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(54) **Utensil**

(57) A utensil is provided comprising a wall member having a curvature and a first surface and a second surface facing away from said first surface. The first surface is covered with a plurality of translucent portions arranged on said first surface and that extend from the first surface to the second surface. A carrier structure is provided adjacent the second surface. Said carrier structure carries light sources. Light guiding means extend between the plurality of light sources and the plurality of translucent portions, optically coupling each translucent portion to at least one light source, such that light emitted from a light source is visible from outside the first surface of the wall member. The said carrier structure comprises a plurality of rigid flat carrier elements that each carry at least one of said light sources on a support face which support face faces the second surface of the utensil.

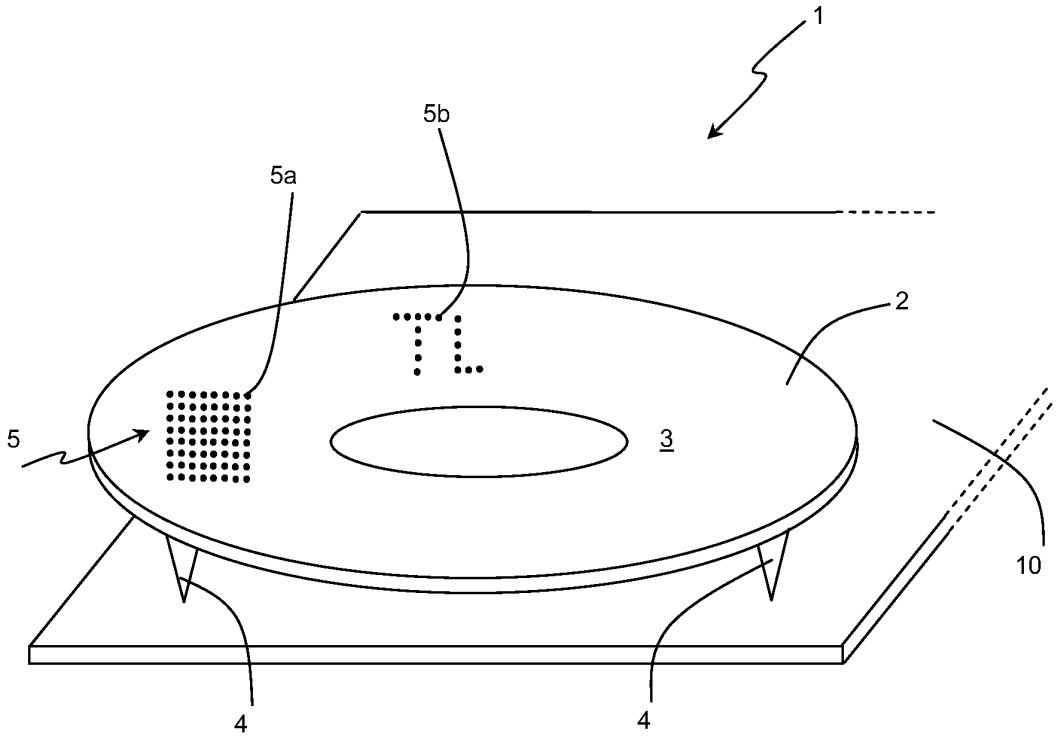

Fig. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to an utensil. In particular the invention relates to an utensil for everyday use which can be used as a display device.

BACKGROUND OF THE INVENTION

[0002] In everyday live information is displayed in many locations and various kinds of objects are used to display such information. Many types of information may come in the form of animations, ambient light effects or textual information. Nowadays it is not uncommon that objects are used to display information or to carry a device to display such information, that do normally not have a display function. An example of such an object that is used to display information upon is a building on which a large display is for example mounted, in particular a display that is wrapped around one of its corners, such that information displayed can be seen from different positions with respect to the building. Such a display is for example a large LED screen that is curved, or a DLP rear projection screen. In smaller form such curved display may comprise bendable OLED screens. In particular a bendable OLED screen offers the possibility of providing a thin yet curved display screen. These types of displays are all curved or bendable in one direction only. In some occasions however it may be desired to display information on a three dimensional surface, i.e. a surface that is curved in two directions. A first possibility of displaying information on a double curved surface is for example by means of projection. Such a display system is for example known from United States patent application US 2005/0017924. The known system has a display surface having a three-dimensional convex shape and a projection system that projects an image on the interior of the display surface. This system requires a complicated projection system with special lenses and can only display images (information) on (semi-)circular surfaces.

[0003] A concern of the known solutions is that these are not suitable for every day utensils having free form shape, such as for example a three-dimensional shape.

OBJECT OF THE INVENTION

[0004] It would therefore be desirable to provide a utensil of the above-mentioned type that can be used as a display device. More in particular it would also be desirable to provide a utensil for everyday use that has a free form shape, in particular a three-dimensional surface, which surface can be used as a display surface.

SUMMARY OF THE INVENTION

[0005] To better address one or more of these concerns, a utensil is provided wherein the utensil comprises a wall member having a curvature in at least a first direction, the wall member having a first surface and a second surface facing away from said first surface. The first surface is, at least partly, covered with a plurality of translucent portions that are arranged in a predetermined pattern on said first surface and that extend from the first surface to the second surface. Further, a carrier structure is provided that is positioned adjacent the second surface of the utensil, wherein said carrier structure carries a plurality of light sources, which are operable by operating means for operating the light sources. Light guiding means extend between the plurality of light sources and the plurality of translucent portions, optically coupling each translucent portion to at least one light source, such that light emitted from a light source is visible from outside the first surface of the wall member. The said carrier structure comprises a plurality of rigid flat carrier elements that each carry at least one of said light sources on a support face which support face faces the second surface of the utensil, wherein said carrier elements are arranged adjacent the second surface of the utensil.

[0006] By providing a carrier structure that comprises a number of rigid and flat carrier elements it is possible to position the carrier elements close to the second surface of the utensil. As the light sources located on the carrier elements are optically coupled to the translucent portions, the light emitted by the light sources, i.e. the light emitted by those sources that are operable, is transmitted to the translucent portions and is thus visible at the first surface of the utensil. The invention makes it possible to provide a utensil having a wall member with a curved surface, wherein that utensil can be used as a display device by using the wall member as a display surface. More in particular, the present invention provides that the carrier structure is adjacent to the second surface of the wall member. In this way any curvature of the wall member and its surfaces can be followed by the carrier structure, which means that the carrier structure that supports the light sources may remain close to the wall member and thus on the one hand allows any three-dimensional shape to be followed and on the other hand to adapt everyday utensils to be able to function as a display device.

[0007] Hence, with the present invention it is now possible to provide an everyday utensil with a display functionality by using its wall member as a display surface, as the carrier structure as proposed by the invention is able to closely conform to a curvature of said wall member such that free form shapes can be used as display surface.

[0008] In an embodiment between the support face of said carrier elements and the second surface of the utensil a gap is defined, which gap has an average height that is substantially equal for each carrier element. More in particular, this embodiment provides that the carrier structure is as close as possible to the second surface of the wall member by providing that the average distance between each carrier element and said surface is sub-

stantially the same for all said carrier elements, which further increases the degree of conformity that can be obtained between the carrier structure and the second surface.

[0009] In an embodiment said plurality of translucent portions are made of a transparent material and/or through holes in the wall member. Providing translucent portions of a transparent material makes it possible to provide a waterproof surface. By providing through holes the emitted light can be seen without obstruction providing for a clearer image formed.

[0010] In an embodiment the light sources are light emitting diodes (LED) which are provided on the carrier elements. LED light sources are very efficient light sources that are well controllable. Furthermore, LED light sources can be easily miniaturized enabling the first surface to be provided with a large number of translucent portions, thus increasing the resolution.

[0011] In an embodiment the carrier elements are triangular in shape, which has proven to increase the degree of conformity that can be reached between the curvature of the carrier structure and the wall member.

[0012] In an embodiment the carrier elements are electronic circuit boards. Such electronic circuit boards are easy to manufacture and can be easily shaped.

[0013] In an embodiment the electronic circuit boards are electronically interconnected to establish an electronic data path, which enables joint operation of the light sources.

[0014] In an embodiment said electronic data path comprises a control unit for controlling the operating means, which allows a user to control the different light sources.

[0015] In an embodiment the control unit comprises a personal computer, which allows a user to program the utensil so as to control the light sources to display different patterns, animations etcetera.

[0016] In an embodiment the light guiding means are light pipes, made from a translucent material, extending from the light sources to the translucent portions. Light pipes are very suitable to couple the light sources with the translucent portions and allow for a certain offset in the respective positions of the light sources and the translucent portions. In other words, the light sources and the corresponding translucent portions do not need to be directly opposite to each other as the light pipes bridge any distance and/or offset between them. However, it is advantageous if the light sources and the respective translucent portions are arranged in each other's vicinity to reduce the amount of distance to be bridged by the light guiding means.

[0017] In an embodiment a cover member is provided adjacent the first surface of the wall member and substantially covering said first surface, wherein said cover member is made from a transparent material, in particular a diffuse transparent material.

[0018] In an embodiment the cover member is provided with a coating on an outer surface thereof, such as a Indium Tin Oxide coating (ITO), a wear-resistant coating or a waterproof coating. A wear-resistant coating increases life of the utensil. An ITO coating allows to provide the utensil with a touch sensitive surface, with which surface the utensil can be controlled.

[0019] In an embodiment the translucent portions are arranged in a regular pattern over the first surface of the wall member, whereby a pitch between neighboring translucent portions is substantially equal for each translucent portion. In this manner the translucent portions that make up an image on the first surface of the wall member are evenly distributed which improves the quality of the image displayed on the utensil and increases the perception of a person viewing the image displayed on the utensil in that the image is part of the utensil. Furthermore, the image displayed is able to follow more closely the curvature of the wall member.

[0020] In an embodiment the rigid flat carrier elements together span a carrier structure surface that faces the second surface of the wall member, which carrier structure surface approximates the curvature of wall member. This allows for substantially any free form product surface to be followed for example by approximating the free form surface by means of a polygon triangulation method.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] Further advantageous embodiments of the utensil according to the invention are described in the claims and in the following description with reference to the drawing, in which:

Fig. 1 shows a utensil according to the invention;
Fig. 2 shows a cross-section of the utensil of Figure 1, and
Fig. 3 is a schematic representation of a bowl according to the invention.

DETAILED DESCRIPTION OF EXAMPLES

[0022] In the below description of the invention the utensil incorporating the invention will be described in the example of a bowl shaped object, hereinafter denoted as a bowl. It is emphasized here that the invention is not limited nor intended to be limited to such a bowl, but is equally applicable to other three-dimensional objects such as consumer lifestyle products, kitchen appliances, mobile multimedia devices, lighting and luminaires and the like. In other words, the invention is applicable to any free form object.

[0023] Referring to Figure 1 a utensil 1 or object is shown. The utensil 1 is in the example of Figure 1 a bowl which has a wall member 2. The wall member 2 has an inwardly curved or concave first surface 3 which faces outward and can be seen by a viewer. For ease of use the bowl 1 is provided with support legs 4 with which the bowl 1 rests on a support surface 10.

[0024] The first surface 3 is a so-called double curved

surface, i.e. the first surface 3 (or wall member 2) has a curvature in a first direction and in a second direction, which directions are orthogonal with respect to each other. In the first surface 3 a plurality of translucent portions 5 are provided. This is only schematically depicted in the drawing. The translucent portions 5 are evenly distributed over the first surface 3, in particular the translucent portions 5 are arranged in a regular pattern over the first surface 3 of the wall member 2, whereby a pitch s between neighboring translucent portions 5 (see Figure 2) is substantially equal for each translucent portion 5. In the example of Figure 1 it is shown that a first number of translucent portions 5a form a square matrix. A second number of translucent portions 5b forms the letters TL.

[0025] Figure 2 schematically shows a cross section of the bowl 1. As can be seen in Figure 2, the wall member 2 is supported by a housing part 8 of the bowl 1. The wall member 2 encloses together with the housing part 8 an interior 6. It is however not essential that the interior 6 is closed. The housing part 8 with the wall member 2 is again supported by the support surface 10 for example a table. The wall member 2 has a second surface 7 that faces the interior 6 and thus faces away from the first surface 3. Inside the interior 6 and adjacent the second surface 7 of the wall member 2, a number of carrier elements 9a-9c are provided. For reasons of illustrative simplicity only three carrier elements are drawn in Figure 2, but more carrier elements are present as will be explained in more detail below.

[0026] The carrier elements 9a-9c together form a carrier structure 9 that is arranged to carry a number of light sources 20, such as for example LED's. Between the light sources 20 light guiding means 25 are provided that extend between the plurality of light sources 20 and the plurality of translucent portions 5. Hence, the light guiding means 25 optically couple each translucent portion 5 to at least one light source 20, such that light emitted from a light source 20 is visible from outside the first surface of the wall member via the respective translucent portion 5. In particular the carrier structure 9 is formed by a plurality of said carrier elements 9a-9c which are rigid and flat, wherein each carrier element 9a-9c carries at least one of said light sources 20 on a support face 30 which faces the second surface 7 of the utensil or bowl 1. Between the support face 30 of the carrier elements 9a-9c and the second surface 7 of the bowl 1 a gap is defined, which gap has an average height h1 that is substantially equal for each carrier element 9a-9c. The gap is bridged by the light guide means 25, which are preferably in the form of light pipes, e.g. made from Perspex or from glass fibre. The light pipes may extend through the wall member 2 in case that the translucent portions are designed as through holes or may extend from the light sources 20 to the second surface 7 in case the translucent portions are designed as transparent portions provided in the material the wall member 2 is made of. It is also possible that some translucent portions 5 are designed as through holes and some are designed as transparent portions.

[0027] The carrier elements 9a-9c which carry the light sources 20 together form the carrier structure 9. As can be seen in the drawing, the carrier structure 9 spans a carrier structure surface, which is made up of all the support faces 30 of the individual carrier elements 9a-9c, which closely matches the curvature of the wall member 2. In fact, the shape and size of the carrier elements 9a-9c is determined such, that the overall surface, i.e. the carrier structure surface, approximates the curvature of the wall member 2 as closely as possible. One way of determining what shape and size of the carrier elements 9a-9c will yield a good approximation of the curvature of the wall member 2 is to use a mathematical method of polygonal triangulation, which method is known per se. Such a method is for example known from the field of computer graphics. In particular such a method is used with elements that are triangular in shape and which is known to give good approximation results.

[0028] The carrier elements 9a-9c are electronic circuit boards on which the light sources 20, preferably LED's, are provided. The electronic circuit boards are interconnected to form a data path, which simplifies electronic design. Further, the data path comprises a operating means 40 for operating the light sources, which may comprise a control unit 50 for example in the form of a personal computer, a PDA, a portable multimedia device, a wireless controller such as a wireless multimedia center etcetera. The control unit 50 may be used to program light effects (animations, textual information etcetera) produced by the light sources 20, i.e. via the control unit 50 control signals 51, 52, 53 are provided for each individual electronic circuit board or carrier element 9a-9c. In case the light sources 20 are LED's, such control signals may include various control parameters for said LED's. In the example shown, the control unit 50 has an input 61 for receiving input such as control commands from a user or program instructions. The control unit 50 further comprises an output 62 for supplying control commands to the operating means 40.

[0029] As an example, Figure 3 shows the bowl 1 and shows how the results of the approximation that has been done may work out. Figure 3 shows the wall member 2 having a circular cross-section. Further and in a very schematic manner a number of carrier elements 9a-9e are shown, which in practice would be located behind the wall member 2. For illustrative purposes the carrier element 9a is provided with a hatching and the carrier elements 9a-9e are shown to extend beyond a peripheral rim 2a of the wall member 2 also for reasons of illustrative clarity. As can be seen, some of the carrier elements 9d-9e are not triangular. However, these carrier elements are built up from two or more triangular elements to form a single carrier element of non-triangular shape. Further it can be seen (see also Figure 2) that the translucent portions 5 are distributed in an evenly manner over the first or outer surface 3 of the wall member 2. Preferably, the translucent portions 5 are arranged in a regular pat-

tern over the first surface 3 of the wall member 2, whereby a pitch s between neighboring translucent portions 5 is substantially equal for each translucent portion 5.

[0030] Although the translucent portions 5 are evenly distributed over the surface 3 of the wall member 2, the same does not have to be true for the distribution of the light sources 20 on the carrier elements 9a-9e. In fact, each position of a light source 20 is preferably determined by first determining the position of the respective translucent portion 5 which position is than projected from said surface 3 on the carrier element 9a-9e carrying the respective light source 5. In this way substantially straight light pipes 25 can be used, or alternatively the light pipes 25 can be easily made from the same base material as the wall member 2, for example by means of 3D printing methods.

[0031] As mentioned a method using polygonal triangulation may be used to determine the number and shape of the carrier elements 9a-9e. In practice a parameter in such a mathematical determination could be the maximum distance h2 (see Figure 2) between the support face 30 of the carrier elements 9a-9e and the second surface 7 of the wall member 2. This maximum distance h2 will then be a limit for the maximum space between the carrier elements 9a-9e and the wall member 2 and will be a measure for the thickness of the wall member 2 that is perceived by a user. The smaller the maximum distance h2 is chosen to be, the better the approximation of the curvature of the wall member 2 will be. It may further be desirable to keep a minimum distance in order to avoid an occurrence of "hotspots" exhibiting a too high intensity.

[0032] In a further embodiment of the invention, the bowl 1 is further provided with a cover member 60 which is provided adjacent the first surface 3 of the wall member 2 and which substantially covers said first surface 3. Preferably said cover member 60 is made from a transparent material, in particular a diffuse transparent material which may be colored. Further, the cover member 60 may be provided with a coating on an outer surface thereof, such as a Indium Tin Oxide coating (ITO), a wear-resistant coating or a waterproof coating. In particular the provision of a ITO coating, which is known to be a touch sensitive material, offers the possibility of adding a further means of control to the utensil and the light sources. In fact, the ITO conductive material may be connected in a manner known per se to the person skilled in the art to the control unit 50 or to the operating means 40. In this manner it may be possible for a user to 'guide' single points or clusters of light around the area that is provided with the translucent portions 5. An alternative would be to use light guides to channel light inwards, i.e. towards the interior 6, to one or more optical sensors that can detect movement at the first surface 3 and translate such movement to control signals that may control movement of said points or clusters of light.

[0033] Movement or animation of light effects over the surface of the wall member, in particular when combined with touch sensitive control as described above, can be combined with certain rules of physics that normally apply to actual physical objects that move across a surface. Examples of such rules are gravity, friction etcetera. Applying such rules to moving points of light or moving clusters of light across the surface of the wall member will provide an illusion of natural movement over said surface, wherein the shape of the utensil (the wall member) apparently affects the movement. For example, a cluster or blob of lights that starts near the peripheral edge 2a of the bowl 1 will under the influence of 'gravity' move towards the centre of the bowl following the shape (curvature) thereof.

[0034] The invention has been described in relation to a bowl shaped object. It is to be understood however that the invention is not limited to the examples given, but that these examples are only given to exemplify certain embodiments of the invention. It is emphasized again that the invention is not limited nor intended to be limited to such a bowl, but is equally applicable to other objects as well. Applications may for example include dashboards of automobiles having a curved surface.

[0035] As an alternative to the above described light sources in the form of LED's, it is also possible to use backlit LCD's or other sources of light. It is also possible to use clusters of colored LED's to produce colored images. It is of course to be understood, that depending on the amount of translucent portions and their mutual distance, i.e. the resolution, the amount of detail of images can be adjusted.

[0036] While the subject-matter has been illustrated in the drawings and the foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive; the subject-matter is not limited to the disclosed embodiments. Other variations to the disclosed embodiments can be understood and effected by those skilled in the art of practicing the claimed subject-matter, from a study of the drawings, the disclosure and the appended claims. Use of the verb "comprise" and its conjugations does not exclude the presence of other elements other than those stated in a claim or in the description. Use of the indefinite article "a" or "an" preceding an element or step does not exclude the presence of a plurality of such elements or steps. The Figures and description are to be regarded as illustrative only and do not limit the subject-matter. Any reference sign in the claims should not be construed as limiting the scope.

Claims

1. An utensil (1), comprising:

- a wall member (2) having a curvature in at least a first direction, the wall member (2) having a first surface (3) and a second surface (7) facing away from said first surface (3), which first sur-

face (3) is, at least partly, covered with a plurality of translucent portions (5) that are arranged in a predetermined pattern on said first surface (3) and that extend from the first surface (3) to the second surface (7);
- a carrier structure (9) positioned adjacent the second surface (7) of the utensil (1), wherein said carrier structure (9) carries a plurality of light sources (20),
- operating means (40) for operating the light sources (20), and
- light guiding means (25) extending between the plurality of light sources (20) and the plurality of translucent portions (5), optically coupling each translucent portion (5) to at least one light source (20), such that light emitted from a light source (20) is visible from outside the first surface (3) of the wall member (2),

wherein said carrier structure (9) comprises a plurality of rigid flat carrier elements (9a-9e) that each carry at least one of said light sources (20) on a support face (30) which support face (30) faces the second surface (7) of the utensil (1), wherein said carrier elements are arranged adjacent the second surface (7) of the utensil (1).

2. The utensil according to claim 1, wherein a gap is defined between the support face (30) of said carrier elements (9a-9e) and the second surface (7) of the utensil (1), which gap has an average height (h2) that is substantially equal for each carrier element (9a-9e).

3. The utensil according to claim 1 or 2, wherein said plurality of translucent portions (5) are made of a transparent material and/or through holes in the wall member (2).

4. The utensil according to claim 1, 2 or 3, wherein the light sources (20) are light emitting diodes (LED) which are provided on the carrier elements (9a-9e).

5. The utensil according to any of the previous claims, wherein the carrier elements (9a-9e) are triangular in shape.

6. The utensil according to any of the previous claims, wherein the carrier elements (9a-9e) are electronic circuit boards.

7. The utensil according to claim 6, wherein the electronic circuit boards are electronically interconnected to establish an electronic data path.

8. The utensil according to claim 7, wherein said electronic data path comprises a control unit (50) for controlling the operating means (40).

9. The utensil according to claim 8, wherein the control unit (50) comprises one or more of a personal computer, a PDA, a portable multimedia device, a wireless controller such as a wireless multimedia center.

10. The utensil according to any of the previous claims, wherein the light guiding means (35) are light pipes, made from a translucent material, extending from the light sources (20) to the translucent portions (5).

11. The utensil according to any of the previous claims, further comprising a cover member (60) provided adjacent the first surface (3) of the wall member (2) and substantially covering said first surface (3), wherein said cover member (60) is made from a transparent material, in particular a diffuse transparent material.

12. The utensil according to claim 11, wherein the cover member (60) is provided with a coating on an outer surface thereof, such as a Indium Tin Oxide coating (ITO), a wear-resistant coating or a waterproof coating.

13. The utensil according to any of the previous claims, wherein the translucent portions (5) are arranged in a regular pattern over the first surface of the wall member, whereby a pitch (s) between neighboring translucent portions (5) is substantially equal for each translucent portion (5).

14. The utensil according to any of the previous claims, wherein the wall member (2) has a further curvature in a second direction, said second direction being orthogonal to said first direction.

15. The utensil according to any of the previous claims, wherein the rigid flat carrier elements (9a-9e) together span a carrier structure surface that faces the second surface (7) of the wall member (2), which carrier structure surface approximates the curvature of wall member (2).

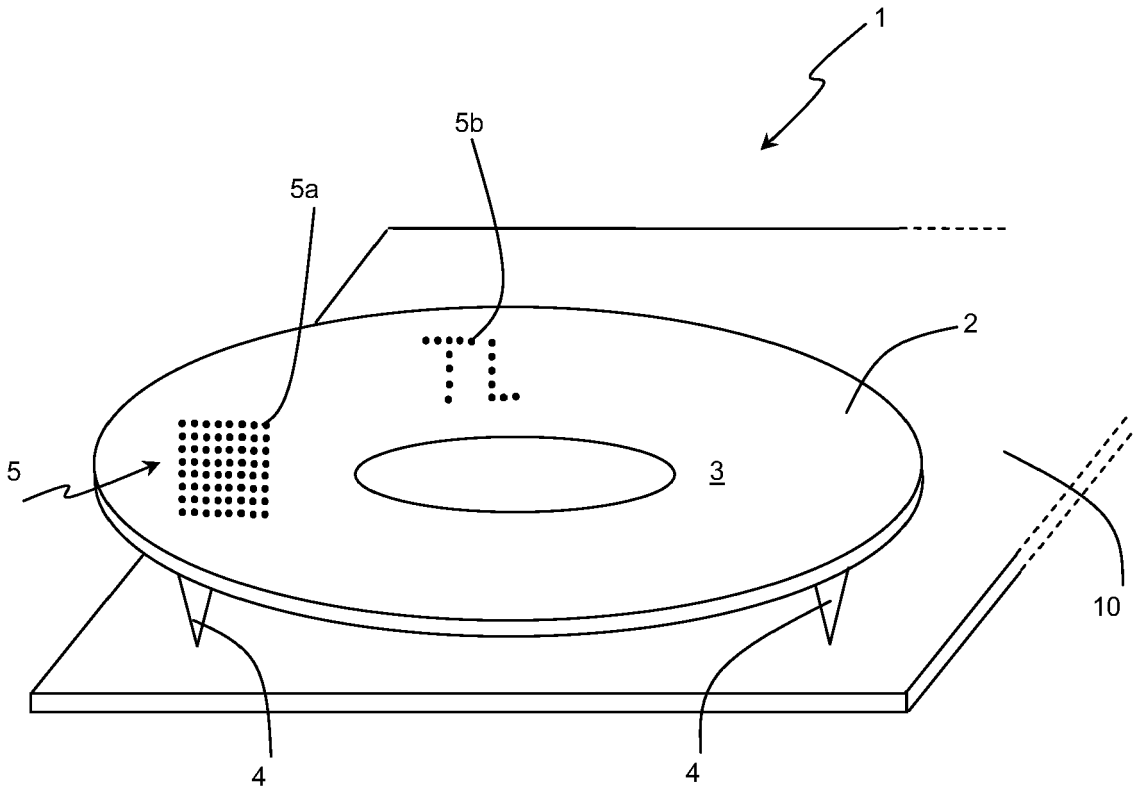

Fig. 1

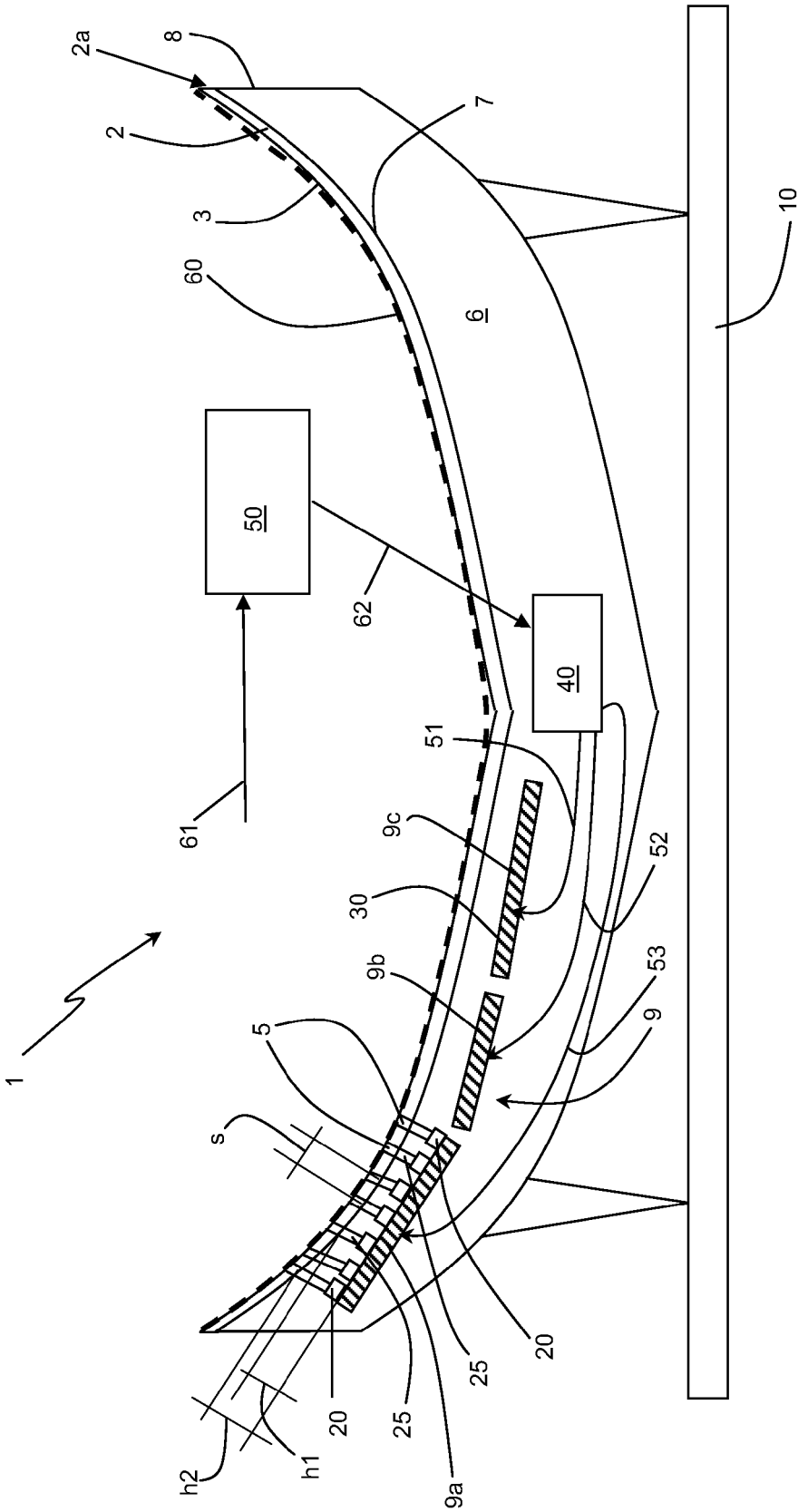

Fig. 2

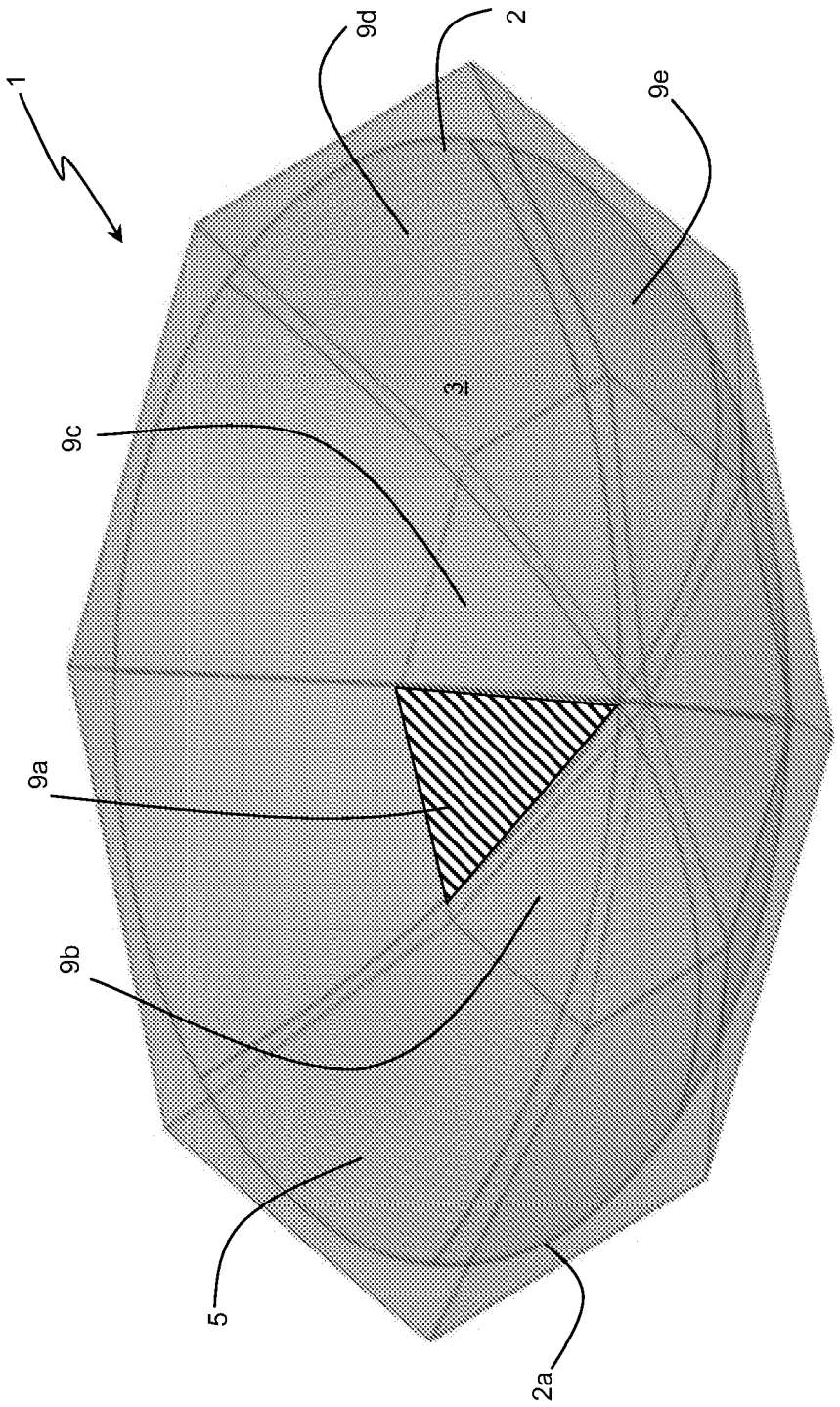

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 09 17 0008

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 11 149263 A (COPAL CO LTD) 2 June 1999 (1999-06-02) * abstract * -----	1-4,6-15	INV. G09F9/33
X	JP 07 135341 A (ROHM CO LTD) 23 May 1995 (1995-05-23) * abstract * * figure 3 * -----	1-4,6-15	
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TECHNICAL FIELDS SEARCHED (IPC)

G09F
G09G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 November 2009	Pavón Mayo, Manuel

CATEGORY OF CITED DOCUMENTS

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03-11-2009

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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