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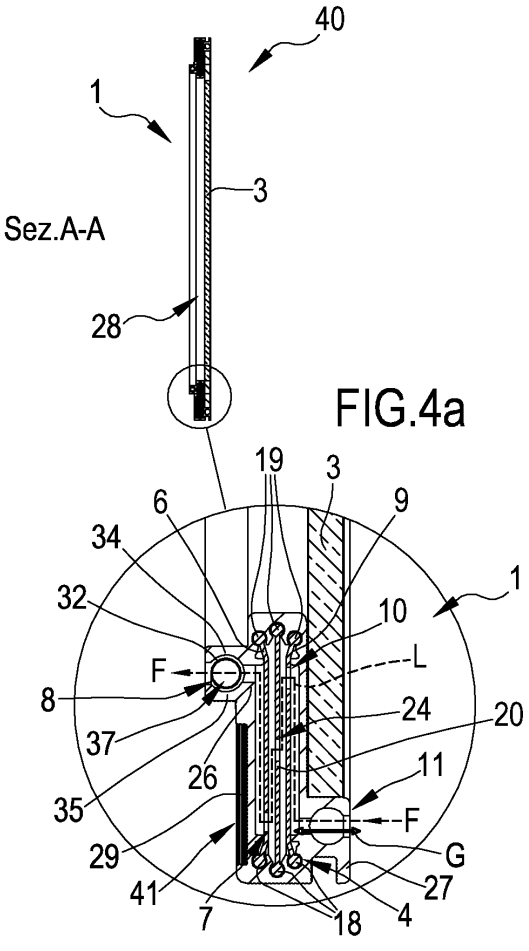
## (54) Perimetrical frame for delimiting compartments, especially for nautical applications, and window comprising such a frame

(57) A perimetrical frame (1) for delimiting compartments, especially for nautical applications, comprising a shaped element (2) suitable to be fixed to a reference structure at the compartment and to support a finishing slab (3) made of transparent material, and sealing means (4), contained into an inner groove (5) made in shaped element (2). In particular, the sealing means (4) comprise a first laminar gasket (6) having a plurality of first through micro-openings (7) and communicating with the outside through a plurality of first through holes (8) made in the inner wall (2a) of the element shaped (2), and a second laminar gasket (9), facing to and spaced apart from the first gasket (6), having a plurality of second through micro-openings (10), staggered with respect to the first through micro-openings (7), and communicating with the outside through a plurality of second through holes (11) made in the outer wall (2b) of the shaped element (2), wherein the first through micro-openings (7) and the second through micro-openings (10) are mutually staggered in such a way as to create a tortuous labyrinth (L) that allows the passage of air and prevents the passage of water.

FIG.4

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## Description

**[0001]** The present invention relates to a perimetrical frame (or matrix) for delimiting compartments, especially for nautical applications, such as pleasure boats, where it is installed to seal compartments properly made in the superstructure, above the upper deck or main deck of the boat.

**[0002]** The invention described herein also relates to a window that includes such a kind of perimetrical delimitation frame which, as it will be seen below, advantageously allows the aeration or ventilation of the inner compartment in which it is installed.

**[0003]** In the following, the present description will be mainly if not exclusively oriented to the nautical circle: this only for exposition convenience, being understood that the inventive concept and the scope of protection underlying the present invention are applicable and valid also in other areas of technique involving the use or installation of perimetrical frames for delimiting compartments, and related windows, for purposes of protection and/or repair from bad weather.

**[0004]** Notoriously, in one or more of the areas of the superstructure, above the upper deck or main deck, boats comprise one or more windows for lighting and/or aerating the internal environment at which they are installed.

**[0005]** Typically and basically, any pattern of these windows of known type includes a perimetrical frame for delimiting a compartment, frame which in turn is composed of a shaped element, suitable to be fixed to a reference structure at the compartment itself, as well as of sealing and tightening means, contained into an inner groove made in the shaped element.

**[0006]** The perimetrical frame assumes, therefore, a classical frame-like shape and has a closed, generally quadrilateral, profile; the inner groove extends along the entire closed path defined by the shaped element or it is made at the corners of the shaped element, where junction occurs, for example by welding, between the linear components (profiles, bars, wireworks and the like) made of metallic material, such as stainless steel, of the shaped element itself. A traditional pattern of the windows of the prior art concerned also comprises a finishing slab (or leaf) made of transparent material, for example crystal, and coupled with the shaped element of the perimetrical frame for delimiting the compartment through junction means, for example, adhesive substances such as silicone.

**[0007]** The known windows so essentially designed are definitely capable of performing the function for which they are provided for, keeping a level of sealing at least sufficient to prevent the entry of water or steam into the internal environment where they are installed.

**[0008]** However, the windows of the prior art, especially for applications in the nautical field, and in particular the perimetrical frames for delimiting compartments belonging to it, are not free from some acknowledged drawbacks.

**[0009]** A first drawback of the perimetrical frames for delimiting compartments for applications or structures in critical, continuous and severe, if not too aggressive and disruptive, contact with the water or aqueous surfaces derives from the fact that they are not able to prevent phenomena of water stagnation and/or creation of humidity inside them.

**[0010]** This situation involves, on one hand, generation of bad smells in the internal environment, on the other hand, occurrence of mist of the finishing slab made of transparent material, with all the disadvantages and inconveniences that follow and that imply the need to perform remedy or maintenance interventions, often hard from the physical point of view, which unfortunately have only temporary and limited effects.

**[0011]** Starting, therefore, from the acknowledgement of the aforementioned drawbacks of the prior art, the present invention intends to give accomplished and effective remedy to them.

**[0012]** In particular, primary purpose of the invention is to provide a perimetrical frame for delimiting compartments, especially for nautical applications, which avoids or at least drastically reduces compared to the known technique phenomena of moisture or even minimal stagnation of water.

**[0013]** Within said purpose, it is a first task of the present invention to design a perimetrical frame for delimiting compartments, especially for nautical applications, which averts or significantly limits with respect to the prior art generation of bad smells which could expand in the internal environment frequented or accessible by people.

**[0014]** It is a second task of the invention to realize a perimetrical frame for delimiting compartments, especially for nautical applications, which, compared to equivalent perimetrical frames of known type, reduces appearance of harassing and undesired phenomena of mist of the finishing slab made of transparent material.

**[0015]** It is another task of the present invention to develop a perimetrical frame for delimiting compartments which eliminates, or at least considerably reduces compared to the current state of the art, the frequency of those sanitary maintenance interventions, such as the manual cleaning of the finishing slab (or leaf)and opening of the finishing slab itself in order to ventilate the compartment: these interventions, as mentioned, have only the effect of improving the practical conditions for a limited time and which, however, are not always technically possible, especially in fixed windows in the closing position of the compartment. It is consequently a further task of the invention to prevent, or strongly reduce compared to the prior art, physical efforts to be performed by any user in order to keep a window in a proper and correct operating condition.

**[0016]** It is a last but not least purpose of the present invention to make available a perimetrical frame for delimiting compartments, especially for nautical applica-

tions, which, while achieving the purposes and by carrying out the above tasks, is simple to be manufactured. Said purposes are achieved by means of a perimetrical frame for delimiting compartments, especially for nautical applications, according to claim 1 attached herewith, as hereinafter referred for the sake of brevity of exposure.

**[0017]** Further technical features of detail of the perimetrical frame for delimiting compartments of the invention are given in the corresponding dependent claims.

**[0018]** Also a window, integral part of the present invention, according to the attached claim 16 contributes to achieve the aforesaid purposes, as hereinafter referred again for the sake of brevity.

**[0019]** The aforementioned claims, specifically and concretely defined in the following, are considered an integral part of the present description.

**[0020]** Advantageously, the perimetrical frame of the invention, used to delimit compartments, especially for nautical applications, allows to avoid or at least significantly reduce compared to the prior art onset of phenomena of moisture or even minimal stagnation of water inside of it.

**[0021]** This is due to the presence of through micro-openings made in the laminar gaskets of the sealing means, through holes made in the inner wall and outer wall of the shaped element, with which the through micro-openings communicate, as well as to the tortuous labyrinth for air created by the plurality of these through micro-openings and through holes.

**[0022]** Indeed, the first through micro- openings and the second through micro- openings, staggered or non-coaxial with respect to the first through micro- openings, let air pass through but not water which, being forced to cover the same tortuous path of the air within the inner groove of the shaped element, largely if not completely evaporates.

**[0023]** At the entry into the shaped element of the perimetrical frame of the invention, the water finds a solid and continuous portion of the second laminar gasket that forces it to make a vertical path (ascent or descent, in the horizontal opposite sections of the shaped element of the perimetrical frame) or a horizontal path (towards the right or towards the left, in the vertical opposite sections of the shaped element): the second laminar gasket causes the evaporation of water, as a result of contact with the air, or at least constitutes a barrier to its propagation inside the shaped element.

**[0024]** As a consequence of what has just been said, still advantageously, the perimetrical frame for delimiting compartments of the invention averts or significantly limits compared to the prior art formation of bad smells stale due to also minimum stagnation of water that could adversely expand in the internal environment accessible by people.

**[0025]** Equally advantageously, the always undesirable thermal phenomena of mist of the finishing slab (or leaf) made of transparent material are largely limited with respect to the perimetrical known perimetrical frames, if not eliminated at all, by the perimetrical frame for delimiting compartments of the invention.

**[0026]** In advantageous manner, furthermore, the perimetrical frame and window of the invention allow to eliminate or reduce the frequency of execution of those saneness interventions, such as the manual cleaning of the finishing slab (or leaf) or the temporary opening of the finishing slab itself in order to favour aeration, which are less methodical, scientific and regular - being left to the user's experience and sensitivity - and above all have the sole effect of temporarily improve environmental conditions.

**[0027]** Not to be neglected then that in the windows where, by construction, the finishing slab (or leaf) remains fixed in the closing position of the compartment, these maintenance or saneness interventions are technically very laborious or often almost impossible to be performed, so that the advantages brought by the current invention can be even more understood.

**[0028]** The user must thus make minor physical effort than in the prior art to keep the window in a proper and functional operating configuration.

**[0029]** Further features and details of the invention will appear to a greater extent from the detailed description which follows, relating to a preferred embodiment of the perimetrical frame for delimiting compartments and the window which are here claimed by exclusive, given as an indicative and illustrative, but not limitative, way with reference to the accompanying drawings, in which:

- figure 1 is a truncated assonometric view of the perimetrical frame and window of the invention;
- figure 2 is a truncated and cross-sectioned assonometric view of the perimetrical frame and window of the invention;
- figure 3 is a front view, externally visible in application conditions, of the perimetrical frame and window of figures 1 and 2;
- figure 4 is the view of figure 3 according to the cutting plane A-A;
- figure 4a is an enlarged view of a constructive detail of figure 4;
- figure 5 is the view of figure 3 according to the cutting plane B-B;
- figure 5a is an enlarged view of a constructive detail of figure 5;
- figure 6 is a cross-sectional view of the perimetrical frame of figure 1 and 2;
- figure 7 is a first constructive detail of the perimetrical frame of figure 3;
- figure 8 is a second constructive detail of the perimetrical frame of figure 3;
- figure 9 is a third construction detail of the perimetrical frame of figure 3;
- figure 10 is a fourth constructive detail of the perimetrical frame of figure 3.

**[0030]** The perimetrical frame for delimiting compart-

ments, especially for nautical applications, object of the invention, is illustrated in figures 1 and 2, where it is globally numbered with 1. As it can be seen, the perimetrical frame 1 includes:

- a shaped element 2 suitable for being fixed to a reference structure, such as the upper deck or main deck of a boat, at the compartment and for supporting a finishing slab3 made of transparent material, such as crystal;
- sealing means, overall indicated with 4, contained into an inner groove 5 made in the entire perimeter of the shaped element 2.

**[0031]** In accordance with the primary feature of the invention, the sealing means 4 comprise:

- a first laminar gasket 6 having a plurality of first through micro-openings, fully visible in figure 8 where they're indicated with 7, and communicating with the outside through a series of first through holes 8 made in the entire inner wall 2a of the shaped element 2;
- a second laminar gasket 9, facing to and spaced apart from the first gasket 6, having a plurality of second through micro-openings, fully visible in figure 9 where they're indicated with 10 and staggered with respect to the first through micro-openings 7, and communicating with the outside through a plurality of second through holes 11 made in the entire outer wall 2b of the shaped element 2.

**[0032]** More properly, the first through micro-openings 7 and second through micro-openings 10 are mutually staggered so as to create a tortuous labyrinth L that allows the passage of air but prevents the passage of water.

**[0033]** In addition, as it is well derived from the same figures 8 and 9, the first through micro-openings 7 and the second through micro-openings 10 are preferably uniformly distributed along the entire inner perimeter respectively of the first laminar gasket 6 and second laminar gasket 9.

**[0034]** Moreover, always by preferred but not binding title, the first through micro- openings 7 of the first gasket 6 are aligned each other, as well as the second through micro- openings 10 of the second gasket 9.

**[0035]** In properly advantageous way, the through micro-openings 7, 10 of the laminar gaskets 6, 9 are also staggered with respect to the through holes 8, 11 of the inner wall 2a and outer wall 2b of the shaped element 2 in such a manner that each of the laminar gaskets 6, 9 conveniently faces the through holes 8, 11 of the shaped element 2 by an inner thickened portion, as clearly shown by figures 4a and 5a.

**[0036]** Figures 1 and 2, but with greater detail the enlargements of figures 4a and 5a and the figure 6, show that the laminar gaskets 6, 9, made for example of rubber, are properly and preferably spaced apart from the inner faces 2c, 2d opposite each other delimiting the inner groove 5 of the shaped element 2 in such a way as to divide the inner groove 5 itself in three interstitial channels 12, 13, 14.

**[0037]** More in detail, the first interstitial channel 12 is disposed between the laminar gaskets 6, 9, while the second interstitial channel 13 is disposed between the first gasket 6 and the inner face 2c of the inner wall 2a of the shaped element 2 and the third interstitial channel 14 is disposed between the second gasket 9 and the inner face 2d of the outer wall 2b of the shaped element 2.

**[0038]** Each of the laminar gaskets 6, 9 is stably coupled with the shaped element 2, within the inner groove 5, by means of interlocking means, collectively indicated with 15.

**[0039]** Preferably but not necessarily, the interlocking means 15 comprise:

- a pair of shaped recesses 16, 17, clearly visible in figure 7, having an open profile so as to communicate with the inner groove 5 and made one for each of the inner surfaces 2e, 2f opposite each other which, together with the aforementioned inner faces 2c, 2d, delimit the inner groove 5 of the shaped element 2;
- a pair of counter-shaped protuberances 18, 19 arranged at the side edges 6a, 6b and 9a, 9b opposite each other of each of the laminar gaskets 6, 9 and engaged into the respective shaped recesses 16, 17.

**[0040]** According to the preferred embodiment described herein of the invention, the sealing means 4 include also a third laminar gasket 20, interposed between the first laminar gasket 6 and second laminar gasket 9 so as to divide the first interstitial channel 12 of the inner groove 5 into a pair of central interstitial channels 21, 22.

**[0041]** Even the third laminar gasket 20, visible by its own in figure 10, is firmly coupled with the shaped element 2, inside the inner groove 5, through interlocking means, generally indicated with 23, equivalent to those ones just described and indicated with 15.

**[0042]** The third laminar gasket 20, also made for example of rubber, suitably presents a plurality of third through micro-openings 24, staggered with respect to the first through micro-openings 7 and second micro-through apertures 10 in such a way as to increase the tortuous labyrinth L of the air passage.

**[0043]** As far as the shaped element 2 is concerned, figures 6 and 7 highlight that, in preferred but not exclusive manner, it presents in cross section a substantially Z-shaped profile, being composed of a central portion 25, in which the inner groove 5 is properly made, and two abutment teeth 26, 27 symmetrically and inversely opposite one another, projecting laterally for the entire perimeter of the central portion 25.

**[0044]** In particular, the first abutment tooth 26 is provided with a front surface 26a in which the first through holes 8 communicating with the inner groove 5 are made,

while the second abutment tooth 27 is provided with a front surface 27a in which the second through holes 11, always communicating with the inner groove 5, are made.

**[0045]** Figures 3-5 show that the shaped element 2, made for example of light alloy steel, presents in front view a classic closed profile (rectangular in shape in this case) and defines a central through hole 28 which partially accommodates the finishing slab 3.

**[0046]** In the figures mentioned so far, and in particular in figures 6 and 7, it is observed that the shaped element 2 presents in the inner wall 2a a first flat surface 29 side-by-side to one of the abutment teeth 26, 27 and suitable to be coupled with a predefined portion of the reference structure concerned, surrounding the compartment, trough junction means, not represented and of the type known per se to the person skilled in the field of boating, such as for example silicone.

**[0047]** In the outer wall 2b, the shaped element 2 presents a second flat surface 30, side-by-side to another of the abutment teeth 26, 27 and suitable to be coupled with a peripheral portion of the finishing slab 3 through junction means, yet not represented and preferably of the same type of those ones just mentioned in relation to the first flat surface 29.

**[0048]** It should be observed that, purely by way of indicative and illustrative example, the flat surfaces 29 and 30 of the shaped element 2 comprise, in the specific case, a series of seal knurls, ribs, indentations or serrations 41 which have the function of increasing the stability of the coupling of the shaped element 2 itself with the reference structure, on one hand, and with the finishing slab 3 on the other.

**[0049]** In advantageous but not binding way for the purposes of the invention described herein, the shaped element 2 comprises gaseous flow (for example, ventilation air) stop means, whose overall reference numeral is 31 and associated with the outer wall 2b of the shaped element 2 itself.

**[0050]** More specifically, the gaseous flow stop means 31 preferably include:

- four elastically yielding tubes 32, visible in figures from 1 to 5b, each of which housed in an open profile linear seat 33 made in the entire longitudinal development portion of the first abutment tooth 26 (which, as said, develops for the entire perimeter of the center frame 25, in the example of the preferred embodiment described herein) and delimited by two arched wings 34, 35 facing and opposite each other;
- pumping means, visible in figure 5 where they are indicated as a whole with 36, coupled with the inner wall 2b of the shaped element 2 and suitable to be driven by control means for inflating air into the inner chamber 37 of the elastically yielding tubes 32, placing the outer surface 32a of the elastically yielding tubes close to the concave surface 34a, 35a of the arched wings 34, 35, and thus blocking the passage of air between the external environment and internal environment of the perimetrical frame 1.

**[0051]** More precisely, in applicative and operative conditions, the abutment tooth 26 which presents the linear seat 33 faces the inside of the compartment delimited by the perimetrical frame 1 and is arranged laterally close to the reference structure (the upper deck or main bridge of the boat, in this case).

**[0052]** Moreover, the elastically yielding tube 32, made for example of plastic material, partially faces outwardly and, preferably, occupies the entire longitudinal portion of the open profile linear seat 33 of the first abutment tooth 26.

**[0053]** It is understood that in other embodiments of the invention, not shown in the drawings that follow, the gaseous flow stop means could include a number of elastically yielding tubes different than four, such a number could vary depending on the choices and the construction needs starting from one.

**[0054]** It should be noted that the pumping means 36 comprise in this case, by way of example only, a manual pump 38, while remaining understood that in other alternative embodiments of the invention, not illustrated in the attached drawings, the pumping means could be of other type suitable for the type of application and commonly available to the skilled in the art.

**[0055]** In addition, it should be noted that the control means which actuate the pumping means 36 are not visible in the appended figures and they may be either manual or automatic, depending on requirements and design choices.

**[0056]** Suitably but not necessarily, the shaped element 2 comprises a vent valve 39, operatively connected with the pneumatic circuit of connection among each of the elastically yielding tubes 32 and pumping means 36, which is actuated to deflate the elastically yielding tubes from the air previously accumulated in them and restore the air passage between the external environment and internal environment of the perimetrical frame 1.

**[0057]** It is understood that other optional embodiments of the invention, here not accompanied by drawings of reference, the shaped element could include a single vent valve per one or more of the elastically yielding tubes of the gaseous flow stop means, which is operatively connected with.

**[0058]** As already mentioned, object of the present invention is also a window, especially for nautical applications, visible in truncated and partially form in figures 1 and 2, where it is globally indicated with 40, and comprising:

- the perimetrical frame 1 for delimiting compartments which includes, in turn:
  - the shaped element 2 suitable to be fixed to a reference structure (such as the upper deck of a boat hull) at the compartment;
  - the sealing means 4, contained into the inner

groove 5 made in the shaped element 2;

- a finishing slab 3 made of transparent material, such as for example crystal, and coupled with the shaped element 2 of the perimetrical frame 1.

**[0059]** According to the invention, the sealing means 4 of the perimetrical frame 1 of the window are of the type previously described and essentially comprise the technical features contained in the attached claim 1.

**[0060]** Operatively, the advantageous tortuous labyrinth L flow in which air is forced through the perimetrical frame 1 for delimiting compartments of the invention is indicated in figure 4a by the dashed arrow F; the second gasket 9 instead form a stop barrier for the incoming water which is partly conveyed upwardly in the third interstitial channel 14 but, mostly, for the most part, is rejected to the outside through those same second through holes 11 through which it come in (according to what indicated by the enlarged arrow G in figure 4a), without thereby further penetrate into the inner groove 5 of the shaped element 2, with the evident and already mentioned benefits derived therefrom.

**[0061]** In function of the foregoing, it is understood, therefore, that the perimetrical frame for delimiting compartments, especially for nautical applications, of the present invention achieves the purposes and realizes the advantages already mentioned.

**[0062]** Upon implementation, changes could be made to the perimetrical frame of the invention consisting, for example, in an inner groove formed only in a linear portion of the perimeter of the shaped element and not to the entire perimeter, as previously indicated in relation to preferred embodiment described.

**[0063]** As a direct result of what has been stated in the previous paragraph, it turns out that:

- the first and second through micro-openings will be evenly distributed along at least a portion of the inner perimeter of the first and second laminar gasket, respectively;
- the two abutment teeth symmetrically and inversely opposite each other protrude laterally from the central portion of the shaped element for at least the aforesaid linear portion which is made the inner groove along;
- the open profile linear seat which houses the elastically yielding tube of the gaseous flow stop means will affect the entire longitudinal portion of the first abutment tooth and, in return, the aforesaid linear portion of their constructive development.

**[0064]** Beyond this, other embodiments, not shown in the drawings that follow, of the herein claimed window, especially for nautical applications, could exist in which the latter could comprise more than one finishing slab made of transparent material and coupled with the shaped element of the perimetrical frame, which does not affect the advantage brought by the present invention.

**[0065]** In addition, in further alternative embodiments of the window of the invention, not yet represented in the appended drawings, the finishing slab made of transparent material could be totally contained into the overall dimensions defined by the perimetrical frame.

**[0066]** It also stresses that the perimetrical frame for delimiting compartments and the window of the invention could be applied, through the provision of appropriate design features, even to the wall (emerged part of the sides) of the hull of a boat.

**[0067]** It is, finally, clear that several other changes could be made to the perimetrical frame and window concerned, without departing from the principle of novelty intrinsic in the inventive idea expressed herein, as it is clear that, in the practical implementation of the invention, materials, shapes and sizes of the illustrated details could be changed, as needed, and replaced with others technically equivalent.

**[0068]** Where the constructive features and techniques mentioned in the following claims are followed by reference numbers or signs, those reference signs have been introduced with the sole objective of increasing the intelligibility of the claims themselves and therefore they have no limiting effect on the interpretation of each element identified, by way of example only, by these reference signs.

## Claims

**1.** Perimetrical frame (1) for delimiting compartments, especially for nautical applications, comprising:

- a shaped element (2) suitable to be fixed to a reference structure at said compartment and to support a finishing slab (3) made of transparent material;
- sealing means (4), contained into an inner groove (5) made in at least one linear section of the perimeter of said shaped element (2),

**characterized in that** said sealing means (4) comprise:

- a first laminar gasket (6) having a plurality of first through micro-openings (7) and communicating with the outside through a plurality of first through holes (8) made in at least a portion of the inner wall (2a) of said element shaped (2);
- a second laminar gasket (9), spaced apart from said first gasket (6), having a plurality of second through micro-openings (10), staggered with respect to said first through micro-openings (7), communicating with the outside through a plurality of second through holes (11) made in at least a portion of the outer wall (2b) of said

shaped element (2),

wherein said first through micro-openings (7) and said second through micro-openings (10) are mutually staggered in such a way as to create a tortuous labyrinth (L) that allows the passage of air and prevents the passage of water.

**2.** Frame (1) according to claim 1) **characterized in that** said first and second through micro-openings (7, 10) are uniformly distributed along at least a portion of the inner perimeter of said first and second laminar gasket (6, 9), respectively.

**3.** Frame (1) according to claim 1) or 2) **characterized in that** said first through micro-openings (7) of said first gasket (6) are aligned each other and said second through micro-openings (10) of said second gasket (9) are aligned each other.

**4.** Frame (1) according to any of the preceding claims **characterized in that** said through micro-openings (7, 10) of said laminar gaskets (6, 9) are staggered with respect to said through holes (8, 11) of said inner wall ( 2a) and said outer wall (2b) of said shaped element (2) in such a way that each of said laminar gaskets (6, 9) faces said through holes (8, 11) of said shaped element (2) by an inner thickened portion.

**5.** Frame (1) according to any of the preceding claims **characterized in that** said laminar gaskets (6, 9) are spaced apart from the inner faces (2c, 2d) opposite each other delimiting said inner groove (5) of said shaped element (2) so as to divide said inner groove (5) into three interstitial channels (12, 13, 14), a first of which disposed between said laminar gaskets (6, 9), a second of which disposed between said first gasket (6) and the inner face of said inner wall (2a) of said shaped element (2) and a third of which disposed between said second gasket (9) and the inner face of said outer wall (2b) of said shaped element (2).

**6.** Frame (1) according to any of the preceding claims **characterized in that** each of said laminar gaskets (6, 9) is firmly coupled with said shaped element (2), within said inner groove (5), through interlocking means (15).

**7.** Frame (1) according to claim 6), **characterized in that** said interlocking means (15) include:

- a pair of shaped recesses (16, 17), having an open profile so as to communicate with said inner groove (5) and made one for each of the inner surfaces (2e, 2f) opposite each other which, together with said inner faces (2c, 2d), delimit said inner groove (5) of said shaped element (2);
- a pair of counter-shaped protuberances (18, 19) arranged at the side edges (6a, 6b, 9a, 9b) opposite each other of each of said laminar gaskets (6, 9) and engaged into said shaped recesses (16 , 17).

**8.** Frame (1) according to any of the claims from 4) to 7) **characterized in that** said sealing means (4) include a third laminar gasket (20), interposed between said first laminar gasket (6) and said second laminar gasket ( 9), so as to divide said first interstitial channel (12) of said inner grove (5) into a pair of central interstitial channels (21, 22), and firmly coupled with said shaped element (2), inside said inner groove (5), through interlocking means (23).

**9.** Frame (1) according to claim 8) **characterized in that** said third laminar gasket (20) has a plurality of third through micro-openings (24), staggered with respect to said first through micro-openings (7) and to said second through micro-openings (10) in such a way as to increase the tortuosity of said tortuous labyrinth (L) of the air passage.

**10.** Frame (1) according to any of the preceding claims **characterized in that** said shaped element (2) presents in cross section a substantially Z-shaped profile being composed of a central portion (25), in which said inner groove (5) is made, and two abutment teeth (26, 27) symmetrically and inversely opposite each other, projecting laterally from said central portion (25) for at least said linear portion, each of which is provided with a front surface (26a, 27a) in which said first through holes (8) or said second through holes (11) communicating with said inner groove (5) are made.

**11.** Frame (1) according to claim 10) **characterized in that** said shaped element (2) presents:

- in said inner wall (2a), a first flat surface (29) side-by-side to one of said abutment teeth (26, 27) and suitable to be coupled through junction means with a predefined portion of said reference structure surrounding said compartment;
- in said outer wall (2b), a second flat surface (30), side-by-side to another of said abutment teeth (26, 27) and suitable to be coupled through junction means with a peripheral portion of said finishing slab (3).

**12.** Frame (1) according to any of the preceding claims **characterized in that** said shaped element (2) comprises gaseous flow stop means (31) associated with said outer wall (2b) of said shaped element (2).

**13.** Frame (1) according to claim 12) **characterized in**

**that** said gaseous flow stop means (31) include:

- at least one elastically yielding tube (32), housed in an open profile linear seat (33) made in the entire longitudinal portion of one of said abutment teeth (26, 27) and delimited by two arched wings (34, 35) facing and opposite each other;
- pumping means (36), coupled with said inner wall (2a) of said shaped element (2), suitable to be driven by control means for inflating air into the inner chamber (37) of said elastically yielding tube (32), placing the outer surface (32a) of said elastically yielding tube (32) close to the concave surface (34a, 35a) of said arched wings (34, 35), and blocking the air passage between the external environment and internal environment.

**14.** Frame (1) according to claim 13) **characterized in that** said elastically yielding tube (32) partially faces outwardly and occupies the entire longitudinal portion of said open profile linear seat (33) of said first shaped tooth (26).

**15.** Frame (1) according to claim 13) or 14) **characterized in that** said shaped element (2) comprises a vent valve (39), operatively connected with the pneumatic circuit of connection between said elastically yielding tube (32) and said pumping means (36), suitable to be actuated to deflate said elastically yielding tube (32) and restore the air passage between the external environment and internal environment.

**16.** Window (40), especially for nautical applications, comprising:

- a perimetrical frame (1) for delimiting compartments which includes:
  - a shaped element (2) suitable to be fixed to a reference structure at said compartment;
  - sealing means (4), contained into at least a portion of an inner groove (5) made in said shaped element (2);
- at least one finishing slab (3) made of transparent material and coupled with said shaped element (2) of said perimetrical frame (1),

**characterized in that** said sealing means (4) comprise:

- a first laminar gasket (6) having a plurality of first through micro-openings (7) and communicating with the outside through a plurality of first through holes (8) made in at least a portion of the inner wall (2a) of said element shaped (2);
- a second laminar gasket (9), spaced apart from said first gasket (6), having a plurality of second through micro-openings (10), staggered with respect to said first through micro-openings (7), communicating with the outside through a plurality of second through holes (11) made in at least a portion of the outer wall (2b) of said shaped element (2),

wherein said first through micro-openings (7) and said second through micro-openings (10) are mutually staggered in such a way as to create a tortuous labyrinth (L) that allows the passage of air and prevents the passage of water.

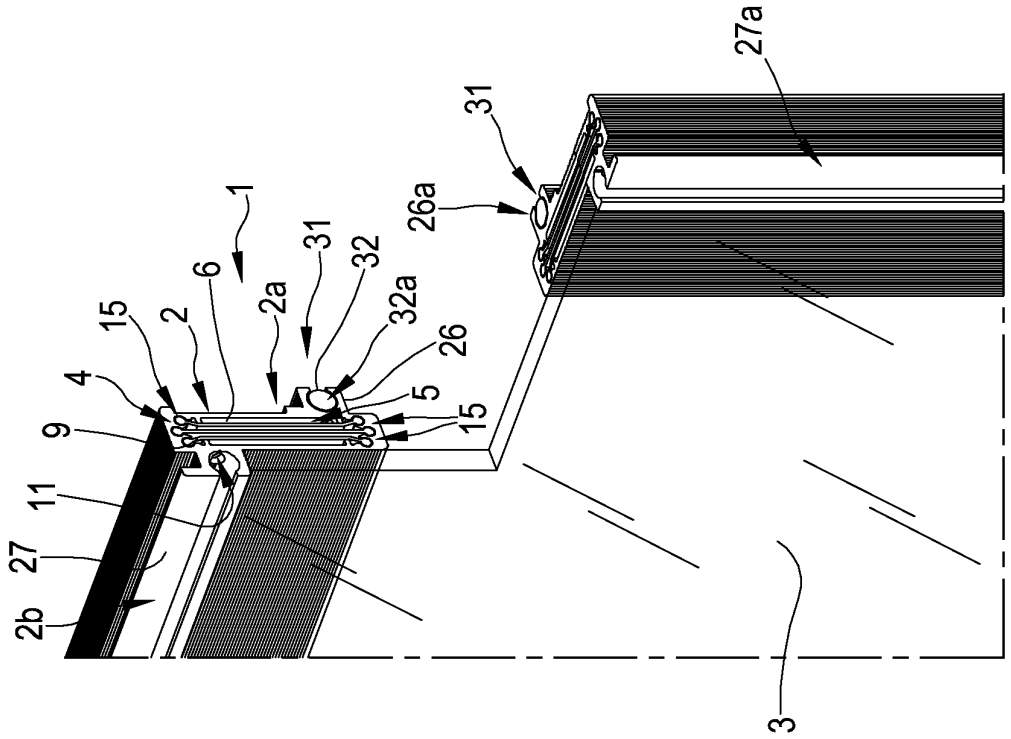

27a
31
26a
1
6
31
32
2a
32a
15
2
26
4
5
15
9
11
27
2b
3

FIG.2

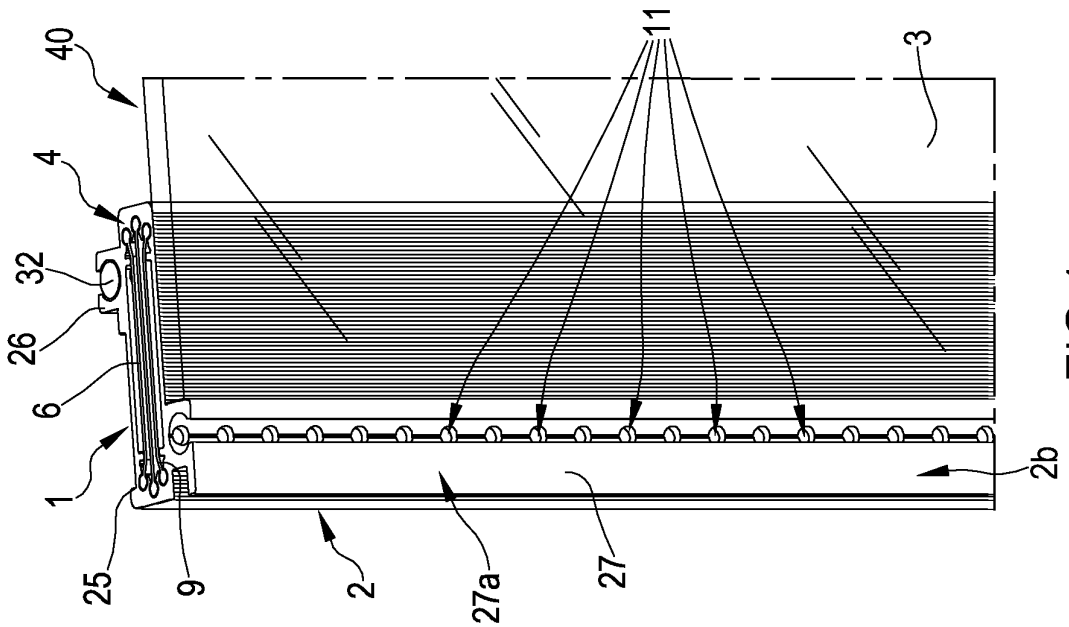

40
11
3
4
32
26
6
1
2b
25
9
2
27a
27

FIG.1

FIG.3

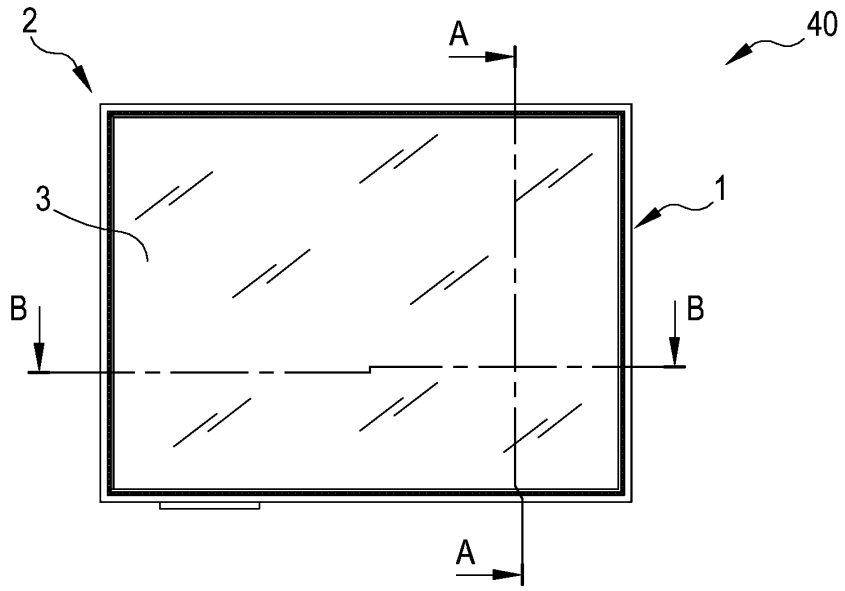



FIG.4

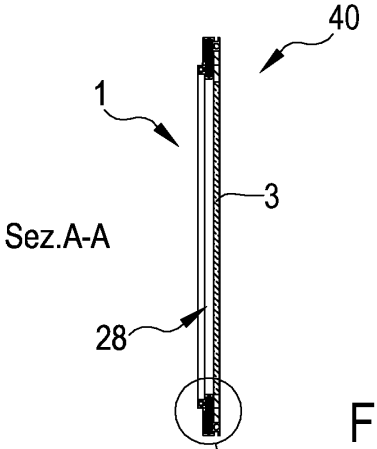



FIG.4a

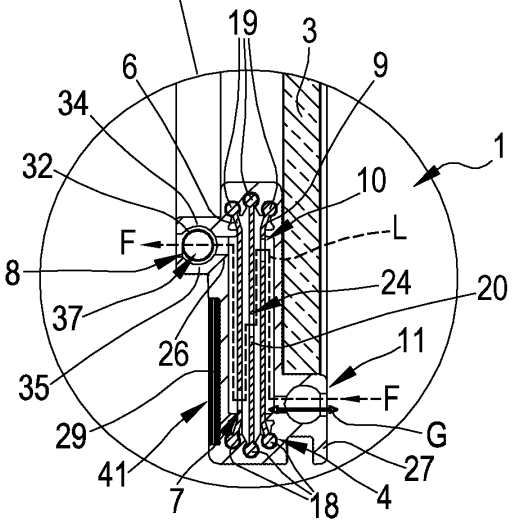
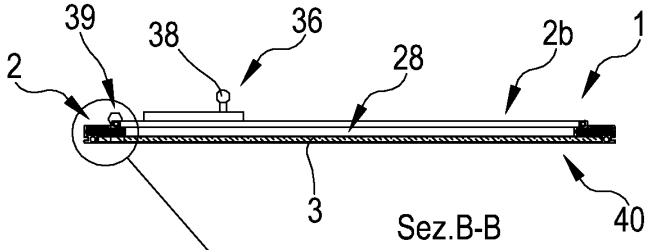



FIG.5



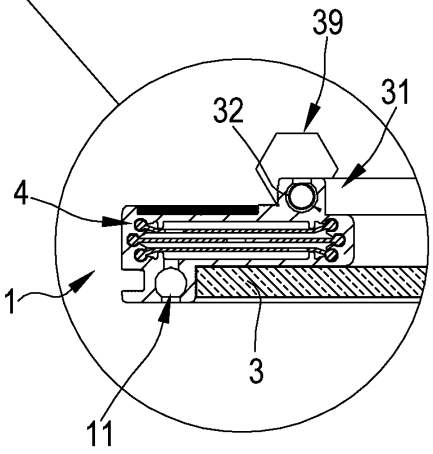




FIG.5a

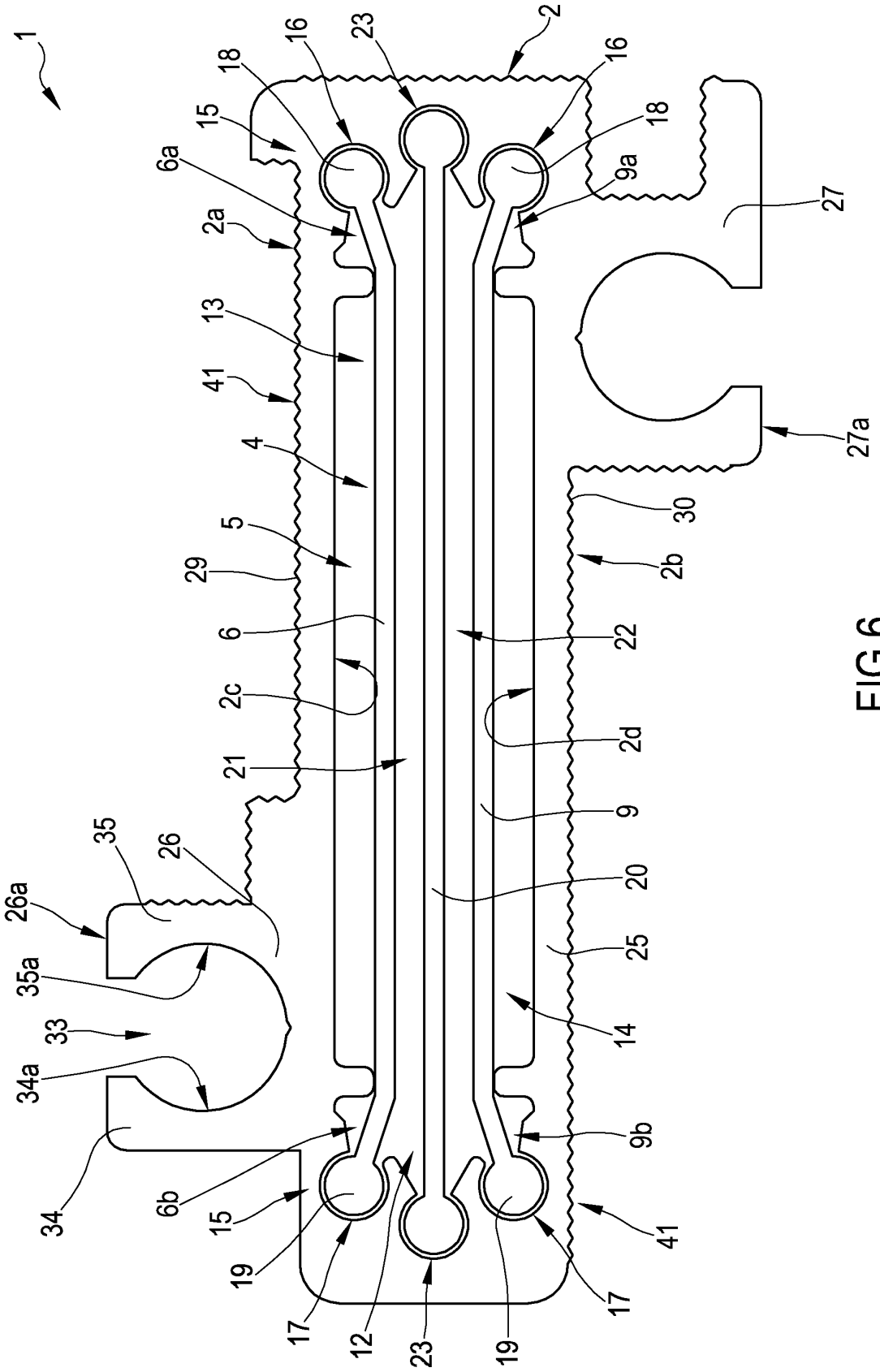

1
2
16
23
18
15
6a
2a
13
41
4
5
29
6
2c
21
35
26
26a
35a
33
34a
34
6b
15
19
17
12
23
19
17
41
9b
14
25
20
9
2d
22
2b
30
27a
27
9a
18
16

FIG.6

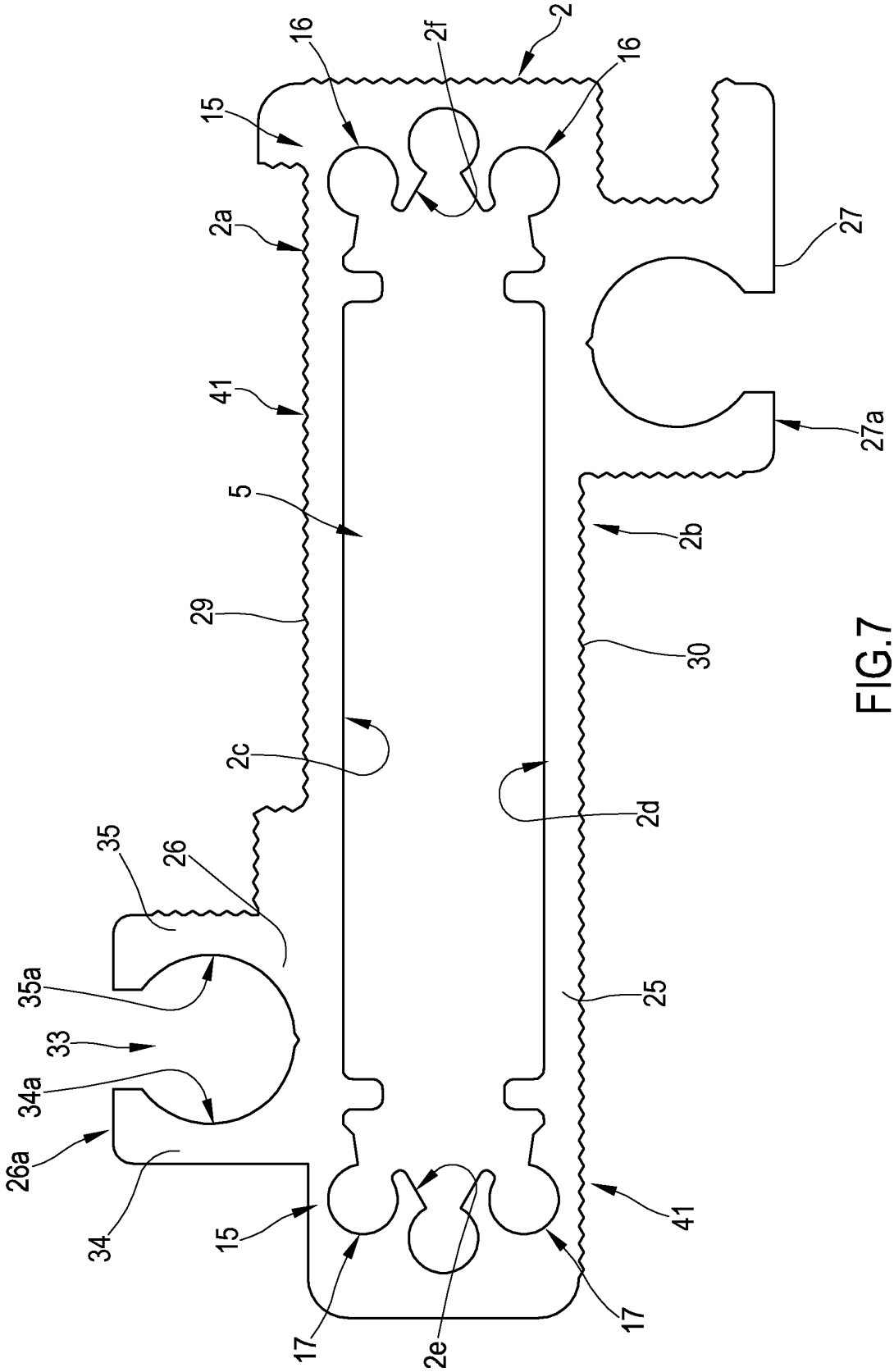

2
2f
16
16
15
2a
27
41
27a
5
2b
29
30
2c
2d
35
26
35a
25
33
34a
26a
34
15
41
17
2e
17

FIG.7

FIG.8

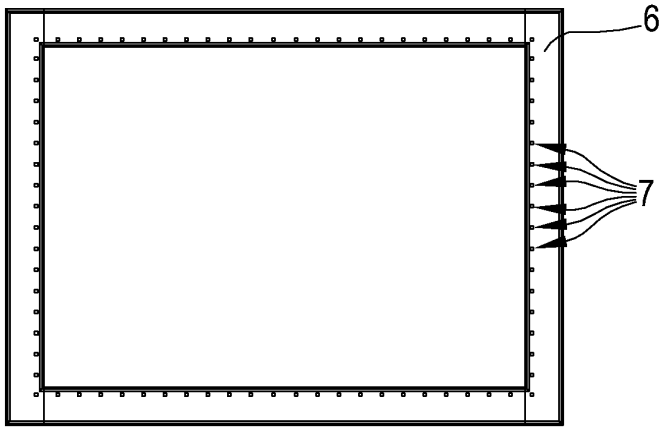
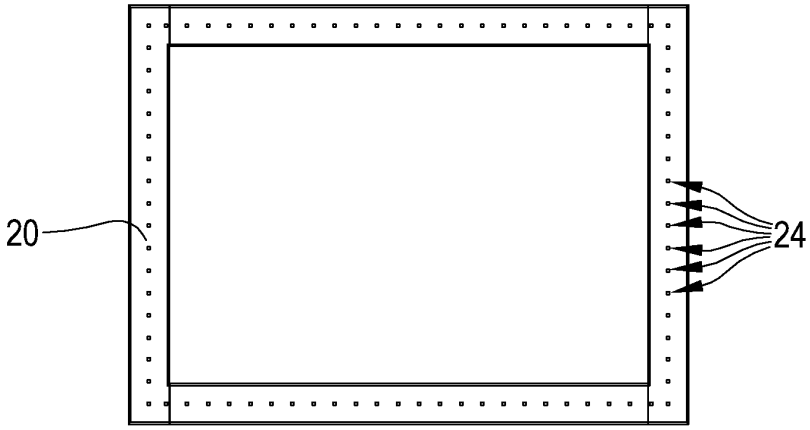



FIG.9


FIG.10



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# EUROPEAN SEARCH REPORT

Application Number
EP 13 15 8792

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| Y | US 2009/211512 A1 (MASON CHRISTOPHER A [US] ET AL) 27 August 2009 (2009-08-27)<br>* the whole document *<br>----- | 1-16 | INV.<br>B63B19/00<br>B60J10/02<br>B63J2/04 |
| Y | US 2007/249278 A1 (MCCLARY BRADLEY K [US]) 25 October 2007 (2007-10-25)<br>* paragraph [0009] - paragraph [0010] *<br>* paragraph [0054]; figures 1-5 *<br>----- | 1-16 | B60H1/26 |
| A | US 6 042 473 A (MCCLARY BRADLEY K [US]) 28 March 2000 (2000-03-28)<br>* the whole document *<br>----- | 1-16 | |

TECHNICAL FIELDS SEARCHED (IPC)

B63J
B60H

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 13 August 2013 | De Sena Hernandorena |

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& : member of the same patent family, corresponding document

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EPO FORM 1503 03.82 (P04C01)

## ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 13 15 8792

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13-08-2013

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---|---|---|
| US 2009211512 A1 | 27-08-2009 | NONE | |
| US 2007249278 A1 | 25-10-2007 | US 2007249278 A1 | 25-10-2007 |
| | | US 2009227196 A1 | 10-09-2009 |
| US 6042473 A | 28-03-2000 | NONE | |