



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 1 378 969 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**07.01.2004 Bulletin 2004/02**

(51) Int Cl.7: **H01R 13/46**, H01H 9/18

(21) Application number: **03396053.5**

(22) Date of filing: **06.06.2003**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IT LI LU MC NL PT RO SE SI SK TR**  
Designated Extension States:  
**AL LT LV MK**

(72) Inventor: **Granberg, Johan**  
**48600 Karhula (FI)**

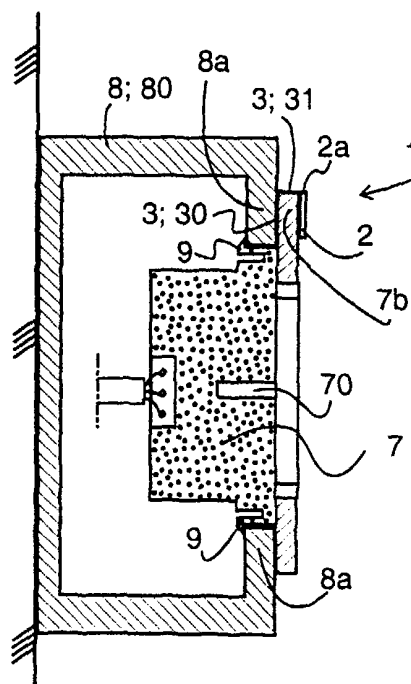
(74) Representative: **Tanhua, Pekka Vilhelm**  
**Berggren Oy Ab,**  
**P.O. Box 16**  
**00101 Helsinki (FI)**

(30) Priority: **02.07.2002 FI 20021307**

(71) Applicant: **Lexel Electric Oy**  
**07970 Ruotsinpyhtää (FI)**

(54) **Sign plate**

(57) The invention relates to a sign plate (1) including a face board (2) and a fastener (3). An identification element (4) can be attached in connection with the face board (2). The sign plate can be connected by the fastener (3) to the outlet box (7). According to the invention, the fastener (3) comprises a flat plate-like fastening element (30) and possibly a rear element (31). The fastening element is arranged at the edge (2a) of the face board (2). When observed at the front of the sign plate (1), the fastening element is positioned behind the face board (2), so that between the fastening element and the face board (2), there is arranged a groove in which the edge (7b) of the outlet box (7) can be fitted, so that the fastening element (30) is pressed between the outlet box edge (7a) and the edge (8a) of the housing (8; 80) when the sign plate (1) is installed in place when marking the outlet box (7).



**FIG. 2B**

**EP 1 378 969 A1**

## Description

**[0001]** The invention relates to a sign plate defined in the preamble of claim 1, said sign plate being connectable to an outlet box, particularly to an electrical duct box. By using the sign plate, there is identified an outlet box, such as electrical power socket, and/or given information of the features of said box. By means of the sign plate, it is possible for instance to mark all electrical power sockets under reserve power and respectively those belonging to the normal mains especially in a hospital. In a similar fashion, also the outlet boxes of data transmission wires can be marked.

**[0002]** An electrical duct box is meant to be installed in an electric duct. The term electric duct here means elongate installation spaces that can be installed in a wall, usually made of U-shaped regular profile and designed in various shapes and at least partly covered by a shielding cover; along said spaces, there can be drawn various cables and wires, such as electric and/or data transmission wires, and various electric and/or connection appliances can be installed in said spaces. As for the term electrical duct box, it here refers generally to an electric appliance to be installed in an electric duct, including for instance power sockets, switches, meters, tele, telephone and data transmission connectors/elements and other similar devices.

**[0003]** In the prior art there are known, for example from the Finnish patent publications FI-88447 and FI-20012084, similar types of electrical duct boxes as those described above, which boxes can be installed in an electric duct without a separate shielding box. An electrical duct box is locked in place in the electric duct by fast coupling elements, so that it can be installed without tools. Tools are, however, needed when detaching the electrical duct box.

**[0004]** It is known to attach a plastic label or identification note by gluing in connection with an outlet box. The identification note can either be already printed, or such that the desired alphanumeric code or short name can be written thereon. However, a problem is that when the purpose of use of the outlet box is changed or when its features are updated, the glued note is fairly difficult to remove - in most cases it is mechanically scraped off. Another problem is that in the course of time, the glued note may wear off or become illegible.

**[0005]** In the prior art there is known, from the patent publication US 5,613,874, a label for marking modular information management outlets in data transmission. These label plates are usually pressed into grooves that are provided in the immediate vicinity of the outlet boxes. In this patent publication, the back surface of the label is provided with a number of flexible attachment tabs which are designed so that they fit in the label fastening slots arranged in the outlets, and that they can also be easily removed therefrom.

**[0006]** The problem with the label according to the above described patent publication is that the outlets

must be provided, already at the manufacturing step, with fastening slots for the label plates. Another drawback is that in connection with said outlet boxes, there can only be used such sign plates that have certain types of attachment tabs.

**[0007]** The structure of the label plate, particularly as regards the attachment tabs, can also be considered a drawback. These tabs require a certain level of advanced manufacturing technology, such as injection molding, where the label plate and its attachment tabs are made in one single process.

**[0008]** The object of the invention is to eliminate the drawbacks connected to the above described label plates. Another object of the invention is to realize a new sign plate that is particularly suited in connection with electrical duct boxes and in general in installation systems utilizing electric ducts.

**[0009]** The sign plate according to the invention is characterized by what is set forth in claim 1. The dependent claims refer to preferred embodiments of the invention.

**[0010]** The sign plate according to the invention includes a face board and a fastener; an identification element can be attached in connection with said face board, and the sign plate can be attached at the fastener to be connected to the outlet box. According to the invention, the fastener comprises a flat, plate-like fastening element that is arranged at the edge of the face board, said fastening element being positioned, when observed at the front of the sign plate, behind the face board, so that between the fastening element and the face board, there is provided a groove or a similar recess in which the edge of the outlet box can be arranged, so that the fastening element is compressed between the outlet box edge and the housing edge, when the sign plate is installed in place when marking the outlet box.

**[0011]** In the most preferred embodiment of the invention, the fastener also includes a rear plate by which the fastening element is connected to the face board, and by which the fastening element is arranged at a distance from the face board. The advantage of this embodiment is that by means of the rear plate, there is obtained a spacious groove, whereafter in this spacious groove that is most advantageously customized according to the measures of the outlet box, the outlet box edge is easily fitted so that the bottom surface of the edge presses the fastening element against the edge of the housing, such as an electric duct, and thus the sign plate remains immovably and reliably in place.

**[0012]** In a preferred embodiment that is second only to the one described above, the width of the fastening element of the fastener is equal to the face board length in the direction of the face board edge, and in addition, the rear element of the fastener is a flat, plate-like element with a width that in the direction of the face board edge is equal to the width of the fastening element. In that case the sign plate is most advantageously realized so that the whole sign plate, i.e. the face board together

with the fastening element and the rear element, constitute one uniform flat plate material, such as plastic. The manufacturing of this kind of a sign plate automatically of a suitable plate material is easy, quick and cost-effective. Moreover, the sign plate dimensions are simple to modify for various applications. Another advantage is that this kind of a sign plate can be manufactured of a thin material, and yet it is strong and rigid and is not accidentally detached from the outlet box; likewise, its face board is not easily bent when the sign plate is used.

**[0013]** Yet another advantage of the invention is that the sign plate is easily installed and replaced, particularly in outlet boxes used in connection with an electric duct. At the same time as the electrical duct box is manually attached in place in the electric duct, the sign plate is arranged in the junction seam of the outlet box and the duct and pressed in place by means of the electrical duct box. When the electrical duct box is detached by using a suitable tool, also the sign plate can be detached without any separate procedures. The fastening is arranged to take place by means of a fastening arrangement that is specific to the outlet box and is most advantageously a snap-in joint arrangement. Yet another advantage of the invention is that when the fastening of the sign plate is realized in this fashion, it is strong and secure.

**[0014]** The invention is described in more detail below with reference to the appended drawing, where

- figure 1 is a front-view illustration of an outlet box installed in a housing, where the sign plate according to the invention is arranged in connection with the outlet box;
- figure 2A illustrates the cross-section B - B of the outlet box of figure 1 and of a first sign plate;
- figure 2B illustrates another cross-section B - B of the outlet box of figure 1 and of a second sign plate;
- figure 3A illustrates an enlarged cross-section of the first sign plate;
- figure 3B illustrates an enlarged cross-section of the second sign plate;
- figure 4 is a front-view illustration of the second sign plate;
- figure 5A is a rear-view illustration of the second sign plate;
- figure 5B is a rear-view illustration of a third sign plate;
- figure 6A illustrates the second sign plate as seen from the side, from the direction of the rear

element;

figure 6B illustrates the third sign plate as seen from the side, from the direction of the rear element; and

figure 7 illustrates a cross-section of a fourth sign plate in connection with an outlet box and a housing.

**[0015]** Like numbers for like parts are used in the drawings.

**[0016]** The sign plate 1 according to the invention includes a face board 2 and a fastener 3. The face board 2 is an essentially planar, flat plate-like element with a rectangular shape in the preferred embodiment of the figures. It is arranged on the outer surface of the outlet box 7 or a corresponding connector or appliance housing to be marked, in the vicinity of fastening elements 70 or other use and/or display elements, so that it is easily observed. The identification element 4 is attached in connection with the face board 2. In the identification element 4, there is defined the outlet box 7 or part thereof in connection to which the sign plate 1 is attached. The sign plate 1 can be fastened at the fastener 3 in connection with the outlet box 7.

**[0017]** According to the invention, the fastener 3 comprises a flat plate-like fastening element 30 that is arranged at the edge 2a of the face board 2. Moreover, the fastening element 30 is arranged in connection with the face board 2, so that it is located behind the face board 2, when observed at the front of the sign plate 1. Now between the fastening element 30 and the face board 2, there is provided a groove 5; 51, 52 or a corresponding recess. When the outlet box 7 is marked by the sign plate 1, the edge 7a, 7b of the outlet box 7 is fitted in the groove 5, and the outlet box 7 is installed in the electric duct 80 or in a corresponding housing 8. The purpose is that the fastening element 30 of the sign plate 1 is thus compressed between the outlet box edge 7a and its mounting tray, in this case between the edge 8a of the electric duct 80 or housing 8, at the same time as the sign plate 1 is installed in place.

**[0018]** In the preferred embodiment of figures 2A and 3A, the fastening element 30 is attached directly and at a given angle to the face board 2. With respect to each other, the face board 2 and the fastening element 30 are positioned at an acute angle  $\alpha$  that is equal to 45 degrees or smaller, most advantageously within the range 25 - 45 degrees. In cross-section, the groove 5; 51 has an acute angle. This requires that also the cross-section of the edge 7a of the outlet box 7 has an acute angle in a similar fashion, so that the edge 7a is preferably inserted in the groove 5; 51, as far as the bottom of said groove, and at the same time the holding and compression surface of the fastening element 30, between the outlet box edge 7a and the housing edge 8a, is made as large as possible, so that the fastening of the

sign plate 1 becomes secure. Thus the size of the angle  $\alpha$  depends on the shape of the edge 7a of the outlet box 7. However, it is possible that the edge 7a is designed so that it is circular or polygonal in cross-section, in which case there is left a small empty space on the bottom of the groove, when the sign plate 1 is installed in place.

**[0019]** In the most advantageous embodiment of the invention, for instance figures 2B and 3B, the fastener 3 comprises, in addition to the fastening element 30, also a rear element 31. By said rear element, the fastening element 30 is connected to the face board 2. Thus the fastening element 30 is arranged at the distance e from the face board 2, and the groove 5; 52 is made wide at the bottom. Now the edge 7b of the outlet box 7 that is polygonal in cross-section, in this preferred embodiment rectangular, the width of said edge 7b corresponding to said distance e, is fitted in the groove 5, down to the bottom. Preferably the cross-section of the fastener 3 is designed to conform to the edge 7a, 7b of the outlet box 7.

**[0020]** Most advantageously the rear element 31 is a flat, plate-like element. At the same time it serves as a reinforcement for the sign plate 1. In structure, the rear element 31 is thus a flat element, not unlike the fastening element 30. Also the face board 2 is of the same type. Thus it is advantageous that the face board 2 of the sign plate 1 and the fastening element 30 and rear element 31 of the fastener are made of a uniform plate or film material, such as thin plastic plate. The thickness of the plate material is for instance 0.2 - 1.0 mm.

**[0021]** In a preferred embodiment of the invention, the width h of the fastening element 30 of the fastener 3 is equal to the length p of the face board 2 in the direction of the face board edge 2a, as is illustrated in figure 5A. Also in this embodiment, the width s of the rear element 31 in the direction of the edge 2a of the face board 2 is equal to the length s of the face board 2 and the width h of the fastening element 30. Among the advantages of this type of a sign plate, let us point out its simple structure and manufacturing. Preferably the blank of the sign plate 1 is a rectangular piece of plate. Now the sign plate 1 can be manufactured of the plate by cutting it into a rectangular shape and by bending it into a fastening element 30, a rear element 31 and a face board 2 at suitable angles with respect to each other, for example by making use of thermal treatment directed to the long junctions of the object. In similar fashion there can also be realized the preferred embodiment illustrated in figures 1, 2A and 3A, where the sign plate face board 2 is directly connected to the fastening element 30 without the rear element 31. When the sign plate 1 is made ready, the fastening element 30 of the fastener 3 and its possible rear element 31 are fairly rigid with respect to the face board 2, and their mutual positions, i.e. their respective angles, cannot preferably be much altered.

**[0022]** In a preferred embodiment, the fastener 3 of the sign plate 1 includes one fastening element 30, for

instance according to the embodiments illustrated in figures 2A, 2B, 3A, 3B, 4, 5A and 6A. As an alternative, the fastening element is compiled of a number of adjacent fastening elements 30<sup>1</sup>, 30<sup>2</sup>, for instance like in the preferred embodiments of figure 5B and 6B. In the latter case, the fastener 3 comprises two adjacent flat fastening elements 30<sup>1</sup>, 30<sup>2</sup>, arranged at the edge 2a of the face board 2 and spaced apart. In the embodiment of figure 6B, they are arranged, in the lengthwise direction of the elongate face board 2, at the ends thereof. The fastening elements 30<sup>1</sup>, 30<sup>2</sup> are connected by corresponding rear elements 31<sup>1</sup>, 31<sup>2</sup>, having the width of the fastening elements, to the edge 2a of the face board 2. Alternatively the rear element 31 is a uniform structure, as in the embodiment of figure 6A, in which case its width in the direction of the edge 2a of the face board 2 is equal to the length s of the face board 2.

**[0023]** In the preferred embodiments of the invention illustrated in figures 2B, 3B, 5A, 5B, 6A and 6B, the fastening element 30; 30<sup>1</sup>, 30<sup>2</sup> and the rear element 31; 31<sup>1</sup>, 31<sup>2</sup> are mutually arranged essentially at an angle of 90 degrees, and the rear element 31; 31<sup>1</sup>, 31<sup>2</sup> is respectively arranged at an angle of 90 degrees with respect to the face board 2. Now, when seen at the front of the sign plate 1, the fastening element 30; 30<sup>1</sup>, 30<sup>2</sup> is directed from the rear element 31; 31<sup>1</sup>, 31<sup>2</sup> to behind the face board 2.

**[0024]** Thus the sign plate 1 is suited to be used together with an outlet box 7 where the sides of the edge 7b are positioned at right angles to each other. Now the width e of the rear element is most advantageously equal to the thickness of the edge 7a of the outlet box. This type of a sign plate 1 can be attached solidly in place, and the identification element 4 attached to the face board 2 is clearly visible, as is illustrated in figure 1.

**[0025]** In the preferred embodiment of the invention according to figure 7, there is illustrated a sign plate 1 where the face board 2 and the fastening element 30 of the fastener 3 are mutually arranged at an angle  $\alpha$  that is equal to 45 degrees or smaller, preferably within the range 25 - 45 degrees. Thus the rear element 31 belonging to the fastener also is positioned at an angle deviant from 90 degrees, both with respect to the face board 2 and to the fastening element 30. These angles correspond to the angles between the sides of the edge 7c of the outlet box 7.

**[0026]** Most advantageously the identification element 4 of the sign plate 1 is a replaceable element, but it may also be permanently attached, such as glued, onto the face board 2. The identification element 4 is a plate that can be made of paper, such as paper board, plastic film or other such material in which there is for example printed the alphanumeric code of the installation box A and/or the employed name or name abbreviation 4a.

**[0027]** In the preferred embodiments discussed above, the identification element 4 is a replaceable element. Now the sign plate 1 according to the invention

can be effectively utilized in marking as well as in possible changes in the markings. The face board 2 includes elements for fastening the identification element to the face board, preferably by means of friction. These fastening elements include for example a groove, recess or corresponding pocket 6 provided in the face board, in the direction of the plane thereof, in which groove the identification element 4 can be fitted, so that it remains in place in the pocket 6 by means of the friction between the identification element 4 and the pocket 6, and so that the information 4a arranged in the identification element 4 can be easily and clearly read at the front board side of the outlet box 7.

**[0028]** As an alternative, the pocket 6 may, when observed at the front, be placed on the outer or inner surface of the face board 2. When the pocket is located on the outer surface, the front surface of the identification element 4 with the appropriate codes 4a is visible, and only the edges of the identification element are located inside the grooves. In this case the face board 2 can be made of some opaque material, such as thin plastic plate that is dyed throughout.

**[0029]** Preferably the pocket 6 is located on the inner surface of the face board 2, as is apparent for instance from the preferred embodiments illustrated in figures 3A and 3B. The face board 2 covers the identification element 4, and at the same time it protects it. In this case the face board 2 is made of some transparent material, such as thin, clear plastic plate.

**[0030]** Generally the face board 2 is a rectangular strip or a strip modified from the rectangular form. The face board may also have some other shape. The face board 2 has at least one straight long edge 2a that is preferably parallel to the character string arranged in the identification element 4.

**[0031]** The length k of the fastening element 30 in the transversal direction B - B of the sign plate 1 is equal to the corresponding width of the face board 2, or a part thereof, for example one half. The length k of the fastening element 30 must be sufficient in order to ensure that it is compressed along an adequate length between the outlet box 7 and the housing 8 when installing the sign plate 1 in place.

**[0032]** The sign plate 1 is arranged in place in connection with the outlet box 7 at the same time as it is attached to the housing 8, for instance to an electric duct 80. In the most preferred embodiment, the sign plate 1 is arranged in the outlet box 7 so that the sign plate rear element 31; 31<sup>1</sup>, 31<sup>2</sup> rests against the outer side of the edge 7a, 7b, 7c of the outlet box 7. Thus the face board 2 and the identification element 4 arranged in connection with it are seen on top of that side of the outlet box 7 that is visible from the outside. As for the fastening element 30; 30<sup>1</sup>, 30<sup>2</sup>, it in turn rests against the rear side of the edge of the outlet box. When the outlet box 7 is pressed in the housing 8; 80, it is snapped in place in the housing edge 8a by means of its fastening elements 9. At the same time the fastening element 30; 30<sup>1</sup>, 30<sup>2</sup>

is pressed between the edge 7a, 7b, 7c of the outlet box 7 and the edge 8a of the housing 8; 80, whereafter the sign plate 1 is attached in place.

**[0033]** The invention is not restricted to the above described preferred embodiment only, but many modifications are possible within the scope of the inventive idea defined in the claims.

## 10 Claims

1. A sign plate (1) including a face board (2) and a fastener (3), where in connection with the face board (2) there can be fastened an identification element (4), said sign plate being connectable at the fastener (3) to an outlet box (7), **characterized in that** the fastener (3) comprises a flat plate-like fastening element (30; 30<sup>1</sup>, 30<sup>2</sup>) that is arranged at the edge (2a) of the face board (2) and is, when observed at the front of the sign plate (1), located behind the face board (2), so that between the fastening element (30; 30<sup>1</sup>, 30<sup>2</sup>) and the face board (2), there is made a groove (5; 51; 52) or a corresponding recess, in which the edge (7a; 7b; 7c) of the outlet box (7) can be fitted, so that the fastening element (30; 30<sup>1</sup>, 30<sup>2</sup>) is compressed between the outlet box edge (7a; 7b; 7c) and the edge (8a) of the housing (8; 80), when the sign plate (1) is installed in place when marking the outlet box (7).
2. A sign plate according to claim 1, **characterized in that** the width (h) of the fastening element (30) is equal to the length (p) of the face board (2) in the direction of the edge (2a).
3. A sign plate according to claim 1, **characterized in that** the fastener (3) comprises a number of adjacent, flat fastening elements (30<sup>1</sup>, 30<sup>2</sup>) arranged at the edge (2a) of the face board (2).
4. A sign plate according to claim 1, 2 or 3, **characterized in that** the fastener (3) also comprises a rear element (31; 31<sup>1</sup>, 31<sup>2</sup>), by which the fastening element (30; 30<sup>1</sup>, 30<sup>2</sup>) is connected to the face board (2) and by which the fastening element is arranged at the distance (e) from the face board (2).
5. A sign plate according to claim 4, **characterized in that** the rear element (31) is preferably a flat plate-like element having a width (s) that in the direction of the edge (2a) of the face board (2) is equal to the width (h) of the fastening element (30).
6. A sign plate according to claim 1 - 5, **characterized in that** the face board (2) and the fastening element (30; 30<sup>1</sup>, 30<sup>2</sup>) are mutually positioned at an angle ( $\alpha$ ) that is equal to or smaller than 45 degrees, most advantageously within the range 25 - 45 degrees.

7. A sign plate according to claim 5, **characterized in that** the fastening element (30; 30<sup>1</sup>, 30<sup>2</sup>) and the rear element (31; 31<sup>1</sup>, 31<sup>2</sup>) are mutually positioned essentially at an angle of 90 degrees, and that the rear element (31; 31<sup>1</sup>, 31<sup>2</sup>) is respectively at an angle of 90 degrees with respect to the face board (2), and so that the fastening element (30; 30<sup>1</sup>, 30<sup>2</sup>) is, when observed at the front of the sign plate (1), directed from the rear element (31; 31<sup>1</sup>, 31<sup>2</sup>) to behind the face board (2).
8. A sign plate according to any of the preceding claims, **characterized in that** the face board (2) has at least one long straight edge (2a), which most preferably is parallel to the character string (4a) provided in the identification element (4) attached to the face board.
9. A sign plate according to any of the preceding claims, **characterized in that** the face board (2) of the sign plate (1) and the fastening element (30; 30<sup>1</sup>, 30<sup>2</sup>) and rear element (31; 31<sup>1</sup>, 31<sup>2</sup>) of the fastener (3) constitute one uniform piece of flat plate material, such as plastic.
10. A sign plate according to any of the preceding claims, **characterized in that** the face board (2) includes means (6) for fastening the identification element (4) replaceably in place in the sign plate (1).

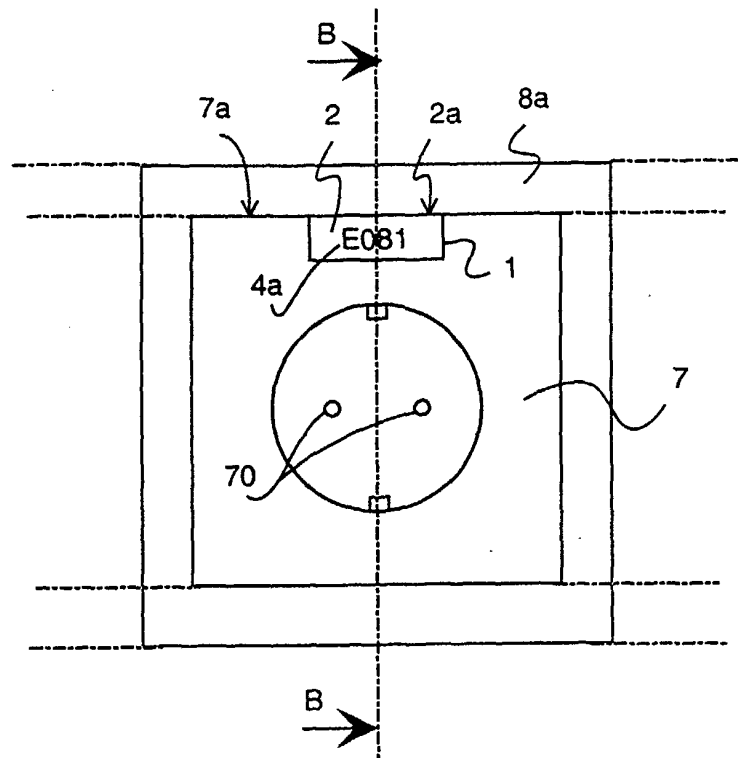


FIG. 1

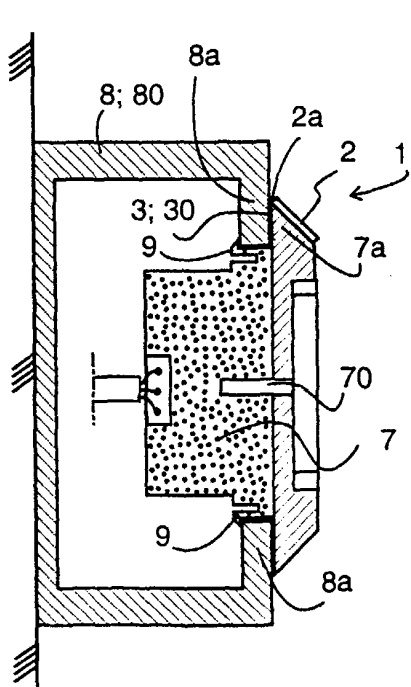


FIG. 2A

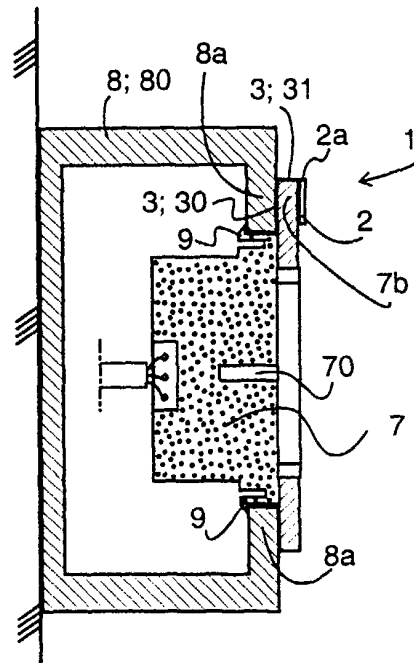


FIG. 2B

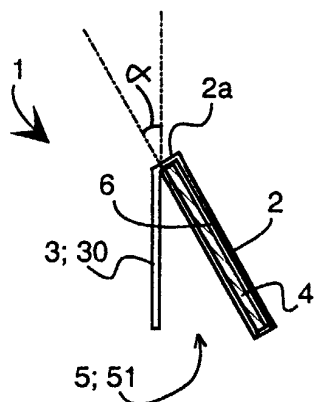


FIG. 3A

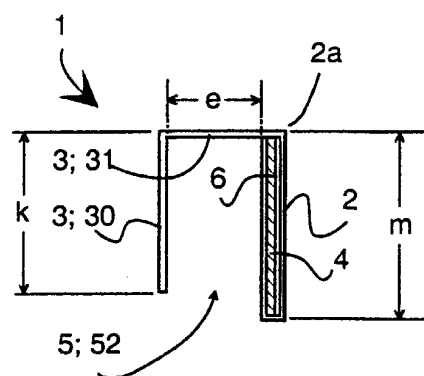


FIG. 3B

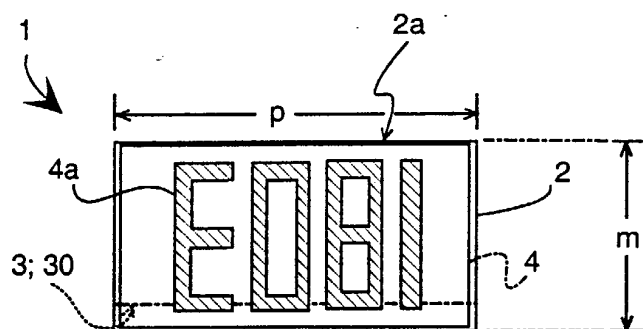


FIG. 4

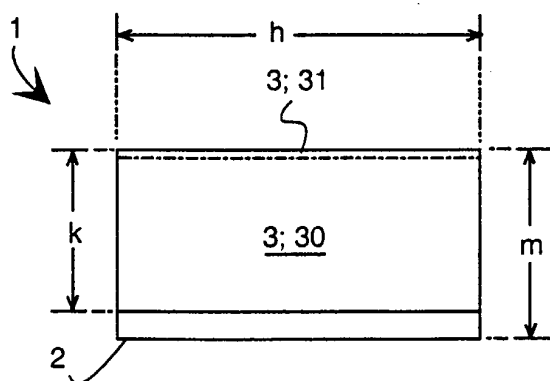


FIG. 5A

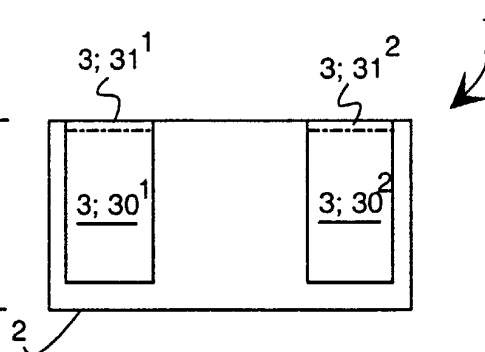


FIG. 5B



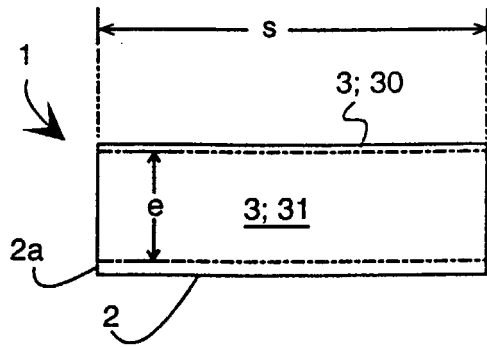


FIG. 6A

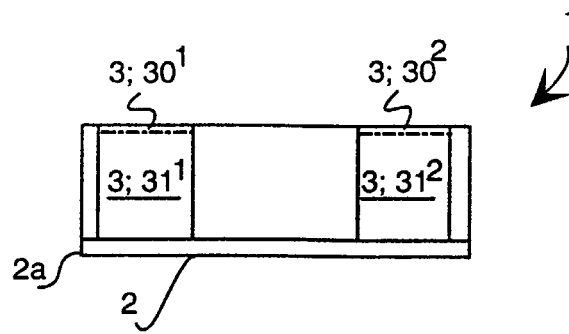


FIG. 6B

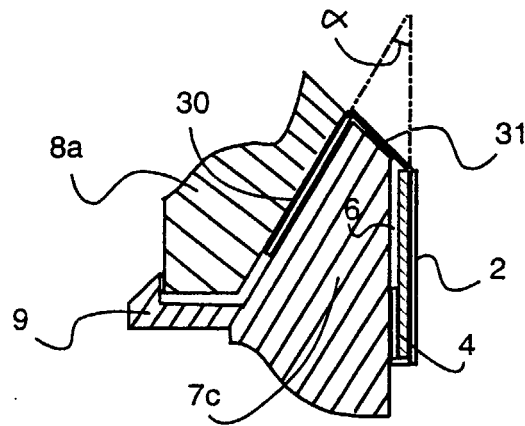


FIG. 7



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 03 39 6053

| 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.7) |
| A,D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | US 5 613 874 A (ORLANDO STEPHEN A ET AL)<br>25 March 1997 (1997-03-25)<br>* abstract; figures *<br>* column 2, line 60 - column 4, line 34 *<br>---                       | 1                                | H01R13/46<br>H01H9/18                        |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | US 3 159 937 A (BARNES CHESTER L)<br>8 December 1964 (1964-12-08)<br>* abstract; figures *<br>* column 1, line 9 - column 3, line 35 *<br>---                             | 1                                |                                              |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CH 344 619 A (BARTHE MARCEL)<br>15 February 1960 (1960-02-15)<br>* figures *<br>* page 1 *<br>---                                                                         | 1                                |                                              |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DE 37 09 314 C (MURR FORMENBAU GMBH;PTR MESSTECHNIK GMBH)<br>23 June 1988 (1988-06-23)<br>* abstract; figures 1,4 *<br>* column 5, line 65 - column 7, line 38 *<br>----- | 1                                |                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                           |                                  | TECHNICAL FIELDS SEARCHED (Int.Cl.7)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                           |                                  | H01R<br>H01H<br>G09F                         |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                           |                                  |                                              |
| Place of search                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                           | Date of completion of the search | Examiner                                     |
| THE HAGUE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                           | 10 October 2003                  | Serrano Funcia, J                            |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/> Y : particularly relevant if combined with another document of the same category<br/> A : technological background<br/> O : non-written disclosure<br/> P : intermediate document</p> <p>T : theory or principle underlying the invention<br/> E : earlier patent document, but published on, or after the filing date<br/> D : document cited in the application<br/> L : document cited for other reasons<br/> &amp; : member of the same patent family, corresponding document</p> |                                                                                                                                                                           |                                  |                                              |

EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 39 6053

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

10-10-2003

| Patent document<br>cited in search report |   | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|---|---------------------|----------------------------|---------------------|
| US 5613874                                | A | 25-03-1997          | NONE                       |                     |
| US 3159937                                | A | 08-12-1964          | NONE                       |                     |
| CH 344619                                 | A | 15-02-1960          | NONE                       |                     |
| DE 3709314                                | C | 23-06-1988          | DE 3709314 C1              | 23-06-1988          |

EPO FORM P0459

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