic surface finish. This may, for example, comprise a lacquer containing colour pigments. When subsequently formed, these parts will form the exterior sides of the housing or fixture. It should be noted here that the substrate may also comprise other expedient materials, for example steel or plastic materials.

[0009] Between the outer stripes it is possible to apply one or more types of stripes or fields 2 which have different light-distributing or aesthetic properties. Such fields may comprise a coating which may include lacquers with added particles which change the distribution of light. Alternatively, transparent lacquers with different degrees of lustre from high lustre to half lustre may be used or the surface may be metallised. Moreover, it should be mentioned that the fields may be fashioned in different ways, for example stripe lacquering, possibly followed by metallisation or anodisation followed by stripe lacquering, stripe stamping, stripe printing or stripe lamination.

[0010] Another method for producing the light-distributing fields 2 may be to use stripe stamping or embossing (not shown). This method changes the surface topography and thus the lighting and aesthetic properties of the material.

[0011] One or more stripes 2, 3 between the fields which make up the exterior part may constitute the reflector and will thus be fields with the desired lighting properties. Field 3 may comprise an area with high lustre, where, for example, the substrate material is fashioned by chemical or electrochemical brightening followed by lacquering or anodising. The anodising may be performed with a well-defined oxide layer thickness, which results in a better reflectiveness than with standard anodising or lacquering.

[0012] The present invention is not limited to a symmetrical distribution of the stripes on the substrate or a fixed number of different stripes. It is also possible to fashion semi-products which comprise solutions in which the fields with lighting properties can be positioned in another way; this may depend, among other things, on the design of the lighting arrangement.

[0013] Preferably, a strip substrate which is wound or on a coil (not shown) is used. The advantage of this is that the process can be continuous and the strip substrate can be lengthened without stopping the process. At the same time, it should be noted that sheets may also be used as the substrate.

[0014] The various coatings can be fashioned and the various treatments may be applied expediently using known techniques. Alternatively, the substrate may be subjected to treatment/coating across its entire width before the stripes are fashioned. Thus the substrate may be lacquered or anodised before the stripe lacquer-

ing. The stripes may be fashioned in different operations. The special aspect of the coating in accordance with the present invention is that fields of the desired width may be fashioned with different lighting and/or aesthetic properties.

[0015] The equipment for coating the semi-product for lighting purposes may expediently comprise a strip lacquering machine with a coating/treatment station 20 with a pick-up roller 21 which collects the lacquer from a reservoir 22 or has lacquer applied to its top and one or more rollers 23 which apply lacquer to the substrate 10 and possibly one or more transfer rollers (not shown) which are mounted between the stated rollers; the application roller(s) 23 have a width which is less than the width of the substrate. The equipment may also comprise an adjustment roller 27. Moreover, the application roller may have milled grooves 25 so that lacquer is only applied to the substrate in the areas of the roller which do not have grooves. Alternatively, several application rollers mounted on a joint shaft 26 can be used; the rollers are at equal distances from each other in the transverse direction. Moreover, the rollers may comprise means which allow them to be controlled individually with regard to direction of rotation and speed (not shown).

[0016] It may be mentioned that the substrate may be treated/coated on both sides. A strip substrate on a coil may, in connection with the fashioning of the lighting/aesthetic properties, pass through the treatment line and be wound before being turned and passed through a new treatment. Alternatively, the substrate may be coated on both sides in one pass through the treatment line. The strip may first be treated/coated on its top in a first stage and be treated on its bottom in a second stage or vice versa. In connection with treatment/coating of the top and bottom of the substrate, the fields with different lighting/aesthetic properties must be placed on the substrate in such a way that they are in the desired location when the substrate is subsequently formed to create the intermediate product. Thus, for example, one side of the substrate may constitute the exterior of the intermediate product and be coated with a lacquer with colour pigments. The other side of the substrate may be treated/coated so that fields with light-distributing and reflecting properties are fashioned in the semi-product.

[0017] Figure 2a shows a semi-product 14 which, in this case, has two fields 2, 3 with different light-distributing properties. The semi-product shown may, for example, be mounted beside a long light source such as a fluorescent tube in a housing (dotted). Figure 2b shows an equivalent semi-product 15 for use as a cross mirror or lamella. In this way, the semi-product comprising two or more lighting/aesthetic properties may be used as a reflector in a lighting product.

[0018] Figure 3 shows an example of forming a substrate into a semi-product which comprises both a reflector and a fixture housing. It has been shown that it is possible, using the above treatment/coating tech-

niques, to fashion a substrate treated/coated with stripes/fields which can be exposed to fairly large stresses/deformations without the coatings cracking or the treated areas deteriorating. This produces major advantages during manufacture as the substrate can first be coated/treated and then processed/formed to the desired form at a processing station. The figure illustrates, via a cross-section through the substrate, the forming of a plane substrate to create a semi-product 12 by using three forming stages, b, c and d. More than three forming stages may, naturally, be used if this is favourable.

[0019] The forming is performed preferably by a treated/coated substrate on a coil being fed into a roll-forming unit either directly from the surface treatment unit or after first having been wound on a coil. The roll-forming unit may consist of one or more forming stages. It is expedient to use several stages which produce a gradual deformation of the substrate until the final form has been obtained. In this way, it will be possible to make semi-products from substrates which undergo major deformations in connection with the forming without the surface treatment/coating being weakened or deteriorating.

[0020] If the width of the substrate so allows, it is possible to fashion several sets of stripes/fields in the width of the substrate. In this case, the substrate will be split before passing into one or more roll-forming units or is possibly wound.

[0021] It can be mentioned that another method of forming the substrate is to cut it into the desired lengths and form it to the desired geometry in one or more stages by using known forming methods such as buckling, bending, roll-forming and deep drawing.

[0022] Alternatively, the surface treatment may be transverse to the substrate. In this case, the substrate is cut transversely between each section of stripes/fields. Piece-by-piece forming of these panels can then take place as stated above. The application equipment may comprise rollers with grooves which run transversely to the substrate/band. It is then expedient for the stripes/fields to be fashioned by printing.

[0023] It should be understood that application equipment other than rollers may also be used within the framework of the attached claims. For example, the fields may be fashioned by using spray equipment which sprays coatings onto the substrate (not shown).

[0024] After the forming operation, the mounting of the semi-product may be completed by fitting it with electrical equipment and possibly prefabricated gables. The gables may be treated externally in accordance with the outer coating of the housing (for example, lacquer with pigments) and possibly internally with a light-distributing or reflecting coating. The means of fastening for assembling the intermediate product and the gables and electrical equipment may expediently comprise glue, nails, screws, snap fasteners, etc.

Claims

1. A procedure for producing a semi-product for lighting purposes by using a sheet material, preferably a metallic material such as aluminium or an aluminium alloy,
characterised in that
the panel-shaped material comprises a plane substrate (10) which expediently comprises a wound-up, strips material or a coil and which is treated/coated to produce delimited fields or stripes (1, 2, 3) with different lighting and/or aesthetic properties, after which the plane substrate is formed/processed into the form of the semi-product (12).
2. A procedure in accordance with claim 1,
characterised in that
the substrate is treated/coated on both sides.
3. A procedure in accordance with claims 1-2,
characterised in that
the fields or stripes are applied longitudinally to the substrate and that the substrate may be split; the substrate is formed by continuous roll-forming and is cut to the desired length.
4. A procedure in accordance with claims 1-2,
characterised in that
the substrate may be split and cut to the desired length/width and formed to the desired geometry.
5. A semi-product for lighting purposes fashioned from a sheet material, preferably of metal,
characterised in that
the sheet material comprises a plane substrate (10) which is treated/coated so that it comprises fields or stripes (1, 2, 3) with different lighting and/or aesthetic properties; the substrate is formed/processed into the form of the semi-product after treatment/coating.
6. A semi-product in accordance with claim 5,
characterised in that
the substrate is a strip and wound on a roller or coil before treatment/coating.
7. A semi-product in accordance with claims 5-6,
characterised in that
the substrate is made of aluminium or an aluminium alloy.
8. A semi-product in accordance with claims 5-7,
characterised in that
it constitutes a reflector element with different lighting properties.
9. A semi-product in accordance with claims 5-7,
characterised in that

it constitutes both the exterior elements and the reflecting elements in the lighting product after assembly.

10. Equipment for the production of intermediate products for lighting purposes, where the intermediate product is fashioned from a panel-shaped material, preferably of metal,
characterised in that
the panel-shaped material is coated by means of a band or panel lacquering machine with several treatment/coating stations (20) for fashioning stripes/fields on the top and/or bottom of the panel-shaped material, where the stripes/fields have different lighting and/or aesthetic properties, the stations comprise a pick-up roller (21) which collects the lacquer from a reservoir (22) or has lacquer applied to its top and one or more rollers (23) which apply lacquer to the substrate and possibly one or more transfer rollers or adjustment rollers, the application roller(s) has/have a width which is less than the width of the substrate and the equipment also comprises a forming unit.
11. Equipment in accordance with claim 10,
characterised in that
it comprises an application roller with milled grooves (25) so that lacquer is applied to the substrate (10) only in the areas of the roller which do not comprise grooves.
12. Equipment in accordance with claim 10,
characterised in that
it comprises several application rollers mounted on a joint shaft (26), where the rollers are at equal distances from each other in the transverse direction.
13. Equipment in accordance with claim 10,
characterised in that
the rollers comprise means which allow them to be controlled individually with regard to the direction of rotation and speed.
14. Equipment in accordance with claim 10,
characterised in that
it comprises means for hardening the band after a short flash-off of solvents.

Patentansprüche

1. Verfahren zur Herstellung eines Halbzeugs für Beleuchtungszwecke durch Einsatz eines Blechmaterials, vorzugsweise eines metallischen Materials, wie etwa Aluminium oder eine Aluminiumlegierung,
dadurch gekennzeichnet, dass
das plattenförmige Material ein ebenflächiges Substrat (10) mit einbezieht, welches zweckmäßi-

gerweise ein aufgespultes Streifenmaterial oder einen Bandring beinhaltet und welches behandelt/beschichtet wird, um abgegrenzte Felder oder Streifen (1, 2, 3) mit verschiedenen lichttechnischen und/oder ästhetischen Eigenschaften zu erzeugen, woraufhin das ebenflächige Substrat zu der Form des Halbzeugs (12) geformt/verarbeitet wird.

2. Verfahren gemäß Anspruch 1,
dadurch gekennzeichnet, dass
das Substrat auf beiden Seiten behandelt/beschichtet wird. 10
3. Verfahren gemäß den Ansprüchen 1-2,
dadurch gekennzeichnet, dass
die Felder oder Streifen längsverlaufend auf das Substrat aufgebracht werden und dass das Substrat gespalten werden kann; das Substrat durch kontinuierliches Profilwalzen geformt wird und auf die gewünschte Länge geschnitten wird. 15 20
4. Verfahren gemäß den Ansprüchen 1-2,
dadurch gekennzeichnet, dass
das Substrat gespalten und auf die gewünschte Länge/Breite geschnitten werden kann und entsprechend der gewünschten Geometrie geformt wird. 25
5. Halbzeug für beleuchtungstechnische Zwecke, das aus Blechmaterial, vorzugsweise aus Metall, gestaltet wird, 30
dadurch gekennzeichnet, dass
das Blechmaterial ein ebenflächiges Substrat (10) mit einbezieht, welches derart behandelt/beschichtet wird, dass es Felder oder Streifen (1, 2, 3) mit verschiedenen lichttechnischen und/oder ästhetischen Eigenschaften aufweist; das Substrat anschließend an die Behandlung/Beschichtung zu der Form des Halbzeugs geformt/verarbeitet wird. 35 40
6. Halbzeug gemäß Anspruch 5,
dadurch gekennzeichnet, dass
das Substrat aus einem Streifen besteht und zu einer Rolle oder einem Bandring aufgespult wird, bevor es einer Behandlung/Beschichtung unterzogen wird. 45
7. Halbzeug gemäß den Ansprüchen 5-6,
dadurch gekennzeichnet, dass
das Substrat aus Aluminium oder aus einer Aluminiumlegierung hergestellt wird. 50
8. Halbzeug gemäß den Ansprüchen 5-7,
dadurch gekennzeichnet, dass
es ein reflektierendes Element mit verschiedenen lichttechnischen Eigenschaften darstellt. 55
9. Halbzeug gemäß den Ansprüchen 5-7,

dadurch gekennzeichnet, dass
es nach dem Zusammenbau sowohl die äußeren Elemente als auch die reflektierenden Elemente in einem Beleuchtungsprodukt darstellt.

10. Einrichtung für die Herstellung von Zwischenprodukten für Beleuchtungszwecke, wo das Zwischenprodukt aus einem plattenförmigen Material gestaltet wird, vorzugsweise aus Metall,
dadurch gekennzeichnet, dass
das plattenförmige Material beschichtet wird mit Hilfe einer Band- oder Plattenlackierungsmaschine mit mehreren Behandlungs-/Beschichtungsstationen (20) für die Gestaltung von Streifen/Feldern auf der Ober- und/oder Unterseite des plattenförmigen Materials, wobei die Streifen/Felder verschiedene lichttechnische und/oder ästhetische Eigenschaften aufweisen; die Stationen eine Aufnehmerwalze (21) enthalten, welche Lack aus einem Behälter (22) aufnimmt oder bei welcher Lack auf die Oberfläche aufgebracht wird; und eine oder mehrere Walzen (23), die Lack auf das Substrat auftragen, sowie gegebenenfalls eine oder mehrere Übertragung- oder Einstellwalzen, wobei die Auftragwalze(n) eine Breite aufweist(en), welche geringer ist als die Breite des Substrats und dass die Einrichtung ebenfalls ein Formgebungseinheit umfasst.
11. Einrichtung gemäß Anspruch 10,
dadurch gekennzeichnet, dass
sie eine Auftragwalze mit eingearbeiteten Rillen (25) umfasst, so dass Lack auf das Substrat (10) nur in denjenigen Bereichen der Walze aufgetragen wird, welche keine Rillen aufweisen.
12. Einrichtung gemäß Anspruch 10,
dadurch gekennzeichnet, dass
sie mehrere Auftragwalzen umfasst, welche auf einer gemeinsamen Welle (26) aufmontiert sind, wobei sich die Walzen, in der querverlaufenden Richtung gesehen, unter gleichen Entfernungen die einen in Bezug auf die anderen befinden.
13. Einrichtung gemäß Anspruch 10,
dadurch gekennzeichnet, dass
die Walzen ein Mittel enthalten, welches es ihnen erlaubt individuell in Bezug auf ihre Rotationsrichtung und -geschwindigkeit geregelt zu werden.
14. Einrichtung gemäß Anspruch 10,
dadurch gekennzeichnet, dass
sie ein Mittel enthält für das Härten des Bandes nach einer kurzen Verdampfung von Lösungsmitteln.

Revendications

1. Procédé pour la production d'un demi-produit destiné à l'éclairage en utilisant un matériau en feuille, de préférence un matériau métallique tel que l'aluminium ou un alliage d'aluminium, 5
caractérisé en ce que
 le matériau sous forme de panneau comprend un substrat plat (10) qui englobe de manière appropriée un matériau en bande, enroulé ou une bobine et qui est traité/revêtu pour produire des zones ou des raies délimitées (1, 2, 3) avec différentes propriétés d'éclairage et/ou esthétiques, après quoi le substrat plat est façonné/usiné en la forme du demi-produit (12). 10
2. Procédé suivant la revendication 1, 15
caractérisé en ce que
 le substrat est traité/revêtu sur les deux côtés. 20
3. Procédé suivant les revendications 1-2, 25
caractérisé en ce que
 les zones ou les raies sont appliquées longitudinalement au substrat et en ce que le substrat peut être fendu; le substrat est façonné par un profilage par laminage continu et il est coupé à la longueur désirée. 30
4. Procédé suivant les revendications 1-2, 35
caractérisé en ce que
 le substrat peut être fendu et coupé à la longueur/largeur désirée et façonné à la géométrie désirée. 40
5. Demi-produit destiné à l'éclairage, façonné à partir d'un matériau en feuille, de préférence métallique, 45
caractérisé en ce que
 le matériau en feuille comprend un substrat plat (10) qui est traité/revêtu de sorte qu'il comprend des zones ou des raies (1, 2, 3) avec différentes propriétés d'éclairage et/ou esthétiques; le substrat est façonné/usiné en la forme du demi-produit après le traitement/revêtement. 50
6. Demi-produit suivant la revendication 5, 55
caractérisé en ce que
 le substrat est une bande et il est enroulé sur un rouleau ou une bobine avant le traitement/revêtement.
7. Demi-produit suivant les revendications 5-6, 60
caractérisé en ce que
 le substrat est constitué d'aluminium ou d'un alliage d'aluminium.
8. Demi-produit suivant les revendications 5-7, 65
caractérisé en ce que
 il constitue un élément réflecteur avec différentes propriétés d'éclairage.
9. Demi-produit suivant les revendications 5-7, 70
caractérisé en ce que
 il constitue à la fois les éléments extérieurs et les éléments réflecteurs dans le produit d'éclairage après son assemblage.
10. Equipement pour la production de produits intermédiaires destinés à l'éclairage, dans lequel le produit intermédiaire est façonné à partir d'un matériau sous forme de panneau, de préférence métallique, 75
caractérisé en ce que
 le matériau sous forme de panneau est revêtu au moyen d'une machine de laquage de bandes ou de panneaux avec plusieurs stations de traitement/revêtement (20) pour le façonnage de raies/zones sur la partie supérieure et/ou la partie inférieure du matériau sous forme de panneau, dans lequel les raies/zones présentent différentes propriétés d'éclairage et/ou esthétiques, les stations comprennent un rouleau collecteur (21) qui recueille la laque à partir d'un réservoir (22) ou qui possède de la laque appliquée sur sa surface et un ou plusieurs rouleaux (23) qui appliquent la laque sur le substrat et éventuellement un ou plusieurs rouleaux de transfert ou rouleaux d'ajustement, le ou les rouleaux d'application possèdent une largeur qui est inférieure à la largeur du substrat et l'équipement comprend également une unité de façonnage.
11. Equipement suivant la revendication 10, 80
caractérisé en ce que
 il comprend un rouleau d'application avec des rainures fraisées (25) de sorte que la laque est appliquée sur le substrat (10) seulement dans les zones du rouleau qui ne comprennent pas de rainures.
12. Equipement suivant la revendication 10, 85
caractérisé en ce que
 il comprend plusieurs rouleaux d'application montés sur un arbre commun (26), sur lequel les rouleaux se trouvent à des distances égales les uns des autres dans la direction transversale.
13. Equipement suivant la revendication 10, 90
caractérisé en ce que
 les rouleaux comprennent un moyen qui leur permet d'être contrôlés individuellement en ce qui concerne la direction de rotation et la vitesse.
14. Equipement suivant la revendication 10, 95
caractérisé en ce que
 il comprend un moyen pour durcir la bande après une brève évaporation de solvants.

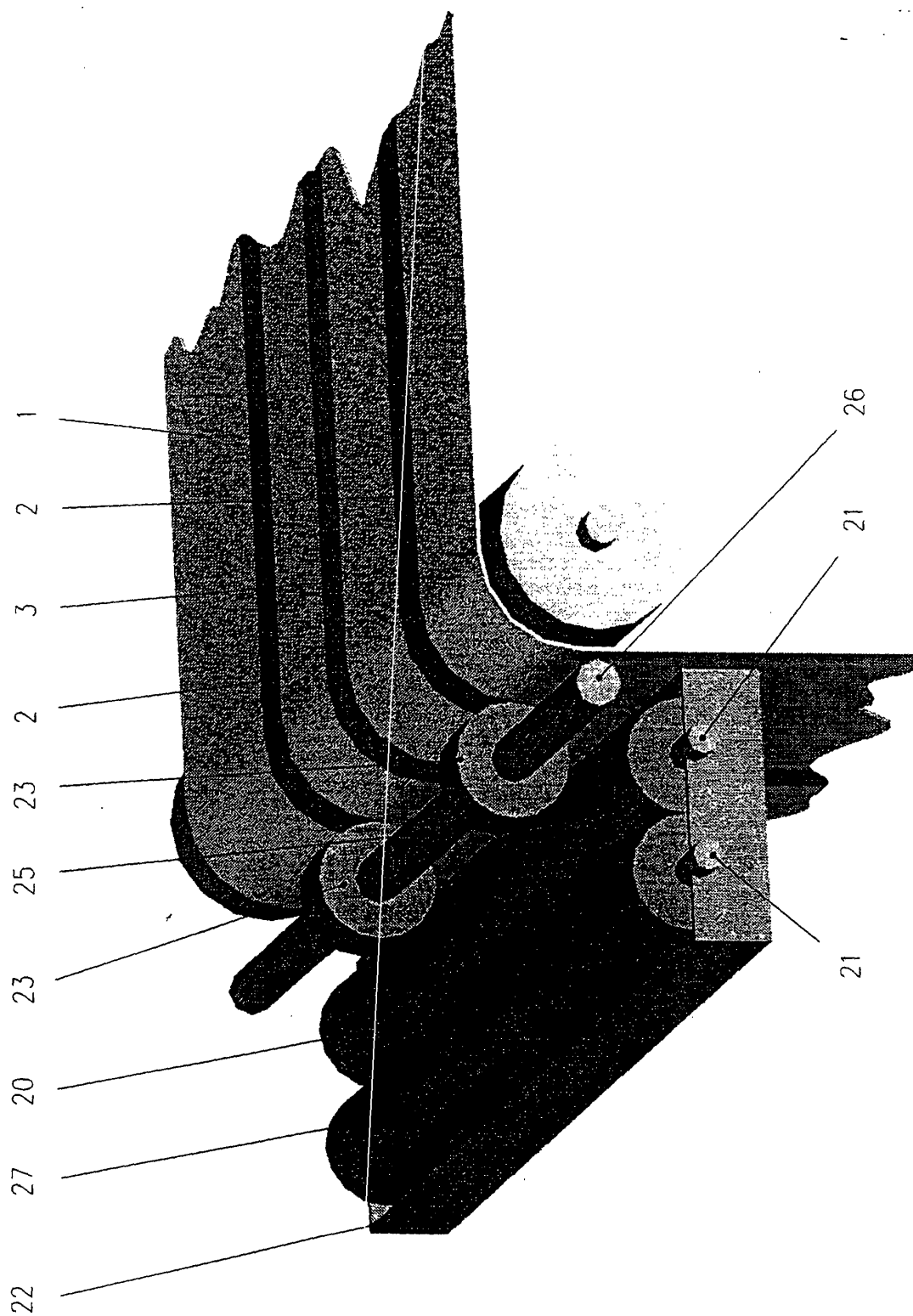


Fig. 1

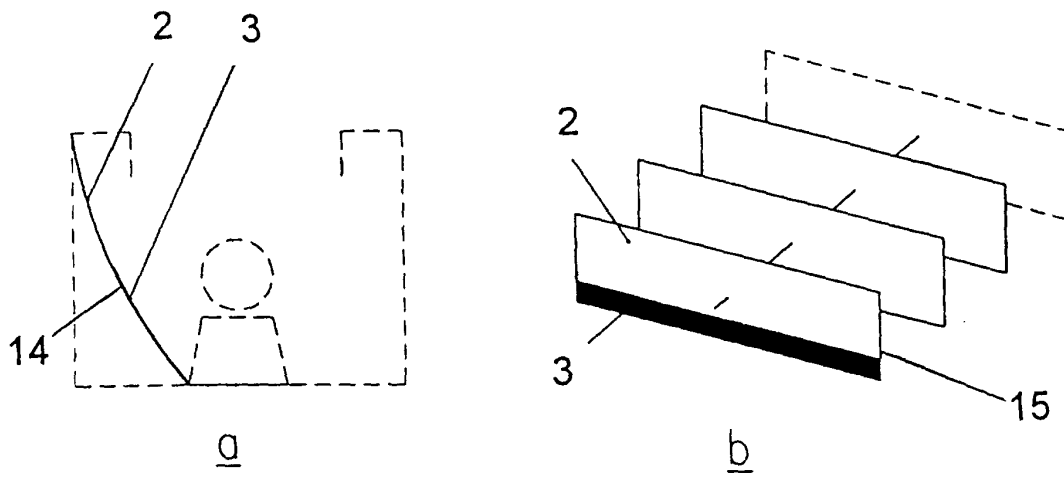


Fig. 2

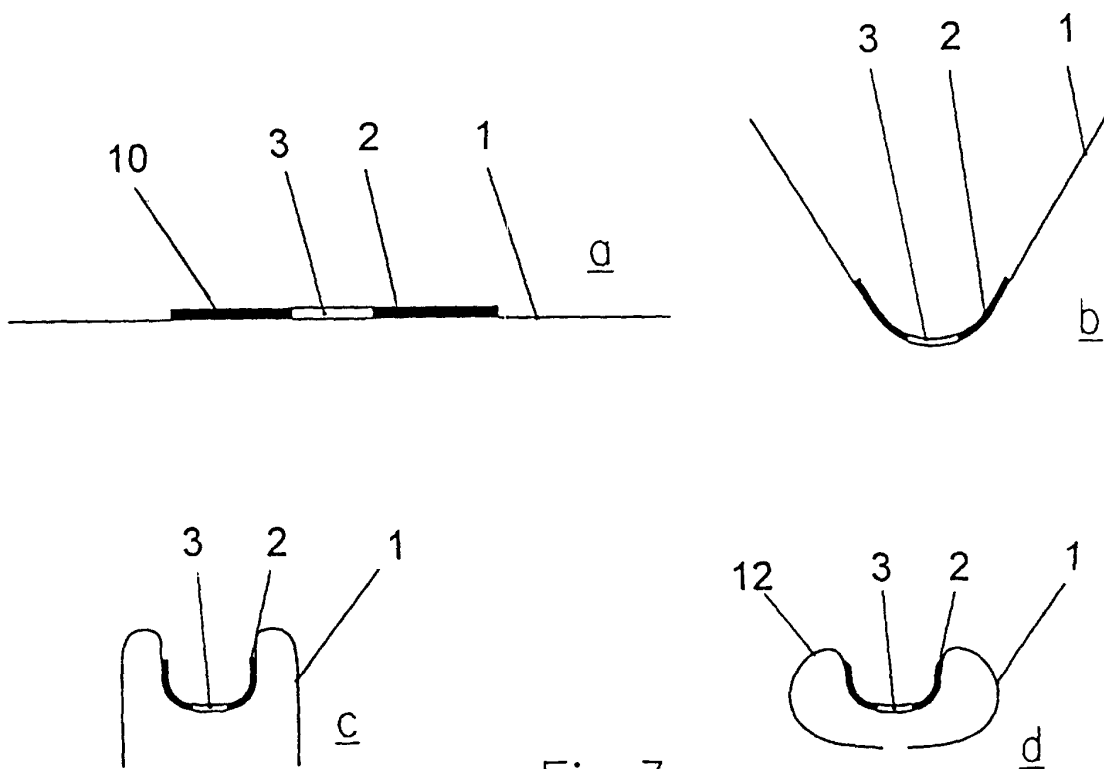


Fig. 3