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(54) **Showcase having elastomeric gasket formed in situ**

Vitrine mit elastomeren Dichtung in situ gebildet

Vitrine avec joint élastomère formé in situ

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(73) Proprietor: **Goppion S.p.A.  
20090 Trezzano sul Naviglio (MI) (IT)**

(72) Inventor: **Goppion, Alessandro  
I-20144 Milano (IT)**

(74) Representative: **Checacci, Giorgio et al  
Porta, Checacci & Associati S.p.A.  
Via Trebbia 20  
20135 Milano (IT)**

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## Description

**[0001]** The present invention refers to a showcase for preserving and displaying objects in a protected environment, typically such as artworks, cultural heritage objects or delicate objects, in museums, exhibitions and the like.

**[0002]** The expression protected environment herein and hereinafter refers to an environment in which the atmosphere is controlled, through the monitoring of one or more parameters among temperature, relative humidity, dust content, pollutant content, with the aim of maintaining the conditions provided for preserving the displayed objects, and in which access thereto by unauthorised personnel is prohibited, so as to avoid theft or damage of the displayed objects.

**[0003]** Thus, showcases of this type must meet various types of requirements, in view of the preservation and entirety of the displayed objects. In addition, obviously, these showcases are required to guarantee the best visibility for the displayed objects.

**[0004]** With the aim of guaranteeing the best sealing, extremely important are the sealing systems between the fixed parts and the mobile parts, i.e. normally between a fixed abutment frame provided on the fixed box of the showcase and a mobile abutment frame provided on the mobile panel which can be open.

**[0005]** For such purpose are often used more or less compressible gaskets, alongside closing means for applying a pressure between the mobile panel and the fixed box.

**[0006]** The closing means which hold the mobile panel against the fixed box are usually located at some points along the abutment frames; with showcases of large dimensions, in particular if obtained using a box and openable glass panels, it is possible that the distance between these means and the deformability of the panel are such that the distance between the panel and the box along the fixed and mobile abutment frame is not constant, but smaller in proximity of the closing means and greater in intermediate positions. Practically, a divergence between the mobile panel and the fixed box occurs, proportionally increasing as the distance from the closing means increases.

**[0007]** In order to guarantee sealing in case of situations of this type, there are normally two approaches.

**[0008]** The first approach is that of providing high deformability gaskets, i.e. capable of having a thickness variable in a rather large spectrum so as to be able to operate correctly where the mobile panel and the box are closer to each other and where they are more spaced. Theoretically, this should overcome the drawback; however, it is clear that in more spaced areas the gasket is less compressed up to a possible detachment in case of particularly considerable deformations, thus reducing the sealing of the showcase.

**[0009]** The second approach is that of forming the gasket in loco. Thus, this implies that a trace of elastomeric material in the paste state on one of the two abutment

frames is laid, that the mobile panel is then closed compress the elastomeric material and that the elastomeric material is left to solidify with the thicknesses acquired during the closure. The compression of the pasty elastomeric material during the step of closing the mobile panel allows that where the distance between the fixed box and the panel is smaller, a greater amount of pasty elastomeric material is compressed and thus pushed laterally. This allows to obtain a gasket whose thickness and width are variable along the abutment frame: the thickness is obviously left unvaried, while the surplus width is eliminated by cutting using a special blade.

**[0010]** While this solution is theoretically adapted to guarantee a more uniform sealing along the entire abutment frame, the actuation thereof is not easy. First and foremost, the application of the elastomeric material in the paste state requires a lot of skill, so as to guarantee deposition regularity. In addition, the final operation of cutting to insert the gasket width-wise is quite sensitive and it can easily cause damages to the gasket; these damages may be immediately visible, thus leading to the need for repeating the gasket application process, or they may be actually invisible (for example, cuts may trigger the detachment of the gasket from the abutment frame); in this case, the gasket could seem whole though without being able to provide the required sealing over time. In addition, it is extremely difficult to obtain a constant width of the gasket by cutting.

**[0011]** Thus, the problem of having, between the fixed box and a mobile door of a showcase, gasket means adapted to guarantee the desired sealing arises.

**[0012]** Thus, the present invention regards a method as defined in claim 1 and a showcase as defined in claim 6. Preferred characteristics are indicated in the dependent claims.

**[0013]** GB 2 268 533 A discloses a door with a sealing gasket assembly between a fixed abutment frame and a mobile abutment frame, wherein the gasket assembly comprises:

- a support, applied to the mobile abutment frame, said support having a rear face applied to the mobile abutment frame and a front face with a central channel delimited by two longitudinal heels;
- a gasket of elastomeric material in the central channel of the support, having constant thickness along the longitudinal extension of the support.

**[0014]** In particular, the invention regards - in a first aspect thereof - a method for applying a sealing gasket assembly to a showcase for preserving and displaying objects in a protected environment, comprising:

- providing said showcase with a box having a fixed abutment frame, a mobile panel which can be closed on said fixed abutment frame through its own mobile abutment frame;
- providing a support with a flat rear face and a front

face with a central channel delimited by two longitudinal heels;

- applying the support with the rear face to one between the fixed framework and the mobile framework;
- extruding in the channel of the support an elastomeric material in the paste state to form a gasket;
- closing the openable panel so as to shape the gasket in the thickness point by point necessary for the showcase;
- allowing the shaped elastomeric material to solidify so as to form the gasket;
- cutting away the solidified elastomeric material exceeding in width, so as to form the gasket.

**[0015]** Due to the support provided with the heels and the central channel, the deposition of the elastomeric material in the paste state is guided so as to reduce the risk of deposition defects that may jeopardise the functional entirety of the gasket.

**[0016]** Preferably, the step of cutting away provides for the use of the heels of the support as a guide for the movement of a blade. This allows to guarantee that the gasket not only has the necessary thickness in every area of the abutment frame, but also a uniform width; this leads to an improved sealing between mobile panel and box. The step of applying the support may provide for applying the support to the mobile abutment frame or to the fixed abutment frame.

**[0017]** Preferably, the elastomeric material is a silicone rubber. This material allows an easy management of the deposition in the paste state and guarantees -once solidified- the formation of a gasket with the elasticity suitable for this purpose.

**[0018]** In a second aspect thereof, the invention regards in particular a showcase for preserving and displaying objects in a protected environment, comprising a box with a fixed abutment frame, a mobile panel which can be closed in a sealing fashion on said fixed abutment frame through its own mobile abutment frame, a sealing gasket assembly between the fixed abutment frame and the mobile abutment frame, wherein the gasket assembly comprises:

- a support, applied to one between the fixed abutment frame and the mobile abutment frame, said support having a rear face applied to the abutment frame and a front face with a central channel delimited by two longitudinal heels;
- a gasket of elastomeric material in the central channel of the support. Preferably, the support is made from a lath, with a flat central portion and two longitudinally extended side portions, bent above the flat central portion, said bent portions forming said two heels.

**[0019]** Thus, this allows to obtain a clear delimitation of the central channel, though without the thickness of

the heels interfering, both when laying and especially when using the showcase.

**[0020]** The gasket has a non-constant thickness along the longitudinal extension of the support, so as to take into account the actual distance between the box and the openable panel in every area of the abutment frames.

**[0021]** Further characteristics and advantages of the invention shall be more apparent from the following description of a preferred embodiment of a showcase according to the invention, provided with reference to the attached drawings, wherein:

- Fig 1 is a perspective view of a showcase according to the invention;
- Fig 2 is a sectional view of a detail of the showcase of Fig 1;
- Fig 3 is an enlargement of the detail of Fig 2;
- Fig 4 is a schematic view of a detail of the showcase of Fig 1.

**[0022]** In the figure, a showcase according to the invention is indicated in its entirety with 10. The showcase 10 comprises a base 20, surmounted by a box 26 made up of fixed panels welded to each other, all indicated with 40, and by an openable lateral panel 50. In the illustrated example, the showcase 10 is substantially parallelepiped-shaped and thus there are four fixed panels 40, three side panels and an upper panel.

**[0023]** The openable panel 50 has chamfered edges, in particular chamfered at 45°, so that the assembly thereof forms a mobile abutment frame 55. Correspondingly, the edges of the fixed panels 40, also chamfered in an oblique fashion at 45°, together with an abutment element provided in the base 20, also inclined in an oblique fashion at 45°, form a fixed abutment frame 45.

**[0024]** The openable panel 50 is supported and guided for the opening and closing movements thereof by opening supports 60, for example hinges, among which only the upper opening support is visible in the drawings (Fig 1).

**[0025]** A sealing gasket assembly 80 is interposed between the fixed abutment frame 45 and the mobile abutment frame 55.

**[0026]** The sealing gasket assembly 80 comprises a support 81, which is applied (preferably by gluing) with its own flat rear face 82 to one between the fixed abutment frame 45 and the mobile abutment frame 55; in the illustrated showcase 10, the support 81 is glued to the mobile abutment frame 55. The support 81 then comprises, on a front face thereof opposite to the rear face 82, a central channel 84 delimited by two longitudinal heels 85.

**[0027]** The support 81, as observable in the Fig 2 and especially 3, is made from a lath provided with a flat central portion and two longitudinally extended side portions and bent above the flat portion; the two bent side portions form the heels 85.

**[0028]** The sealing gasket assembly 80 also comprises a gasket 88 made of elastomeric material, preferably sil-

icone rubber, housed in the central channel 84 of the support 81.

**[0029]** The sealing gasket assembly 80 is obtained and applied to the showcase 10 as follows.

**[0030]** Initially, the showcase 10, with the box 26 having the fixed abutment frame 45, and the mobile panel 50 with its mobile abutment frame 55 is provided.

**[0031]** Then, the support 81 is applied to one between the fixed abutment frame 45 and the mobile abutment frame 55 (the latter, in the illustrated showcase 10), by gluing it with its rear flat face 82 on the edges of the openable panel 50 cut at 45°.

**[0032]** Obviously, the fixed abutment frame 55 has different sides (for example four, in the normal case of a quadrangular openable panel 50), and thus on each of them a support piece 81 shall be applied; the adjacent pieces are then connected to each other, so that their central channels 84 and heels 85 follow each other at the corners.

**[0033]** Subsequently, in the central channel 84 of the support 81 an elastomeric material (preferably silicone rubber) in the paste state is extruded, to form the gasket 88. In this step the elastomeric material shall be slightly more than strictly required for the volume of the gasket 88.

**[0034]** Upon completing the extrusion of the elastomeric material, the openable panel 50 is closed, so as to shape the gasket 88 in the thickness point by point necessary for the showcase 10.

**[0035]** In this context it should be observed that the panels 40 and 50 of the showcase 10 are actually never compulsorily straight; especially they differ from the ideal lines as the distance from the established constraints from the opening supports 60 increases. This is due to the deformability of the materials, especially the bending deformability due to the forces applied in the closing step at the closing supports 60; in Fig 4, this phenomenon is indicated schematically (and emphasised).

**[0036]** In the case wherein the elastomeric material has excessive stickiness, a sheet made of suitable material, with low adherence, may be interposed before the closing of the mobile panel 50 thereon.

**[0037]** After the shaped elastomeric material is left to solidify, the mobile panel 50 is opened and the excess (width-wise) solidified elastomeric material is eliminated by cutting, using a blade, so as to form the gasket 88.

**[0038]** During the cutting, the heels 85 of the support 81 are used as a guide for the movement of a cutting blade, so as to easily confer the gasket 88 a uniform width. On the contrary, the thickness of the gasket 88 shall not be uniform, as emphasised in Fig 4; this lack of thickness uniformity allows the resulting gasket 88 to be perfectly adapted to the specific showcase 10, having the point by point thickness corresponding to the shape that the showcase 10 acquires in closed condition.

**[0039]** In addition, due to the presence of the heels 85 which guide the cutting operation, the risk of erroneous cutting which may damage the gasket 88 is considerably

reduced.

## Claims

1. Method of applying a sealing gasket assembly (80) to a case (11) for preserving and displaying objects in a protected environment, comprising:
  - providing said case (10) with a box (26) having a fixed abutment framework (45), a mobile panel (50) able to close onto said fixed abutment framework (45) through its own mobile abutment framework (55);
  - providing a support (81) with a flat rear face (82) and a front face with a central channel (84) defined by two longitudinal heels (85);
  - applying the support (81) with the rear face (82) to one (55) from the fixed framework and the mobile framework;
  - extruding an elastomeric material in paste state into the channel (84) of the support (81) to form a gasket (88);
  - closing the openable panel (50) so as to shape the gasket (88) into the thickness point by point necessary for the case (10);
  - allowing the shaped elastomeric material to solidify;
  - cutting away the solidified elastomeric material exceeding in width, so as to form the gasket (88).
2. Method according to claim 1, wherein the step of cutting away provides using the heels (85) of the support (81) as a guide for the movement of a blade.
3. Method according to claim 1, wherein the step of applying the support (81) provides applying the support (81) to the mobile abutment framework (55).
4. Method according to claim 1, wherein the step of applying the support (81) provides applying the support (81) to the fixed abutment framework (45).
5. Method according to claim 1, wherein the elastomeric material is a silicone rubber.
6. Case (10) for preserving and displaying objects in a protected environment, comprising a box (26) with a fixed abutment framework (45), an openable panel (50) able to be closed in a sealed fashion onto said fixed abutment framework (45) through a mobile abutment framework (55) thereof, wherein the distance between the panel (50) and the box (26) along the fixed (45) and mobile abutment framework (55) is not constant, a sealing gasket assembly (80) between the fixed abutment framework (45) and the mobile abutment framework (55), wherein the sealing gasket assembly (80) comprises:

- a support (81), applied to one (55) from the fixed abutment framework and the mobile abutment framework, said support (81) having a rear face (82) applied to the abutment framework (55) and a front face with a central channel (84) defined by two longitudinal heels (85);
- a gasket (88) made from elastomeric material in the central channel (84) of the support (81);

**characterised in that**

the gasket (88) has a non-constant thickness along the longitudinal extension of the support (81).

7. Case (10) according to claim 6, wherein the support (81) is made from a lath, with a flat central portion and two side portions extending longitudinally, bent above the flat central portion, said bent portions forming said two heels (85).
8. Case (10) according to claim 6, wherein the elastomeric material is a silicone rubber.
9. Case (10) according to claim 6, wherein the support (81) is applied to the mobile abutment framework (55).
10. Case (10) according to claim 6, wherein the support (81) is applied to the abutment framework (45, 55) through gluing.

**Patentansprüche**

1. Verfahren zum Aufbringen einer abdichtenden Dichtungsanordnung (80) in einer Vitrine (11) zum Aufbewahren und Ausstellen von Objekten in einer geschützten Umgebung, umfassend:
  - Bereitstellen der Vitrine (10) mit einem Kasten (26), der einen festen Widerlagerrahmen (45) aufweist, eine bewegliche Wand (50), die in der Lage ist, auf dem festen Widerlagerrahmen (45) durch ihren eigenen, beweglichen Widerlagerrahmen (55) zu schließen;
  - Bereitstellen einer Auflage (81) mit einer flachen Rückfläche (82) und einer Frontfläche mit einer mittleren Rinne (84), die durch zwei Längsabsätze (85) definiert ist;
  - Aufbringen der Auflage (81) mit der Rückfläche (82) auf einen (55) festen Rahmen bzw. beweglichen Rahmen;
  - Extrudieren eines pastösen elastomeren Materials in die Rinne (84) der Auflage (81), um eine Dichtung (88) zu bilden;
  - Verschließen der zu öffnenden Wand (50) derart, dass die Dichtung (88) in der Dicke geformt wird, die Punkt für Punkt für die Vitrine (10) erforderlich ist;

- Aushärten lassen des geformten elastomeren Materials;
- Beschneiden des die Breite überschreitenden, ausgehärteten elastomeren Materials, um die Dichtung (88) zu bilden.

2. Verfahren nach Anspruch 1, wobei der Schritt des Beschneidens die Verwendung der Absätze (85) der Auflage (81) als Führung beim Bewegen einer Klinge vorsieht.
3. Verfahren nach Anspruch 1, wobei der Schritt des Aufbringens der Auflage (81) das Aufbringen der Auflage (81) auf dem beweglichen Widerlagerrahmen (55) vorsieht.
4. Verfahren nach Anspruch 1, wobei der Schritt des Aufbringens der Auflage (81) das Aufbringen der Auflage (81) auf dem festen Widerlagerrahmen (45) vorsieht.
5. Verfahren nach Anspruch 1, wobei das elastomere Material ein Silikonkautschuk ist.
6. Vitrine (10) zum Aufbewahren und Ausstellen von Objekten in einer geschützten Umgebung, umfassend einen Kasten (26) mit einem festen Widerlagerrahmen (45), eine zu öffnende Wand (50), die in der Lage ist, auf dichte Weise auf dem festen Widerlagerrahmen (45) durch einen beweglichen Widerlagerrahmen (55) hiervon verschlossen zu werden, wobei der Abstand zwischen der Wand (50) und dem Kasten (26) längs des festen (45) und des beweglichen Widerlagerrahmens (55) nicht gleichbleibend ist, eine abdichtende Dichtungsanordnung (80) zwischen dem festen Widerlagerrahmen (45) und dem beweglichen Widerlagerrahmen (55), wobei die abdichtende Dichtungsanordnung (80) Folgendes umfasst:
  - eine Auflage (81), die auf einem (55) festen Widerlagerrahmen bzw. beweglichen Widerlagerrahmen aufgebracht wird, wobei die Auflage (81) eine Rückfläche (82) aufweist, die auf dem Widerlagerrahmen (55) aufgebracht wird, und eine Frontfläche mit einer mittleren Rinne (84), die durch zwei Längsabsätze (85) definiert ist;
  - eine Dichtung (88), die aus elastomerem Material in der mittleren Rinne (84) der Auflage (81) hergestellt ist,

**dadurch gekennzeichnet, dass**

die Dichtung (88) eine nicht konstante Dicke längs der Längenausdehnung der Auflage (81) aufweist.
7. Vitrine (10) nach Anspruch 6, wobei die Auflage (81) aus einer Latte mit einem flachen, mittleren Abschnitt und zwei sich längs erstreckenden Seitenabschnit-

ten hergestellt ist, die oberhalb des flachen, mittleren Abschnitts gebogen sind, wobei die gebogenen Abschnitte die beiden Absätze (85) bilden.

8. Vitrine (10) nach Anspruch 6, wobei das elastomere Material ein Silikonkautschuk ist. 5
9. Vitrine (10) nach Anspruch 6, wobei die Auflage (81) auf dem beweglichen Widerlagerrahmen (55) aufgebracht wird. 10
10. Vitrine (10) nach Anspruch 6, wobei die Auflage (81) mittels Aufkleben auf dem Widerlagerrahmen (45, 55) aufgebracht wird. 15

### Revendications

1. Procédé d'application d'un ensemble de joint d'étanchéité (80) à une vitrine (11) pour préserver et exposer des objets dans un environnement protégé, comprenant :
- la disposition de ladite vitrine (10) avec une boîte (26) ayant un châssis de butée fixe (45), un panneau mobile (50) adapté pour se fermer sur ledit châssis de butée fixe (45) par l'intermédiaire de son propre châssis de butée mobile (55) ; 25
  - la disposition d'un support (81) avec une face arrière plate (82) et une face avant avec un canal central (84) défini par deux talons longitudinaux (85) ; 30
  - l'application du support (81) avec la face arrière (82) à l'un (55) parmi le châssis fixe et le châssis mobile ; 35
  - l'extrusion d'un matériau élastomère à l'état de pâte dans le canal (84) du support (81) pour former un joint (88) ; 40
  - la fermeture du panneau ouvrant (50) de manière à façonner le joint (88) à l'épaisseur nécessaire point par point pour la vitrine (10) ;
  - le fait de laisser solidifier le matériau élastomère façonné ;
  - le découpage du matériau élastomère solidifié dépassant en largeur, de manière à former le joint (88). 45
2. Procédé selon la revendication 1, dans lequel l'étape de découpage prévoit l'utilisation des talons (85) du support (81) comme un guide pour le mouvement d'une lame. 50
3. Procédé selon la revendication 1, dans lequel l'étape d'application du support (81) prévoit l'application du support (81) au châssis de butée mobile (55). 55
4. Procédé selon la revendication 1, dans lequel l'étape

d'application du support (81) prévoit l'application du support (81) au châssis de butée fixe (45).

5. Procédé selon la revendication 1, dans lequel le matériau élastomère est un caoutchouc de silicone.
6. Vitrine (10) pour préserver et exposer des objets dans un environnement protégé, comprenant une boîte (26) avec un châssis de butée fixe (45), un panneau ouvrant (50) adapté pour être fermé d'une manière étanche sur ledit châssis de butée fixe (45) par l'intermédiaire d'un châssis de butée mobile (55) de celle-ci, dans laquelle la distance entre le panneau (50) et la boîte (26) le long du châssis de butée fixe (45) et mobile (55) n'est pas constante, un ensemble de joint d'étanchéité (80) entre le châssis de butée fixe (45) et le châssis de butée mobile (55), dans laquelle l'ensemble de joint d'étanchéité (80) comprend :

- a support (81), appliqué à l'un (55) parmi le châssis de butée fixe et le châssis de butée mobile, ledit support (81) ayant une face arrière (82) appliquée au châssis de butée (55) et une face avant avec un canal central (84) défini par deux talons longitudinaux (85) ;
- un joint (88) réalisé à partir d'un matériau élastomère dans le canal central (84) du support (81) ;

### caractérisée en ce que

le joint (88) a une épaisseur non constante suivant l'extension longitudinale du support (81).

7. Vitrine (10) selon la revendication 6, dans laquelle le support (81) est réalisé à partir d'une latte, avec une portion centrale plate et deux portions latérales s'étendant longitudinalement, repliées au-dessus de la portion centrale plate, lesdites portions repliées formant lesdits deux talons (85). 40
8. Vitrine (10) selon la revendication 6, dans laquelle le matériau élastomère est un caoutchouc de silicone.
9. Vitrine (10) selon la revendication 6, dans laquelle le support (81) est appliqué au châssis de butée mobile (55).
10. Vitrine (10) selon la revendication 6, dans laquelle le support (81) est appliqué au châssis de butée (45, 55) par collage. 55

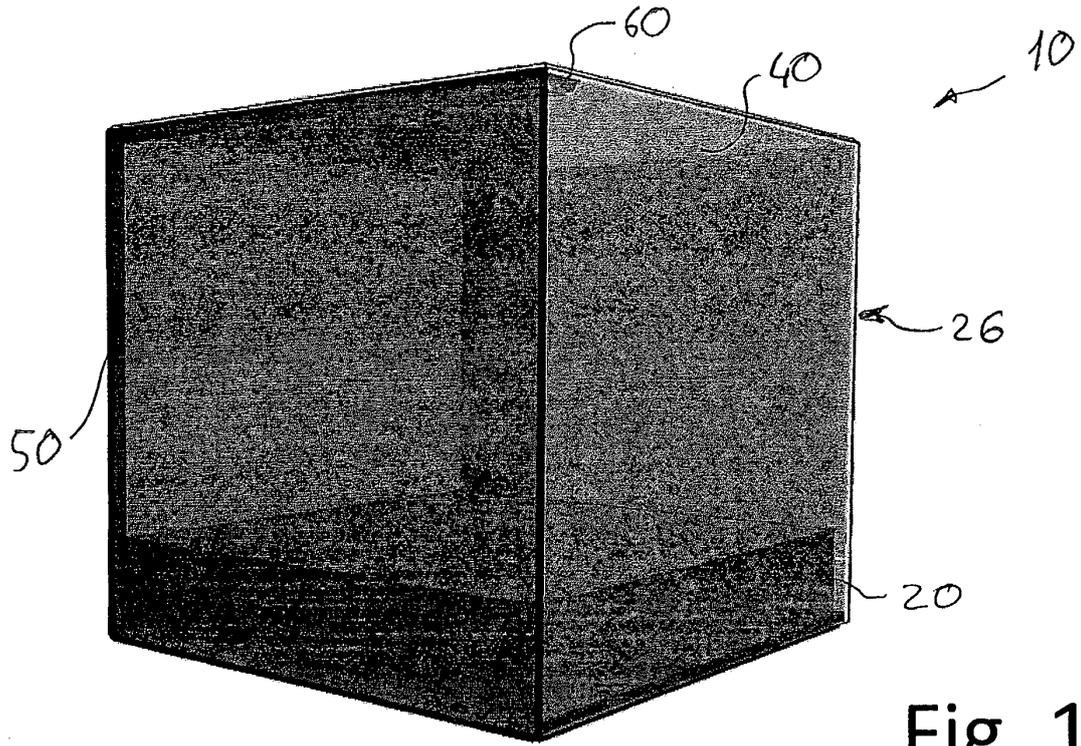


Fig. 1

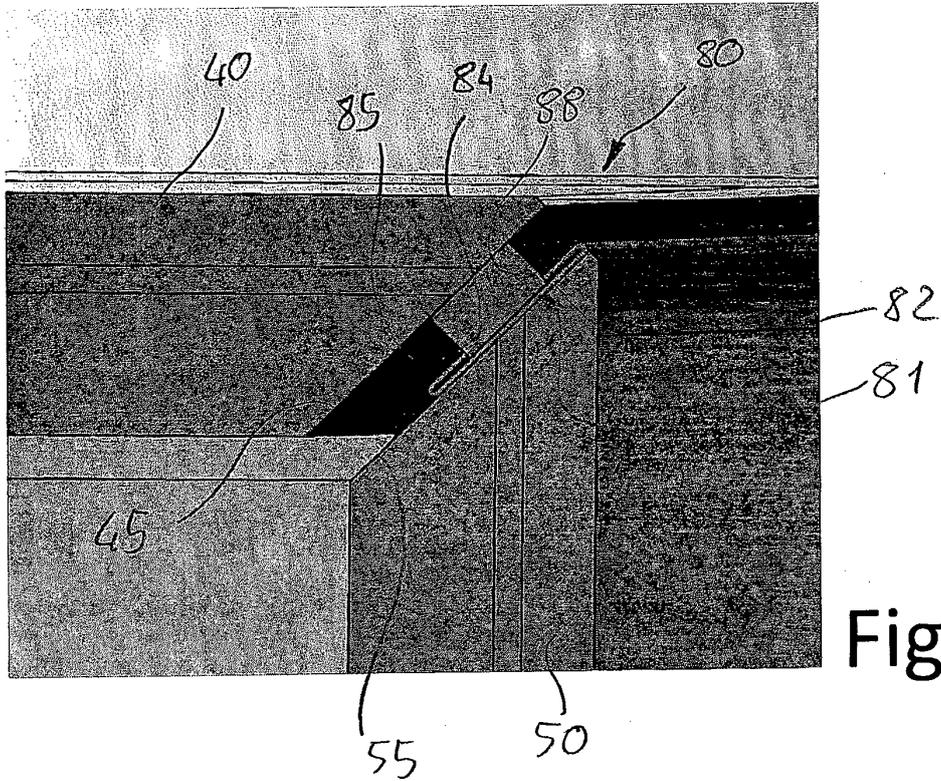


Fig. 2

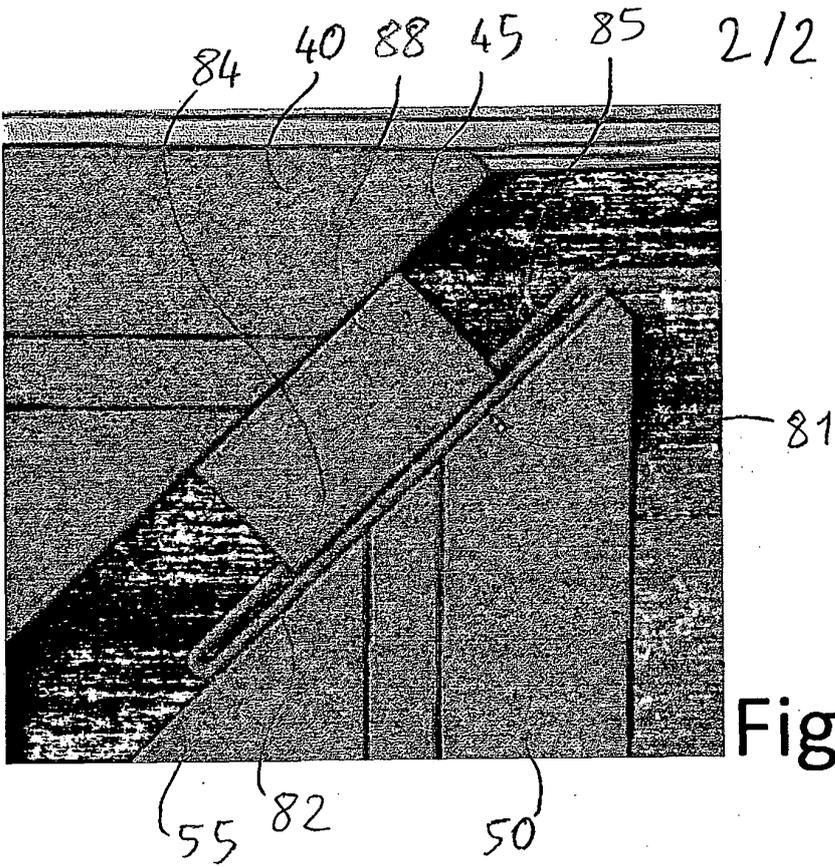
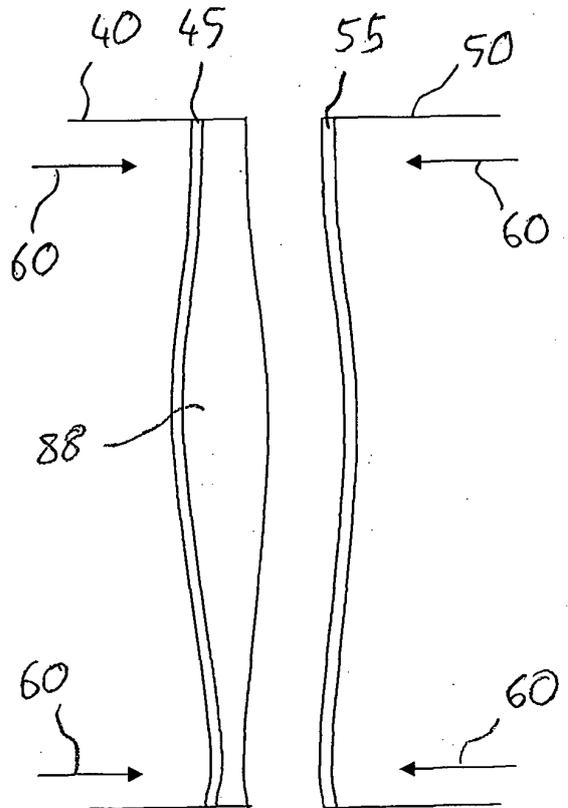


Fig. 4



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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