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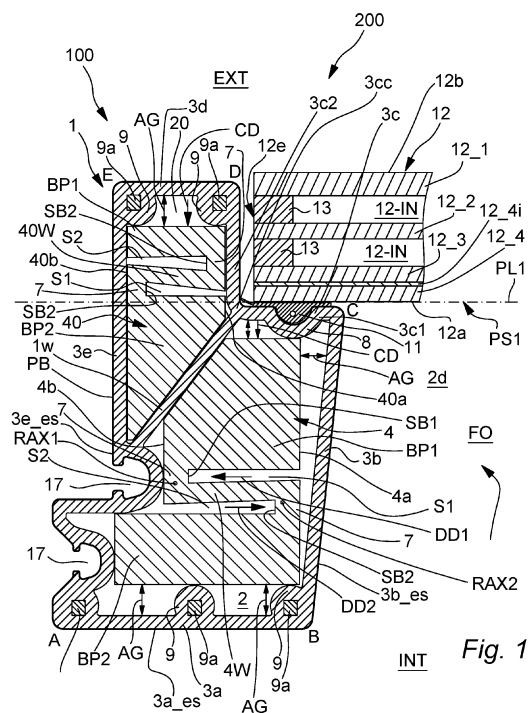
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(54) PROFILE COMPRISING AN ELONGATED INSULATION BLOCK

(57) The disclosure relates to a window or door profile (1). The window or door profile (1) comprises exterior walls (3a-3e) providing an outer profile boundary. The profile (1) is elongated and extends in a longitudinal direction (LD1), and the exterior walls (3a-3e) encloses at least one elongated chamber (2, 20) which extends in the longitudinal direction (LD1) of the profile (1). The profile (1) comprises at least one elongated insulation block (4, 40) which extends inside the elongated chamber (2, 20) in the longitudinal direction (LD1) of the profile (1). The elongated insulation block comprises one or more interior spaces that is/are elongated and extends in the longitudinal direction of the elongated insulation block. The one or more interior spaces (S 1, S 2) is arranged between a first insulation body part (BP1) and a second insulation body part (BP2) of the elongated insulation block. The first and second insulation body parts are interconnected by means of at least one wall part of the elongated insulation block which is arranged opposite to the one or more interior spaces. The one or more interior spaces has a depth which extends transverse to the longitudinal direction of the elongated insulation block (4, 40). The depth may extend over at least 50%, of the width of the insulation block. The elongated insulation block (4, 40) is in a compressed state (CS, H2) in the elongated chamber (2, 20).

**Fig. 1****EP 4 517 022 A1**

Description

[0001] The present disclosure relates to a window or door profile, such as a roof window profile, and to a building window or door. Also, the present disclosure relates to a method of providing an insulated window or door profile.

Background

[0002] Building window and building door profiles are continuously subject to improvements in order to e.g. improve thermal insulation performance. In order to improve thermal insulation performance, heat insulation material may be provided into the interior of the profile. Some solutions suggest using expansion foaming (such as spraying expansion foam) inside the profile during manufacturing of the profile to comprise an interior heat insulation material.

[0003] EP 2 080 864 B1 discloses a solution wherein a profile is provided and comprises an insulating core comprising a reinforcement. The insulating core is here reversibly deformable when acted on by a force, and may comprise several, flexible lips projecting away from an insulating solid body of the insulating core. These lips abut the inner wall of an insulating chamber of the profile. This solution may provide drawbacks. For example, it may provide an insulation solution resulting in drawbacks with respect to the insulation performance and/or ease of installing the insulating core. Additionally or alternatively it may provide a cost expensive solution. For example, the solution in EP 2 080 864 B1 may provide high resistance/friction during insertion of the insulating core.

[0004] It may e.g. be a purpose of the present disclosure to provide a solution for a profile for a building window or building door that is cost efficient and/or easy to provide and which also provides good heat insulation performance.

Summary

[0005] The present disclosure relates, in a first aspect, to a window or door profile, such as a roof window profile. The window or door profile comprises exterior walls providing an outer profile boundary. The profile is elongated and extends in a longitudinal direction. The exterior walls encloses at least one elongated chamber which extends in the longitudinal direction of the profile. The profile comprises at least one elongated insulation block which extends inside the elongated chamber in the longitudinal direction of the profile. The elongated insulation block may comprise a foam insulation material. The elongated insulation block comprises one or more interior spaces, wherein the one or more interior spaces is elongated and extends in the longitudinal direction of the elongated insulation block. The one or more interior spaces is arranged between a first insulation body part and a second insulation body part of the elongated in-

sulation block. The first and second insulation body parts are interconnected by means of at least one wall part of the elongated insulation block which is arranged opposite to the one or more interior spaces. The one or more interior spaces may have a depth which extends transverse to the longitudinal direction of the elongated insulation block, wherein said depth extends over at least 50%, of the width of the insulation block.

[0006] The solution according to embodiments of the present disclosure may e.g. provide a solution which may be beneficial when providing heat insulation inside a window or door profile having a complex interior shape. Additionally or alternatively, the one or more interior spaces, such as one or more slits, may provide a solution where the insulation material is more easy to insert into the profile chamber. Additionally or alternatively, the one or more interior spaces may help to provide that the insulation material is more easy to remove at end of life of the window or door, thereby providing recycling advantages. The spaces may additionally or alternatively provide a solution where the insulation material may be inserted also in profiles having profile surfaces that may induce higher friction, e.g. due to surface roughness.

[0007] Moreover, the elongated insulation block is not provided by using expansion foaming (such as spraying expansion foam) inside the profile during manufacturing of the profile to comprise the interior heat insulation material. This may e.g. provide that the profile wall material is not exposed to high temperatures generated in the foaming process.

[0008] Computer simulations have indicated that even though one or more interior, elongated spaces (in the simulated example it was slits) is/are provided in the insulation material, the heat insulation performance may still be acceptable, and a U_{frame} value lower than 1.54 W/mK, such as lower than 1.52 W/mK, such as lower than 1.51 W/mK may be obtained after insulation insertion. This may even be obtained while at the same time leaving certain areas of the elongated chamber unfilled with insulation material of the insulation block.

[0009] The interior spaces may also help to adapt the final, compressed shape of the insulation block to unevenness along the profile, e.g. unevenness originating from manufacturing the profile with the desired cross sectional shape and length.

[0010] In one or more embodiments of the present disclosure, the one or more interior spaces is/are filled with gas, such as air.

[0011] The window or door profile may in embodiments of the present disclosure be a frame profile for a building door or building window.

[0012] In one or more embodiments of the present disclosure, the one or more interior spaces may have a depth which extends transverse to the longitudinal direction of the elongated insulation block wherein said depth extends over at least 50% of the width of the insulation block at the area of the one or more interior spaces.

[0013] In one or more embodiments of the present

disclosure, the one or more interior spaces comprises one or more slits arranged in an outer surface of the elongated insulation block. These one or more one slits may extend in a depth direction into the elongated insulation block towards a slit bottom from a slit opening. The slit opening is arranged in an outer surface of the elongated insulation block, and the at least one wall part provides a bottom of the slits.

[0014] The slits may help to ease insulation block insertion (and in some embodiments also removal) of the insulation block while the bottom walls may help to provide resiliency and/or weakening to the profile that helps to push parts of the insulation block against parts of the profile.

[0015] In one or more embodiments of the present disclosure, said slit bottom may be provided by the bottom wall part of the elongated insulation block.

[0016] In one or more embodiments of the present disclosure, the one or more slits may extend in a depth direction into the elongated insulation block towards a slit bottom from an outer surface of the elongated insulation block, so that the at least one slit provides a deflection space into which a part of the elongated insulation block extends in response to a compression force subjected to the elongated insulation block inside the elongated chamber providing the insulation block into a compressed state.

[0017] In one or more embodiments of the present disclosure, one or both of the first and second body part may constitute at least 15%, such as at least 25%, such as at least 35% or at least 45%, of the total cross sectional area of the elongated insulation.

[0018] In one or more embodiments of the present disclosure, the one or more interior spaces may comprise a first slit and a second slit arranged in outer surfaces of the elongated insulation block, wherein the first slit and the second slit each extends in a depth direction into the elongated insulation block towards a slit bottom from slit openings in different outer surfaces of the elongated insulation block so that the first slit and the second slit overlap and so that a partition wall part of the elongated insulation block is arranged between the first slit and the second slit.

[0019] This may e.g. help to provide a desired compression property of the elongated insulation block, and/or help to increase the compression range of the insulation block, such as with a resulting, reduced compression of the body parts.

[0020] In one or more embodiments of the present disclosure, the one or more interior spaces may be a first slit and a second slit arranged in outer surfaces of the elongated insulation block, wherein the first slit and the second slit each extends in a depth direction into the elongated insulation block towards a slit bottom from slit openings in different outer surfaces of the elongated insulation block so that the first slit and the second slit overlap and so that a partition wall part of the elongated insulation block is arranged between the first slit and the

second slit.

[0021] In one or more embodiments of the present disclosure, the different outer surfaces of the elongated insulation block are oppositely directed. Additionally or alternatively, in one or more embodiments of the present disclosure, the first depth direction and the second depth direction may be substantially oppositely directed.

[0022] This may e.g. help to provide an advantageous controlled compression of the insulation block.

[0023] In one or more embodiments of the present disclosure, the elongated insulation block may comprise at least a first slit arranged in a first outer surface of the elongated insulation block, and a second slit arranged in another, e.g. oppositely directed, second outer surface of the elongated insulation block.

[0024] In some embodiments of the present disclosure, the first slit may extend into the elongated insulation block from a first outer surface of the elongated insulation block in a first depth direction, wherein the first slit has a first depth extending from the first outer surface of the elongated insulation block to a slit bottom. Additionally or alternatively, the second slit may extend into the elongated insulation block from a second outer surface of the elongated insulation block in a second depth direction and wherein the second slit has a second depth extending from the second outer surface of the elongated insulation block to a slit bottom.

[0025] In one or more embodiments of the present disclosure, the elongated insulation block may be in a compressed state in the elongated chamber.

[0026] In one or more embodiments of the present disclosure, the first and second insulation body parts may be resiliently suspended, such as by means of one or more walls of the elongated insulation block.

[0027] In one or more embodiments of the present disclosure, a partition wall part may, for example directly or indirectly, interconnect bottom wall parts which provides a bottom of different interior spaces.

[0028] In one or more embodiments of the present disclosure, the first and second insulation body parts may be resiliently suspended by means of one or more bottom walls and at least one partition wall of the elongated insulation block.

[0029] This may e.g. help to provide a desired compression properties and insulation properties of the elongated insulation block, and/or help to increase the compression range of the insulation block, such as with a resulting, reduced compression of the body parts.

[0030] In one or more embodiments of the present disclosure, said one or more walls, such as the one or more bottom walls and the at least one partition wall, may be in a compressed state, such as in a deflected state, in the elongated chamber.

[0031] This may help to provide a controlled compression of the insulation block so as to control the area of compression of the elongated insulation block. This may e.g. help to reduce compression of the first insulation body part and the second insulation body part.

[0032] In one or more embodiments of the present disclosure, the elongated insulation block is in the compressed state in the elongated chamber so that a cross sectional area of the one or more interior spaces is reduced.

[0033] Providing that the compression of the elongated insulation block to the compressed state (by the profile) in the elongated chamber is obtained by reducing the cross sectional area of the one or more interior spaces may e.g. help to e.g. limit or even substantially avoid compression of the insulation material itself at e.g. the first and second insulation body parts. Additionally or alternatively. It may provide a controlled deflection of the insulation block, which may provide benefits from an insulation point of view and/or a durability point of view.

[0034] It is noted that the cross-sectional area of the one or more interior spaces, such as slits, may be reduced when the insulation block is in a compressed state in the profile chamber when compared to the cross sectional area of the one or more interior spaces when the insulation block is in a substantially uncompressed state.

[0035] In one or more embodiments of the present disclosure, one or more of the one or more interior spaces may provide a deflection space into which a part of the elongated insulation block extends in response to a compression force subjected to the elongated insulation block in a compression direction inside the elongated chamber. This may in some embodiments e.g. occur in the said compressed state where the cross sectional area of the interior space(s) is/are reduced.

[0036] This may help to reduce compression of the insulation material of the body parts themselves.

[0037] It is understood that the interior spaces may provide controlled weakening areas of the insulation block so that the compression of the insulation block is controlled to mainly or only be provided at the desired areas, such as the areas at and/or near the interior spaces.

[0038] In one or more embodiments of the present disclosure, the elongated insulation block comprises a partition wall part placed between the first insulation body part and a second insulation body part. Here, an interior space is arranged at each side of the partition wall part.

[0039] In one or more embodiments of the present disclosure, at least one of the first and second body part constitutes at least 25%, such as at least 35%, or at least 45% of the total cross sectional area of the elongated insulation block.

[0040] In one or more embodiments of the present disclosure, each of the first and second body part may constitute at least 15%, such as at least 25%, such as at least 35% or at least 40%, of the total cross sectional area of the elongated insulation block.

[0041] In some embodiments of the present disclosure, the cross sectional area of the first and second body parts may be substantially identical. In other embodiments of the present disclosure, the cross sectional area of the first and second body parts may be different so

that the cross sectional area of one of the first and second body parts is larger than the cross sectional area of the other of the first and second body parts.

[0042] The cross sectional area of the elongated insulation block may in embodiments of the present disclosure be defined by and enclosed by the outer/exterior boundary of the elongated insulation block.

[0043] In one or more embodiments of the present disclosure, one of the first and second body part may constitute more than 25%, of the total cross-sectional area of the elongated insulation block, whereas the other of the first and second body part may constitute at least 35%, of the total cross-sectional area of the elongated insulation block.

[0044] In one or more embodiments of the present disclosure, the elongated insulation block may be resilient and thereby provides a counter force in response to a compression force subjected to the elongated insulation block inside the elongated chamber. This may e.g. help to improve heat insulation over time. In further embodiments of the present disclosure, said counter force may be obtained due to the inherent resilient properties of the insulation material of the insulation block. This may e.g. help to provide improved heat insulation performance and/or a more cost efficient solution.

[0045] In one or more embodiments of the present disclosure, the elongated insulation block may be compressed in a compression direction to a compressed state by means of one or more contact surfaces, such as contact surfaces provided by walls and/or protrusions of the profile.

[0046] In one or more embodiments of the present disclosure, said compression direction may be at least partly transverse to the depth direction of the interior spaces, such as slits, so that one or more wall side surfaces of the elongated insulation block that abuts the at least one slit is moved into the at least one slit.

[0047] In one or more embodiments of the present disclosure, the one or more interior spaces may comprise a first interior space and a second interior space, wherein the first and the second interior space overlaps so that a partition wall part of the elongated insulation block is arranged between the first interior space and the second interior space.

[0048] This may e.g. help to increase the compression range of the insulation block.

[0049] In one or more embodiments of the present disclosure, one or both of the first and second insulation body parts and/or a partition wall part of the elongated insulation block may be configured so as to rotate at least partly around one or more rotation axes in response to a deflection force provided by the profile, wherein said rotation axis extends in the longitudinal direction of the elongated insulation block. This may e.g. help to provide a mechanically simple solution for obtaining a controlled compression of the elongated insulation block.

[0050] In one or more embodiments of the present disclosure, one or both of the first and second insulation

body parts and/or said partition wall part may be configured so as to rotate around at least two rotation axes in response to a deflection force provided by the profile, wherein said at least two rotation axes extends in the longitudinal direction of the elongated insulation block. In further embodiments, the at least two rotation axes may be arranged at different side portions of the elongated insulation block. This may e.g. help to provide a mechanically simple solution for obtaining a more controlled compression of the elongated insulation block so as to adapt to the interior geometry of the elongated chamber of the profile. Additionally or alternatively, it may help to obtain an increased compression range where also the compression of the insulation body part(s) is reduced.

[0051] In one or more embodiments of the present disclosure, at least the partition wall part of the elongated insulation block may be configured to provide said rotation around the one or more rotation axes due to a deflection of the partition wall.

[0052] This may help to provide a controlled compression of the elongated insulation block.

[0053] In one or more embodiments of the present disclosure, said rotation axis or axes may be defined by and/or arranged at the area of the at least one interconnecting wall part and/or the partition wall.

[0054] In one or more embodiments of the present disclosure, the partition wall part comprises a first partition wall side surface and a second partition wall side surface, wherein the partition wall side surfaces are oppositely directed so that a first of the partition wall side surfaces faces a first of the slits and a second of the partition wall side surfaces faces the other of the slits, wherein each partition wall side surface extends in the depth direction of the respective slit between the slit opening in the respective outer surface and the slit bottom.

[0055] In one or more embodiments of the present disclosure, said slits together provides an S-shaped and/or a Σ -shaped elongated insulation block when seen in cross section in a plane that is perpendicular to the longitudinal direction of the elongated insulation block.

[0056] In one or more embodiments of the present disclosure, said slits provide a corrugated deflection portion of the insulation block. This is when seen in a cross-sectional view of the elongated insulation block.

[0057] In one or more embodiments of the present disclosure, the elongated insulation block is configured so that one or more of said one or more interior spaces, such as one or more slits, has/have a slit height between 0.5 mm and 4 mm, such as between 0.5 and 2 mm, such as between 1 mm and 2 mm.

[0058] In one or more embodiments of the present disclosure, the elongated insulation block is compressed by at least 1%, such as at by at least 3%, such as by at least 5% when compared to the initial, uncompressed height of the elongated insulation block.

[0059] In one or more embodiments of the present disclosure, the elongated insulation block is compressed

by no more than 20%, such as no more than 15%, such as no more than 10%, such as no more than 7%, when compared to the initial, uncompressed height of the elongated insulation block.

5 **[0060]** In one or more embodiments of the present disclosure, the depth of the one or more interior spaces, such as one or more slits, extends over at least 60%, such as over at least 70%, such as over at least 80% of the width of the elongated insulation block at the area of the interior space.

10 **[0061]** This may e.g. provide an insulation block having "softer" compression properties and/or help to reduce friction when inserting the insulation block in the profile chamber.

15 **[0062]** In one or more embodiments of the present disclosure, said width of the elongated insulation block may be defined between oppositely directed, exterior surfaces of the insulation block.

[0063] In one or more embodiments of the present disclosure, the depth of the interior spaces, such as one or more slits, extends into less than 95%, such as less than 90%, such as less than 85% of the width of the elongated insulation block at the area of the slit.

[0064] This may e.g. help to remain a counter force in response to a compression force subjected to the elongated insulation block inside the elongated chamber, due to the resiliency of the elongated insulation block 1. It may additionally or alternatively help to maintain resiliency of the insulation block over time.

25 **[0065]** In one or more embodiments of the present disclosure, the elongated insulation block may rest one or more elongated protrusions of the profile which extends into the chamber, wherein the elongated protrusions extend in the longitudinal direction of the profile. In one or more further embodiments, one or more of the one or more elongated protrusions may comprise reinforcement protrusions.

30 **[0066]** Such protrusions may help to provide a profile having desired characteristic. For example, providing reinforcement protrusions/ridges, such as discrete protrusions/ridges, extending inside the profile chamber may help to provide a visually appealing profile while also providing a profile having a desired strength. The inventor has found that it may be acceptable that the insulation block rests on such protrusions. The insulation block may not extend in between neighboring protrusions/ridges, as this may increase friction during insulation block insertion, and the inventor has realized that acceptable insulation performance may still be obtained.

35 **[0067]** In one or more embodiments of the present disclosure, the one or more elongated protrusions may provide some or all of said compression of the elongated insulation block to the compressed state. This may e.g. help to reduce friction upon insertion of the elongated insulation block. The elongated insulation block may e.g. support on a surface of the one or more protrusions.

40 **[0068]** In one or more embodiments of the present disclosure, an air gap of at least 1 mm, such as at least

2 mm is provided between the elongated insulation block and one or more of the exterior profile walls. In one or more embodiments of the present disclosure, an air gap of between least 1 mm and 5mm, such as between 2mm and 5 mm is provided between the elongated insulation block and one or more of the exterior profile walls. This may e.g. help to reduce friction upon insulation block insertion

[0069] In one or more embodiments of the present disclosure, the air gap is arranged next to or between neighboring, discreet protrusions of the profile.

[0070] In one or more embodiments of the present disclosure, the body parts may be solid in the sense that substantially no holes, gaps, openings, slits and/or the like are provided other than pockets, such as air/gas pockets, provided by inherent properties of the insulation material itself.

[0071] This may e.g. provide a desired, resilient solution where the insulation block is compressible while also a main part/parts of the insulation may not be deformed/-compressed, or may only be limited deformed, as the deformation by compressing the insulation block is primarily facilitated by the bottom wall part(s) of the insulation block.

[0072] In one or more embodiments of the present disclosure, the elongated insulation block is a substantially monolithic structure. This may e.g. help to provide advantageous compression properties of the insulation block and/or provide advantages with regards to recycling after end of life of the window or door. Additionally or alternatively, it may provide a cost efficient and/or more mechanically simple insulation solution.

[0073] In one or more embodiments of the present disclosure, the elongated insulation block is without interior reinforcements. In one or more embodiments of the present disclosure, the elongated insulation block is without interior reinforcements of another material and/or density than the insulation material of the elongated insulation block.

[0074] Omitting interior reinforcements in the elongated insulation block may e.g. provide a cost efficient and/or more mechanically simple insulation solution. Additionally or alternatively, it may provide advantages with regards to improved thermal insulation performance.

[0075] Providing that the elongated insulation block is without interior reinforcements of another material and/or density than the insulation material of the elongated insulation block may e.g. provide advantages with regards to obtaining advantageous compression properties of the insulation block and/or providing advantages with regards to recycling after end of life of the window or door.

[0076] In one or more embodiments of the present disclosure, the elongated insulation block may be unbonded to the profile.

Hence, no glue or other chemical and/or mechanical bonding solution may be provided between the insulation block and the profile walls: This may e.g. help to improve

recyclability at end of life of the window or door.

[0077] In one or more embodiments of the present disclosure, the insulation material of the elongated insulation block may have a density between 25 kg/m³ and 70 kg/m³, such as between 28 kg/m³ and 60 kg/m³, for example between 30 kg/m³ and 45 kg/m³.

[0078] This may provide a relatively hard insulation block that may provide e.g. one or more advantages in relation to insulation block insertion in the profile chamber and/or relating to the structural integrity over time of the insulation block. Additionally or alternatively, it may provide advantages in relation to heat insulation properties and/or provide a desired resiliency of the insulation block (when the one or more spaces is/are provided). It may additionally or alternatively provide that the body parts are less compressed when the insulation block a whole is compressed into a compressed state inside the profile chamber.

[0079] In one or more embodiments of the present disclosure, the insulation material of the elongated insulation block has a U-value of less than 0.040 W/mK, such as less than 0.0350 W/mK. In some embodiments of the present disclosure, the insulation material of the elongated insulation block has a U-value between 0.025 W/mK, and 0.045 W/mK, such as between 0.03 W/mK, and 0.04 W/mK.

[0080] This may e.g. provide an insulation block with acceptable heat insulation performance.

[0081] In one or more embodiments of the present disclosure, the foam insulation material of the elongated insulation block may comprise, such as be, an expanded polypropylene insulation material, such as a closed cell expanded polypropylene insulation material.

[0082] In other embodiments of the present disclosure, the foam insulation material of the elongated insulation block may be an Expanded Polystyrene (EPS) foam, or a Polyvinyl Chloride (PVC) foam.

[0083] In one or more embodiments of the present disclosure, one or both interior spaces, such as slits, extends continuously in the longitudinal direction of the elongated insulation block between the opposite ends of the elongated insulation block.

[0084] This may e.g. provide an insulation block that is easy to insert in the profile chamber and/or which is easy to manufacture.

[0085] In one or more embodiments of the present disclosure, a plurality of said interior spaces, such as slits, extend between the opposite ends of the elongated insulation block, wherein the consecutively arranged, interior spaces are separated by intermediate walls in the insulation material. This may e.g. provide a solution where the resistance against compression of the insulation block may be controlled by the intermediate walls, such as based on the thickness of the intermediate walls, the number of intermediate walls per length of the insulation block and/or the like. Additionally or alternatively, it may provide a more long-lasting solution.

[0086] These intermediate walls may be designed to

maintain a certain degree of stiffness at abrupt portions of the insulation block along the insulation block length.

[0087] In one or more embodiments of the present disclosure, the one or more interior, elongated spaces, such as slits, may be pre-shaped in the elongated insulation block and may have been provided at predefined locations of the elongated insulation block.

[0088] In one or more embodiments of the present disclosure, the one or more interior, elongated spaces, such as slits, may be present as a result of a manufacturing solution involving one or more of:

- machining the one or more interior spaces (S1, S2), such as slits, into the elongated insulation block,
- melting the one or more interior spaces (S 1, S2), such as slits, into the elongated insulation block, and/or
- molding, extruding or compressing/pressing the elongated insulation block during insulation block shaping/manufacturing so as to provide an elongated insulation block comprising the one or more interior spaces (S 1, S2), such as slits.

[0089] In one or more embodiments of the present disclosure, the elongated insulation block has a length which extends over substantially the entire length of the profile.

[0090] In one or more embodiments of the present disclosure, wherein at least 50%, such as at least 80%, such as at least 95% of the compression of the elongated insulation block inside the profile is provided by means of one or more insulation body parts of the elongated insulation block extending into the one or more interior spaces due to the compression of the elongated insulation block. Hence, the cross-sectional area of the one or more interior spaces may be reduced upon insertion of the elongated insulation block into the profile chamber. The reduction of the cross-sectional area of the one or more spaces may adapt to the interior shape of the profile chamber over the length of the profile.

[0091] In one or more embodiments of the present disclosure, the elongated insulation block may be in the compressed state in the elongated chamber so that at least 50%, such as at least 80%, such as at least 95% of the compression (H1→H2) of the elongated insulation block in a compression direction is provided by means of a reduction of the cross sectional area of the one or more interior spaces when compared to the cross sectional area of the one or more interior spaces when the elongated insulation block is in a substantially uncompressed state.

[0092] Hereby, the compression of the insulation of the body parts is reduced or substantially avoided.

[0093] In one or more embodiments of the present disclosure, the window or door profile comprises a first and a second elongated chamber. A first of said elongated insulation block may be arranged in the first elongated chamber, and a second of said elongated insula-

tion block may be arranged in the second elongated chamber.

[0094] This may e.g. improve insulation performance of the profile.

[0095] In some embodiments of the present disclosure, the first insulation block may be arranged opposite to a support wall of the profile which is configured to support a major surface of a glass unit. Additionally or alternatively, in some embodiments of the present disclosure, the second insulation block may be arranged opposite to a profile wall which is configured to be arranged opposite to a side edge surface of the insulating glass unit.

[0096] In one or more embodiments of the present disclosure, the cross sectional area of the elongated insulation block may take up less than 90%, such as less than 80%, such as less than 72% or less than 65% of the total cross sectional area of the elongated chamber.

[0097] This may e.g. help to provide a solution where less friction occur when inserting the insulation block. Additionally or alternatively, it may help provide a solution where a more complex interior profile shape may be allowed while at the same time allowing more easy insulation block insertion over the profile length. For example, interior reinforcement protrusions, complex (such as acute) wall angles and or the like of the profile may be allowed in the compartment without the insulation block necessarily filling out minor spaces around these complex shapes. However, also larger, straight surfaces facing the interior chamber of the profile may not be in touch with, or may only be partly in touch with the insulation block.

[0098] In one or more embodiments of the present disclosure, the profile may not be completely straight, at least prior to installation of a window profile and/or prior to attachment of other profiles to that profile. The insulation material may adapt to the unevenness of the profile due to the resiliency provided by the one or more interior spaces of the insulation block and/or the cross-sectional dimension of the insulation block. This may hence help to provide a solution where it may be more easy to insert the insulation block and still the insulation block may adapt due to its resiliency so as to adapt to the shape of the profile in the longitudinal direction of the profile.

[0099] In one or more embodiments of the present disclosure, the cross-sectional area of the elongated insulation block may take up less than 90%, such as less than 80%, such as less than 72% or less than 65% of the total cross sectional area of the elongated chamber over at least 50%, such as at least 70% or at least 80% of the length of the profile.

[0100] This may help to reduce friction and the inventor has found by simulation that an acceptable heat insulation degree of the profile may still be obtained even though the insulation block does not completely fill out the total cross section of the elongated chamber (2, 20). For example, in some embodiments of the present disclosure, a U-frame value lower than 1.54 W/mK, such as

lower than 1.52 W/mK, such as lower than 1.51 W/mK may be obtained after insulation block insertion.

[0101] In one or more embodiments of the present disclosure, the cross-sectional area of the elongated insulation block takes up at least 50% such as at least 60%, such as at least 65% of the total cross sectional area of the elongated chamber.

[0102] This provides an improved heat insulation performance.

[0103] In one or more embodiments of the present disclosure, the cross-sectional area of the elongated insulation block may take up at least 50% such as at least 60%, such as at least 65% of the total cross sectional area of the elongated chamber over at least 50%, such as at least 70% or at least 80% of the length of the profile.

[0104] In one or more embodiments of the present disclosure, the one or more interior spaces provides a wakened portion of the elongated insulation block, and thereby a deflection area/section providing that the majority of the compression of the elongated insulation block is provided at the area of the one or more interior spaces.

[0105] In one or more embodiments of the present disclosure, the wakened portion provides that at least 50%, such as at least 80%, such as at least 95% of the compression of the elongated insulation block is provided by means of one or more insulation body parts of the elongated insulation block extending into the one or more interior spaces due to the compression of the elongated insulation block. This may help to omit the reduction of, or reduce the reduction of, the cross-sectional area of the body part(s) when the elongated insulation block is placed in the elongated profile chamber.

[0106] In one or more embodiments of the present disclosure, the elongated insulation block may be compressed inside the profile so that the height of the elongated insulation block is reduced whereas the insulation block remains substantially uncompressed in the width direction of the profile.

[0107] The present disclosure moreover, in a second aspect, relates to a building window or door, such as a roof window or a facade window, comprising a frame. The frame comprises a plurality of profiles according to one or more of the previously disclosed embodiments. The profiles of the frame together provides a rectangular frame with a frame opening. An insulating glass unit is supported by the frame, such as by a profile wall of the profiles. A gasket may be placed between the profile wall and the insulated glass unit.

[0108] In one or more embodiments of the second aspect, the insulating glass unit extends into an elongated, recessed portion of the profile, wherein the recessed portion is provided by means of first and second profile wall parts of the profile, so that the first profile wall part of the profile overlaps and supports a part of an exterior major surface of the insulated glass unit, and so that the second profile wall part is arranged opposite to an edge surface of the insulating glass unit.

[0109] In one or more embodiments of the second aspect, at least one of said at least one elongated insulation block extends to a position opposite an exterior major surface of the insulating glass unit.

[0110] In one or more embodiments of the second aspect, at least one of the at least one elongated insulation block extends to a position opposite a side edge surface of the insulating glass unit.

[0111] In one or more embodiments of the second aspect, the building window is a roof window configured to be / designed to be installed in a roof structure of a building, such as with an angle which is larger than 17°, such as larger than 30° with respect to horizontal.

[0112] In one or more embodiments of the second aspect, the design of the window and the one or more interior spaces is configured so as provide that a plurality of isotherm lines extends through the one or more interior spaces in a direction transverse to the depth direction of the one or more interior spaces when the building window is installed in a structure, such as a roof structure, of a building.

[0113] This may provide advantages with respect to heat insulation performance.

[0114] In one or more embodiments of the second aspect, the temperature difference between adjacent isotherm lines ITL of said plurality of isotherm lines may be less than 5°C, such as less than 3°C, such as e.g. 2 °C, or 1 °C.

[0115] In one or more embodiments of the second aspect, one or more of the interior spaces, such as one or more slits, may have a height, such as a maximum height, less than 4 mm such as less than 3 mm, such as less than 2 mm.

[0116] The height, such as a slit height may be when the insulation block is in an uncompressed state and/or a compressed state. The slit height may be substantially constant or it may be a maximum slit height.

[0117] The height may extend transverse to the depth direction of the interior space.

[0118] The present disclosure moreover, in a third aspect, relates to a method of providing an insulated window or door profile according to any of the preceding embodiments and/or aspects. The method comprises:

- providing a window or door profile comprising exterior walls providing an outer profile boundary, wherein the profile is elongated and extends in a longitudinal direction, wherein the exterior walls encloses at least one elongated chamber which extends in the longitudinal direction,
- providing an elongated insulation block, comprising one or more interior spaces, wherein the one or more interior spaces is elongated and extends in the longitudinal direction of the elongated insulation block, wherein the one or more interior spaces is arranged between a first insulation body part and a second insulation body part of the elongated insulation block, wherein the first and second insulation body

parts are interconnected by means of at least one wall part of the elongated insulation block which is arranged opposite to the one or more interior spaces,

wherein the method further comprises providing a driving force in the longitudinal direction of the profile, such as by means of a drive arrangement, so as to introduce the elongated insulation block into the elongated chamber from an end of the profile, and wherein the elongated insulation block is arranged in a compressed state inside the elongated chamber.

[0119] In one or more embodiments of the method, the driving force may be provided so as to introduce at least 40 cm, such as at least 70 cm, for example at least 100 cm, of the length of the elongated insulation block (4, 40) into the elongated chamber (2, 20).

[0120] In one or more embodiments of the method, the driving force may move the elongated insulation block into the elongated chamber while the profile is maintained unmoved.

[0121] In one or more embodiments of the method, the method provides a profile comprising one or more elongated insulation blocks arranged in an interior chamber of the profile, according one or more of the above mentioned embodiments, such as according to the first aspect and/or second aspect.

[0122] In one or more embodiments of the present disclosure, the height of the one or more interior spaces, such as the height of the one or more slits, is reduced due to the compression force provided in a direction that is transverse to the dept direction of the one or more interior spaces.

Figures

[0123] Various embodiments of the present disclosure will be described in the following with reference to the figures in which:

- fig. 1 : illustrates a cross section of a window or door profile, according to embodiments of the present disclosure,
- fig. 2 : illustrates a cross section of an elongated insulation block, according to embodiments of the present disclosure,
- fig. 3 : illustrates an elongated insulation block seen in perspective, according to embodiments of the present disclosure,
- fig. 4 : illustrates an elongated insulation block seen in perspective, according to further embodiments of the present disclosure,
- fig. 5 : illustrates an elongated insulation block comprising a continuous elongated slit, according to embodiments of the present disclosure,
- fig. 6 : illustrates an elongated insulation block comprising discrete slits that are arranged consecutively in a longitudinal direction of

figs. 7-10

figs. 11-13

fig. 14

15 fig. 15

fig. 15

20 fig. 16

fig. 17

25

the insulation block, according to embodiments of the present disclosure,

: illustrates various embodiments of an elongated insulation block comprising interior spaces being slits, according to various embodiments of the present disclosure,

: illustrates various embodiments of method of providing an insulated window or door profile, according to embodiments of the present disclosure,

: illustrates an insulation block comprising enclosed interior spaces, according to embodiments of the present disclosure,

: illustrates an insulation block comprising enclosed interior spaces, according to embodiments of the present disclosure,

: illustrates a roof window according to embodiments of the present disclosure,

: illustrates a building comprising windows and doors, according to embodiments of the present disclosure, and

: illustrates isotherm lines inside a window profile, according to embodiments of the present disclosure.

Detailed description

[0124] Fig. 1 illustrates schematically a cross section of a window or door profile 1, according to embodiments of the present disclosure. In fig. 1, the profile 1 is a profile of a frame 100 of a roof window 200, but it may also be a frame of another type of building window or building door, in other embodiments of the present disclosure.

[0125] The frame 100 comprises one or more of said profile 1, such as e.g. two, three or four of said profile 1. The frame 100 provides/frames a frame opening FO. The frame 100 supports a glass unit such as an insulated glass unit 12.

[0126] The insulated glass unit 12 comprises a plurality of glass sheets 12_1-12_4. In the embodiment of fig. 1, the glass unit 12 is a triple pane glass unit comprising an intermediate glass sheet 12_2 and two outer glass sheets 12_1, 12_3. Insulating spaces 12-IN are placed between the intermediate glass sheet 12_2 and the respective outer glass sheet 12_1, 12_3. The insulating spaces 12-IN may be filled with a gas or may be evacuated. If evacuated, the glass unit 12 may be a vacuum insulated glass unit (VIG), and a plurality of spacers (not illustrated), such as pillars, may be distributed in the insulating space 12-IN to maintain a distance between the glass sheets.

[0127] Edge seals 13 seal the insulating spaces 12-IN between the glass sheets 12_1, 12_2, 12_3. The edge seal 13 type may be selected dependent on the glass unit 12 type.

[0128] In fig. 1, the glass unit 12 is a laminated glass unit and comprises a glass sheet 12_4 that adhere to the

glass sheet 12_3 by means of a lamination interlayer 12_4i, such as a PVB (Polyvinyl butyral) or EVA (Ethylene-vinyl acetate) interlayer.

[0129] It is understood that in some embodiments of the present disclosure, just one insulating space 12-IN may be provided and the glass unit 12 may comprise just two glass sheets (and e.g. also the lamination glass 12_4). In further embodiments, more than two insulating spaces/gaps 12-IN, and hence also more glass sheets, may be provided.

[0130] The 12 glass unit comprises outer major surfaces 12a, 12b (coated or uncoated) provided by the glass sheets 12_1 and 12_4 respectively, and a side edge 12e having a surface extending between the outer major surfaces 12a, 12b. The surface of the side edge 12e extends between the exterior major surfaces 12a, 12b of the insulating glass unit.

[0131] The exterior major surface 12a is configured to face the interior INT of a building when the window 200 is installed in the building, and the exterior major surface 12b is configured to face the exterior EXT of the building.

[0132] If the glass unit 12 is un-laminated, the outer major surface 12a may instead be provided by e.g. the glass sheet 12_2 or 12_3 dependent on the glass unit type.

[0133] The profile 1 comprises exterior walls 3a-3e providing an outer/exterior profile boundary PB defined by the exterior surface of the profile. This profile boundary PB is indicated by means of a more bold line, which indicates the outer surface of the profile 1.

[0134] One or more parts of the outer surface providing the outer boundary PB may be visible to the human user after the profile is used/installed to provide a frame such as a window frame or a door frame and when the frame is installed to provide a window or door.

[0135] In embodiments of the present disclosure, the exterior walls 3a-3e are structural walls.

[0136] In embodiments of the present disclosure, the exterior walls 3a-3e may comprise or be made from a polymer.

[0137] In embodiments of the present disclosure, the walls 3a-3e may be PVC (Polyvinyl Chloride) walls, such as Chlorinated Polyvinyl Chloride (CPVC) walls. In other embodiments, the exterior walls 3a-3e may be Polypropylene (PP) walls, such as reinforced Polypropylene walls, e.g. reinforced by means of glass fibers and/or carbon fibers. It is generally understood that in some embodiments, fibers may be blended into the wall 3a-3e material of the exterior walls 3a-3e so as to provide reinforced profile walls.

[0138] The profile 1 is elongated and extends in an longitudinal direction (not illustrated in fig. 1, see e.g. figs. 11 and 12). The exterior walls 3a-3e encloses at least one elongated chamber 2, 20 which extends in the longitudinal direction LD1 of the profile 1.

[0139] In the embodiment of fig. 1, The exterior walls 3a-3e encloses two elongated chambers 2, 20, but it is understood that in further embodiments of the present

disclosure, more than two, such as three, four, five or even more elongated chambers may be present and be separated by partition walls 1w of the profile, or just one chamber is present in the profile 1.

[0140] In fig. 1, a partition wall 1w of the profile 1 is integrated in the profile 1, and separates the two chambers 2, 20. In Fig. 1, the partition wall 1w of the profile extends from the wall 3e comprising the exterior surface 3e_es facing away from the frame opening FO provided by the frame 100 and arranged opposite to the wall 3b comprising the exterior surface 3b_es facing and abutting the frame opening FO. The partition wall 1w of the profile 1 extends to an exterior wall 3c of the profile which provides a recess for receiving an edge of the insulated glass unit 12.

[0141] It can be seen that the wall 3a extends between the first corner A and second corner B, and that the wall 3b comprising the surface facing the frame opening FO extends between the second corner B and the third corner C. The Third corner C is located proximate to and opposite to the exterior major surface 12a configured to face the building interior INT when the window 200 is installed in a building. The wall 3c (comprising wall part 3c1 and 3c2) extends between the third C and fourth D corner and comprises the corner part 3CC. The top wall 3d extends between the fourth corner D and a fifth corner E. The Wall 3e extends between the fifth E and the first corner A, and may comprise one or more recesses 17 or the like for holding a gasket (not illustrated) such as a resilient gasket, such as a rubber gasket or the like, configured to provide water tightening and/or air tightening between a fixation frame (not illustrated in fig 1) and the frame 100.

[0142] The exterior wall 3c of the profile 1 extends between the top wall 3d and the wall 3b facing the frame opening FO, and provides a recess for receiving an edge of the insulated glass unit 12. The wall 3c hence comprises a first 3c1 and a second 3c2 wall part, which meet at a corner portion 3cc, in order to provide the recess. The wall part 3c 1 supports a part of the major surface of the glass unit 12 (e.g. with gasket and/or glue between the wall 3c1 and the glass unit. The wall part 3c2 is placed opposite to a side edge of the glass unit 12. The partition wall 1w may be unitary with the exterior walls 3e, 3c.

[0143] The exterior surfaces 3a_es and 3b_es of the walls 3a and 3b may be visible from the inside INT of the building by human eye when the window 200 is installed in the building such as in a roof structure of the building.

[0144] The profile 1 comprises at least one elongated insulation block 4, 40 which extends inside the elongated chamber 2, 20 in the longitudinal direction LD1 of the profile 1. In fig. 1, two insulation blocks are provided, and are arranged in each their elongated chamber 2, 20.

[0145] The elongated insulation blocks 4,40 each comprises a foam insulation material.

The foam insulation material of the elongated insulation block 4, 40 may in embodiments of the present disclosure consist of or comprise, such as be, an expanded poly-

propylene insulation material, such as a closed cell expanded polypropylene insulation material. In other embodiments of the present disclosure, the foam insulation material of the elongated insulation block may comprise or consist of, such as be, an expanded Polystyrene (EPS) foam, or a Polyvinyl Chloride (PVC) foam.

[0146] It is generally understood that in embodiments of the present disclosure, the insulation material of the elongated insulation block 4, 40 may have a density between 25 kg/m³ and 70 kg/m³, such as between 28 kg/m³ and 60 kg/m³, for example between 30 kg/m³ and 45 kg/m³.

[0147] In some embodiments of the present disclosure, the insulation material of the elongated insulation block 4, 40 has a U-value of less than 0.040 W/mK, such as less than 0.0350 W/mK,

[0148] In some embodiments of the present disclosure, the insulation material of the elongated insulation block 4, 40 has a U-value between 0.025 W/mK, and 0.045 W/mK, such as between 0.03 W/mK, and 0.04 W/mK.

[0149] As can be seen from fig. 1, the elongated insulation block 4 comprises one or more interior spaces S1, S2. In the embodiment of fig. 1, the elongated insulation block 4 comprises two spaces, i.e. a first space S1 and a second space S2, but in further embodiments of the present disclosure, further spaces, such as three, four or five spaces, may be provided (not illustrated in fig. 1.). In one embodiment of the present disclosure, a single space may be provided (not illustrated in fig. 1.). The one or more interior spaces S1, S2 is/are elongated and extends in the longitudinal direction LD2 of the elongated insulation block 4, 40. See e.g. one embodiment hereof in fig. 4.

[0150] The interior spaces S1, S2 are arranged between a first insulation body part BP1 and a second insulation body part BP2 of the elongated insulation block 4, 40.

[0151] In one or more embodiments of the present disclosure, the one or more interior spaces S1, S2 in the elongated insulation block is/are filled with gas such as air.

[0152] The one or more interior spaces S1, S2 may in embodiments of the present disclosure be in fluid communication with the elongated chamber 2, 20. In fig. 1, the interior spaces S1, S2 of the elongated insulation block 4 is in fluid communication with the elongated chamber 2, whereas the interior spaces S1, S2 of the elongated insulation block 40 is in fluid communication with the elongated chamber 20. The one or more interior spaces S1, S2 are in fig. 1 in fluid communication with the elongated chamber 2, 20 due to the slit openings SO1, SO2 (See fig. 2)

[0153] The first and second insulation body parts BP1, BP2 are interconnected by means of wall parts 7 of the elongated insulation block 4, 40 which is arranged opposite to the one or more interior spaces S1, S2 and provides a bottom wall.

[0154] In fig. 1, the elongated insulation block 4, 40 comprises a partition wall part 4W, 40W. This partition wall part is placed between the first insulation body part BP1 and the second insulation body part BP2 so that the interior spaces S1, S2 are arranged at each side of the partition wall part 4W, 40W. Hence, the insulation body parts BP1, BP2 are suspended from each other by means of the bottom wall parts 7 and the partition wall 4W, 40W that interconnects the bottom wall parts 7. This provides that the first and second insulation body parts BP1, BP2 are resiliently suspended, by means of the bottom wall part 7 and the partition wall 4W, 40W. Accordingly, when the profile 1 provides a compression force so that the insulation block 1 in the cavity 2, 20 is compressed, the primary part of the compression, or substantially the entire part of the compression of the insulation block 1, may be provided by deflecting the partition wall 4W, 40W and possibly also a part of the bottom wall 7 and/or a limited area of one or both body parts BP1, BP2 located proximate the bottom wall 7. Hence, the major part of the body parts BP1, BP2 may remain substantially uncompressed.

[0155] In some embodiments of the present disclosure, at least 50%, such as at least 80%, such as at least 95% of the compression of the height H1 (See fig. 2) of the elongated insulation block 4, 40 inside the profile 1 cavity 2, 20 is provided by that one or more insulation body parts BP1, BP2 of the elongated insulation block 4, 40 extending into the one or more interior spaces S1, S2 due to the compression of the elongated insulation block 4, 40. Accordingly, a partly or limited compression of the insulation body parts BP1, BP2 may occur, but it may be so that the major part of the compression from H1 to H2 is provided by means of one or more of the insulation body parts BP1, BP2 of the elongated insulation block 4, 40 extending into the one or more interior spaces S1, S2 due to the compression.

[0156] It can be seen that the insulation body parts BP1, BP2 of the elongated insulation block 4, 40 extends into the one or more interior spaces S1, S2 (In fig. 1 and 2, the interior spaces are slits) due to the compression. This may as illustrated in fig. 2 provide that the height of the slit S1, S2 and/or the height of the slit opening(s) SO1, SO2 is reduced due to the compression force in the compression direction CD.

[0157] The compression direction may in embodiments of the present disclosure, be transverse to, such as perpendicular to, the plane PL1.

[0158] When compressed by the profile 1, the elongated insulation block 4, 40 provides a counter force in response to a compression force subjected to the elongated insulation block inside the elongated chamber 2, 20, due to the resiliency of the elongated insulation block 1.

[0159] In embodiments of the present disclosure, one or more of the interior spaces S1, S2, such as one or more slits, may has/have a slit height SH (see fig. 2) less than 4 mm such as less than 3 mm, such as less than 2 mm. This

may at least be the case when the insulation block 4, 40 is compressed, and may be the slit height for the major part or the whole part of the slit depth extension.

[0160] In embodiments of the present disclosure, one or more of the interior spaces S1, S2, such as one or more slits, may has/have a slit height SH (see fig. 2) between 0.5 mm and 4 mm, such as between 0.5 and 2 mm, such as between 1 mm and 2 mm, at least when the elongated insulation block 4, 40 is in a substantially uncompressed state US. This height is reduced when the elongated insulation block is compressed by the profile 1.

[0161] In one or more embodiments of the present disclosure, at least one of the first and second body part BP1, BP2 may constitute at least 25%, such as at least 35%, or at least 45% of the total cross sectional area of the elongated insulation block 4, 40.

[0162] In one or more embodiments of the present disclosure, the first body part BP1 may constitute at least 15%, such as at least 25%, such as at least 35% or at least 45%, of the total cross sectional area of the elongated insulation block 4, 40.

[0163] In one or more embodiments of the present disclosure, the second body part BP2 may constitute at least 15%, such as at least 25%, such as at least 35% or at least 45%, of the total cross sectional area of the elongated insulation block 4, 40.

[0164] In one or more embodiments of the present disclosure, each of the first and second body part BP1, BP2 constitutes at least 15%, such as at least 25%, such as at least 35%, or at least 40% of the total cross sectional area of the elongated insulation block (4, 40).

[0165] In one or more embodiments of the present disclosure, the first body part BP1 may constitute less than 50%, such as less than 40%, of the total cross sectional area of the elongated insulation block 4, 40.

[0166] In one or more embodiments of the present disclosure, the second body part BP2, may constitute less than 50%, such as less than 40%, of the total cross sectional area of the elongated insulation block 4, 40.

[0167] In some embodiments of the present disclosure, the cross sectional area of the first and second body parts BP1, BP2 may be substantially identical. In other embodiments of the present disclosure, the cross sectional area of the first and second body parts BP1, BP2 may be different so that the cross sectional area of one of the first and second body parts is larger than the cross sectional area of the other of the first and second body parts.

[0168] In some embodiments, the interconnecting partition wall part 4W, 40W arranged between the spaces S1, S2 interconnects the bottom wall parts 7 which are arranged opposite to a bottom SB1, SB2 of the interior space S1, S2.

[0169] In figs. 1 and 2, the interior spaces S1, S2 comprises slits arranged in an outer surface 4a, 40a, 4b, 40b of the elongated insulation block 4, 40. The slits S1, S2 extends in a depth direction DD1, DD2 into the elongated insulation block 4, 40 towards a slit bottom

SB1, SB2 from an outer surface 4a, 40a, 4b, 40b of the elongated insulation block 4, 40. The wall part 7 comprises/provides a bottom wall part 7 which is arranged opposite to a bottom SB1, SB2 of the one or more slits S1, S2.

[0170] It is understood that in embodiments of the present disclosure, the slit(s) S1, S2 may be considered grooves or slots. The slits S1, S2 may be long (in the longitudinal direction of the insulation block) and narrow (in the height direction HD) channels in a surface 4a, 4b of the insulation block 4, 40, and the slits extend into the insulation block in the depth direction DD1, DD2.

[0171] In figs. 1 and 2, the slits comprises a first slit S1 and a second slit S2. The first slit S1 and the second slit S2 each extends in the depth direction DD1, DD2 into the elongated insulation block 4, 40 towards the slit bottom SB1, SB2 from different outer surfaces 4a, 40a, 4b, 40b of the elongated insulation block 4, 40 so that the first S1 and the second S2 slit overlaps and so that the partition wall part 4W, 40W of the elongated insulation block 4, 40 is arranged between the first slit S1 and the second slit S2.

[0172] In figs. 1 and 2, the different outer surfaces 4a, 40a, 4b, 40b are oppositely directed.

[0173] Additionally, as illustrated, the first depth direction DD1 and the second depth direction DD2 may be substantially oppositely directed.

[0174] In some embodiments of the present disclosure, this partition wall 4W of the insulation block may have a thickness that is less than 1/5, such as less than 1/8 or less than 1/10 of the uncompressed height H1 of the insulation block 4, 40. The height H1, H2 extends in a height direction HD.

[0175] In fig. 1 and fig. 2, the slits provides an S-shaped, elongated insulation block 4, 40 when seen in cross section in a plane that is perpendicular to the longitudinal direction LD1 of the elongated insulation block 4, 40.

[0176] Fig. 2 illustrates a cross section of an elongated insulation block 4, according to embodiments of the present disclosure in an uncompressed state US (left) and a compressed state CS (right), respectively. The insulation block 4 in fig. 2 substantially corresponds to the insulation block 4 illustrated in fig. 1.

[0177] The interior spaces S1, S2 has/have a depth SD1, SD2 which extends in a depth direction transverse to the longitudinal direction of the elongated insulation block 4, 40. This depth SD1, SD2 may in embodiments of the present disclosure extend over at least 30%, such as over at least 50%, of the width W1 of the insulation block 4, 40 at the area of the respective one or more interior spaces S1, S2.

[0178] The width W1 extends in a width direction WD. The height direction HD and width direction WD may be perpendicular to each other.

[0179] In some embodiments of the present disclosure, the depth SD1, SD2 of the one or more interior spaces S1, S2, may extend over at least 60%, such as

over at least 70%, such as over at least 80% of the width W1 of the elongated insulation block 4, 40 at the area of the interior space S1, S2.

[0180] In some embodiments of the present disclosure, the depth SD1, SD2 of the interior space S1, S2 may extend into less than 95%, such as less than 90%, such as less than 85% of the width W1 of the elongated insulation block 4, 40 at the area of the slit S1, S2.

[0181] The width W1 may be defined between the edge of the slit opening SO1, SO2 and perpendicular to the longitudinal direction LD2 of insulation block (4, 40). For example, the width W1 may be defined in a direction that may be substantially parallel to the plane PL1 and/or substantially parallel to the depth direction DD1, DD2. The width W1 may be defined between the opposing surface 4a, 4b, 40a, 40b.

[0182] For example, in some embodiments of the present disclosure, the depth SD1, SD2 of the one or more interior spaces S1, S2, may extend between 50% and 95%, such as between 60% and 95%, such as between 70% and 95% of the width W1 of the elongated insulation block 4, 40 at the area of the interior space S1, S2.

[0183] The elongated insulation block 4,40 is compressed in a compression direction CD to a compressed state CS by means of one or more contact surfaces, see fig. 1 and 2. In the embodiment of fig. 1, the contact surfaces for the insulation block are provided by walls 3a, 3c1, and/or protrusions 8, 9 thereof. The partition wall 1W may possibly also provide support for the insulation block.. However, e.g. the wall 3b may provide substantially no support for the insulation block 4, or the support may at least be reduced when compared to the support provided by the walls 3c1 and 3a.

[0184] The oppositely directed surfaces SU1, SU2 of the insulation block 4 may in embodiments about the contact surfaces, such as surfaces of the protrusion(s) 8, 9.

[0185] As can be seen from e.g. fig. 1, The cross section of the insulation block 40, 4 may not completely fill the elongated chamber 2, 20. For example, as can be seen for the chamber 2, the chamber(s) 2 may have a relatively complex cross sectional shape provided by e.g. protrusions 8, 9 and walls of the profile. The complex cross sectional shape may originate from features providing advantages with regard to e.g. reduction of material use and/or CO2 footprint, improving insulation performance and/or the like. However, the complex cross sectional shape may also be less desirable from the perspective of introducing an insulation block into the chamber, e.g. due to risk of increased friction caused by larger surface area and/or friction caused by corners, small gaps, steep, such as acute, angles and/or the like and the like. However, according to some embodiments of the present disclosure, the cross sectional area of the elongated insulation block 4, 40 may take up less than 90%, such as less than 80%, such as less than 72% or less than 65% of the total cross sectional area of the elongated chamber 2, 20. This may e.g. help, together

with the interior spaces S1, S2, to provide a solution where less friction occur when inserting the insulation block.

[0186] In one or more embodiments of the present disclosure, the profile may not be completely straight, at least prior to installation of a window profile 1 and/or prior to attachment of other profiles to that profile 1. The insulation block 4, 40 shape may adapt to the local unevenness of the profile over the profile length due to the resiliency provided by the one or more interior spaces S1 S2 of the insulation block and/or the cross sectional dimension of the insulation block 4, 40. This may hence help to provide a solution where it may be more easy to insert the insulation block in chambers 2, 20 with complex shapes, and still the insulation block may adapt due to it's controlled resiliency provided by the interior spaces S1, S2 so as to adapt to the shape of the profile in the longitudinal direction of the profile.

[0187] In some embodiments of the present disclosure, the cross sectional area of the elongated insulation block 4, 40 may take up less than 90%, such as less than 80%, such as less than 72% or less than 65% of the total cross sectional area of the elongated chamber 2, 20 over at least 50%, such as at least 70% or at least 80% of the total length of the profile 1.

[0188] In some embodiments of the present disclosure, the cross sectional area of the elongated insulation block 4, 40 may take up less than 80% of the total cross sectional area of the elongated chamber 2, 20 over at least 70% or at least 80% of the total length of the profile 1.

[0189] In some embodiments of the present disclosure, the cross sectional area of the elongated insulation block 4, 40 may take up at least 50% such as at least 60%, such as at least 65% of the total cross sectional area of the elongated chamber 2, 20.

[0190] In some embodiments of the present disclosure, the cross sectional area of the elongated insulation block (4, 40) takes up at least 60% of the total cross sectional area of the elongated chamber 2, 20 over at least 70% of the length of the profile.

[0191] The one or more interior spaces S1, S2 provides a deflection space into which a part BP1, BP2, 4W of the elongated insulation block 4, 40 extends in response to a compression force subjected in a compression direction to the elongated insulation block 4, 40 inside the elongated chamber 2, 20.

[0192] In some embodiments of the present disclosure, the cross sectional area of the elongated insulation block 4, 40 may take up between 50% and 90%, such as between 60% and 80%, such as between 65% and 72% of the total cross sectional area of the elongated chamber 2, 20.

[0193] It is understood that the cross section of the profile may be determined (such as in a plane) perpendicular to the longitudinal direction of the profile, and that the cross section of the elongated insulation block may be determined (such as in a plane) perpendicular to the longitudinal direction of the elongated insulation block.

[0194] In some embodiments, the compression direction CD is at least partly transverse to the depth direction dd1, dd2 of the spaces (such as slits) S1, S2, so that one or more wall side surfaces WS1, WS2 of the elongated insulation block 4, 40 that abuts the at least one space S1, S2 is/are moved into the space S1, S2. This is illustrated in fig. 1 as well as in fig. 2.

[0195] In some embodiments of the present disclosure, the depth direction DD 1, DD2 may extend along, such as parallel to, or with an acute angle to, an exterior major surface 12a, of the insulated glass unit. In case of an acute angle, acute angle, this acute angle may be less than 30°, such as less than 20° or less than 10°

[0196] The partition wall part 4W, 40W of the elongated insulation block comprises a first partition wall side surface WS1 and a second partition wall side surface WS2. The partition wall side surfaces WS1, WS2 are oppositely directed so that a first of the partition wall side surfaces WS1 faces a first of the spaces S1, and a second of the partition wall side surfaces WS2 faces the other of the spaces, S2. In figs. 1-2, the spaces S1, S2 are slits. Each partition wall side surface WS1, WS2 extends in the depth direction DDR1, DDR2 of the respective slit between the slit opening SO1, SO2 in the respective outer surface 4a, 40a, 4b, 40b and the slit bottom SB1, SB2 that is provided by the bottom wall part 7.

[0197] As can be seen, one or both body parts BP1, BP2 may in embodiments of the present disclosure comprise a surface BP1S, BP2S facing and abutting the respective slit/space S1, S2.

[0198] In some embodiments of the present disclosure, one or both of the first and second insulation body parts BP1, BP2 and/or the partition wall part 4W, 40W of the elongated insulation block 4, 40 may be configured so as to rotate around a rotation axis RAX1, RAX2 in response to the compression force provided by the profile 1. The rotation axis RAX1, RAX2 extends in the longitudinal direction LD2 of the elongated insulation block.

[0199] The two rotation axes RAX1, RAX2 are substantially parallel and are arranged at different side portions of the elongated insulation block 4, 40.

[0200] The rotation may e.g. be provided by the partition wall 4W, 40W and/or walls 7 deflecting in response to the compression force.

[0201] If more than two rotation axes are present, these may also be parallel, e.g. if more than two slits S1, S2 are provided.

[0202] In some embodiments of the present disclosure, as illustrated in figs 1 and 2, said rotation axis RAX1 RAX2 may be defined by and/or arranged at the area of the at least one interconnecting wall part 7 and/or the partition wall 4W, 40W. This may help to provide a flexible and controlled deformation of the insulation block 4, 40, so that the orientation and displacement of the body part BP1 and/or BP2 is adapted the interior geometry of the chambers 20, 2, that is defined by the profile 1 walls 3a-3e and/or parts 8, 9 connected to or integrated therein.

[0203] Accordingly, rather than providing a compression

sion of the outer portions of the body parts BP1, BP2 near the profile wall, the compression of the elongated insulation block 4, 40 is obtained in a controlled manner in the designed compression area of the spaces S1, S2 and the partition wall.

[0204] In some embodiments of the present disclosure, the body parts BP1, BP2 may be substantially solid in the sense that substantially no holes, gaps, openings, slits and/or the like are provided other than air/gas pockets provided by inherent properties of the insulation itself.

[0205] The maximum uncompressed height H1 of the elongated insulation block 4, 40 is reduced to a reduced height H2 by of the profile 1 by means of compression, see fig. 2. This compression may in embodiments of the present disclosure be at least 1%, such as at by at least 3%, such as at least 5% or at least 10% when compared to the initial, uncompressed height H1 of the elongated insulation block 4, 40. However, the compression of the elongated insulation profile 1 is effectuated at the area of the spaces/slits S1, S2, so that the body parts BP1, BP2 are displaced into the spaces provided by the slits S1, S2, thereby preventing or at least reducing the compression of the material of the bodies PB1, BP2.

[0206] In some embodiments of the present disclosure, the elongated insulation block 4, 40 is compressed H2 by no more than 15%, such as no more than 10%, such as no more than 7% when compared to the initial, uncompressed US height H2 of the elongated insulation block 4, 40.

[0207] The maximum (uncompressed) height H1 of the insulation block 4, 40 extends between oppositely directed surfaces SU1, SU2 of the insulation block. The wall or walls 4W, 7 suspends the body parts BP1, BP2 from each other until an outer compression force is applied in the compression direction CD. In some embodiments, the spaces S1, S2, such as slits, are located with a distance from both of the oppositely directed surfaces SU1, SU2 (see fig. 2), with a distance of at least 10%, such as at least 20% or at least 30% of the uncompressed height H1 of the insulation block 4, 40, from one or both of the respective surface SU1, SU2.

[0208] The depth direction DD1, DD2 may extend at least partly transverse to the height H1, H2 direction.

[0209] In one or more embodiments of the present disclosure, the elongated insulation block 1 is a substantially monolithic structure/block. Hence, the elongated insulation block 1 may be molded, cut or in other ways shaped in a single-piece material. In other embodiments of the present disclosure (not illustrated), however, the insulation block 1 may not be monolithic and may be shaped by two or more insulation parts, such as made from or consisting of the same insulation material. In this case, these insulation parts may be glued together, mechanically interconnected and/or the like in order to provide an insulation block build from two or more interconnected insulation parts.

[0210] In one or more embodiments the present disclosure, the elongated insulation block 1 is without inter-

ior reinforcements, such as substantially without interior reinforcements of another material and/or density than the insulation material of the elongated insulation block 4, 40. Hence, the density of the insulation block 1 material may be the same for substantially the entire insulation block.

[0211] The interior spaces S 1, S2, such as slits, are elongated and extend in the longitudinal direction of the insulation block. The interior, elongated spaces S1, S2, such as slits, is/are pre-shaped in the elongated insulation block and is/are provided at predefined locations of the elongated insulation block 4, 40.

[0212] In some embodiments of the present disclosure, the interior, elongated spaces S1, S2, such as slits are provided as a result of a manufacturing solution involving one or more of:

- machining the one or more interior spaces S 1, S2, such as slits, into the elongated insulation block,
- melting the one or more interior spaces S1, S2, such as slits, into the elongated insulation block, and/or
- molding extruding and/or pressing the elongated insulation block during insulation block shaping/manufacturing so as to provide an elongated insulation block comprising the one or more interior spaces S 1, S2.

[0213] As can be seen from fig. 1, the elongated insulation block 4, 40 may in embodiments of the present disclosure rest one or more elongated protrusions 8, 9 such as ridges.

[0214] In fig. 1, two types of such protrusions/ridges 8, 9 are illustrated. The first protrusion type is a reinforcement protrusion 9. The reinforcement protrusion(s) 9 are configured to reinforce the profile 1 to improve the structural integrity.

[0215] In some embodiments of the present disclosure (not illustrated), the reinforcement protrusion 9 may comprise an elongated, solid protrusion made substantially entirely from the same material as the wall 3a-3f wall material and extending in the longitudinal direction of the profile 1.

[0216] In the embodiment of fig. 1, the reinforcement protrusions 9 extend in the longitudinal direction of the profile 1, and a reinforcing core 9a, such as a metal core, e.g., a metal rod, such as a solid metal rod, is embedded inside the protrusion 9. In other embodiments, the reinforcing core 9a may be a material different from the profile wall 3a-3e material, and may e.g. be harder than the wall material. For example, a harder polymer material and/or a fiber reinforced material. This may e.g. be provided by means of co-extrusion. The cross section of the reinforcing core 9a may e.g. be rectangular (as illustrated), or it may e.g. be circular or have another polygonal shape (not illustrated). The reinforcing core 9a may as illustrated be surrounded by, and may abut, a shell of the same material as the walls 3a-3e.

[0217] In fig. 1, five reinforcement protrusions 9 are

provided, but it is understood that fewer, such as two, three or four reinforcement protrusions 9, or more than five, such as six, seven or eight reinforcement protrusions 9, may be provided in further embodiments. In fig. 1, two of the reinforcement protrusions 9 are placed opposite to the glass unit side surface 12e, and three reinforcement protrusions 9 are arranged at the side PS1 of the glass unit plane PL1 facing away from the major glass unit surface 12a. The major glass unit surface 12a is intended for facing the interior of the building after window (or door) installation. The plane side PS1 faces the wall 3c1 that supports the glass unit and the gasket 11. The major glass unit surface 12a comprises/defines the plane PL1. In the embodiment of fig. 1, the major surface 12a is provided by means of the lamination glass 12_4 surface (the surface may be coated or uncoated).

[0218] The reinforcement protrusions 9 are discreetly arranged with a distance between neighboring reinforcement protrusions. The reinforcement protrusions 9 may be parallel.

[0219] In some embodiments of the present disclosure, an air gap AG of at least 1 mm, such as at least 2 mm is provided between the elongated insulation block 4, 40 and one or more of the exterior profile walls 3a-3e. In some embodiments of the present disclosure, an air gap AG of between least 1 mm and 5 mm, such as between 2 mm and 5 mm, is provided between the elongated insulation block 4, 40 and one or more of the exterior profile walls 3a-3e. In some embodiments, the air gap AG height may substantially correspond to the height of the reinforcement protrusion 9 height.

[0220] As illustrated, the air gap AG may be placed next to one or more of said protrusions 9, such as between the protrusions 9.

[0221] However, also larger, straight surfaces facing the interior chamber of the profile may not be in touch with, or may only be partly in touch with the insulation block. For example, in some embodiments, the profile wall 3b for facing the frame opening FO of the final window or door frame may comprise a wall surface facing the interior chamber 2, where that wall surface that is not in touch with, or is only partly in touch with the insulation block. This is illustrated in e.g. fig. 1. As can be seen, the air gap AG distance between the insulation block 4 and the wall 3b may gradually increase from the distant profile corner B and towards the corner C that is placed proximate the major surface 12a of the insulated/insulating glass unit 12.

[0222] The insulation block 1 may in embodiments of the present disclosure, as illustrated, not extend into the air gap(s) AG. Instead, it may rest on top of the protrusions 9, 8.

[0223] The other type of protrusion is protrusion 8 provided to obtain a recessed portion in the exterior surface of the profile 1, such as the recessed portion in the wall 3c1. The recessed portion in wall 3c 1 is provided in order to receive a part of a gasket 11 that is placed between the profile wall 3c1 and the glass unit 12. The

recessed portion may e.g. be provided to maintain the gasket 11 in place and/or help to provide space for a gasket material to enable improved characteristics, such as improved resiliency and/or tightness of the gasket 11 and/or to enable a smaller distance between the profile wall 3c 1 and the glass unit.

[0224] The elongated protrusions 8, 9 extends in the longitudinal direction LD1 of the profile 1.

[0225] The elongated protrusions 8, 9 provides a compression of the elongated insulation block 4, 40.

[0226] In some embodiments of the present disclosure, the elongated insulation block 4, 40 may be unbonded to the profile 1.

[0227] Computer simulations have shown that even though one or more interior, elongated spaces S1, S2 (in the simulated example it was slits) is/are provided in the insulation material, the heat insulation performance may still be acceptable, and a U-frame value lower than 1.54 W/mK, such as lower than 1.52 W/mK, such as lower than 1.51 W/mK may be obtained after insulation insertion. This may even be obtained while at the same time leaving certain areas AG of the elongated chamber 2 unfilled with insulation material of the insulation block.

[0228] In fig. 1, the window or door profile 1 comprises a first 2 and a second 20 elongated chamber. A first 4 and a second 40 of said elongated insulation block 1 is provided in each their chamber 2, 20. The first insulation block 4 is arranged to extend in over and overlap the major surface 12a of the glass unit. The first insulation block 4 also extends in a direction parallel to the major surface 12a to a position out over the side edge of the glass unit 12. Hence, as can be seen, a part of the first insulation block 4 extends to a position opposite to, in this case below, the major surface 12a of the glass unit 12.

[0229] The first insulation block 4 is arranged opposite to the support wall 3c1 of the profile which is configured to support the major glass unit 12 surface 12a.

[0230] The second insulation block 40 is arranged so that it overlaps the side edge 12e surface.

[0231] The second insulation block 40 is arranged opposite to the profile wall 3c2.

[0232] As can be seen from fig 1, the first insulation block 4 and second insulation block 40 may in embodiments of the present disclosure overlap. As can be seen, the second insulation block 40 may extend through the plane PL1.

[0233] In embodiments of the present disclosure, the first insulation block 4 and second insulation block 40 overlaps in a direction parallel to a major surfaces 12a and 12b of the glass unit. Additionally (as illustrated) or alternatively, the first insulation block 4 and second insulation block 40 may overlap in a direction perpendicular to the major surfaces 12a and 12b of the glass unit. In the embodiment illustrated in fig. 1.

[0234] One or both insulation blocks 4, 40 may as illustrated comprise slanting surfaces. In fig 1, the slanting surfaces face the partition wall 1w of the profile. The slanting surfaces may, or may not, about the partition wall

1w.

[0235] In some embodiments of the present disclosure, one or both of the insulation blocks 4, 40 may comprise one or more of the spaces S1, S2, such as slits, as described according to various embodiments of the present disclosure above and/or below. In other embodiments of the present disclosure, only one of the insulation blocks 4, 40 may comprise one or more of the spaces S1, S2, such as slits. In some embodiments, for example, the second insulation block 40 may be omitted or another insulation solution may be provided in the cavity 20.

[0236] In figs. 1 and 2, one or more of the bottom walls 7 and/or the partition wall 4W is/are in a deflected state when the insulation block 4 is in the compressed state CS.

[0237] It is generally understood that in embodiments of the present disclosure, the elongated insulation block 4, 40 may be compressed inside the profile so that the height H1 of the elongated insulation block 4, 40 is reduced, see H2, whereas the insulation block 4, 40 may remain substantially uncompressed in the width direction WD of the profile.

[0238] Fig. 3 illustrates schematically the insulation block 4 according to embodiments of the present disclosure, seen in perspective. In fig. 3, the interior spaces S1, S2, in this case slits, extends continuously in the longitudinal direction LD2 of the elongated insulation block 4, 40 between the opposite ends E1, E1_1 of the elongated insulation block 40. The elongated insulation block 40 has a length IBL extending in the longitudinal direction. This length may extend over substantially the entire length of the profile 1.

[0239] Fig. 4 illustrates schematically an end part of the second insulation block 40, seen in perspective. This 40 has a longitudinal direction LD2 and may have a length substantially corresponding to the length of the profile 1 and/or the length of the first insulation block. Also here, the spaces S1, S2 are slits arranged in oppositely directed surfaces.

[0240] As can be seen from figs 1 and 4, the cross section of the body part B2 may be substantially larger than the cross section of the body part BP1, such as more than 1.5 times or more than 2 times larger the cross section of the body part BP1.

[0241] Fig. 5 illustrates schematically the insulation block 4, seen from the side, towards the side surface 4a comprising the slit S1. Also here, it can be seen that the slit S1 may extend continuously between the opposing ends E1, E1_2. This is different from the embodiment illustrated in fig. 6.

[0242] Fig. 6 illustrates schematically an embodiment of the present disclosure, wherein the insulation block 4 (and/or 40) comprises a plurality of discrete, consecutively arranged, interior spaces S1, S2, in this case slits. The view is towards the surface 4a, but it is understood that the second slit S2 may also be present, as illustrated by dashed lines in fig. 5 and 6.

[0243] In fig. 6, as opposed to fig. 5, the slits comprises a plurality of slits S1, S2 that are distributed consecutively between the opposite ends E1, E1_1 of the elongated insulation block 4, 40. The consecutively arranged, slits S1, S2 are separated by intermediate, discrete walls 14 of insulation material that are distributed in the longitudinal direction of the insulation block 1, and acts as partition walls between two neighboring slits so that a plurality of slit openings SO1 are provided. These intermediate walls 14 between neighboring slits provides a certain resistance towards compression of the insulation block 1, and may help to provide a counter force when the insulation block is subjected to a compression force in the compression direction that is transverse to the longitudinal direction of the insulation block 4. It is understood that the thickness of the walls 14 may be relatively low so as to allow the walls 14 to buckle and/or in other ways deform in response to the compression force in the compression direction CD that is subjected by the profile 1, so that the body part(s) BP1, BP2 moves into the slit spaces and to reduce or avoid compression of the insulation material of the body part(s) BP1, BP2.

[0244] The thickness of the walls 14 (i.e. the wall thickness extending in the longitudinal direction LD2 of the block 1) may in embodiments of the present disclosure be at least 10 times, such as 20 times, such as at least 40 times, smaller than the length of one or both neighboring slits S1 that abuts the respective, intermediate wall 14.

[0245] Figs. 7-10 illustrate schematically various embodiments of the elongated insulation block 4, 40 and the interior spaces S1-S3 (in these embodiments slits) thereof, according to various embodiments of the present disclosure.

[0246] In fig. 7, and also the various embodiments shown in e.g. figs. 1-10, the compression direction CD is at least partly transverse to the depth direction dd1, dd2 of the spaces S1, S2, in this case slits. The slits S1, S2 have a depth (see fig 2) which extends in a depth direction DD1, DD2 transverse to the longitudinal direction of the elongated insulation block 4, 40. Also, the depth of the slits S1, S2 extends transverse to the compression direction CD. The slits S1, S2 extends from a slit opening SO1, SO2 in a surface 4a, 4b of the insulation block 4, 40.

[0247] In figs. 1 and 2, the depth direction DD1, DD2 of the slits (in an uncompressed state) extends substantially perpendicular to height H1 direction HD of the insulation block 1 and may be parallel to the width direction WD (in an uncompressed state), whereas in figs. 7 and 10, the depth directions DD1, DD2 extends sloping with respect to the height direction HD and width direction WD of the insulation block 1.

[0248] The depth directions DD1, DD2 may in embodiments of the present disclosure be parallel and oppositely directed (See e.g. figs. 2-4 and 7-9). In other embodiments, the depth directions DD1, DD2 may be at least partly oppositely directed and non-parallel, See fig. 10. For example, in embodiments of the present

disclosure, the mutual angle α_1 between the depth directions DD1, DD2 may in embodiments of the present disclosure be between 1° and 30° , such as between 3° and 20° , such as between 8° and 15° . The angle α_1 may in embodiments of the present disclosure be an acute angle.

[0249] Figs. 8 and 9 illustrate further embodiments of the present disclosure. Here three spaces S1-S3 are provided, and in this embodiment, the spaces S1, S2, S3 are slits. These slits are provided so that the elongated insulation block is Sigma-shaped (Σ -shaped) when seen in cross section in a plane that is perpendicular to the longitudinal direction LD2 of the elongated insulation block 4, 40. The slits S1-S3 are separated by partition walls W1. One or more, or all, of the slits S1-S3 illustrated in figs. 7-10 may extend continuously (see figs. 3-5) between the oppositely directed ends of the insulation block 1. In other embodiments, one, more or all of the slits S1-S3 may comprise consecutively arranged slits that are separated by intermediate walls 14 which are discretely arranged/distributed in the longitudinal direction of the insulation block 1. See fig. 6 and the description thereto.

[0250] As illustrated in e.g. figs 1-4 and 7-10, the slits S1-S3 may provide a corrugated deflection portion of the insulation block, e.g. by providing An S-shape or is Sigma-shaped (Σ -shaped) cross section. Here it may be understood that the slits S1, S2 and/or S3 provide the grooves/channels and the walls 7 provides the ridges of the corrugated shape.

[0251] Figs. 11-13 illustrate schematically a method of providing an insulated window or door profile 1, according to embodiments of the present disclosure, where an insulation block is introduced into a chamber of a profile 1. The obtained, insulated profile may be a profile as e.g. described above and/or below.

[0252] The window or door profile 1 comprising exterior walls 3a-3e is provided. The profile 1 may e.g. be a profile 1 having a cross sections with walls 3a-3f and possibly also one or more partition walls 1w as previously described. See e.g. fig. 1.

[0253] An elongated insulation block 4, 40 is provided. This insulation block may e.g. be an insulation block 4, 40 as described above according to different embodiments of the present disclosure, e.g. in relation to one or more of figures 1-10.

[0254] The elongated insulation block 4,40 comprises one or more interior spaces S1, S2, such as slits/grooves as described above in relation to various embodiments of the present disclosure.

[0255] The initial, uncompressed height H1 of the insulation block 4 is larger than the height of the profile 1 space 2.

[0256] A driving force DF is provided in the longitudinal direction LD1 of the profile 1 so as to introduce the elongated insulation block 4,40 into the elongated chamber 2, 20 from an end E2 of the profile 1. The the elongated insulation block 4,40 is arranged in a com-

pressed state CS inside the elongated chamber 2, 20, by the body part(s) BP1, BP2 being force moved into the interior space(s) S1, as can be seen in fig. 11 and 12. See also e.g. fig. 1. This provides that the insulation block has the compressed height H2, see figs. 1 and 2.

[0257] In embodiments of the present disclosure, the longitudinal direction LD2 of the elongated insulation block and the longitudinal direction LD1 of the profile 1 may be substantially parallel.

[0258] The driving force DF may be provided so as to introduce at least 40 cm, such as at least 70 cm, for example at least 100 cm, of the length of the elongated insulation block 4, 40 into the elongated chamber 2, 20.

[0259] The driving force DF provides a relative movement between the profile 1 and the insulation block 4 so as to move the insulation block 4, 40 into the profile 1 cavity 2, 20. The driving force DF may be provided by means of drive arrangement 30 comprising one or more drive motors 32 or the like, such as one or more electric motors (not illustrated). The drive arrangement 30 provides a force DF that is transferred to the profile 1. The drive arrangement 30 may in some embodiments of the present disclosure comprise a pushing arrangement 31 configured to transfer a force from a motor 32 to the profile 1 and/or insulation block 4. In some embodiments, the pushing arrangement 31 may comprise one or more wheels, one or more rollers (see fig. 12), one or more belts or the like.

[0260] In some embodiments of the present disclosure, the insulation block 4 may be precompressed by the pushing arrangement 31 and/or by a compressing part (not illustrated), such as a funnel or the like. In some embodiments (not illustrated) a funnel having an outlet that matches or is smaller than the height H2 may be provided to help introducing the insulation block into the chamber 2.

[0261] In some embodiments of the present disclosure, the drive arrangement 30 may move the elongated insulation block 4 into the elongated chamber 2, 20 while the profile 1 is not moved in its longitudinal direction, see fig. 11. In other embodiments, the profile 1 may be moved in its longitudinal direction LD 1 while the insulation block is not moved in its longitudinal direction (not illustrated). In still further embodiments, both the profile 1 and the insulation block 4 may be moved in their longitudinal direction by the drive arrangement 30 to move the insulation block inside the chamber 2.

[0262] The insulation block is initially introduced onto the chamber 2 from the profile 1 end.

[0263] In figs. 11 and 12, protrusions 9, 8, such as ridges, are not present. These protrusions are present in fig. 13. The drive arrangement 30 is not illustrated in fig. 11 and 13 for figure simplicity, but it is naturally understood that this 30 may be present.

[0264] Fig. 14 illustrates schematically a cross section of a building window or door profile 1, according to further embodiments of the present disclosure, wherein the interior spaces S 1, S2 of the insulation block 4, 40 are

enclosed.

[0265] The insulation block 4 in fig. 14 comprises a thin wall 16 arranged opposite to the space S1, S2 bottom SB1, SB2, the walls 16 may in embodiments of the present disclosure be thinner, such as at least 30% thinner, at least 50% thinner or at least 80% thinner, than the bottom wall 7. The walls 16 may be designed to deform, such as buckle (see fig. 14) in response to the compression (as previously disclosed) of the insulation block 4, 40.

[0266] In fig. 14, both spaces S1 S2 are enclosed by the walls SB1, SB2 and 16, respectively. In some embodiments one or more of the spaces S1, S2 may be slits as e.g. illustrated in one or more of figs. 1-13 and the wall 16 may thus not be present. In some embodiments, the wall 16 may extend continuously substantially over the entire length of the insulation block. In other embodiments, the wall 16 may be terminated at one or more locations along the insulation block length. The wall(s) 16 are integrated in the structure of the insulation block 4, 40.

[0267] The space S 1, S2 may in embodiments of the present disclosure extend over at least 50%, of the width W1 of the insulation block 4, 40 at the area of the one or more interior spaces S 1, S2 as e.g. previously disclosed, such as over at least 60%, such as over at least 70%, such as over at least 80% of the width W1 of the elongated insulation block 4, 40 at the area of the interior space S 1, S2.

[0268] The one or more spaces S 1, S2 may be gas-filled such as air-filled.

[0269] The one or more interior spaces S 1, S2 may also in the embodiment of fig. 14 be in fluid communication with the elongated chamber 2, 20. Here, this may be provided at the end(s) of the elongated insulation block 4. However, in some embodiments, if the ends of two elongated insulation blocks abuts at the corner(s) of the final frame (e.g. by means of chamfered insulation block ends), the fluid communication between the chamber 2 and the interior space S1, S2 may be limited or substantially prevented, at least when compared to a slit solution as illustrated in e.g. figs. 1 and 2.

[0270] Fig. 15 illustrates schematically a roof window 200 of the center hung type, according to embodiments of the present disclosure. The roof window comprises a movable frame 100. The movable frame 100 is attached to a fixation frame 105 by means of a hinge arrangement H1 and is configured to rotate around a rotation axis RAX placed between the top TO and bottom BO of the movable frame 100. The rotation axis RAX extends between side profiles of the movable frame. The rotation axis RAX may be substantially horizontal when the roof window 200 is installed in a roof structure of a building.

[0271] The movable frame 100 comprises profiles 1 of the type described above in relation to one or of the figures 1-4. Additionally or alternatively, the fixation frame 150 may comprise profiles 1 of the type described above in relation to one or of the figures 1-4.

[0272] The roof window comprises water covers 110,

111, 112. The roof window in fig. 15 comprises fixed side water covers 10 that are attached to the fixation frame 150. Moreover, the roof window comprises movable side water covers 111 that are configured to move together with the movable frame. The water covers 111, 110 may be configured to guide rainwater towards and/or away from the exterior surface 12b of the insulating glass unit 12. The side water covers 110, 111 may overlap the glass unit surface 12b. The side water covers 110, 111 may be placed in continuation of each other when the movable frame 100 is in a closed position (in fig. 15 the movable frame is in a partly open position). The roof window 200 may also comprise a top cover 112 that extends over a top part of the movable frame 100 when the movable frame is in a closed position. The covers 110, 111, 112 improves water tightness of the roof window.

[0273] In other embodiments of the present disclosure, the roof window 200 may additionally or alternatively be top hung.

[0274] Fig. 16 illustrates a building comprising a door and windows. The windows comprises facade windows. These may in embodiments of the present disclosure comprise a frame 100 comprising one or more profiles 1 as described above.

[0275] The windows of fig. 16 also comprise roof windows arranged in a roof structure 350. One or more of these 200 may in embodiments of the present disclosure comprise a frame 100 comprising one or more profiles 1 as described above.

[0276] The frame 100 of the door may additionally or alternatively comprise one or more profiles 1 as described above.

[0277] Fig. 17 illustrates schematically a cross section of a profile 1 of a roof window 200 according to embodiments of the present disclosure embodiment of the present disclosure, when the window is installed in a roof structure of a building. The window 200 may be a window as illustrated in e.g. fig 1. However, the insulating glass unit 12 and hatching lines indicating the cross section, as well as many reference numbers, are not illustrated in fig. 17 in order to improve understanding of the figure and the indicated isotherm lines ITL illustrated by dashed-dotted lines. It is understood that the isotherm lines ITL are merely schematic and envisaged.

[0278] The illustrated isotherm lines ITL extend inside the chamber 2a, and slant towards the glass unit 12 (see plane PL1). A plurality of the isotherm lines crosses the interior spaces S1, S2 of the insulation block 4. A group, such as two, three, four or more, of the isotherm lines ITL extends in a direction transverse to the depth directions DD1, DD2 (see fig 1) and thereby extends through/-crosses the interior spaces S1, S2, such as slits. The temperature difference between the adjacent isotherm lines ITL may in embodiments of the present disclosure be less than 5°C, such as less than 3°C, such as 2°C, or 1°C.

[0279] The insulation block 4 is in compressible contact with a cold wall 3c and a hot wall 3a of the profile,

respectively.

[0280] In embodiments of the present disclosure, one or more of the interior spaces S1, S2, such as one or more slits, may have a slit height SH (see fig. 2), such as a maximum slit height, less than 4 mm such as less than 3 mm, such as less than 2 mm. The slit height extends transverse to the depth direction DD1, DD2, see fig. 1 and 2. This may at least be the case when the insulation block 4, 40 is compressed, and e.g. also before insulation block compression, and may represent be the slit height SH for the major part or the whole part of extension of the slit depth extension. This may e.g. provide improved heat insulation properties.

[0281] The recessed portion RP provided by walls 3c 1 and 3c2 which meet at corner 3cc is illustrated in fig. 17. This recessed portion is configured to receive the glass unit 12 edge, see fig. 1.

Items

[0282] The present disclosure is described according to various embodiments of the present disclosure, in the below items:

1. A window or door profile (1), such as a roof window profile, wherein the window or door profile (1) comprises exterior walls (3a-3e) providing an outer profile boundary, wherein the profile (1) is elongated and extends in a longitudinal direction (LD1), wherein the exterior walls (3a-3e) encloses at least one elongated chamber (2, 20) which extends in the longitudinal direction (LD1) of the profile (1),

wherein the profile (1) comprises at least one elongated insulation block (4,40) which extends inside the elongated chamber (2, 20) in the longitudinal direction (LD1) of the profile (1), wherein the elongated insulation block (4,40) comprises a foam insulation material, wherein the elongated insulation block (4) comprises one or more interior spaces (S1, S2), wherein the one or more interior spaces (S1, S2) is elongated and extends in the longitudinal direction (LD2) of the elongated insulation block (4, 40),

wherein the one or more interior spaces (S1, S2) is arranged between a first insulation body part (BP1) and a second insulation body part (BP2) of the elongated insulation block (4, 40), wherein the first and second insulation body parts (BP1, BP2) are interconnected by means of at least one wall part (7) of the elongated insulation block (4, 40) which is arranged opposite to the one or more interior spaces (S1, S2).

2. A window or door profile (1) according to item 1, wherein the one or more interior spaces (S1, S2) has/have a depth (SD1, SD2) which extends trans-

verse to the longitudinal direction (LD2) of the elongated insulation block (4, 40), wherein said depth extends over at least 50%, of the width (W1) of the insulation block (4, 40) at the area of the one or more interior spaces (S1, S2).

3. A window or door profile (1) according to item 1 or 2, wherein the one or more interior spaces (S1, S2) comprises one or more slits arranged in an outer surface (4a, 40a, 4b, 40b) of the elongated insulation block (4, 40), wherein the one or more one slits (S1, S2) extends in a depth direction (DD1, DD2) into the elongated insulation block (4, 40) towards a slit bottom (SB1, SB2) from an a slit opening (SO1, SO2) in an outer surface (4a, 40a, 4b, 40b) of the elongated insulation block (4, 40), and wherein the at least one wall part (7) provides a bottom (SB1, SB2) of the slits (S1, S2).

4. A window or door profile (1) according to any of the preceding items, wherein the one or more interior spaces (S1, S2) comprises a first slit (S1) and a second slit (S2) arranged in outer surfaces (4a, 40a, 4b, 40b) of the elongated insulation block (4, 40), wherein the first slit (S1) and the second slit (S2) each extends in a depth direction (DD1, DD2) into the elongated insulation block (4, 40) towards a slit bottom (SB1, SB2) from slit openings (SO1, SO2) in different outer surfaces (4a, 40a, 4b, 40b) of the elongated insulation block (4, 40) so that the first (S1) and the second slit (S2) overlaps and so that a partition wall part (4W, 40W) of the elongated insulation block (4, 40) is arranged between the first slit (S1) and the second slit (S2).

5. A window or door profile (1) according to item 4, wherein the different outer surfaces (4a, 40a, 4b, 40b) of the elongated insulation block (4, 40) are oppositely directed and/or wherein the first depth direction (DD1) and the second depth direction (DD2) are substantially oppositely directed.

6. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block (4, 40) is in a compressed state (CS, H2) in the elongated chamber (2, 20).

7. A window or door profile (1) according to any of the preceding items, wherein the first and second insulation body parts (BP1, BP2) are resiliently suspended, by means of one or more walls (7, 4W, 40W) of the elongated insulation block,

such as wherein a partition wall part (4W, 40W) interconnects bottom wall parts (7) which provides a bottom (SB1, SB2) of different interior spaces (S1, S2),

and/or

wherein the first and second insulation body parts (BP1, BP2) are resiliently suspended by means of one or more bottom walls (7) and at least one partition wall (4W, 40W) of the elongated insulation block.

8. A window or door profile (1) according to any of items 6 or 7, wherein said one or more walls (7, 4W, 40W), such as the one or more bottom walls (7) and the at least one partition wall (4W, 40W), is/are in a compressed state (CS), such as in a deflected state, in the compartment (2, 20).

9. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block (4, 40) is in the compressed state (CS, H2) in the elongated chamber (2, 20) so that a cross sectional area of the one or more interior spaces (S1, S2) is reduced.

10. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block (4, 40) comprises a partition wall part (4W, 40W) placed between the first insulation body part (BP1) and a second insulation body part (BP2), and wherein an interior space (S1, S2) is arranged at each side of the partition wall part (4W, 40W).

11. A window or door profile (1) according to any of the preceding items, wherein each of the first and second body part (BP1, BP2) constitutes at least 15%, such as at least 25%, such as at least 35%, of the total cross-sectional area of the elongated insulation block (4, 40).

12. A window or door profile (1) according to any of the preceding items, wherein at least one of the first and second body part (BP1, BP2) constitutes at least 25%, such as at least 35%, or at least 45% of the total cross-sectional area of the elongated insulation block (4, 40).

13. A window or door profile (1) according to any of the preceding items, wherein the one or more interior spaces (S1, S2) provides a deflection space into which a part (BP1, BP2, 4W, 40W) of the elongated insulation block (4, 40) extends in response to a compression force subjected to the elongated insulation block (4, 40) in a compression direction (CD) inside the elongated chamber (2, 20).

14. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block (4, 40) is resilient and thereby provides a counter force in response to a compression force subjected to the elongated insulation block (4, 40)

inside the elongated chamber (2, 20), preferably due to the inherent resilient properties of the insulation material of the insulation block (4, 40).

15. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block (4,40) is compressed in a compression direction (CD) to a compressed state (CS) by means of one or more contact surfaces, such as contact surfaces provided by walls (1W, 3a, 3c), and/or protrusions (8, 9) of the profile (1),

16. A window or door profile (1) according to item 15, wherein the compression direction (CD) is at least partly transverse to the depth direction (DD1, DD2) of the interior spaces, such as slits, so that one or more wall side surfaces (WS1, WS2) of the elongated insulation block (4, 40) that abuts the at least one slit (S1, S2) is moved into the at least one slit (S1, S2).

17. A window or door profile (1) according to any of the preceding items, wherein the one or more interior spaces (S1, S2) comprises a first interior space (S1) and a second interior space (S2), wherein the first (S1) and the second (S2) interior space overlaps so that a partition wall part (4W, 40W) of the elongated insulation block (4, 40) is arranged between the first interior space (S1) and the second interior space (S2).

18. A window or door profile (1) according to any of the preceding items, wherein one or both of the first and second insulation body parts (BP1, BP2) and/or a partition wall part (4W, 40W) of the elongated insulation block (4, 40) is/are configured so as to rotate at least partly around one or more rotation axes (RAX1, RAX2) in response to a deflection force provided by the profile (1), wherein said rotation axis (RAX1 RAX2) extends in the longitudinal direction (LD2) of the elongated insulation block.

19. A window or door profile (1) according to any of the preceding items, wherein one or both of the first and second insulation body parts (BP1, BP2) and/or said partition wall part (4W, 40W) is/are configured so as to rotate around at least two rotation axes (RAX1, RAX2) in response to a deflection force provided by the profile (1), wherein said at least two rotation axes (RAX1 RAX2) extends in the longitudinal direction (LD2), the elongated insulation block, such as wherein the at least two rotation axes (RAX1 RAX2) are arranged at different side portions of the elongated insulation block (4, 40).

20. A window or door profile (1) according to item 18 or 19, wherein at least the partition wall part (4W, 40W) of the elongated insulation block (4, 40) is

configured to provide said rotation around the one or more rotation axes (RAX1, RAX2) due to a deflection of the partition wall (4W, 40W).

21. A window or door profile (1) according to any of the preceding items, wherein said rotation axis ((RAX1 RAX2) is defined by and/or arranged at the area of the at least one interconnecting wall part (7) and/or the partition wall.

22. A window or door profile (1) according to any of the preceding items, such as one or more of items 4-21, wherein the partition wall part (4W, 40W) comprises a first partition wall side surface (WS1) and a second partition wall side surface (WS2), wherein the partition wall side surfaces (WS1, WS2) are oppositely directed so that a first of the partition wall side surfaces (WS1) faces a first of the slits (S1), and a second of the partition wall side surfaces (WS2) faces the other of the slits (S2), wherein each partition wall side surface (WS1, WS2) extends in the depth direction (DDR1, DDR2) of the respective slit between the slit opening (SO1, SO2) in the respective outer surface (4a, 40a, 4b, 40b) and the slit bottom (SB1, SB2).

23. A window or door profile (1) according to any of items 2-22, wherein said slits (S1, S2) together provides an S-shaped and/or a Σ -shaped elongated insulation block (4, 40) when seen in cross section in a plane that is perpendicular to the longitudinal direction (LD2) of the elongated insulation block (4, 40).

24. A window or door profile (1) according to any of items 2-23, wherein the slits S1-S3 provide a corrugated deflection portion of the insulation block (4, 40)

25. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block (4, 40) is configured so that one or more of said one or more interior spaces (S1, S2), such as one or more slits, has/have a slit height (SH) between 0.5 mm and 4 mm, such as between 0.5 and 2 mm, such as between 1 mm and 2 mm.

26. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block (4, 40) is compressed (H2) by at least 1%, such as at by at least 3%, such as by at least 5% when compared to the initial, uncompressed (US) height (H1) of the elongated insulation block (4, 40).

27. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block (4, 40) is compressed (H2) by no more than 20%, such as no more than 15%, such as no more than 10%, such as no more than 7%, when com-

pared to the initial, uncompressed (US) height (H2) of the elongated insulation block (4, 40).

28. A window or door profile (1) according to any of the preceding items, wherein the depth (SD1, SD2) of the one or more interior spaces (S1, S2), such as one or more slits, extends over at least 60%, such as over at least 70%, such as over at least 80% of the width (W1) of the elongated insulation block (4, 40) at the area of the interior space (S1, S2).

29. A window or door profile (1) according to any of the preceding items, wherein the depth (SD 1, SD2) of the interior space (S1, S2), such as one or more slits, extends into less than 95%, such as less than 90%, such as less than 85% of the width (W1) of the elongated insulation block (4, 40) at the area of the slit (S1, S2).

30. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block (4, 40) rests one or more elongated protrusions (8, 9), such as reinforcement protrusions (9), of the profile (1) which extends into the chamber (2, 20), wherein the elongated protrusions (8, 9) extend in the longitudinal direction (LD1) of the profile (1).

31. A window or door profile (1) according to item 30, wherein the one or more elongated protrusions (8, 9) provides a compression of the elongated insulation block 4, 40.

32. A window or door profile (1) according to any of the preceding items, such as according to item 30 or 31, wherein an air gap (AG) of at least 1 mm, such as at least 2 mm is provided between the elongated insulation block (4, 40) and one or more of the exterior profile walls (3a-3e).

33. A window or door profile (1) according to any of the preceding items, such as according to item 30 or 31, wherein an air gap (AG) of between least 1 mm and 5mm, such as between 2mm and 5 mm is provided between the elongated insulation block (4, 40) and one or more of the exterior profile walls (3a-3e).

34. A window or door profile (1) according to item 32 or 33, wherein the air gap (AG) is arranged next to or between neighboring, discreet protrusions (8, 9) of the profile.

35. A window or door profile (1) according to any of the preceding items, wherein the body parts (BP1, BP2) are solid in the sense that substantially no holes, gaps, openings, slits and/or the like are provided other than air/gas pockets provided by inher-

ent properties of the insulation material itself.

36. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block is a substantially monolithic structure and/or is without interior reinforcements, such as substantially without interior reinforcements of another material and/or density than the insulation material of the elongated insulation block (4, 40).

37. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block (4, 40) is un-bonded to the profile.

38. A window or door profile (1) according to any of the preceding items, wherein the insulation material of the elongated insulation block (4, 40) has a density between 25 kg/m³ and 70 kg/m³, such as between 28 kg/m³ and 60 kg/m³, for example between 30 kg/m³ and 45 kg/m³.

39. A window or door profile (1) according to any of the preceding items, wherein the insulation material of the elongated insulation block (4, 40) has a U-value of less than 0.040 W/mK, such as less than 0.0350 W/mK,

40. A window or door profile (1) according to any of the preceding items, wherein the insulation material of the elongated insulation block (4, 40) has a U-value between 0.025 W/mK, and 0.045 W/mK, such as between 0.03 W/mK, and 0.04 W/mK.

41. A window or door profile (1) according to any of the preceding items, wherein the foam insulation material of the elongated insulation block (4, 40) comprises or is an expanded polypropylene insulation material, such as a closed cell expanded polypropylene insulation material,

42. A window or door profile (1) according to any of the preceding items, wherein one or both interior spaces (S1, S2), such as slits, extends continuously in the longitudinal direction (LD2) of the elongated insulation block (4, 40) between the opposite ends (E1, E1_1) of the elongated insulation block (4, 40).

43. A window or door profile (1) according to any of the preceding items, wherein a plurality of said interior spaces (S1, S2), such as slits, extend between the opposite ends (E1, E1_1) of the elongated insulation block (4, 40), wherein the consecutively arranged, interior spaces (S1, S2) are separated by intermediate walls in the insulation material.

44. A window or door profile (1) according to any of the preceding items, wherein the one or more inter-

ior, elongated spaces (S1, S2), such as slits, is/are pre-shaped in the elongated insulation block and is provided at predefined locations of the elongated insulation block (4, 40)

45. A window or door profile (1) according to any of the preceding items, wherein the one or more interior, elongated spaces (S1, S2), such as slits, are present as a result of a manufacturing solution involving one or more of:

- machining the one or more interior spaces (S1, S2), such as slits, into the elongated insulation block,
- melting the one or more interior spaces (S1, S2), such as slits, into the elongated insulation block, and/or
- molding extruding and/or pressing the elongated insulation block during insulation block shaping/manufacturing so as to provide an elongated insulation block comprising the one or more interior spaces (S1, S2), such as slits.

46. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block (4, 40) has a length (IBL) which extends substantially over the entire length of the profile (1).

47. A window or door profile (1) according to any of the preceding items, wherein at least 50%, such as at least 80%, such as at least 95% of the compression of the elongated insulation block (4, 40) inside the profile is provided by means of one or more insulation body parts (BP1, BP2) of the elongated insulation block (4, 40) extending into the one or more interior spaces (S1, S2) due to the compression of the elongated insulation block (4, 40).

48. A window or door profile (1) according to any of the preceding items, wherein the elongated insulation block (4, 40) is in the compressed state (CS, H2) in the elongated chamber (2, 20) so that at least 50%, such as at least 80%, such as at least 95% of the compression (H1→H2) of the elongated insulation block (4, 40) in a compression direction (CD) is provided by means of a reduction of the cross sectional area of the one or more interior spaces (S1, S2) when compared to the cross sectional area of the one or more interior spaces (S1, S2) when the elongated insulation block 4, 40 is in a substantially uncompressed state.

49. A window or door profile (1) according to any of the preceding items, wherein the window or door profile comprises a first and a second elongated chamber (2, 20), and a first (4) and a second (40) of said elongated insulation block, wherein the first insulation block (4) is arranged opposite to a support

wall (3c1) of the profile which is configured to support a major surface (12a) of a glass unit (12), and wherein the second insulation block (40) is arranged opposite to a profile wall (3c2) which is configured to be arranged opposite to a side edge surface (12e) of the insulating glass unit (12).

50. A window or door profile (1) according to any of the preceding items, wherein the cross sectional area of the elongated insulation block (4, 40) take up less than 90%, such as less than 80%, such as less than 72% or less than 65% of the total cross sectional area of the elongated chamber (2, 20).

51. A window or door profile (1) according to any of the preceding items, wherein the cross sectional area of the elongated insulation block (4, 40) take up less than 90%, such as less than 80%, such as less than 72% or less than 65% of the total cross sectional area of the elongated chamber (2, 20) over at least 50%, such as at least 70% or at least 80% of the length of the profile (1).

52. A window or door profile (1) according to any of the preceding items, wherein the cross-sectional area of the elongated insulation block (4, 40) takes up at least 50% such as at least 60%, such as at least 65% of the total cross sectional area of the elongated chamber (2, 20).

53. A window or door profile (1) according to any of the preceding items, wherein the cross-sectional area of the elongated insulation block (4, 40) takes up at least 50% such as at least 60%, such as at least 65% of the total cross sectional area of the elongated chamber (2, 20) over at least 50%, such as at least 70% or at least 80% of the length of the profile.

54. A building window (200) or door (200), such as a roof window or a facade window, comprising a frame (100), wherein the frame (100) comprises a plurality of profiles (1) according to any of the preceding items which together provides a rectangular frame with a frame opening (FO), wherein an insulating glass unit (12) is supported by the frame (100), such as by a profile wall (3c1).

55. A building window according to claim 54, wherein the insulating glass unit (12) extends into an elongated, recessed portion (RP) of the profile (1), which recessed portion (RP) is provided by means of first and second profile wall parts (3c1, 3c2) of the profile, so that the first profile wall part (3c1) of the profile (1) overlaps and supports a part of an exterior major surface (12a) of the insulated glass unit (12), and so that the second profile wall part (3c2) is arranged opposite to an edge surface (12e) of the insulating glass unit (5).

56. A building window, according to item 54 or 55, wherein at least one of said at least one elongated insulation block (4) extends to a position opposite an exterior major surface (12a) of the insulating glass unit (5).

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57. A building window, according to any of items 54-56, wherein at least one of the at least one elongated insulation block (40) extends to a position opposite a side edge (12e) surface of the insulating glass unit (12).

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58. A building window according to any of items 54-57, wherein the building window is a roof window configured to be installed in a roof structure of a building, such as with an angle which is larger than 17°, such as larger than 30° with respect to horizontal.

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59. A building window (200), according to any of items 54-58, wherein the design of the window (200) and the one or more interior spaces (S1, S2, S3) is configured to provide that a plurality of isotherm lines (ITL) extends through the one or more interior spaces (S1, S2, S3) in a direction transverse to the depth direction (DD1, DD2) of the one or more interior spaces (S1, S2, S3), when the building window (200) is installed in a structure, such as a roof structure (350), of a building (300).

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60. A building window (200) according to item 59, wherein the temperature difference between the adjacent isotherm lines ITL is less than 5°C, such as less than 3°C, such as 2 °C, or 1 °C.

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61. A building window (200) according to item 59 or 60, wherein one or more of the interior spaces (S1, S2), such as one or more slits, has/have a height (SH), such as a maximum slit height, less than 4 mm such as less than 3 mm, such as less than 2 mm.

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62. A method of providing an insulated window or door profile (1) according to any of the preceding items, the method comprising:

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- providing a window or door profile (1) comprising exterior walls (3a-3e) providing an outer profile boundary, wherein the profile (1) is elongated and extends in a longitudinal direction (LD1), wherein the exterior walls (3a-3e) enclose at least one elongated chamber (2, 20) which extends in the longitudinal direction (LD1),
- providing an elongated insulation block (4,40), comprising one or more interior spaces (S1, S2), wherein the one or more interior spaces (S1, S2) is elongated and extends in the longitudinal direction (LD2) of the elongated insulation block

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(4, 40),

wherein the one or more interior spaces (S1, S2) is arranged between a first insulation body part (BP1) and a second insulation body part (BP2) of the elongated insulation block (4, 40), wherein the first and second insulation body parts (BP1, BP2) are interconnected by means of at least one wall part (7) of the elongated insulation block (4, 40) which is arranged opposite to the one or more interior spaces (S1, S2), wherein the one or more interior spaces (S1, S2) has a depth (SD1, SD2) which extends transverse to the longitudinal direction (LD2) of the elongated insulation block (4, 40), wherein said depth extends over at least 50%, of the width (W1) of the insulation block (4, 40) at the area of the one or more interior spaces (S1, S2),

wherein the method further comprises providing a driving force (DF) in the longitudinal direction (LD1) of the profile (1), such as by means of a drive arrangement (30), so as to introduce the elongated insulation block (4,40) into the elongated chamber (2, 20) from an end (E2) of the profile (1), and wherein the elongated insulation block (4,40) is arranged in a compressed state (CS) inside the elongated chamber (2, 20).

63. A method according to claim 62, wherein the driving force (DF) is provided so as to introduce at least 40 cm, such as at least 70 cm, for example at least 100 cm, of the length of the elongated insulation block (4, 40) into the elongated chamber (2, 20).

64. A method according to item 62 or 63, wherein the driving force (DF) moves the elongated insulation block (4, 40) into the elongated chamber (2, 20) while the profile (19) is maintained unmoved.

65. A method according to any of items 62-64, wherein said method provides a profile (1) comprising one or more elongated insulation blocks (4, 40) arranged in an interior chamber (2, 20) of the profile, according to any of items 1-56.

66. A window or door profile (1), such as a roof window profile, according to any of the preceding items, wherein the one or more interior spaces (S1, S2) provides a wakened portion of the elongated insulation block, and thereby a deflection area/section providing that the majority of the compression (H1→H2) of the elongated insulation block is provided at the area of the one or more interior spaces (S1, S2).

67. A window or door profile (1) according to item 66 wherein the wakened portion provides that at least

50%, such as at least 80%, such as at least 95% of the compression of the elongated insulation block is provided by means of one or more insulation body parts (BP1, BP2) of the elongated insulation block (4, 40) extending into the one or more interior spaces (S1, S2) due to the compression of the elongated insulation block (4, 40).

68. A window or door profile (1), such as a roof window profile, according to any of the preceding items, wherein the elongated insulation block (4, 40) is compressed inside the profile so that the height (H1) of the elongated insulation block (4, 40) is reduced whereas the insulation block remains substantially uncompressed in the width direction (WD) of the profile.

[0283] In general, it is to be understood that the present disclosure is not limited to the particular examples described above but may be adapted in a multitude of varieties within the scope of the present disclosure as specified in e.g. the claims and/or items. Accordingly, for example, one or more of the described and/or illustrated embodiments above may be combined to provide further embodiments of the disclosure.

Claims

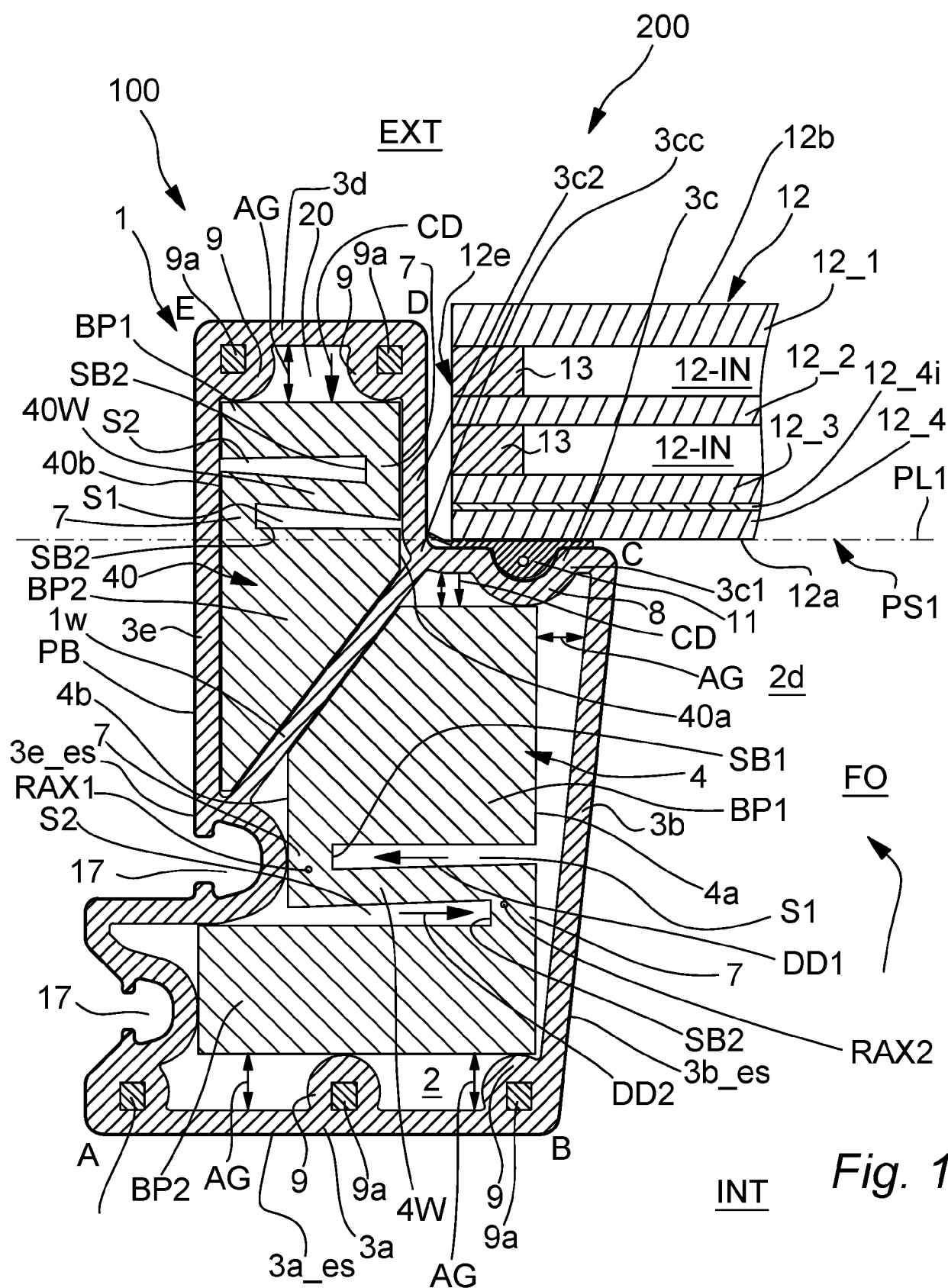
1. A window or door profile (1), such as a roof window profile, wherein the window or door profile (1) comprises exterior walls (3a-3e) providing an outer profile boundary (PB), wherein the profile (1) is elongated and extends in a longitudinal direction (LD1), wherein the exterior walls (3a-3e) encloses at least one elongated chamber (2, 20) which extends in the longitudinal direction (LD1) of the profile (1),

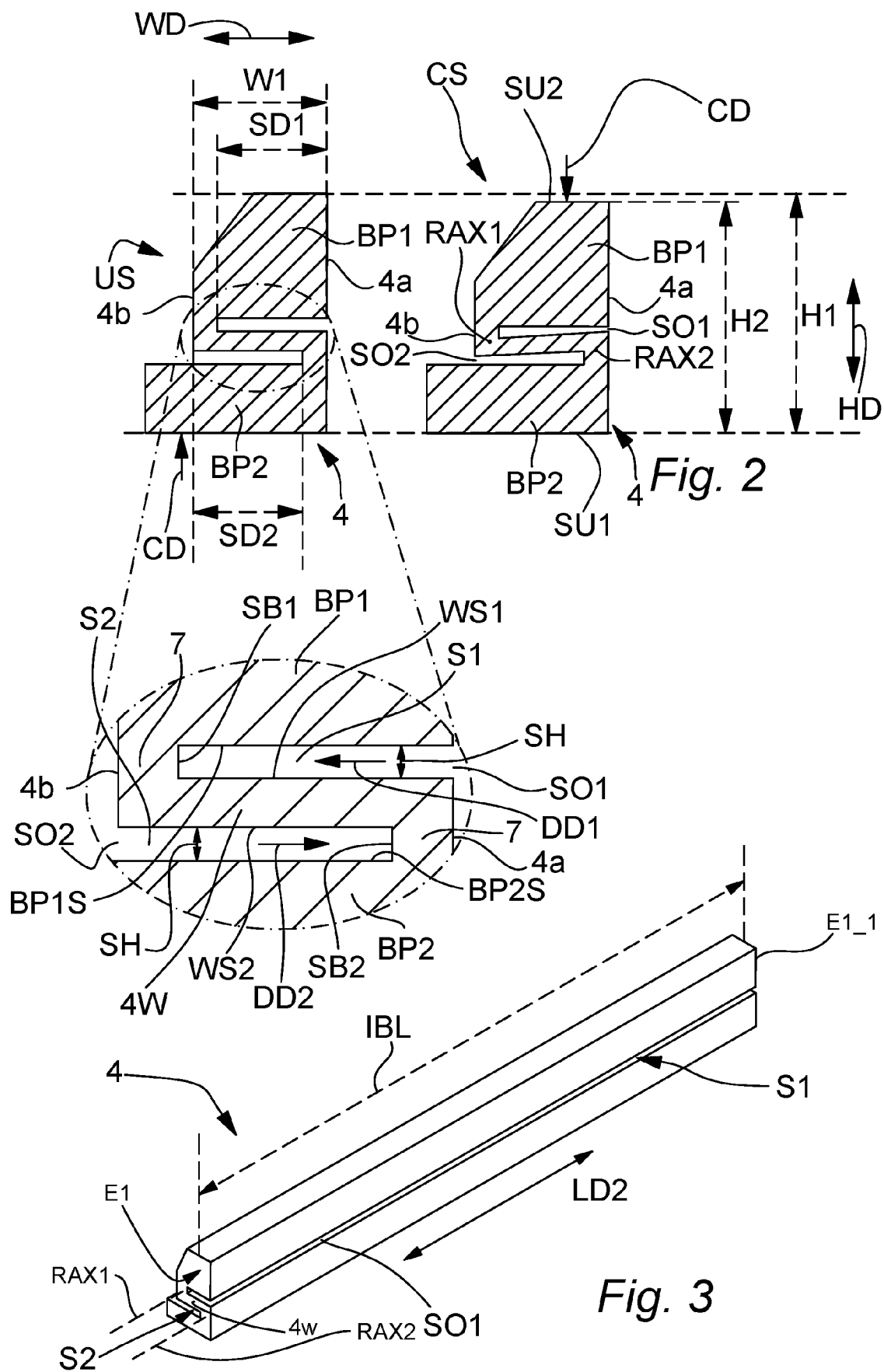
wherein the profile (1) comprises at least one elongated insulation block (4,40) which extends inside the elongated chamber (2, 20) in the longitudinal direction (LD1) of the profile (1), wherein the elongated insulation block (4,40) comprises a foam insulation material, wherein the elongated insulation block (4) comprises one or more interior spaces (S1, S2), wherein the one or more interior spaces (S1, S2) is elongated and extends in the longitudinal direction (LD2) of the elongated insulation block (4, 40), wherein the one or more interior spaces (S1, S2) is arranged between a first insulation body part (BP1) and a second insulation body part (BP2) of the elongated insulation block (4, 40), wherein the first and second insulation body parts (BP1, BP2) are interconnected by means of at least one wall part (7) of the elongated insulation block (4, 40) which is arranged opposite to the

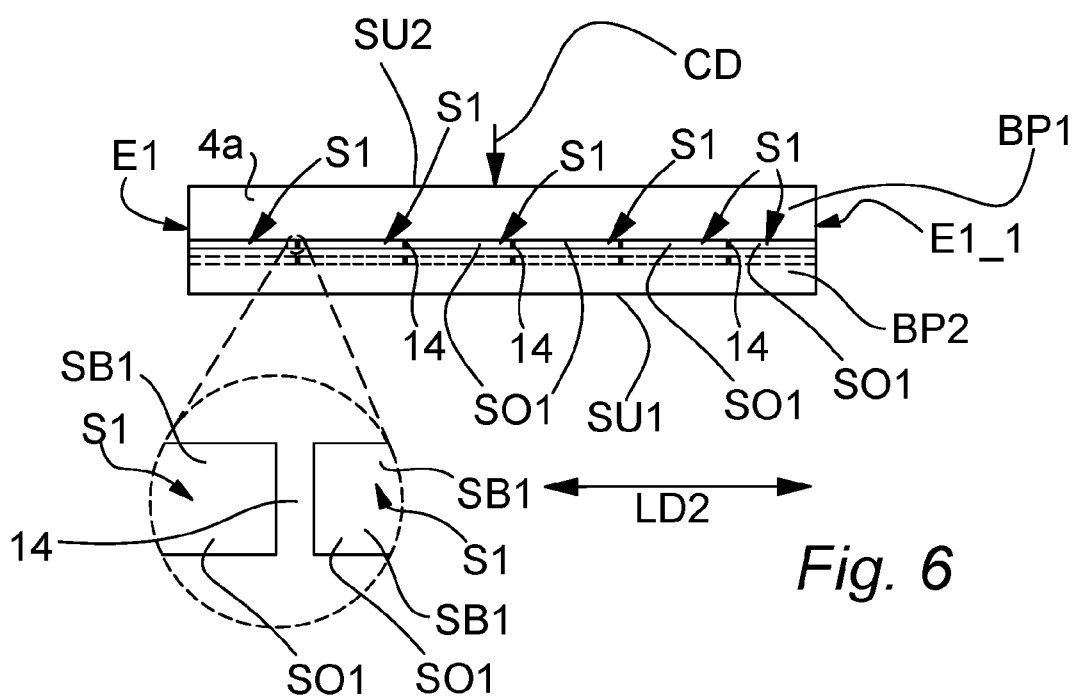
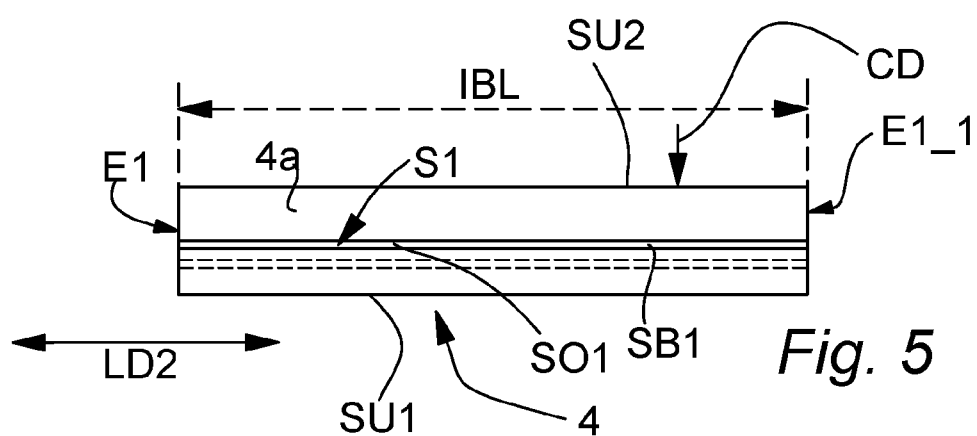
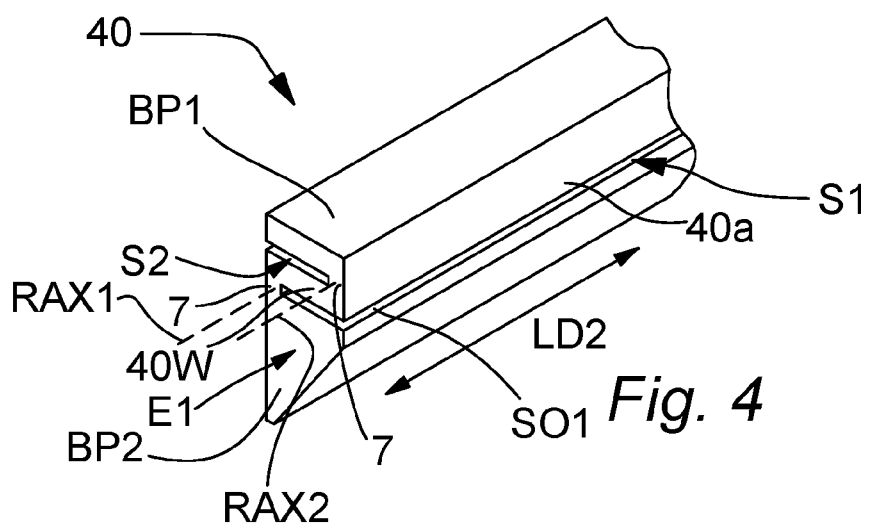
one or more interior spaces (S1, S2), wherein the one or more interior spaces (S1, S2) has a depth (SD1, SD2) which extends transverse to the longitudinal direction (LD2) of the elongated insulation block (4, 40), wherein said depth extends over at least 50%, of the width (W1) of the insulation block (4, 40) at the area of the one or more interior spaces (S1, S2), wherein the elongated insulation block (4,40) is in a compressed state (CS, H2) in the elongated chamber (2, 20).

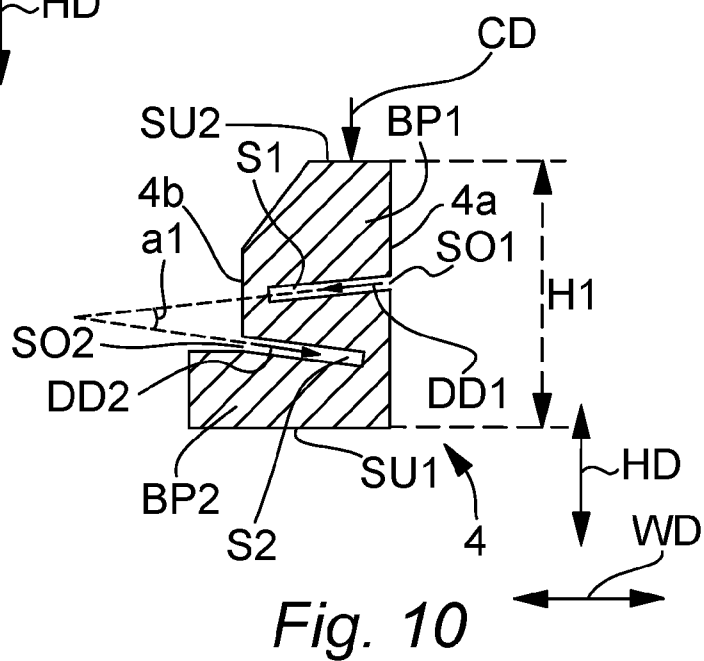
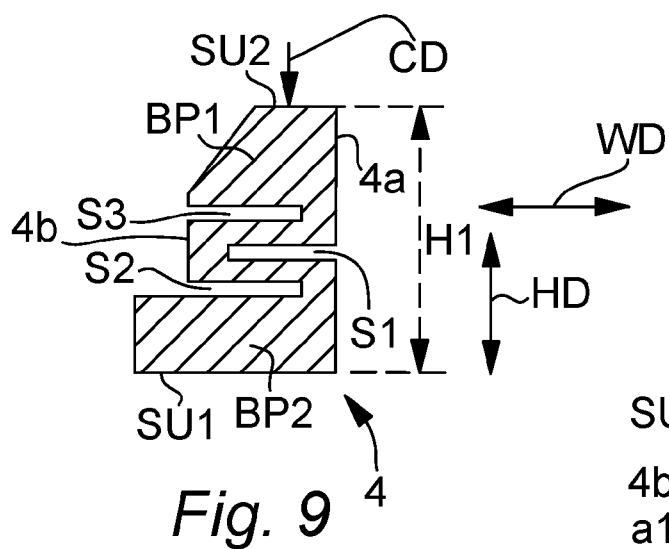
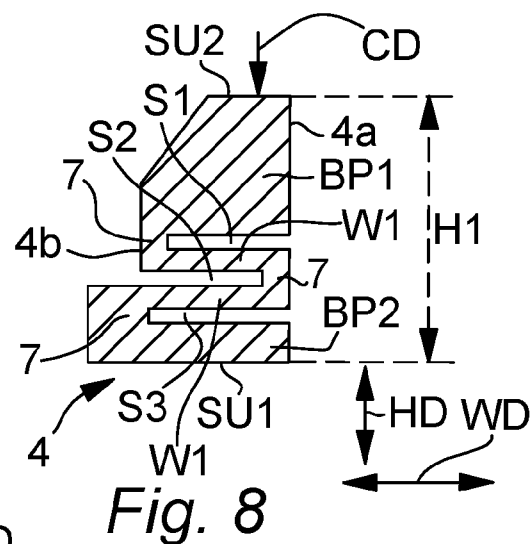
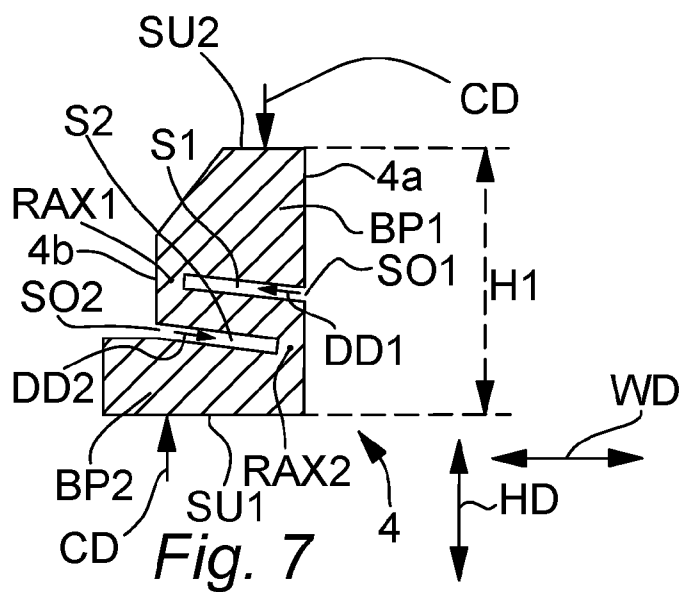
2. A window or door profile (1) according to claim 1, wherein the one or more interior spaces (S1, S2) comprises one or more slits arranged in an outer surface (4a, 40a, 4b, 40b) of the elongated insulation block (4, 40), wherein the one or more slits (S1, S2) extends in a depth direction (DD1, DD2) into the elongated insulation block (4, 40) towards a slit bottom (SB1, SB2) from an a slit opening (SO1, SO2) in an outer surface (4a, 40a, 4b, 40b) of the elongated insulation block (4, 40), and wherein the at least one wall part (7) provides a bottom (SB1, SB2) of the slits (S1, S2).
3. A window or door profile (1) according to any of the preceding claims, wherein the one or more interior spaces (S1, S2) comprises a first slit (S1) and a second slit (S2) arranged in outer surfaces (4a, 40a, 4b, 40b) of the elongated insulation block (4, 40), wherein the first slit (S1) and the second slit (S2) each extends in a depth direction (DD1, DD2) into the elongated insulation block (4, 40) towards a slit bottom (SB1, SB2) from slit openings (SO1, SO2) in different outer surfaces (4a, 40a, 4b, 40b) of the elongated insulation block (4, 40) so that the first (S1) and the second slit (S2) overlaps and so that a partition wall part (4W, 40W) of the elongated insulation block (4, 40) is arranged between the first slit (S1) and the second slit (S2).
4. A window or door profile (1) according to any of the preceding claims, wherein the first and second insulation body parts (BP1, BP2) are configured so as to be resiliently suspended, by means of one or more walls (7, 4W, 40W) of the elongated insulation block, and/or wherein a partition wall part (4W, 40W) interconnects bottom wall parts (7) which provides a bottom (SB1, SB2) of different interior spaces (S1, S2).
5. A window or door profile (1) according to any of the preceding claims, wherein each of the first and second body part (BP1, BP2) constitutes at least 15%, such as at least 25%, such as at least 35%, of the total cross sectional area of the elongated insulation block (4, 40).

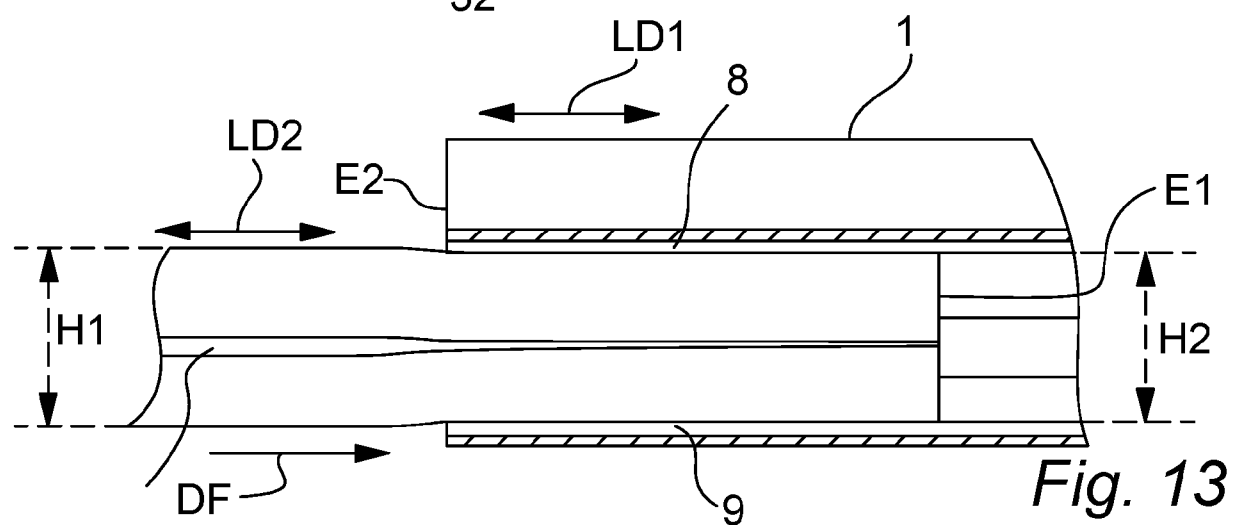
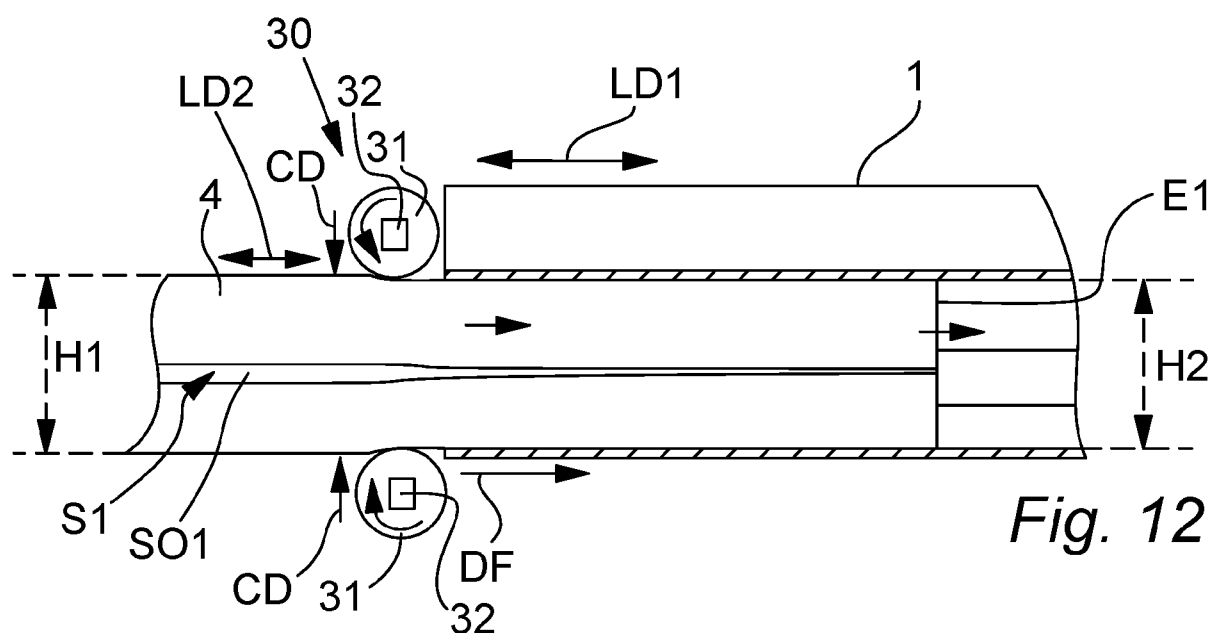
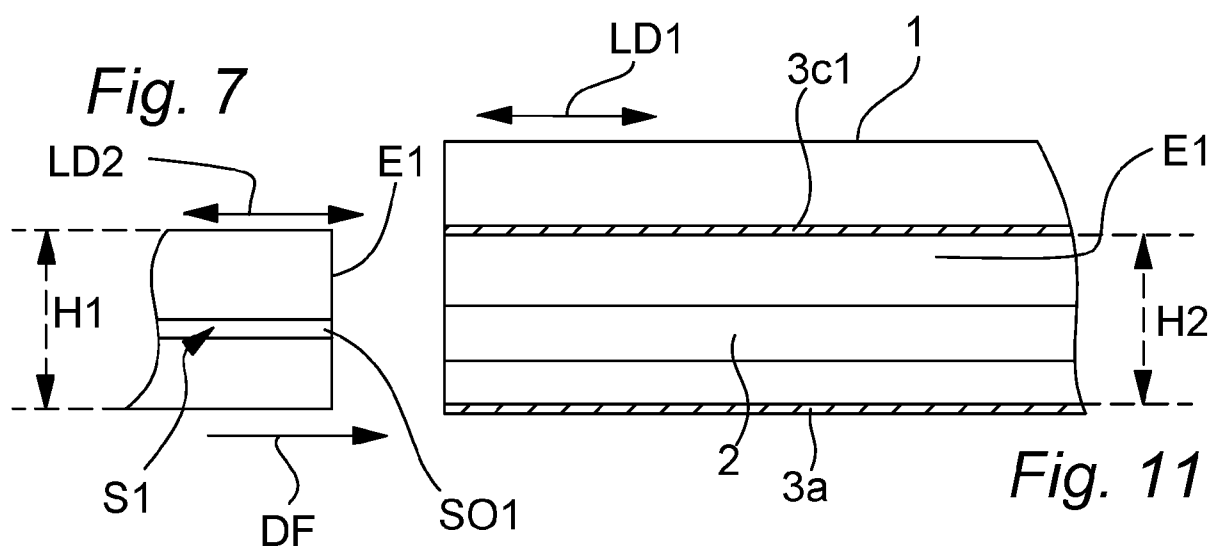
6. A window or door profile (1) according to any of the preceding claims, wherein the elongated insulation block (4,40) is in the compressed state (CS, H2) in the elongated chamber (2, 20) so that a cross sectional area of the one or more interior spaces (S1, S2) is reduced, preferably so that at least 50%, such as at least 80%, such as at least 95% of the compression (H1→H2) of the elongated insulation block (4, 40) is provided by means of a reduction of the cross sectional area of the one or more interior spaces (S 1, S2) when compared to the cross sectional area of the one or more interior spaces (S1, S2) when the elongated insulation block 4, 40.
7. A window or door profile (1) according to any of claims 2-6, wherein said slits (S1, S2) together provides an S-shaped and/or a Σ -shaped elongated insulation block (4, 40) when seen in cross section in a plane that is perpendicular to the longitudinal direction (LD2) of the elongated insulation block (4, 40).
8. A window or door profile (1) according to any of the preceding claims, wherein one or more of said one or more interior spaces (S1, S2), such as one or more slits, has/have a height (SH) between 0.5 mm and 4 mm, such as between 0.5 and 2 mm, such as between 1 mm and 2 mm.
9. A window or door profile (1) according to any of the preceding claims, wherein the cross-sectional area of the elongated insulation block (4, 40) take up less than 80%, such as less than 72% or less than 65% of the total cross sectional area of the elongated chamber (2, 20).
10. A window or door profile (1) according to any of the preceding claims, wherein the depth (SD1, SD2) of the one or more interior spaces (S1, S2), such as one or more slits, extends over at least 60%, such as over at least 70%, such as over at least 80% of the width (W1) of the elongated insulation block (4, 40) at the area of the interior space (S1, S2).
11. A window or door profile (1) according to any of the preceding claims, wherein the elongated insulation block (4, 40) rests on one or more elongated protrusions (8, 9), such as rests on reinforcement protrusions (9), of the profile (1) which extends into the chamber (2, 20), wherein the one or more elongated protrusions (8, 9) extends in the longitudinal direction (LD1) of the profile (1).
12. A window or door profile (1) according to any of the preceding claims, such as according to claim 10 or 11, wherein an air gap (AG) of at least 1 mm, such as at least 2 mm is provided between the elongated insulation block (4, 40) and one or more of the exterior profile walls (3a-3e), preferably wherein the air gap (AG) is arranged next to or between neighboring, discreet protrusions (8, 9), such as reinforcement protrusions, of the profile (1).
13. A window or door profile (1) according to any of the preceding claims, wherein the insulation material of the elongated insulation block (4, 40) has a density between 25 kg/m³ and 70 kg/m³, such as between 28 kg/m³ and 60 kg/m³, for example between 30 kg/m³ and 45 kg/m³.
14. A window or door profile (1) according to any of the preceding claims, wherein the elongated insulation block (4, 40) is compressed inside the profile (1) so that the height (H1) of the elongated insulation block (4, 40) is reduced whereas the insulation block (4, 40) is remained substantially uncompressed in the width (W1) direction (WD) of the profile.
15. A building window or door (200), such as a roof window or a facade window, comprising a frame (100), wherein the frame comprises a plurality of profiles (1) according to any of the preceding claims, wherein said plurality of profiles together provides a rectangular frame with a frame opening (FO), and wherein an insulating glass unit (12) is supported by the frame.











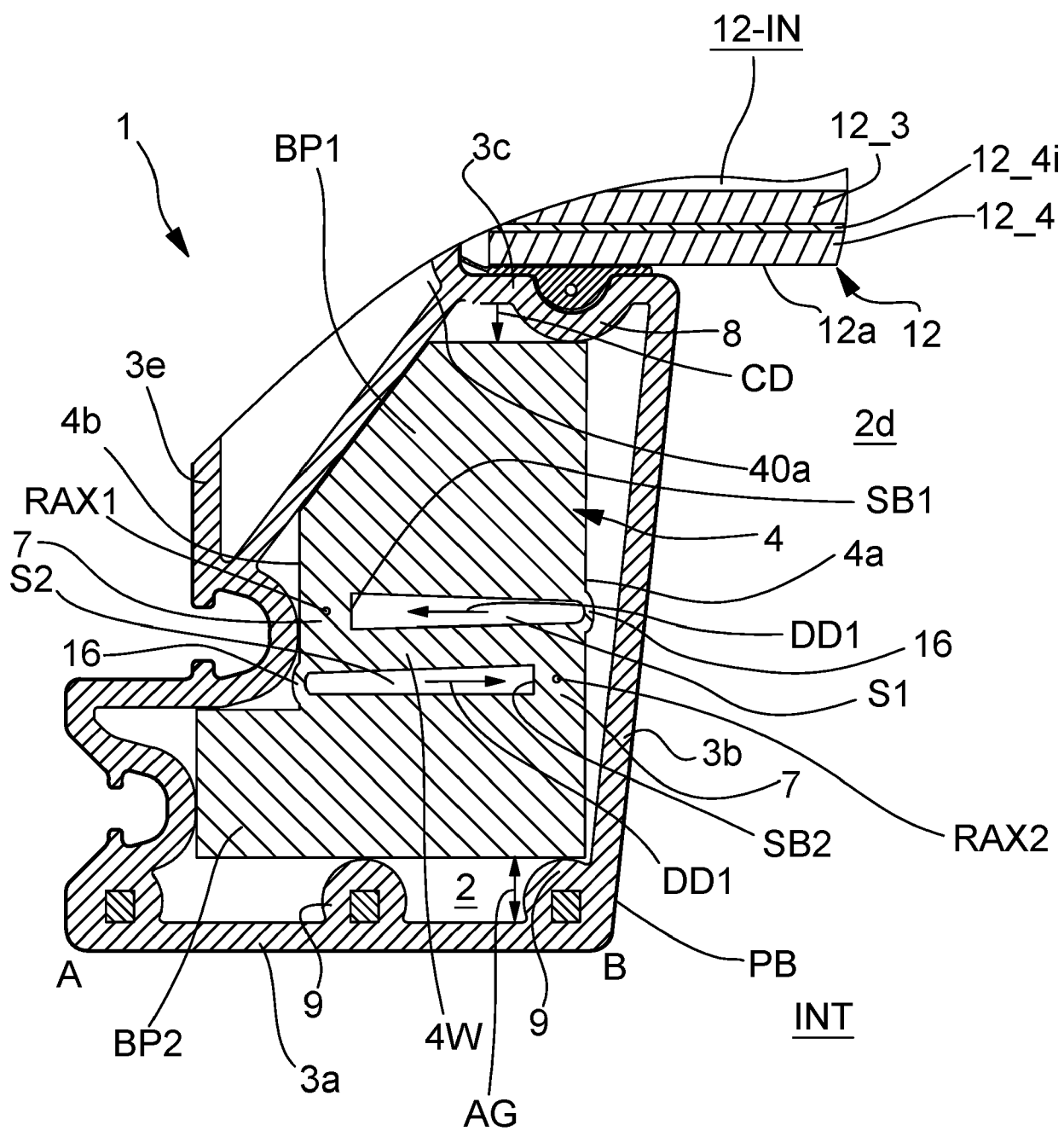
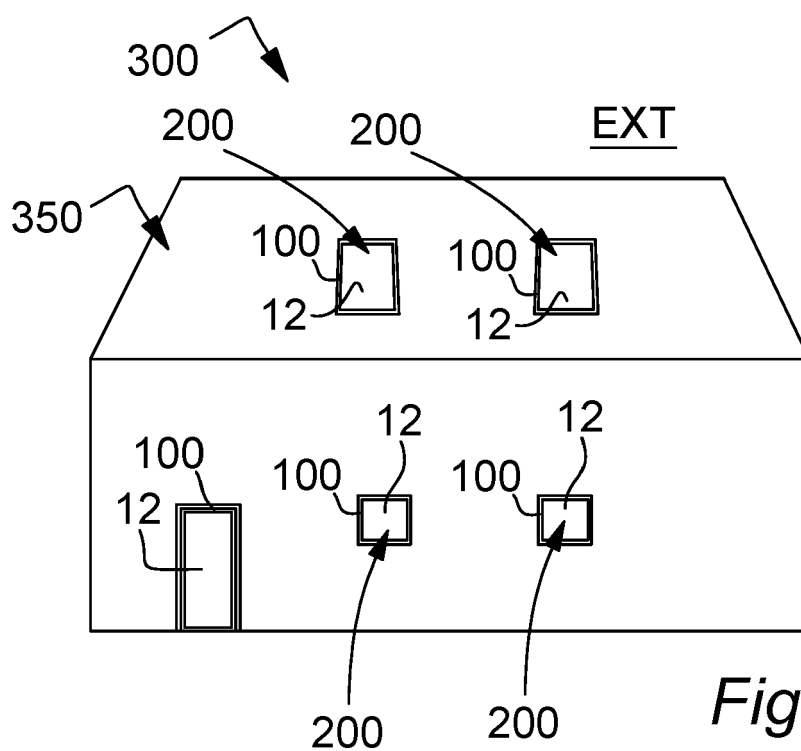
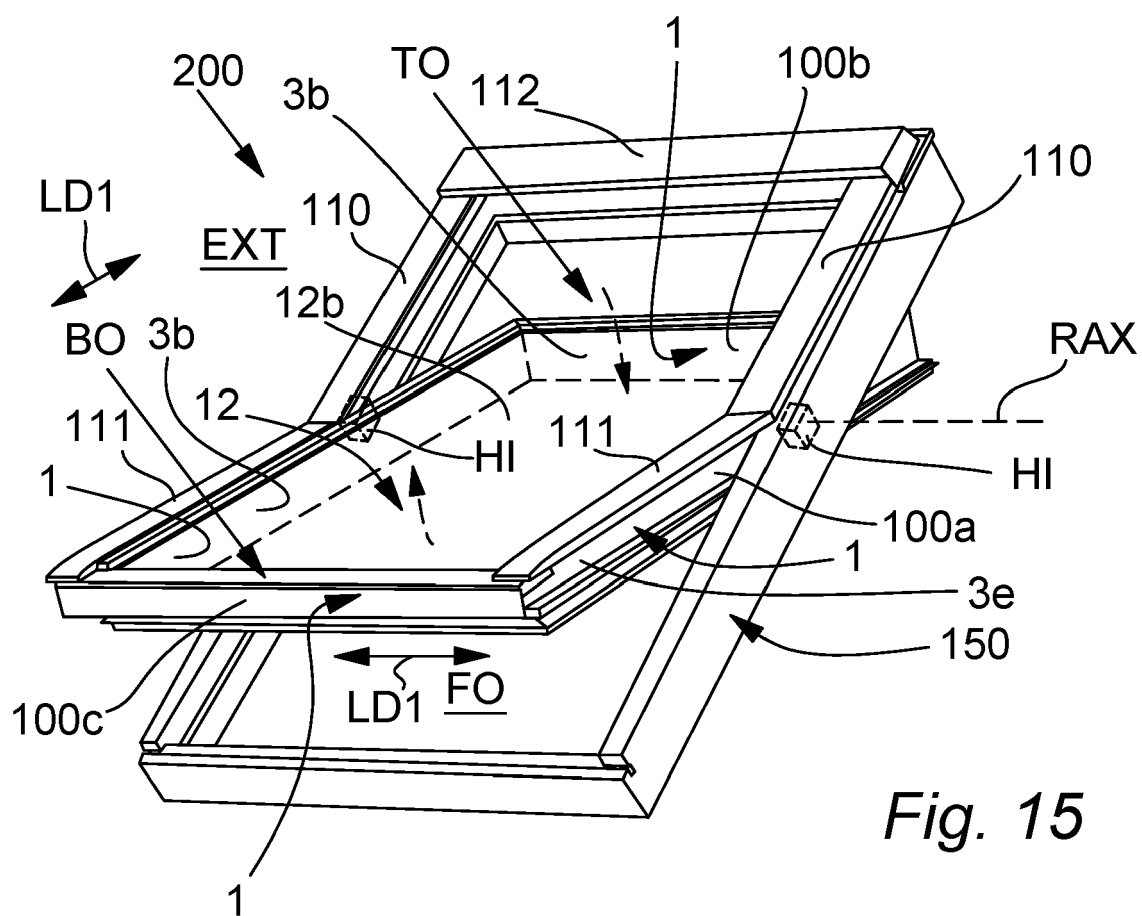


Fig. 14



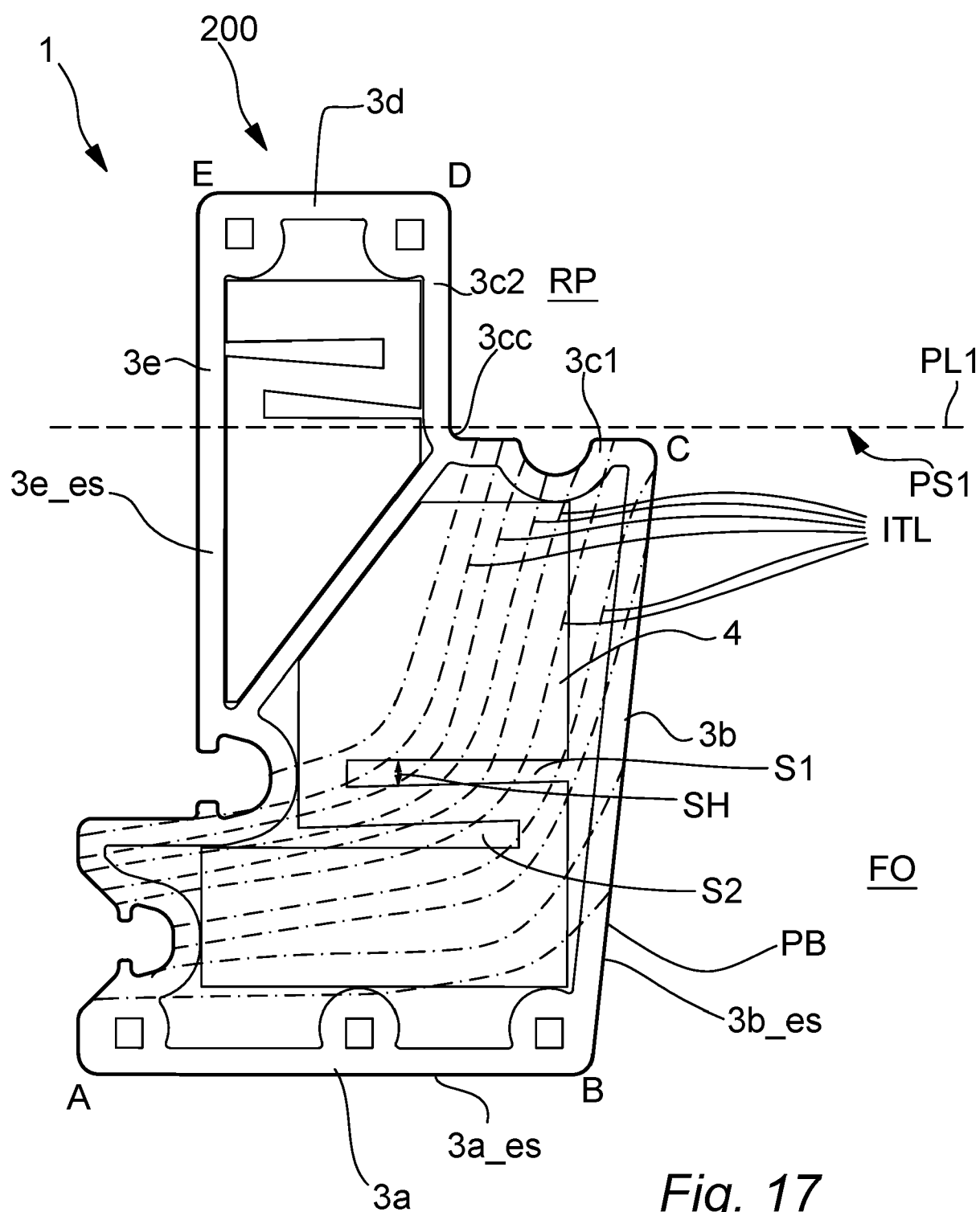


Fig. 17

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Application Number

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