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(54) **Combination of a cut-out sheet of breakable and / or deformable material and a drain**

(57) The invention relates to a combination of a sheet of breakable material and/or deformable material, such as a tile, a thin sheet of metal or sheet of glass, provided with a cut-out opening and strengthening means arranged under the tile and with a drain arranged under the cut-out opening.

The strengthening means can here comprise a strengthening profile arranged along the cut-out opening.

The invention further comprises a method for arranging a combination according to the invention, the method comprising the steps of:

- arranging a drain in a floor, wherein the upper edge of the drain lies substantially flush with the surface of the floor;
- applying an adhesive layer to the floor surface;
- pressing the tile into the adhesive such that the cut-out opening is arranged above the drain.

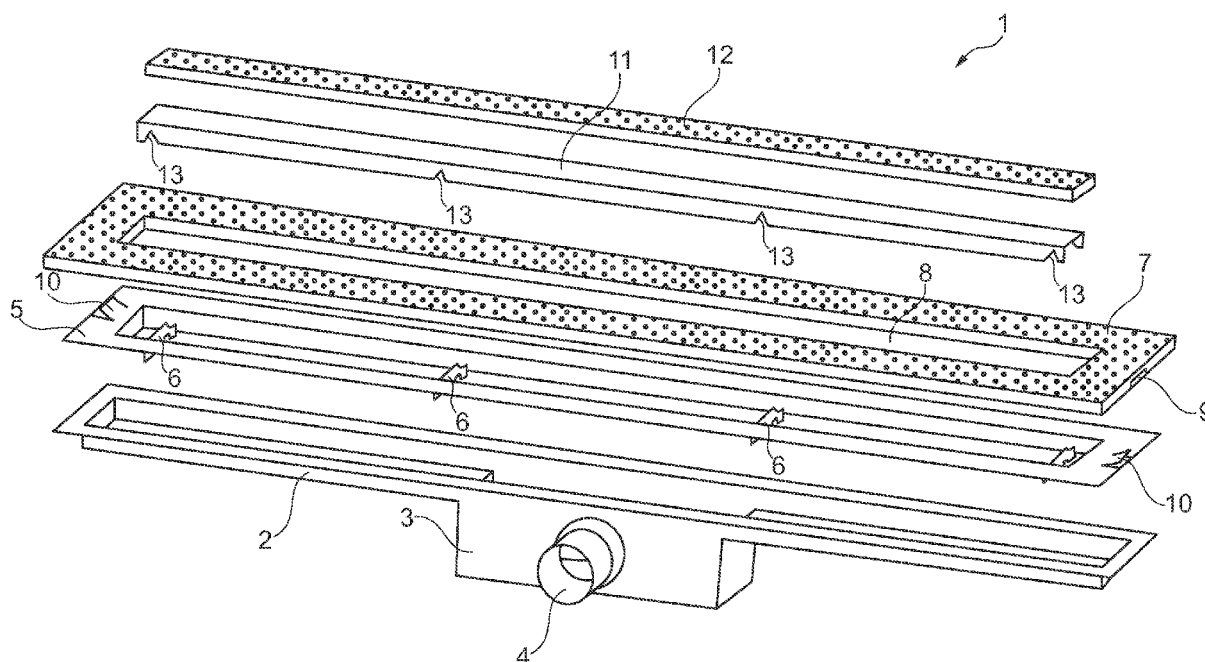


Fig. 1

Description

[0001] The invention relates to a cut-out sheet of breakable and/or deformable material, such as a tile, sheet of glass or thin sheet of metal, and a drain.

[0002] Deformable is understood to mean a material, such as a thin sheet of metal or plastic, which deforms or whose original form is affected by load.

[0003] A drain is understood to mean a container which has on the upper side an opening for collecting a liquid such as water, and wherein the container is provided with an outlet opening for connection to for instance an outlet pipe.

[0004] Numerous variants of drains are already known in the field of sanitary spaces. A square drain is for instance thus known in which a siphon is arranged and wherein a grating is provided on the opening. Shower drains are also known. This is an elongate drain under which or in which a siphon is arranged. A grating can be arranged in the elongate drain, although it is also known to arrange a tile, a closed sheet or glass in the drain. The shower drain is largely concealed from view as a result. The shower water is collected in the elongate drain and guided to the siphon, where it can then flow to an outlet pipe.

[0005] It is further known to provide sanitary spaces with tiles. These tiles must connect properly to the drain. The larger the tiles become, the more difficult this becomes because tiles must be cut into pieces so that they can be laid properly around the opening of a drain. The joins between the tiles cut into pieces are undesirable from an aesthetic viewpoint.

[0006] In addition, cracks may occur owing to difference in expansion coefficient of tiles and drain. It is hereby normally necessary to arrange mastic or flexible sealing between tiles and drain which compensates the contraction differences.

[0007] It is now possible to provide a sheet of breakable material such as tiles with suitable openings, for instance by means of a water jet cutter. Randomly shaped parts can hereby be cut from tiles. Not every tiler has such a machine. It is also possible to saw the tile or grind it from the rear in order to thus cut the desired part from the tile. The tile is however weakened in both cases.

[0008] When the tile is now laid in full spread adhesive, it is necessary for the tile to be pressed down evenly. This is of crucial importance in preventing breakage particularly in the case of large tiles which have been weakened by a part being cut out. This is exceedingly difficult however. Hollow spaces may also occur during adhesion, thereby increasing the chance of breakage.

[0009] A tile can also be provided with an opening in the factory, but transport is then also difficult because there is an increased chance of breakage because the tile has been weakened due to the cutting-out. In addition, a tile must be cut specifically for a type of drain because the tile may not jut out into the drain after fitting since the protruding part could break due to load. This is particu-

larly the case with thin tiles.

[0010] It is now an object of the invention to alleviate or even obviate the above stated drawbacks.

[0011] This object is achieved according to the invention with a combination of a sheet of breakable material and/or deformable material, such as a tile, sheet of metal or glass, provided with a cut-out opening and strengthening means arranged under the tile and with a drain arranged under the cut-out opening.

[0012] The strengthening means arranged under the tile ensure that the tile retains sufficient strength despite the tile being provided with a cut-out opening. Owing to the strengthening means the tile can be handled in the usual manner without an increased risk of breakage. The tile according to the invention can thus be transported in the usual manner and be placed in the adhesive in the usual manner.

[0013] With this invention it is possible to arrange a tile floor in a sanitary space which is not disrupted by tiles having to be cut into pieces around the drain, whereby additional unsightly joins occur in the tile surface. In addition, the chance of leakage is reduced because fewer joins are present.

[0014] Furthermore, no transitions are present in the surface in the invention, whereby differences in contraction can no longer result in cracking, or considerably less so, and no or fewer sealant edges are therefore necessary. The sheet with breakable material extends over the drain, whereby two separate layers of breakable material and drain are created, and stresses resulting from temperature fluctuations can be easily absorbed. Now that separate layers are provided, a shear force is exerted at the transition instead of a pressure force as in the case of transitions in the surface. This considerably reduces the chance of cracking.

[0015] In an embodiment of the combination according to the invention the strengthening means comprise a strengthening profile arranged along the cut-out opening. Since the cut-out opening is placed above a drain, it may occur that the inner edge of the opening is not directly supported. Arranging a strengthening profile prevents this inner edge cracking or pieces breaking off due to load. In addition, this provides the possibility of shifting the tile relative to the drain, since owing to the strengthening means the tile is self-supporting.

[0016] In a preferred embodiment of the combination according to the invention the strengthening profile has an L-shaped cross-section, wherein one leg of the L-shaped cross-section lies against the bottom surface of the tile and wherein the other leg of the L-shaped cross-section extends downward into the drain. An L-shaped cross-section has a high moment of inertia, whereby a high bending strength is obtained with a relatively small wall thickness. In addition, the downward extending leg provides a finish so that the edges of the underlying drain are hidden from view.

[0017] The strengthening profile can also have a U-shaped cross-section or be a rib which is optionally inte-

grated with the tile.

[0018] The strengthening means can optionally be provided as a membrane, fleece or gauze, the underside of which is adhered to or integrated in the tile, more or less similar to reinforced concrete.

[0019] In yet another embodiment of the invention the strengthening profile extends partially beyond the edge of the cut-out opening in order to form a support surface for a grating or cover element. Since the strengthening profile is arranged against the underside of the tile, an additional tile can then be placed as grating element on the strengthening profiles, thereby simultaneously ensuring that the upper surfaces of adjacent tiles lie in one plane.

[0020] In addition, it is possible to embody the grating or cover element as a number of separate components, wherein each separate component lies on the strengthening profile. The inner edge of the opening in the tile can optionally be provided here with recesses in which the separate components of the grating or cover element are placed.

[0021] The further advantage of separate components of the grating is that the components can be removed separately of each other. When the grating for instance extends partially under a fixed wall, the grating parts can be partially removed and the other parts can be pushed away below the fixed wall.

[0022] This is also convenient for stock control. It is only necessary to stock separate grating parts and not whole gratings. It is hereby also possible to enable different variations, for instance in colour, or different types of material. When a grating part is damaged, it is possible to suffice with replacing the one damaged part instead of a whole grating.

[0023] Transport is further safer because gratings are usually long and narrow: this creates problems. Now easier to send with smaller parts, because packaging compact.

[0024] It is further possible to provide the strengthening means with a height adjustment so that the upper surface of a covering element arranged on the strengthening means can be made flush with the surrounding surface.

[0025] The drain of the combination according to the invention can be arranged between two walls, whereby the side parts of the tile can be omitted.

[0026] In yet another embodiment of the combination according to the invention the strengthening means comprise a frame arranged around the cut-out opening.

[0027] The drain preferably has an opening corresponding with the cut-out opening, wherein the opening in the drain is larger than the cut-out opening such that the cut-out opening can be shifted relative to the opening in the drain. Because the tile can be shifted relative to the drain, inaccuracies occurring during arranging of the drain in the floor can hereby be compensated. In yet another preferred embodiment of the combination according to the invention the strengthening means support on the bottom of the drain. An edge of the tile can hereby

be maximally loaded since the edge supports on the bottom via the strengthening means.

[0028] In addition, it is possible to arrange a tile with a cut-out opening on a number of different drains from different manufacturers. Because the cut-out opening is smaller than the drain, and the tile is in addition reinforced, the dimensions of the drain are of secondary importance.

[0029] Exchangeable supports can further be provided which are either arranged on the strengthening means or support on the bottom of the drain. It is thus possible for instance to position a grating in the cut-out opening irrespective of the drain. It is only necessary to choose the correct supports in order to make this possible.

[0030] It is also possible to arrange a sheet with a large number of holes in the drain, into which holes parts can be screwed at the correct position in order to hold a grating in the correct position.

[0031] The drain can comprise a siphon, this being usual when the combination is arranged in the floor of a sanitary space.

[0032] In yet another embodiment of the combination according to the invention a holder extending upward from the underside of the tile is arranged along at least one outer edge of the tile, and a second, vertically extending tile is arranged on the holder. Since the combination can be made in the factory, the sealing of the tiles in the corner can hereby be guaranteed. The holder further prevents cracks occurring between the floor tiles and wall tiles due to movement of the wall relative to the floor. A transition with the wall is hereby thus provided at the same time. The upright tiles can be arranged along one, two or three sides.

[0033] It is further possible to integrate the sheet of breakable material or floor tile and the second tile, and embody them as one whole. Obtained through the integration is a homogeneous surface which extends from the floor onto the wall, whereby a durable seal is obtained. It is hereby further possible to complete the final finish in wholly watertight manner, while the drain is still arranged separately of the final finish, such as for instance a tile.

[0034] A further advantage of the combination according to the invention is that the positioning of the drain relative to the tile surface is known, since the combination is manufactured integrally. It is hereby possible to minimize the dimensions, and particularly the height, of the drain, and thereby realize a minimal overall depth of the combination.

[0035] The strengthening means are preferably arranged on the bottom surface of the tile by means of a suitable sealant or adhesive. A two-component adhesive can also be used. Such a two-component adhesive has the advantage that it is harder and stronger. The adhesive thickness thereof is also known, and can be taken into account in minimizing the overall depth of the combination.

[0036] The strengthening means is preferably arranged on the tile in the factory. The thickness of the

adhesive layer between strengthening means and tile can hereby be minimized and a reliable, watertight connection can be obtained between the two parts. In addition, the minimized thickness of the adhesive layer ensures that soap residues and the like can have little effect on the adhesive layer and the chance of leakage as a result of the adhesive layer being adversely affected is prevented.

[0037] The strengthening means can optionally also be provided by a suitably shaped tile strip, whereby the appearance of the strengthening means corresponds to the upper surface of the combination according to the invention.

[0038] The strengthening means and the drain can optionally be integrated and form one whole.

[0039] A secondary sealing membrane can further be arranged on the strengthening profile. Should the drain subside, thereby creating stresses or cracking in the underlayer, the secondary sealing membrane then provides additional sealing.

[0040] The invention further comprises a method for arranging a combination according to the invention, the method comprising the steps of:

- arranging a drain in a floor, wherein the upper edge of the drain lies substantially flush with the surface of the floor;
- applying an adhesive layer to the floor surface;
- pressing the tile into the adhesive such that the cut-out opening is arranged above the drain.

[0041] These and other features of the invention are further elucidated with reference to the accompanying drawings.

Figure 1 shows an exploded view of a first embodiment of the combination according to the invention. Figure 2 shows a schematic cross-sectional view of the combination according to figure 1.

Figure 3 shows a cross-sectional view of a second embodiment.

Figure 4 shows a cross-sectional view of a third embodiment.

Figure 5 shows a cross-sectional view of a fourth embodiment.

Figure 6 shows a cross-sectional view of a fifth embodiment.

Figure 7 shows a cross-sectional view of a sixth embodiment.

Figure 8 shows a perspective view of a seventh embodiment.

[0042] Figure 1 shows a first embodiment 1 of a combination according to the invention. Combination 1 has an elongate drain 2 which is provided in the centre with a siphon housing 3 with an outlet connection 4. Water can be collected via elongate drain 2 and run off to siphon housing 3 and subsequently flow via a siphon (not shown)

and via outlet connection 4 into an outlet pipe.

[0043] A frame 5 is placed in drain 2. This frame 5 consists of strip with an L-shaped cross-section. Frame 5 is further provided with transverse sheets 6. A tile 7 into which an opening 8 has been cut is then placed on the horizontal flange of frame 5. In order to obtain a good centring of tile 7 relative to frame 5 there is arranged in the underside of tile 7 a slot 9 into which protrudes a raised tongue 10 on the horizontal flange of frame 5.

[0044] Further placed in opening 8 is a U-shaped profile 11 on which a second tile 12 is arranged. Arranged in the underside of U-shaped profile 11 are grooves 13 which co-act with transverse sheets 6 and thus ensure a good positioning of cover element 11, 12 in opening 8.

[0045] Figure 2 shows a cross-section of combination 1 according to the invention. It will be apparent from this cross-section that drain 2 is wider than opening 8, whereby frame 5 with tile 7 can be shifted reciprocally in order to thus compensate for inaccuracies in the positioning of drain 2.

[0046] The vertical legs of the L-shaped profiles of frame 5 provide a finish for opening 8 and conceal the larger drain 2 from view.

[0047] Figure 3 shows a second embodiment 20 of the combination according to the invention. This combination 20 has a drain 21 with an upright edge and a horizontal flange 22. Arranged on this horizontal flange 22 is a sealing membrane 23 with which drain 21 and the surrounding floor are made watertight.

[0048] Placed on drain 21 is a tile 24 which is provided with a central opening 25 positioned above drain 21. Tile 24 is usually adhered to the sealing membrane. Strengthening profiles 26, which support on the bottom of drain 21, are provided on either side of central opening 25.

[0049] With this embodiment a thin gap can be provided in tile 24 along which water can flow into drain 21. A removable part can optionally be provided in tile 24 above the siphon (not shown) of the drain in order to enable access to the siphon.

[0050] Figure 4 shows a third embodiment 30 of the combination according to the invention. Combination 30 has a drain 31 with horizontal flanges 32 on which a sealing membrane 33 is arranged.

[0051] A tile 34 with a cut-out opening 35 is further placed on drain 31. This tile 34 is preferably adhered to sealing membrane 33. Partially protruding strengthening profiles 36 are provided below the edges of opening 35. A cover element 37 is placed on the profiles. This cover element 37 can be removed, for instance in order to clean the underlying drain 31.

[0052] Strengthening profile 36 can further be shifted reciprocally inside drain 31, whereby inaccuracies in the positioning of drain 31 can be compensated.

[0053] Figure 5 shows a fourth embodiment 40 of the combination according to the invention. This embodiment 40 also has a drain 41 on which is placed a tile 42 with cut-out opening 43. Strengthening profiles 44 and 45 are arranged under tile 42 around opening 43. These

strengthening profiles have an L-shaped cross-section and support on the bottom of drain 41.

[0054] A support 46 which extends vertically is arranged on strengthening profile 45. A second tile 47 which can connect to the further tiles on the wall is arranged against this vertical support 46.

[0055] Figure 6 further shows a fifth embodiment 50 of the combination according to the invention. This embodiment 50 has a cylindrical drain 51 with an outlet 52. A square tile 53 with a square cut-out opening 54 in the centre is placed on drain 51. A removable cover element 55 is further provided in square opening 54.

[0056] Figure 7 shows a sixth embodiment 60 of the combination according to the invention. The embodiment 60 comprises a drain with a bottom surface 71, upright walls 72 and a horizontal flange 73, 74. A strengthening profile 75 supporting on bottom 71 is arranged in drain 71, 72, 73, 74. A sheet of breakable material 76, in particular a tile, is arranged on strengthening profile 75 and adhered thereto.

[0057] Because horizontal flange 73, 74 takes a stepped form, the height difference caused by strengthening profile 75 is compensated. A grating 77 is further placed on strengthening profile 75.

[0058] Figure 8 shows a perspective view of a seventh embodiment 80. A sheet 81 which can be arranged on a drain can be seen in the figure. Sheet 81 is provided with a central opening 82. Central opening 82 is elongate and provided with recesses 83. A strengthening profile 84 is further provided under the edge of central opening 82. This strengthening profile 84 ensures that sheet 81 is sufficiently strong and that there is a support surface for grating parts 85. These grating parts 85 can be made from the same material as sheet 81, but may also differ in colour and material.

Claims

1. Combination of a sheet of breakable material and/or deformable material, such as a tile, a thin sheet of metal or sheet of glass, provided with a cut-out opening and strengthening means arranged under the tile and with a drain arranged under the cut-out opening.
2. Combination as claimed in claim 1, wherein the strengthening means comprise a strengthening profile arranged along the cut-out opening.
3. Combination as claimed in claim 2, wherein the strengthening profile has an L-shaped cross-section, wherein one leg of the L-shaped cross-section lies against the bottom surface of the sheet and wherein the other leg of the L-shaped cross-section extends downward into the drain.
4. Combination as claimed in claim 3, wherein the strengthening profile extends partially beyond the

edge of the cut-out opening in order to form a support surface for a grating or cover element.

5. Combination as claimed in any of the foregoing claims, wherein the strengthening means comprise a frame arranged around the cut-out opening.
6. Combination as claimed in any of the foregoing claims, wherein the drain has an opening corresponding with the cut-out opening, wherein the opening in the drain is larger than the cut-out opening such that the cut-out opening can be shifted relative to the opening in the drain.
7. Combination as claimed in any of the foregoing claims, wherein the strengthening means support on the bottom of the drain.
8. Combination as claimed in any of the foregoing claims, wherein the drain comprises a siphon.
9. Combination as claimed in any of the foregoing claims, wherein a holder extending upward from the underside of the sheet is arranged along at least one outer edge of the sheet, and wherein a second, vertically extending sheet is arranged on the holder.
10. Method for arranging a combination as claimed in any of the foregoing claims, the method comprising the steps of:
 - arranging a drain in a floor, wherein the upper edge of the drain lies substantially flush with the surface of the floor;
 - applying an adhesive layer to the floor surface;
 - pressing the sheet of breakable material into the adhesive such that the cut-out opening is arranged above the drain.

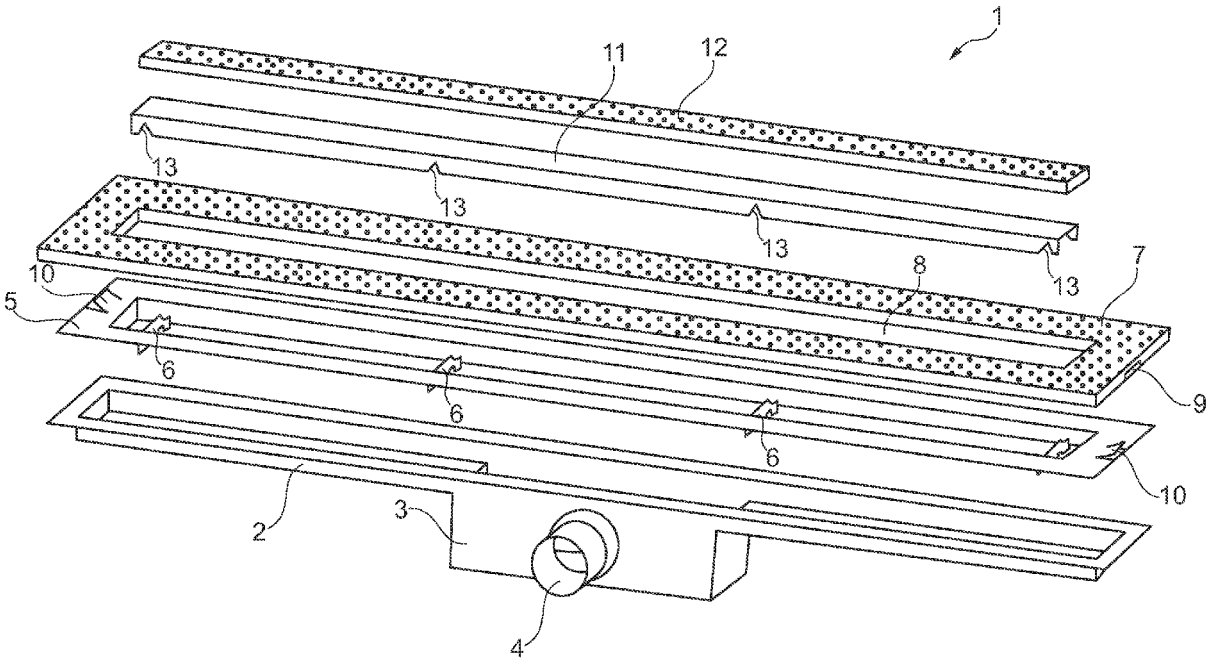


Fig. 1

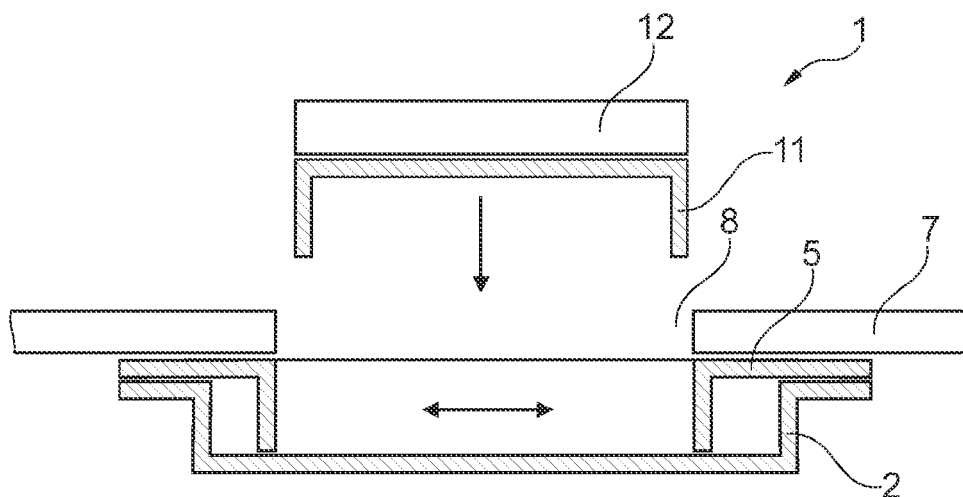


Fig. 2

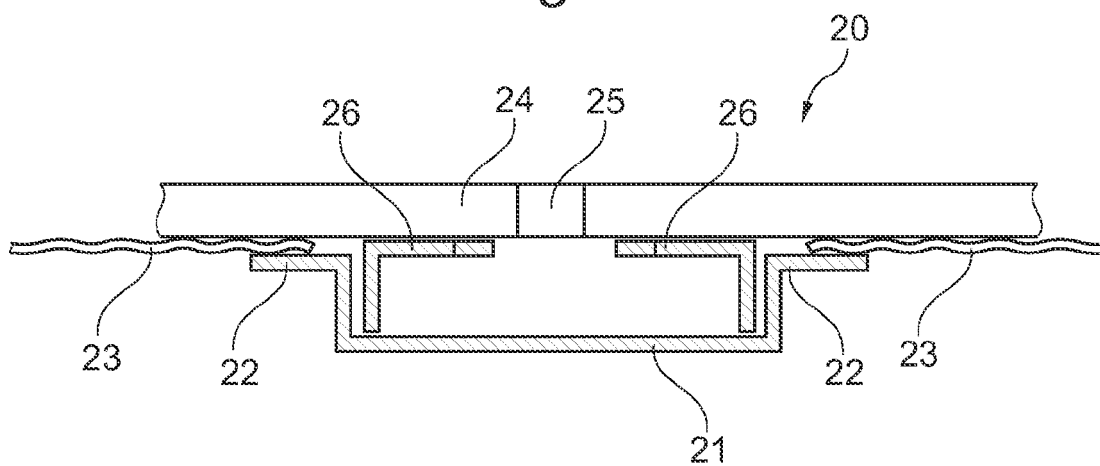


Fig. 3

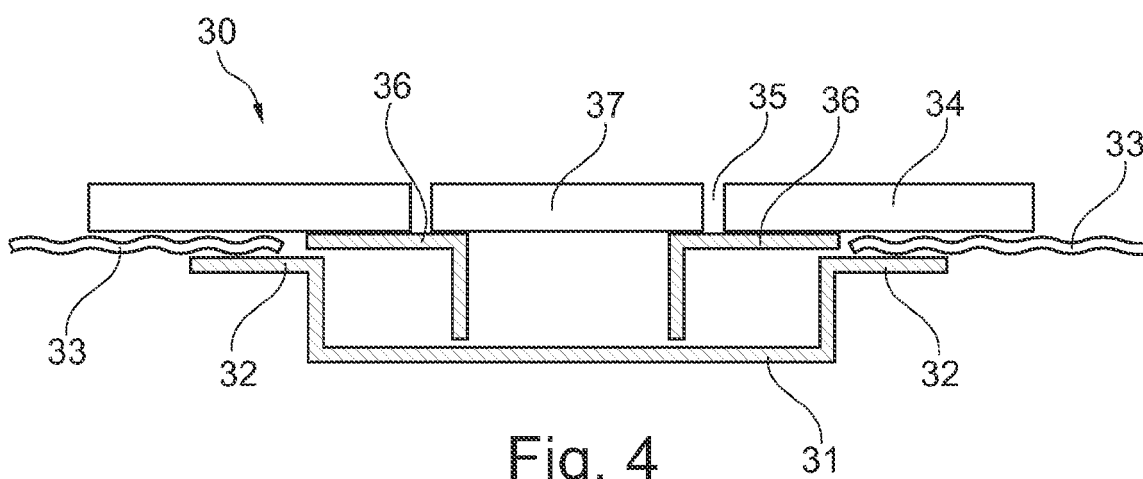


Fig. 4

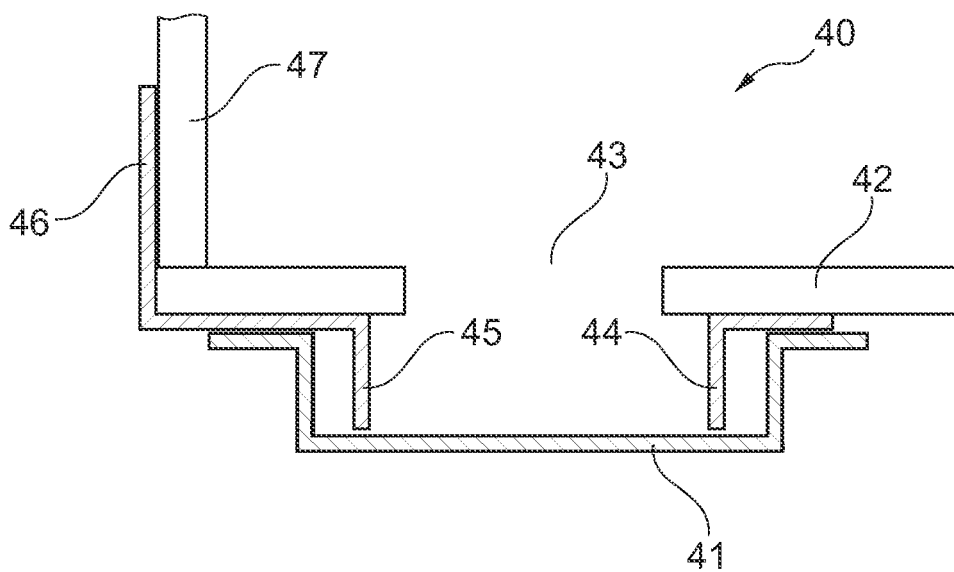


Fig. 5

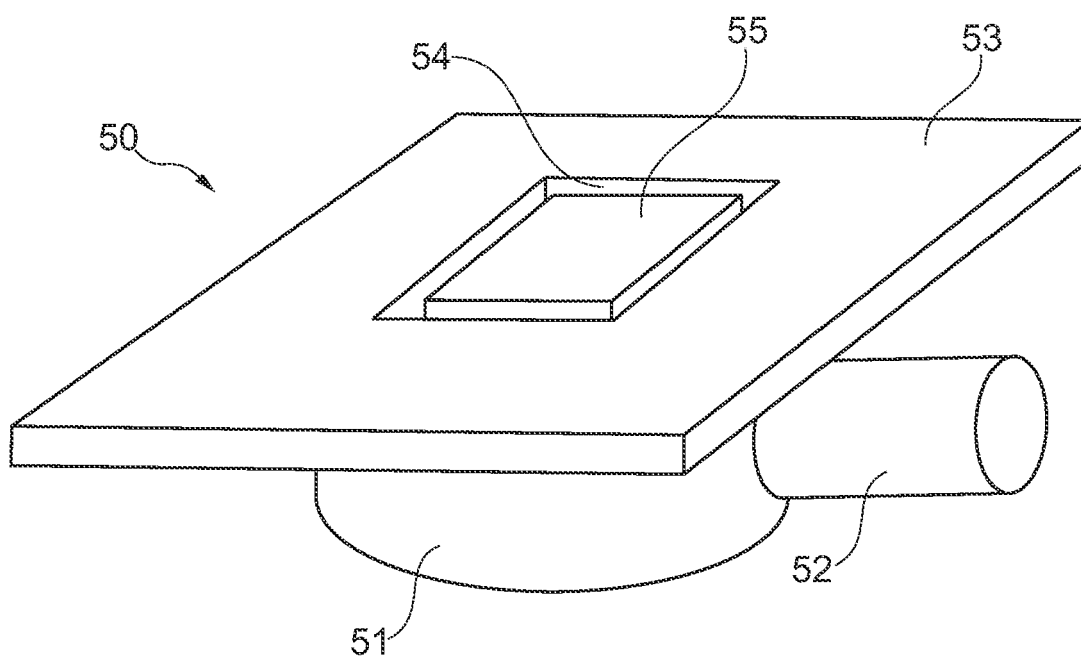


Fig. 6

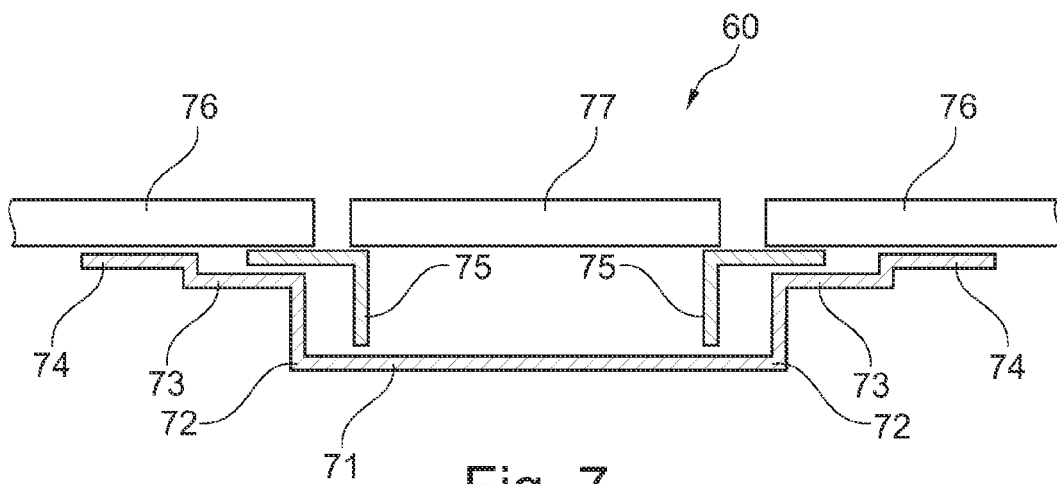


Fig. 7

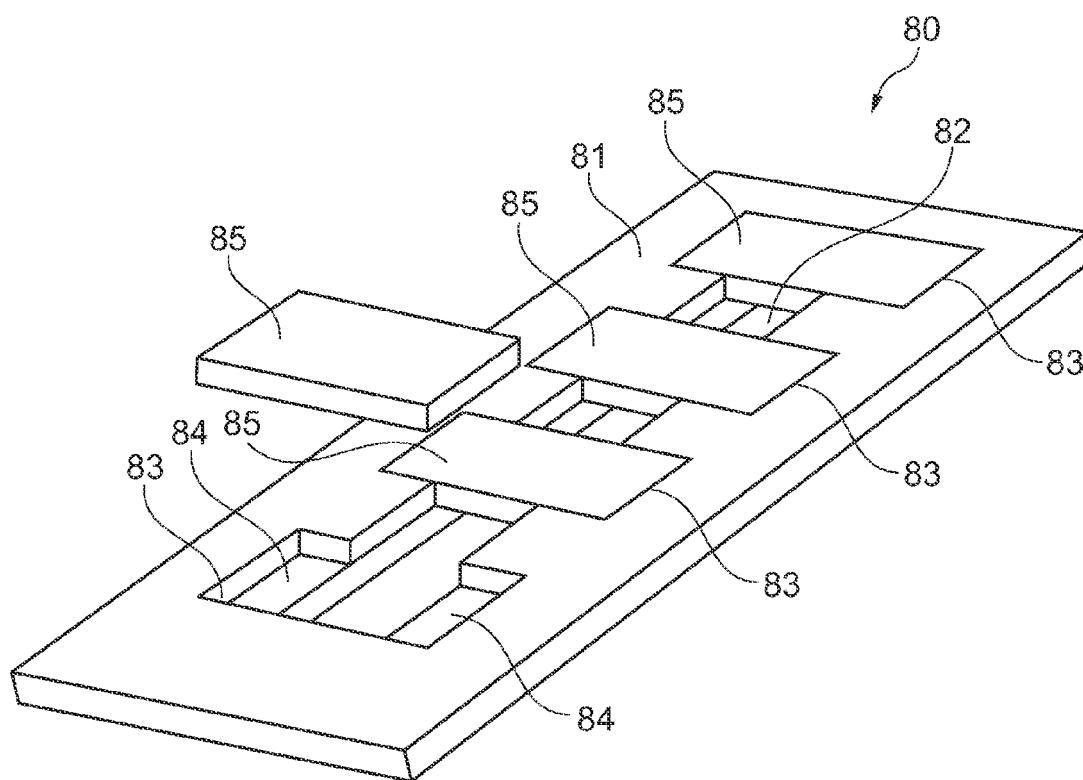


Fig. 8



EUROPEAN SEARCH REPORT

Application Number
EP 11 15 6763

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	DE 20 2007 006050 U1 (DALLMER GMBH & CO KG [DE]) 23 August 2007 (2007-08-23)	1-6,10	INV. E03F5/04
Y	* paragraph [0026] - paragraph [0037]; figures *	9	
X	EP 1 947 253 A1 (BLUECHER METAL AS [DK]) 23 July 2008 (2008-07-23)	1-8,10	
Y	* paragraph [0023] - paragraph [0028]; figures *		

Y	WO 01/73231 A1 (NIELSEN CLAUS DYRE [DK]) 4 October 2001 (2001-10-04)	9	
	* figure 1 *		

			TECHNICAL FIELDS SEARCHED (IPC)
			E03F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		29 July 2011	De Coene, Petrus
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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

EP 11 15 6763

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
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29-07-2011

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202007006050 U1	23-08-2007	NONE	
EP 1947253	A1	23-07-2008	NONE
WO 0173231	A1	04-10-2001	
		AT 312245 T	15-12-2005
		AU 4231901 A	08-10-2001
		CN 1440482 A	03-09-2003
		CZ 20023188 A3	12-03-2003
		DE 60115636 T2	10-08-2006
		EP 1287213 A1	05-03-2003
		ES 2250365 T3	16-04-2006
		JP 4612983 B2	12-01-2011
		JP 2003529005 A	30-09-2003
		NO 20024555 A	19-11-2002
		PL 365880 A1	10-01-2005
		US 2003115814 A1	26-06-2003
		US 2008022617 A1	31-01-2008