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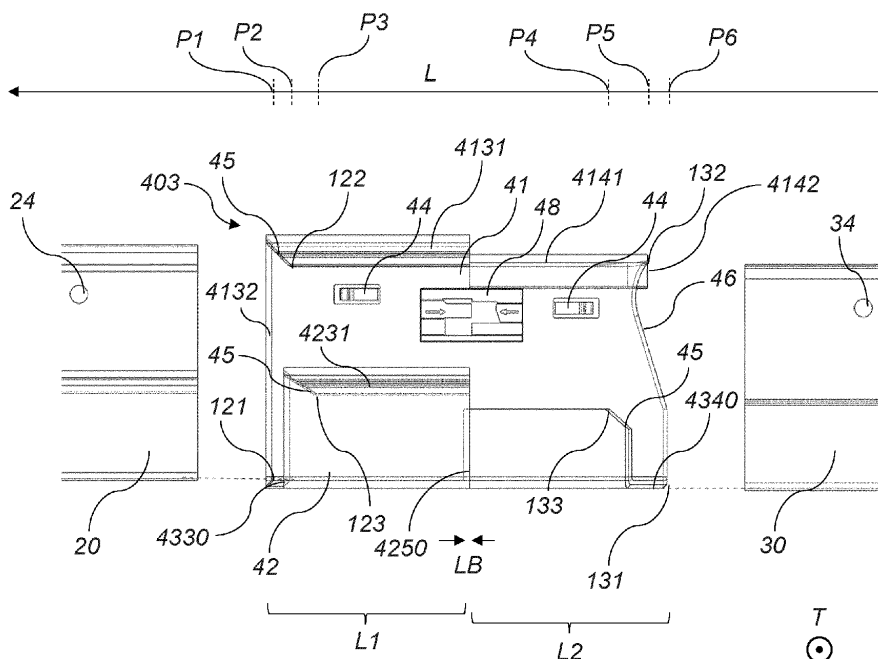
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(30) Priority: **01.04.2022 DK PA202270177**(74) Representative: **AWA Denmark A/S****Strandgade 56****1401 Copenhagen K (DK)**(54) **DRAINAGE GUTTER KIT FOR A ROOF WINDOW**

(57) A drainage gutter kit for a roof window comprising a telescopic drainage gutter having an internal gutter profile and an external gutter profile, and a connector, which connector is configured for connecting to the external gutter profile at one end and configured to connect

to the internal gutter profile at the opposite end. The drainage gutter kit can be used to connect the telescopic drainager gutter of the kit to a further identical telescopic drainager gutter.

**Fig. 12**

Description

Technical Field

[0001] The present invention relates to a drainage gutter kit for guiding water away from an aperture in an underroof, which drainage gutter kit comprises a telescopic drainage gutter comprising an elongate external gutter profile and an elongate internal gutter profile, wherein the internal gutter profile and the external gutter profile are configured for sliding in relation to each other along a longitudinal direction and has a U-shaped cross-section in a transverse plane perpendicular to the longitudinal direction, each of the external and internal gutter profiles extends in the longitudinal direction in an assembled state, and each profile comprises a bottom for guiding away water along the longitudinal direction, a first U-leg, and a second U-leg, the first U-leg and the second U-leg extending from the bottom toward a top of each respective gutter profile and being spaced apart in a transverse direction, the transverse direction being perpendicular to the longitudinal direction, so that an interior space is present between the first U-leg and the second U-leg, and where the internal gutter profile is configured for sliding in the interior space of the external gutter profile along the longitudinal direction.

Background art

[0002] Installation of a roof window often entails the mounting of a number of additional components, such as flashing and insulation components, which are typically supplied alongside the roof window. One such component is a drainage gutter for guiding water away from an aperture in an underroof made to make room for the roof window in an inclined roof. The drainage gutter is mounted along the top of the roof window and used to drain off water along the top of the roof window away from the aperture onto an intact part of the underroof extending along the side(s) of the roof window.

[0003] Various drainage gutter designs are known, one of which is the telescopic type disclosed in EP1131513B1. Telescopic type drainage gutters comprise at least two gutter profiles, one of which has a smaller cross-section so that it can slide lengthwise into the other having a larger cross-section. One of the gutter profiles may be denoted as the external gutter profile and the other the internal gutter profile, referring to their respective positions when assembled. Prior to installation, the internal gutter profile can be fully inserted in the external gutter profile, allowing the telescopic drainage gutter to be packed with other roof window related components, rather than needing its own longer packaging. During installation, the relative position of the two gutter profiles can be adjusted to provide a drainage gutter with a desired length, which allows the same drainage gutter to be used for different size windows and installation scenarios. In use, the telescopic drainage gutter is installed

with an inclination relative to horizontal and with the internal gutter profile being positioned upstream of the external gutter profile creating a downwards overlap. This ensures that water flows down off a shoulder formed at the overlap between internal gutter profile and external gutter profile, and not in between the gutter profiles as might happen if the external gutter profile was positioned upstream so that the overlap was an upwards overlap.

[0004] The adjustable length of the telescopic drainage gutter allows a manufacturer to make one drainage gutter product, which can be used for a range of roof window sizes, the length being adjustable according to the width of the roof window in question. The telescopic drainage gutter also provides the flexibility to adjust the drainage gutter length to the specific installation scenario to reach the intact part of the underroof. The length required may for example depend on rafter spacing. This solution has worked well, but when installing multiple roof windows side-by-side, such as 3, 4 or 5 roof windows side-by-side, the length of one telescopic drainage gutter may not be sufficient to provide drainage for all the roof windows. In these situations, multiple drainage gutters can be mounted separately at different heights, and so that they are draining to the left and right side of the roof window installation, respectively, complicating the installation and adding risk of installation errors. Making special drainage gutters to be used only for specific installation scenarios is, however, not economically desirable.

[0005] At present each roof window is typically supplied with one telescopic drain gutter, hence when installing multiple windows side-by-side multiple pairs telescopic drainage gutter drains are available. Multiple pairs of telescopic drainage gutter drains, however, cannot simply be assembled, as water draining in a downstream direction would then encounter an external-to-internal gutter profile upwards overlap, where water could enter in between the gutter profiles and into the roof structure.

[0006] EP3231956A1 discloses another roof window drainage gutter, where each gutter profile has identical cross-sectional dimensions and where the gutter profiles are thin-walled and pliable, allowing them to be connected by deforming the gutter profiles to fit over/into each other. Having identical profiles to be connected by deformation requires a particular geometry, which limits the options in the design of the drainage gutter. In addition, deforming gutter profiles while on a roof may be troublesome for the installer. Having all gutter profiles be identical also increases the risk of the installer fitting them together incorrectly and creating an upwards overlap where water can enter between two gutter profiles.

[0007] Hence, there is a desire for providing an improved or alternative telescopic drainage gutter assembly which is easy for an installer to use and which may provide for cost and space efficient drainage for a wide range of roof window installations.

Summary of the invention

[0008] These and further objects are achieved by a drainage gutter kit according to the introduction, in other words according to the pre-ambles of claim 1, which is characterized in that the drainage gutter kit further comprises a connector, said connector comprising a first connector section at a first end and a second connector section at a second end, said first end and said second end being opposite each other in the longitudinal direction, that the connector comprises a bottom, a first side leg and a second side leg each extending from the first end to the second end of the connector, the first and second side legs extending from the bottom of the connector toward a top of the connector and being spaced apart in the transverse direction, an interior space of the connector is present between the first side leg and second side leg, that the first connector section has a first substantially U-shaped cross-section in the transverse plane, and the second connector section has a second substantially U-shaped cross-section in the transverse plane, that the first connector section is configured for accommodating an end section of the external gutter profile of the telescopic drainage gutter or of a further telescopic drainage gutter, allowing the end section to slide into the interior space of the first connector section, and that the second connector section is configured for being accommodated in an end section of the internal gutter profile of the telescopic drainage gutter or of a further telescopic drainage gutter, allowing the second connector section to slide into the interior space of the internal gutter profile (30).

[0009] By providing the connector with the first connector section at one end and the second connector section at the other end, the connector will in the assembled state provide a bridge from an external gutter profile arranged upstream to an internal gutter profile arranged downstream. The gutter profiles thus do not have to overlap and the risk of water entering in between the gutter profiles is eliminated. In this way two identical telescopic drainage gutters, each having an internal gutter profile and an external gutter profile, can be connected each with their internal gutter profile arranged upstream, with the external gutter profile of the upstream telescopic drainage gutter having a downwards overlap with the connector and with the connector having a downwards overlap with the internal gutter profile of the downstream telescopic drainage gutter. Water draining along such a sequence will only drop off the shoulders formed at the two internal-to-external connections, at the external-to-connector connection and at the connector-to-internal connection. Hence providing the connector alongside the telescopic drainage gutter as a kit allows the telescopic drainage gutter to be used with another further telescopic drainage gutter for large roof window installations, comprising for example 3 or more roof windows arranged side by side. The further telescopic drainage gutter is in the context of the invention identical to the telescopic drainage gutter which is part of the kit according to the

invention. As the connector of the kit is configured for connecting the internal gutter profile and the external gutter profile of telescopic drainage gutters, the connector can be used to connect the telescopic drainage gutter provided as part of the kit to the further identical telescopic drainage gutter, which is the main use contemplated.

[0010] As the internal gutter profile has a smaller cross-section than the external gutter profile, the first U-shaped cross-section of the first connector section is larger than the second U-shaped cross-section of the second connector section. Specifically, an open area of first connector section is larger than an open area of the second connector section, the open areas being the cross-sections of the interior space of the connector in the transverse planes through the first and second connector section. In this way, the first connector section fits on an exterior side of the external gutter profile, while the second connector section fits in the interior space of the internal gutter profile, i.e. on the interior side. Providing the connector with connector sections which are sized to only fit one of the two gutter profiles, also guides the installer to correct assembly, as the connector cannot be connected to gutter profiles in a manner providing an incorrect overlap, as could happen if both connector sections fit either gutter profile. In the context of the invention, comparing the relative sizes of the first and second connector sections, or the U-shaped cross-sections thereof, is done by evaluating corresponding dimensions. Hence, in comparing transverse distances between the first and second side leg, which may also be called a width, should be measured at the same distance from the bottom of the connector, i.e. at the same height position.

[0011] The connection established when the internal gutter profile is positioned in the interior space of the external gutter profile, is referred to herein as a telescopic connection or being telescopically connected. A telescopic connection entails an overlap between the gutter profiles so connected.

[0012] The internal and external gutter profiles are configured to allow telescopic engagement along substantially their entire lengths, i.e. the internal gutter profile can be slid substantially fully into the external gutter profile. Hence, the external and internal gutter profiles have substantially constant cross-sections along the longitudinal direction. Hence, the first U-leg, second U-leg and bottom of the respective gutter profiles will generally have the same length and longitudinal ends of the gutter profiles will generally be perpendicular to the longitudinal plane.

[0013] The end sections of the gutter profiles overlap with the connector sections of the connector in the assembled state. The surfaces of the connector sections, which are in contact with the gutter profiles in the assembled state, are referred to as engagement surfaces.

[0014] In use, the internal gutter profile and external gutter profile, which are connected to the connector, do not need to have been supplied together. The internal gutter profile or external gutter profile of a telescopic drainage gutter supplied as part of the drainage gutter

kit, can be connected to one end of the connector, while a further internal gutter profile or further external gutter profile of a further identical telescopic drainage gutter can be connected to the other end of the connector. Hence, the term "assembled state" in the context of the invention refers to the state in which an external gutter profile is connected to the first connector section of the connector and an internal gutter profile is connected to the second connector section, but does not require that the two gutter profiles so connected belong to the same kit. In practice it is contemplated that a telescopic drainage gutter and a connector can be delivered with a roof window or with a flashing assembly for a roof window so that the connector is available in case the installation scenario requires it. As the first and second sections of the connector are configured to connect to the external and internal gutter profile, respectively, water drains from the first to the second connector end when installed. Hence, the connector can be made in mirror inverted versions designed for draining water the left or right of a roof window installation. The kit may thus comprise two connectors, one for draining left and one for draining right. When mounting for example four roof windows side-by-side, a number of connectors will be available, but, depending on roof window size and installation arrangement, only some connectors may need to be used and the remainder has to be discarded. It is therefore presently preferred that the connector is made from a material, which can easily be recycled, such as plastic, and that the connector is relatively small compared to the drainage gutter to reduce material use.

[0015] The drainage gutter kit is described herein with reference to the longitudinal direction, the transverse direction and the terms top and bottom. The longitudinal direction is the direction along which the drainage gutter kit extends in the assembled state and is also the direction along which water drains. When the assembled drainage gutter is installed on a roof, the longitudinal direction will be inclined in relation to horizontal. The term bottom is used to refer to the closed portion of U-shaped cross-section and the term top refers to the open portion opposite to the bottom. A height direction extends from the bottom to the top, and the height direction is perpendicular to both the longitudinal direction and the transverse direction. Distances in the longitudinal direction are referred to as lengths, distances in the transverse directions are referred to as widths, and distances in the height direction are referred to as heights.

[0016] The term U-shaped as used herein refers to a shape with is closed at one end, i.e. at the bottom, and open at the top, with sides extending between top and bottom. The shape can also be referred to as "gutter-shaped". The term U-leg is used to refer to a side of a gutter profile, whereas the term side leg is used for a side of the connector. The legs of the U-shape may have similar heights, or one leg may be taller than the other. The sides may be parallel as seen in the transverse plane in which case the transverse distance between the sides

will be the width of the bottom. The sides may alternatively extend at an angle to each other, whereby the bottom may be the intersection of the sides or alternatively be a leg extending between the sides when the sides do not intersect. The first U-legs of the gutter profiles are the U-legs, which abut the roof structure in the mounted state. In the assembled state, the first U-leg of an internal gutter profile and the first U-leg of an external gutter profile extend in continuation of the first side leg of the connector. Correspondingly, in the assembled state the second U-leg of an internal gutter profile and the second U-leg of an external gutter profile extends in continuation of the second side leg of the connector. The first U-legs of the gutter profiles and the first side leg of the connector may be taller than the second U-legs and the second side leg, respectively.

[0017] In some embodiments, the interior dimensions of the first connector section correspond to exterior dimensions of the end section of the external gutter profile, which end section is received in the first connector section in the assembled state, and exterior dimensions of the second connector section correspond to interior dimensions of the end section of the internal gutter profile, which end section is received in the second connector section in the assembled state. When the respective interior and exterior dimensions correspond to each other, the connector sections will engage the end sections, and the connector and the gutter profiles will be retained in relation to other by friction. In this way the gutter profiles are fixed to the connector sections. Corresponding dimensions are dimensions of practically equal magnitude. Interior dimensions refer to distances extending along interior surfaces which interior surfaces delimit the interior space of the gutter profile or connector and to distances extending between such interior surfaces. Similarly, exterior dimensions refer to distances extending along exterior surfaces of the gutter profile or connector and to distances between such exterior surfaces. Hence, an interior width between the first side leg and second side leg at the first connector section corresponding to the exterior width between exterior surfaces of the first U-leg and second U-leg of the external gutter profile, allows the external gutter profile to be retained in the first connector section. Similarly, the exterior width between exterior surfaces of the first side leg and second side leg at the second connector section corresponding to the interior width between the first U-leg and second U-leg of the internal gutter profile, will retain the internal gutter profile to the exterior of the second connector section. These interior widths and exterior widths are evaluated at the same height position. Other corresponding dimensions can be provided between the connector and the gutter profiles.

[0018] In some embodiments, a transverse distance D1 between the first side leg and second side leg of the connector at the first connector section is greater than a corresponding transverse distance D2 between the first side leg and second side leg of the connector at the sec-

ond connector section, both in the assembled state in a non-assembled state of the drainage kit. The transverse distance D1 may also be referred to as the interior width of the first connector section, and the transverse distance D2 may be referred to as the interior width of the second connector section. The non-assembled state refers to a state where the connector is not connected to any gutter profile. By having D1 be greater than D2 also in the non-assembled state, the shape and size of the connector guides the installer to correctly assembling the connector and with the gutter profiles, by the ends of the connector matching the gutter profile with which should be connected. The distances D1 and D2 are evaluated at the same height position.

[0019] The connector comprises a bridge section between the first connector section and the second connector section. In some embodiments the bridge section extends in the longitudinal direction between the first connector section and the second connector section, and a portion of the first side leg and/or a portion of the second side leg extending in the bridge section extends at a bridge angle with respect to the longitudinal direction. In this way, the bridge section provides a narrowing of the interior space of the connector in the direction from the first end to the second end of the connector, i.e. from interior width D1 to interior width D2. This bridge section may also provide a block for the gutter profiles when the installer slides the gutter profiles onto/into the connector. The external gutter profile sliding into the first connector section will encounter the narrowing of the interior space of the connector provided by the bridge section, while the internal gutter profile will encounter the expansion on the exterior side of the connector provided by bridge section. Both of these encounters mark the correct position of the respective gutter profile in relation to the respective connector section. The portions of the first side leg and second side leg extending in the bridge section may be referred to as the first bridge side and the second bridge side. One or both bridge sides can extend at a bridge angle with respect to the longitudinal direction. The two bridge sides may extend at different bridge angles. Preferably only one bridge side extends at a bridge angle with respect to the longitudinal direction, while the other is parallel with the longitudinal direction. The one angled bridge side may preferably be the second bridge side. In this way the exterior surface of the first side leg, which is the side leg facing the roof structure when in use, can be plane, which may be advantageous when mounting the assembled drainage gutter to the roof structure.

[0020] The length of the bridge section is preferably short in relation to the lengths of first and second connector sections. The length of the bridge section may be less than 75 % of the length of each of the connector sections, or less than 50 %, less than 25 % and even less than 10 %.

[0021] The bridge angle can refer to an angle formed by an interior surface and/or exterior surface of the portions in the bridge section, which means that the thick-

ness of the bridge side may not be constant.

[0022] In some embodiments, the first bridge side and/or second bridge side is/are substantially perpendicular to the longitudinal direction of the connector, meaning that the bridge angle is approximately 90°. In this way the bridge section can be made short in the longitudinal direction, reducing the size of the connector. A bridge angle of 80° to 90° is, however, also contemplated. A bridge angle of approximately 90° also potentially provides for a better stop for the gutter profiles during assembly, whereby the installer is less likely to force the gutter profiles too far into/onto the connector. In embodiments with substantially perpendicular bridge sides, the length of the bridge section may be substantially the width of the material forming the connector side legs, which can be less than 5 mm.

[0023] In some embodiments, only one of the portions of the first or second side leg, preferably the portion of the first side leg, extending in the bridge section has the substantially perpendicular bridge angle, while the portion of the second side leg extending in the bridge section is parallel to the longitudinal direction.

[0024] In some embodiments, a top portion of the first U-leg and a top portion of the second U-leg of the external gutter profile forms a first profile track and a second profile track, respectively, a top portion of the first U-leg and a top portion of the second U-leg of the internal gutter profile forms a first guide member and a second guide member, respectively, the first and second profile tracks of the external gutter profile being configured for receiving the first guide member and second guide member of the internal gutter, respectively. By providing the external and internal gutter profile with corresponding profile tracks and guide members, the sliding engagement of the two profiles is improved. The gutter profile tracks extend in the longitudinal direction and can guide the relative longitudinal movement of the two profiles. The gutter profile tracks may also restrain the internal gutter profile from moving in the transverse plane. The gutter profile tracks may for example have a surface facing toward the bottom of the external gutter profile, against which surface the top portions of the internal gutter profile can abut, thereby prevent the internal gutter profile from rotating about the transverse direction. The gutter profile tracks are channels shaped and sized to receive the top portion or guide member of the internal gutter profile. The gutter profile tracks have an open configuration where they are open at one side, through which open side the U-legs of the internal gutter profile can extend into the gutter profile track. The gutter profiles will typically be made from a sheet material, e.g. sheet metal, which has been bent to have the U-shaped cross-section. The gutter profile tracks can be made by bending the top portion of the U-legs to form a longitudinally extending groove. This configuration is sometimes referred to as an open hem. The term guide member refers to the part of the U-legs of the internal gutter profile which is received in the corresponding profile tracks of the external gutter profile. The gutter

guide members can be provided in a particular shape fitting into the gutter profile track. The gutter guide member may for example be a flange extending at an angle to the remaining part of the U-legs, or part of the U-leg can be bend on to itself, providing a closed hem, or combinations thereof. The gutter guide member may have a shape similar to the gutter profile track, but of smaller size. Guide members having such flanges or closed hems can provide surfaces which can rest and/or abut against corresponding surfaces of the gutter profile tracks, when the gutter profiles are telescopically connected. While the gutter profile tracks and guide members are mainly provided to improve the telescopic connection between the gutter profiles, the connector can also be configured to make use of the gutter profile tracks and guide members when the gutter profiles are connected to the connector.

[0025] In some embodiments, the first and second profile tracks are open toward the bottom of the external gutter profile. Such profile tracks can be provided by the top portions of the U-legs being bent or folded toward the interior space of the external gutter profile. In those embodiments, the first and second guide member of the internal connector have shapes which project from the respective U-legs into the interior space of the of the internal gutter profile, such as the top portion being folded or bent toward the interior space. In some embodiments, a top portion of the first side leg and/or second side leg of the connector forms one or more tracks for receiving corresponding top portions of the first U-leg or second U-legs of the internal gutter profile and/or the external gutter profile. Such tracks can, as the gutter profile tracks of the gutter profile, both guide the assembly of the connector and gutter profile and engage the gutter profile to retain it in the pertinent connector section. The tracks can be provided at the first side leg, at the second side leg or at both. Tracks can be provided in both the first connector section and the second connector section. The tracks in a connector section will typically extend from one end of the connector to the bridge section. The tracks are shaped and sized to receive the top portions of the U-legs of the gutter profiles. Hence, the tracks can be shaped and sized to receive gutter profile top portions in the from profile tracks and guide members. Similar to the gutter profile tracks of the external gutter profile, the tracks of the connector have an open configuration where they are open at one side, whereby the U-legs of the internal gutter profile or external gutter profile can extend into the tracks of the connector.

[0026] In some embodiments, in the first connector section, the top portion of the first side leg and/or the top portion of the second side leg is/are folded toward the interior space of the connector providing a first side track and/or a second side track, which first and second side tracks are configured for receiving a top portion of the first U-leg of the external gutter profile and a top portion of the second U-leg of the external gutter profile, respectively. As the first connector section is configured to re-

ceive the external gutter profile in the interior space of the connector, the first and second side tracks will wrap around the top portions of the external gutter profile. If the top portions of the U-legs of the external gutter profile are formed as profile tracks, the first and second side tracks are shaped and sized to receive the gutter profile tracks.

[0027] Generally, the first and second side tracks may be referred to as interior tracks, as an open side of the first and second side track is provided in the interior space of the connector.

[0028] In some embodiments, in the second connector section, the top portion of the first side leg and/or the top portion of the second side leg is/are folded away from the interior of the connector providing one or two exterior tracks, the exterior track(s) being configured for receiving the top portion of the first U-leg or second U-leg of the internal gutter profile. As the second connector section is configured to slide into the interior space of the internal gutter profile, the exterior tracks will wrap around the top portions of the external gutter profile. If the top portions of the internal gutter profile are formed as guide members, the exterior tracks are shaped and sized to receive the gutter guide members of the internal gutter profile.

[0029] A top portion of the connector or of a gutter profile being folded is not to be construed as being limited to the portion having shaped by bending and folding the material of the top portion; the portion could also be formed in a folded shape, e.g. by moulding.

[0030] In some embodiments, wherein one or more of the gutter guide members of the internal gutter profile project into the interior space of the internal gutter profile, the top portion of the first and/or second side leg at the second connector section is configured to engage the gutter guide member from below, supporting the gutter guide member.

[0031] In a further development, one side leg at the second connector section forms an exterior track and the other side leg engages the gutter guide member of the internal gutter profile, which guide member extends into the interior space of the internal gutter profile. In a further development, one or more of the tracks of the connector, such as the first side track, second side track and/or exterior track(s), comprises a protrusion protruding into an interior space of the at least one track. The at least one track may comprise more than one such protrusion. By providing protrusions in the track, the protrusions may engage part of the received top portion and retain the top portion by friction. The protrusion(s) also provides ledges and corners, which may be engaged by profile tracks and guide members of the gutter profiles to retain the gutter profiles in the track of the connector.

[0032] In some embodiments, an end edge of the bottom of the connector at the first end or at the second end of the connector, or a part of said end edges extends at a bottom angle with respect the transverse direction. By providing an angled end edge or an angled portion of the end edge of the bottom, a part of the bottom will extend

further in the longitudinal direction than other parts of the bottom. In this way, when connecting the gutter profile to the connector, contact is increased gradually as the gutter profile and connector come into engagement. This may facilitate assembly for the user. The entire end edge of the bottom can be angled with respect to the transverse direction, or the end edge can be composed of one or more angled portions and one or more portions, which are parallel with the transverse direction. The bottom angle may be 2 to 45°, such as 2 to 30° or 2 to 20°. Having a bottom angle also offsets an end edge of the first side leg from an end edge of the second side leg in the longitudinal direction. This may allow one side leg to engage the gutter profile before the other side leg when the user connects a gutter profile to the connector, thereby guiding the gutter profile to the correct position during assembly. Preferably, the first side leg extends further than the second side leg in the longitudinal direction. When different portions of an end of the connector engages a gutter profile sequentially during the assembly process, this is in the context of the invention referred to as "staggered engagement" and such portions as having "staggered positions".

[0033] In some embodiments, an end edge of the first side leg or second side leg, or a portion said end edge, is inclined in relation to the longitudinal direction. This will also provide staggered engagement.

[0034] In some embodiments, an end edge of the first side leg and/or of the second side leg comprises a non-linear section, such as curved or angular section. Providing the non-linear section is another way of providing staggered engagement between the gutter profile and the connector. The non-linear section can include a bulge or recess in the longitudinal direction.

[0035] In some embodiments, a top portion of the first side leg and/or of the second side leg comprises a bevelling at the first end or second end of the connector. The bevelling extends from an end edge of the first side leg or of the second side leg to a longitudinal edge of the first side leg or second side leg, respectively. The bevelling may be provided on a leg or a portion forming a track of the connector, e.g. the first side track, second side track or an exterior track. One or more of the top portions may have such a bevelling. The bevelling may be linear bevelling or a curved bevelling. Providing a bevelling may provide staggered engagement of a gutter profile to the top portion, as contact may increase gradually along the bevelling. Bevellings can for example allow the gutter profile to engage one side of a track of the connector first, which will guide the gutter profile into the track and then gradually engage another opposite side of the track.

[0036] In some embodiments, staggered engagement is achieved by the connector having combinations of bevellings, non-linear sections, bottom angles, inclined end edges of the side legs, and/or longitudinally offset side legs.

[0037] In some embodiments, first connector section and/or second connector section each comprise three

staggered contact points, each of the contact points having different positions in the longitudinal direction. Preferably, a first of the contact points is at the bottom of the connector, a second of the contact points is at the top portion the first side leg, and a third of the contact points is at the top portion of second side leg, whereby the gutter profile will engage the three staggered contact points sequentially when being brought into engagement with the connector. Arranging three staggered contact points, one at the bottom and one at the top portion of each of the two side legs, may facilitate the assembly process as the contact established at the first contact point may guide the gutter profile in relation to the connector section, while the contact established at the subsequently engaged contact points constrains the gutter profile in relation to the connector section.

[0038] The concept of contact points is to be understood as follows. The connector sections of the connector have a number of engagement surfaces which engage the gutter profiles in the assembled state. The bottom of the connector has an engagement surface at the first connector, which is surface facing the interior space of the connector. At the second connector section, the engagement surface of the bottom is the one facing away from the interior space of the connector, as that surface will engage the interior of the internal gutter profile. Similarly, the first side leg, second side leg, and any tracks thereof, may have engagement surfaces. Such an engagement surface has a leading edge, which leading edge is the edge of the engagement surface which faces away from the centre of the connector as seen in the longitudinal direction. Hence, when a profile is connected to the connector it comes into contact with the engagement surface at the leading edge. The contact points are positioned at these leading edges. If the relevant section profile engages the relevant part of the leading edge simultaneously when sliding the profile in the longitudinal direction into engagement with the connector, the leading edge has one contact point. If the leading edge is engaged gradually, e.g. if the leading edge is angled, the leading edge is said to have two contact points, one of the two contact points being the point at which the leading edge initially engages the profile and the other contact point being the point at which the gutter profile fully engages the leading edge. The contact point which provides initial contact will position the gutter profile, and the contact point which provides full engagement to the leading edge will further secure the position of the gutter profile. Intermediate points along the leading edge are thus not considered as contact points in this context. The leading edges will be the end edges of the bottom, first and second side legs including bevellings provided thereon, as these edges face in the longitudinal direction.

[0039] In one example, an interior surface of the bottom of the connector at the first connector section is an engagement surface and the end edge of the bottom at the first end of the connector is the leading edge of that engagement surface. When said leading edge (end edge

of the bottom) extends at a bottom angle to the transverse direction, the leading edge will first engage the external gutter profile at the side which extends furthest in the longitudinal direction and will fully engage the leading edge at the opposite side of the end edge.

[0040] Another example is a top portion having a bevelling, which bevelling extends between two longitudinal positions and forms a leading edge of an engagement surface. This leading also has two contact points, an initial contact point and furthest from the bridge section of the connector, and a contact point of full engagement at the opposite end of the leading edge.

[0041] The staggered contact points can be provided by having the bottom, first side leg or second side leg, or edges thereof, extend to different longitudinal positions. Having the end edge of the bottom extend at the bottom angle with respect to the transverse direction, offsetting the side legs longitudinally, providing non-linear sections or inclined portions of the end edges of the side legs, and/or providing bevellings, can also be used to provide staggered contact points.

[0042] In some embodiments, at the first connector section, the first contact point is at a junction of the bottom and first side leg, the second contact point is at a bevelling of the top portion of the first side leg, and the third contact point is at a bevelling of the top portion of the second side leg, where a first, second and third longitudinal distance extend from the second end of the connector to the first, second and third contact points, respectively, and the first distance is greater than the second distance and the second distance is greater than the third distance. The longitudinal distances are longitudinal component of the distance between the contact point and the second end.

[0043] In some embodiments, at the second connector section, the first contact point is at the junction of the bottom and the first side leg, the second contact point is at the top portion of the first side leg, and the third contact point is at a bevelling of the top portion of the second side leg, where a first, second and third longitudinal distance extend from first end of the connector to the first, second and third contact points, respectively, and the first distance is greater than the second distance and the second distance is greater than the third distance. The longitudinal distances are longitudinal component of the distance between the contact point and the first end.

[0044] In some embodiments, the first side leg and/or the second side leg comprises a snap-lock for engaging with an aperture or projection in/on one of the U-legs of the internal gutter profile and/or external gutter profile. Providing snap-lock helps retain the gutter profiles and the connector in the assembled state, but may also provide an auditory or tactile signal for the user indicating correct positioning of the gutter profile in/on the connector. An aperture in the gutter profile may be one of a plurality of apertures intended to be used as a pre-formed hole through which fasteners can be inserted when installing the drainage gutter to the roof structure in a tra-

ditional way, i.e. without connecting it to a connector.

[0045] In some embodiments, a length of the first connector section and a length of the second connector section of the connector are each at least 40 mm. The lengths of each connector section is the distance the connector sections can be slid onto/into the respective gutter profiles, i.e. the length of the end section of the gutter profiles which are connected to the connector. In this way the overlap between the connector and gutter profiles at both ends is at least 40 mm, which provides secure fixation of the connector to the gutter profiles. The lengths of the connector sections may be measured at the bottom of connector. The lengths can be measured from the bridge section to the first end or second end of the connector, respectively. When the end edge of the bottom or portion thereof is angled with respect to the transverse direction, the length is measured to the point of the bottom which is furthest from the bridge section, i.e. the longest distance.

[0046] In some embodiments, the length of each connector section is 100 mm or less.

[0047] In some embodiments, the length of each connector section is in the range 40 to 100 mm.

[0048] In some embodiments, a length of the bridge section is less than 50 mm, preferably less than 40mm, less than 30 mm, less than 20 mm, less than 10 mm or less than 5 mm.

[0049] In some embodiments, the first side leg, second side leg and bottom of the connector are integrally formed. Hence, the connector may be one integrally formed piece.

[0050] In some embodiments, the bottom of the connector is level from the first end to the second end.

[0051] In some embodiments, the end edges of the first side leg, second side leg, and bottom of the connector are chamfered. Chamfered edges are inclined surfaces connecting exterior surfaces to interior surfaces of the bottom, of the first side leg, or of the second side leg. Hence, chamfered edges connect two surfaces extending in the longitudinal direction.

[0052] In a second aspect of the invention, there is provided a connector as described herein, which connector is configured for connecting to an external gutter profile of a telescopic drainage gutter and to an internal gutter profile of the telescopic drainage gutter or of a further identical telescopic drainage gutter.

[0053] In a third aspect of the invention, there is provided a method for assembling a drainage gutter kit as disclosed herein and a further telescopic drainage gutter, which further drainage gutter comprises a further external gutter profile and a further internal gutter profile, which method comprises the steps of sliding the end section of the external gutter profile or the end section of the further external gutter profile into the interior space of the first connector section of the connector, and sliding the second connector section of the connector into the interior space of the internal gutter profile or the interior space of the further internal gutter profile to provide an assem-

bled drainage gutter. The method may further comprise the step of telescopically connecting one or both of the gutter profiles, which are not connected to the connector, to one or both of those gutter profiles, which are connected to the connector. This step of telescopically connecting may be done before or after connecting the gutter profiles to the connector. The skilled practitioner will appreciate that the two telescopic drainage gutters and the connector can in practice be assembled in several combinations.

[0054] In a typical installation scenario, multiple roof windows are to be installed side-by-side, and a first drainage gutter kit is supplied with one of the roof windows, while one or more further telescopic drainage gutters or even further drainage gutter kits are supplied with the other roof windows. The first drainage gutter kit has a first telescopic drainage gutter, and the one or more further telescopic drainage gutters has a further external gutter profile and a further internal gutter profile, which are identical to the gutter profiles of the first telescopic drainage gutter. As the first telescopic drainage gutter is supplied in a telescopically connected state where the internal gutter profile is slid into the external gutter profile, the installer withdraws the external gutter profile partly from the internal gutter profile and slides the external gutter profile onto the first connector section. The second connector section is slid into the interior of the further internal gutter profile of the further telescopic drainage gutter, whereby the connector of the first kit connects the external gutter profile of the first telescopic drainage gutter to the further internal gutter profile of the further telescopic drainage gutter, thereby forming one common drainage gutter assembly. The positions of the most upstream internal gutter profile and the most downstream external gutter profile can then be adjusted in relation to their associated gutter profiles to obtain the desired length of the common drainage gutter assembly formed by the two telescopic drainage gutters and the connector. It is also possible to remove the most upstream internal gutter profile and/or the most downstream external gutter profile from the common drainage gutter if this suits the roof window installation scenario in question.

[0055] As the first telescopic drainage gutter and the further telescopic drainage gutters are identical, it is also possible to assemble one gutter profile from one telescopic drainage gutter with a gutter profile from another telescopic drainage gutter. Hence, the two gutter profiles of the first drainage gutter kit can be connected to a respective end of the connector, and then the gutter profiles of a further telescopic drainage gutter can be slid telescopically onto/into the arrangement thus obtained. Hence, in embodiments of the method according to the invention, where the external gutter profile is connected to first connector section of the connector and the internal gutter profile is connected to the second connector section of the connector, the further internal gutter profile may be connected to the external gutter profile and/or the further external gutter profile may be connected to

the internal gutter profile, to provide the assembled drainage gutter. Similarly, in embodiments of the method according to the invention, where the further external gutter profile is connected to first connector section of the connector, and the further internal gutter profile is connected to the second connector section of the connector, the internal gutter profile may be connected to the further external gutter profile and/or the external gutter profile may be connected to the further internal gutter profile, to provide the assembled drainage gutter.

Detailed description

[0056] In the following, embodiments of the invention will be described with reference to the schematic drawings in which

Fig. 1 is a view of two telescopic drainage gutters in the process of being installed above four roof windows without a connector,

Fig. 2 is a view of an assembled drainage gutter kit according to the invention in process of being installed above four roof windows,

Fig. 3 is cross-sectional view of an external gutter profile and an internal gutter profile of a drainage gutter kit according to the invention,

Figs. 4 and 5 are perspective views of an embodiment of the connector according to the invention,

Figs. 6 and 7 are perspective views of an embodiment of drainage gutter kit in a non-assembled state and an assembled state respectively,

Fig. 8 and 9 are cross-sectional views of an embodiment of the connector according the invention,

Fig. 10 and 11 are cross-sectional views of an embodiment of connector according the invention,

Fig. 12 is a frontal view of a drainage gutter kit according to the invention before assembly,

Fig. 13 to 20 are further views of additional embodiments of the connector,

Fig. 21 is a view of a drainage gutter in the assembled state as seen from the internal gutter profile toward the external gutter profile, and

Fig. 22 is view of an angled top connector.

[0057] Referring initially to Figs. 1 and 2 which show telescopic drainage gutters 2 in the process of being installed above four roof windows. Two telescopic drainage gutters 2 are shown each having an internal gutter profile 30 and an external gutter profile 20. As indicated by the arrows the internal gutter profile 30 is slid into the external gutter profile to assemble the telescopic drainage gutter 2. This connection is referred to as a telescopic connection or as being connected telescopically, and it is to be understood the telescopic drainage gutters 2 may be connected in this way already in the state of delivery. The telescopic drainage gutters 2 are inclined in relation to horizontal to ensure that water will flow from left to right in Figs. 1 and 2, which is the downstream direction. The

internal gutter profile 30 is in each telescopic drainage gutter positioned upstream of the external gutter profile 20, ensuring that water does not flow in between the gutter profiles.

[0058] Fig. 1 illustrates how the two telescopic drainage gutters cannot simply be connected telescopically, as sliding them together would create an external-to-internal gutter profile joint, i.e. an upwards overlap, in the downstream direction where water could flow in-between the gutter profiles and into the roof structure underneath the underroof 5.

[0059] In Fig. 2 a drainage gutter kit 1 according to the invention is shown in use. The kit 1 is the connector 4 and the telescopic drainage gutter 2 on the left, which has the external gutter profile 20 and internal gutter profile 30. The connector 4 connects the external gutter profile 20 to a further internal gutter profile 30' of a further identical telescopic drainage gutter 2', to provide an assembled state. The connector 4 serves as a bridge between the gutter profiles 20, 30' as will be described below and thus provides a joint where water will not flow in-between the gutter profiles 20, 30' when flowing from the external gutter profile 20 to the internal gutter profile 30. The downstream direction coincides with a longitudinal direction L of the assembly 1. The further internal gutter profile 30' is of a further telescopic drainage gutter 2' which also includes a further external gutter profile 20'. The telescopic drainage gutter 2 and further telescopic drainage gutter 2' are identical, and as the connector 4 is configured to connect to the external gutter profile 20 and internal gutter profile 30 of the telescopic drainage gutter 2, it can connect the telescopic drainage gutter to the further telescopic drainage gutter 2' as shown in Fig. 2. In the assembled state of Fig. 2 the connector 4 is connected on its left-hand side to external gutter profile 20 which in turn is connected telescopically to internal gutter profile 30, and on its right-hand side to the further internal gutter profile 30' which in turn is telescopically connected to the external gutter profile 20'. In an alternative assembled, the further internal gutter profile 30' and internal gutter profile 30 have swapped positions compared to the assembled state in Fig. 2. In a further alternative assembled state, the further external gutter profile 20' and external gutter profile 20 have swapped positions compared to the assembled state in Fig. 2. In a still further alternative assembled state to the one shown in Fig. 2, the further external gutter profile 20' and further internal gutter profile 30' have swapped positions with the external gutter profile 20 and internal gutter profile 30 respectively, compared to the assembled state in Fig. 2. The telescopic drainage gutters 2, 2' are typically each supplied in a telescopically connected state, hence the installer will not typically separate the gutter profiles before connecting them to the connector 4. Hence, the assembled state will typically be as shown in Fig. 2. But the gutter profiles can be separated prior to connecting to the connector 4, in which case the installer may arrive at an alternative assembled state. In the described assem-

bled states, the assembled states each comprise four gutter profiles, but as will be understood, an assembled state could comprise less than four gutter profiles if that is sufficient for the roof window installation.

[0060] In the following, the invention will be described with reference to the connector 4 and the internal 20 and external gutter profile 30 of the telescopic drainage gutter 2, unless otherwise specified, but it is understood that one of the profiles may be of a further identical telescopic drainage gutter as in Fig. 2.

[0061] Referring now to Fig. 3, which shows cross-sections I and II indicated in Fig. 2 of an embodiment of the external gutter profile 20 and the internal gutter profile 30 of the telescopic drainage gutter 2. The shown cross-sections are in a transverse plane perpendicular to the longitudinal direction L. The size of each of the gutter profiles are such that the internal gutter profile 30 can slide into the external gutter profile 20, meaning that the interior dimensions of the external gutter profile 20 correspond substantially to the exterior dimensions of the internal gutter profile 30. For example, the interior transverse distance D20i of the external gutter profile 20 corresponds the exterior transverse distance D30e of the internal gutter profile 30, both distances being measured in the transverse direction T. The transverse exterior distance D20e of the external gutter profile and transverse interior distance D30i of the internal gutter profile are also shown in Fig. 3. D20e is in this embodiment about 25 mm and D30i is about 22 mm. The cross-sectional shape of each profile 20, 30 is U-shaped and each profile has a bottom 23, 33 and a first U-leg 21, 31 and a second U-leg 22, 32 defining the U-shape. The first U-legs 21, 31 and second U-legs 22, 32 extend from the respective bottoms 23, 33 toward a top of the gutter profile, which top is open between the U-legs. The first U-leg 21, 31 is here taller than the corresponding second U-leg 22, 32 and the first U-legs 21, 31 is the leg resting against the roof structure in the installed state. The cross-section of each profile is substantially constant along the longitudinal direction, which allows the internal gutter profile 30 to slide fully into the external gutter profile 20, whereby the telescopic drainage gutter can be packed efficiently, e.g. in a cardboard box alongside other roof window installation assemblies. Each profile 20, 30 has an interior space 200, 300 between the respective first U-legs 21, 31 and second U-legs 22, 32 and as can be seen the cross-section of the interior space 200 of the external gutter profile has a shape and dimensions corresponding to the exterior dimensions and shape of the internal gutter profile 30.

[0062] In the embodiment of Fig. 3, top portions 210, 220, 310, 320 of the first U-legs 21, 22 and of the second U-legs 31, 32 have been provided as folded shapes. The top portion 210 of the first U-leg 21 of the external gutter profile 20 is folded toward the interior space 200 and part of the top portion 210 is parallel with the first U-leg 21 forming a first profile track 211 which is open toward the bottom 23. The top portion 310 of the first U-leg 31 of the

internal gutter profile 30 has a corresponding shape, but with smaller dimensions and thus fits into the first profile track 211. Hence, the first profile track 211 of the external gutter profile is configured for receiving a first guide member 311 of the internal gutter profile. By providing such track-and-member pairs, the telescopic connection is improved, e.g. by preventing the internal gutter profile from moving upwards. The top portions 220, 320 of the second U-legs 22, 32 are also provided in folded shapes. Each is folded twice toward their respective interior spaces 200, 300 and then back towards the U-leg, and the external gutter profile 20 has a second profile track 221 which is partially open toward the bottom 23 and can receive the folded guide member 321 of the internal gutter profile 30. The gutter guide member 321 of the internal gutter profile is here a closed configuration where U-leg is folded onto itself, i.e. in contact with itself. Contrary thereto, the first guide member 311 is in an open configuration, as are the first profile track 211 and second profile 311. The gutter guide member 311 can in alternative embodiments also have such closed configurations or one/or both guide member 311, 321 could be a thickened section of the U-leg or merely a top edge section of the U-leg. The gutter profile tracks 211, 311 need to be open such that they can receive the corresponding U-legs of the internal gutter profile 30, but they can have other shapes than shown in Fig. 3. For example, the folded part of the first profile track 211, which in Fig. 3 is parallel with the respective U-leg, could extend at an angle with respect to the respective U-leg.

[0063] Referring now to Figs. 4 and 5, which show perspective views of an embodiment of the connector 4 configured to connect the external gutter profile 20 and internal gutter profile 30 shown in Fig. 3, and also referring to Figs. 6 and 7, which show the connector 4 of Figs. 4 and 5 and the gutter profiles of Fig. 3 in a non-assembled state (Fig. 6) and in the assembled state (Fig. 7).

[0064] The connector 4 has a bottom 43, a first side leg 41 and second side leg 42 each of which extends from a first end 401 to a second end 402 of the connector in the longitudinal direction L. The bottom 43 presents a flat level surface toward an interior space 400 of the connector, and the first side leg 41 and second side leg 42 extend perpendicularly away from the bottom 43 toward a top of the connector, defining the interior space 400. The first side leg 41, bottom 43 and second side leg 41 defines a first U-shaped cross-section at a first connector section 403 at the first end 401 and a second U-shaped cross-section at a second connector section 404 at the second end 402. The second U-shaped cross-section is smaller than the first U-shaped cross-section as the transverse distance between the first side leg 41 and second side leg 42 is shorter at the second end 402 than at the first end 401. The distance between the side legs changes at a bridge section 405 of the connector, which is positioned between the first connector section 403 and second connector section 404. The first connector section 403 is configured for receiving an end section of the

external gutter profile 30 in the interior space 400 at the first connector section 403. Hence, the interior dimensions and shape of the first U-shaped cross-section at the first connector section correspond to the exterior dimensions of the external gutter profile, allowing the external gutter profile to slide into the interior 400 of the first connector section along the longitudinal direction L. The second connector section 404 is configured to be received in the interior space 300 of the internal gutter profile 30. Hence, the exterior dimensions and shape of the second U-shaped cross-section correspond to the interior dimensions of the internal gutter profile 30, allowing the second connector section to slide into the interior space 400 of the internal gutter profile 30.

[0065] The assembly process is shown in Figs. 6 and 7. An end section of the external gutter profile 20 is slid into the first connector section 403, the first connector section 403 engaging the exterior surface the end section of the external gutter profile 20. The second connector section 402 is slid into an end section of the internal gutter profile, received in the interior space 300 whereby the exterior surfaces of the bottom 43, first side leg 41 and second side leg 42 in the second connector section 404 engages the interior surfaces of the internal gutter profile 30, as shown in Fig. 7.

[0066] As described above, the bottom 43 of the connector 4 is narrower in the second connector section 404 than in the first connector section 403 and consequently the transverse distance between the first and second side legs is smaller. A change in transverse distance between the first side leg 41 and second leg 42 marks the respective ends of the first connector section 403 and second connector section 404 and the beginnings of the bridge section 405.

[0067] In the embodiment of Figs. 4 and 5, the portions of the first side leg 41 which extend in the first connector section 403, bridge section 405 and second bridge section 404 are all parallel with the longitudinal direction L and the portions are mutually co-axial. In the second side leg 42, the two portions extending in the first connector section 403 and second connector sections 404 are parallel with the longitudinal direction, but they are not co-axial, as the portion extending in the bridge section 405 is angled with respect to the longitudinal direction L.

[0068] The connector 4 is provided with tracks 4131, 4141, 4231 at top portions of the first side leg 41 and second side leg 42. A track is a longitudinal groove for receiving the top portion of the external or internal gutter profile 20, 30 and serves to guide the relative positions of the parts of the assembly during assembly, and to secure their positions in the assembled state. The tracks of the embodiment of Fig. 4 and 5 are configured to receive the top portions of external gutter profile 30 and internal gutter profile 20 of the telescopic drainage gutter shown in Fig. 3. At the first connector section 403 of the connector, a top portion 4130 of the first side leg 41 is folded towards the interior space 400, specifically inwards and downwards, forming a first side track 4131 for

receiving and engaging the first profile track 211 of the external gutter profile in an interior of the track. A top portion 4230 of the second side leg 42 at the first connector section, is also folded towards the interior space 400, also inwards and downwards, to provide a second side track 4231 for receiving the second profile track 221 of the external gutter profile 20 in an interior of the track. Both the first side track 4131 and second side track 4231 are open toward the interior space 400, allowing the first U-leg and second U-leg of the external gutter profile to slide along the first side leg 41 and second side leg 42 with top portions thereof in the tracks 4131, 4231. At the second connector section 404, a top portion 4140 of the first side leg 41 has been folded away from the interior space 400, outwards and downwards, to provide an exterior track 4141 for receiving the first guide member 311 of the internal gutter profile in an interior of the exterior track. The second side leg 42 is in the second connector section 404 not provided with a track, but the top portion 4240 can engage and support the second guide member 321 from below to guide the assembly process and aid in securing the assembled state. Fig. 7 shows the assembled state, with the tracks of the connector receiving the corresponding top portions of the gutter profiles 20, 30.

[0069] The connector 4 in the Fig. 4 and 5 is made by injection moulding, and the first side track 4131, second side track 4231, and exterior track 4141 have thus been formed in the folded shaped by moulding.

[0070] The first side leg 41 is in the embodiment of Figs. 4 and 5 provided with two snap-locks 44, one at each end of the connector, for snapping into a corresponding aperture in the gutter profiles 20, 30. This both helps in maintain secure fastening, but also provides the user with an auditory and/or tactile guidance of when the intended position of the gutter profiles with respect to the connector has been reached. As can be seen, the hook of the snap-lock 44 faces toward the interior space 400 in the first connector section 403 and away from the interior space 400 in the second connector section 404, in accordance the position of the respective gutter profiles in the assembled state.

[0071] Still referring to Figs. 4 to 7, the connector 4 has several features which serve to guide the assembly process, i.e. the process of connecting a gutter profile 20, 30 to the connector. At the first end 401, the end edge 4330 of the bottom 43 has a portion adjacent to the first side leg 41 which portion is angled in relation to the transverse direction T. In this way the first side leg 41 and second side leg 42 will have staggered positions in relation to each other in the longitudinal direction, and when the external gutter profile 20 is inserted in the first connector section, it will first engage the first side leg 41 and its associated part of the bottom 43 and then the second side leg 42 and its associated part of the bottom 43. In this way the engagement of the connector and the gutter profile is built gradually, which may help the user. At the other end 402, the entire end edge 4340 of the bottom

is angled with respect to the transverse direction T. Furthermore, the end edge 4330 of the bottom 43 at the first end 401 is chamfered in that an inclined surface connects the surface of the bottom 43 facing the interior space 400 to the surface of the bottom facing away from the interior space 400. Still further, some corners at the top portions of the first side leg 41 and second side leg 42 at both ends of the connector are provided as bevellings 45, which also staggers the contact and engagement between the gutter profile 20, 30 and connector 4, serving to guide the assembly. In the first connector section 403, the top portions 4130 have bevelled corners 45 at the downwards extending part of the first and second side track (not visible at the second side track), and in the second connector section 404, the top portion 4240 has a bevelled corner 45 at the second end 402. Still further, at the second end 402 the end edge of the first side leg 41, has non-linear section 46, in the form of a curved indentation 46, which also provides staggered contact between the first side leg and the internal gutter profile 30.

[0072] Referring now to Figs. 8 and 9, which show cross-sections of the first connector section 403 and second connector section 404 respectively of another embodiment of the connector 4. Fig. 8 is seen from the bridge section toward the first end of the connector and Fig. 9 is seen from the bridge section toward the second end of the connector. The bottom 43, the first side leg 41 and the second side leg 42 define a substantially U-shaped cross-section, with the first side leg being taller than the second side leg. Fig. 8 shows the transverse distance D1, also called interior width, between the first side leg 41 and second side leg 42 at the first connector section 403, while Fig. 9 shows the corresponding transverse distance D2 or interior width of the second connector section 404. The distance D1 is greater than the distance D2 as described above. The distance D1 corresponds the exterior distance D20i of the external gutter profile 20 (see Fig. 3), whereby the external gutter profile can slide into the interior space 400 of the connector, engaging the interior surfaces of the first side leg 41 and second side leg 42 in the first connector section. The exterior transverse distance D2e is the distance between the exterior sides of the first side leg 41 and second side leg 42 at the second connector section 404. This distance D2e correspond the interior distance D30i of the internal gutter profile 30 (see Fig. 3), whereby the second connector section can slide into the interior space 300 of the connector, engaging the interior surfaces of the U-leg 31 and second U-leg 42 of the internal gutter profile 30.

[0073] Still referring to Figs. 8 and 9, the connector is provided with tracks (4131, 4231, 4241) as described with reference to Figs. 4 to 7. Protrusions 47 project into the interior spaces of the first and second side tracks 4131, 4231. The protrusions 47 project from both sides in the transverse direction T and extend in the longitudinal direction L along the entire length of the respective tracks. The protrusions 47 provide a narrowing of the interior space of the track which the received top portions 210,

211, 220, 221 of the external gutter profile can engage. The received top portions may in some embodiments be constrained between the protrusions 47 in the track and in other embodiments, the received top portions can slide on the ledges formed by the protrusions. At the second connector section 404 top portion 4140 of the first side leg 41 is formed as track 4141 as described with reference to Figs. 4 to 7. The exterior track 4141 comprises one protrusion 47 having the same function as described with reference to the protrusions in the first connector section 403. The top portion 4240 of the second side leg 42 at the second connector section 404 is not formed as a track, but is configured to engage a guide member 321 of the second U-leg 32 of the internal gutter profile 30 from below, which guide member 321 projects into the interior space 300 of the internal gutter profile (see Fig. 3).

[0074] Referring now to Figs. 10 and 11 which show views of an embodiment of the connector 4 as seen in the longitudinal direction. Fig. 10 is viewed from the first end 401 towards the second end 402 and Fig. 11 is viewed from the second end 402 towards the first end 401 of the connector. In this embodiment a portion 4250 of the second side leg 42 extends in a bridge section of the connector and the portion 4250 extends at a bridge angle to the longitudinal direction. The bridge angle is here 90°, whereby the interior width of interior space 400 is narrowed as a step from the transverse distance D1 at the first connector section to the transverse distance D2 at the second connector section. When the external gutter profile 20 is inserted in the first connector section, part of the end edge of the external gutter profile will abut against the face of the portion 4250 visible in Fig. 10. Similarly, when the second connector section 404 is inserted in the interior space 300 of the internal gutter profile 30, the face of the portion 4250 which is visible in Fig. 11 will abut a portion of the end edge of the internal gutter profile 30. The top portion of the second side leg 42 has a bevelling 45 at the second end of the connector. The bevelling 45 is an inclined edge of the second side leg, which connects an end edge of the second side leg with a longitudinally extending edge of the second side leg. As the second connector section 404 is inserted in the interior space 400, engagement is increased along the bevelling 45 and when the internal gutter profile 30 reaches the end of the bevelling, the top portion 4240 of the second side leg 42 can engage the gutter guide member 311 of the internal gutter profile 300, constraining the second side leg 42 in the internal gutter profile 30.

[0075] Referring now to Fig. 12 which shows a frontal view of an embodiment of a connector 4 and the end sections of the internal gutter profile 30 and external gutter profile 20 during the assembly process. The first side leg 41 and second side leg 42 of the connector are shown as see-through. Fig.

[0076] 12 illustrates the staggered engagement between gutter profiles 20, 30 and connector 4 as they are connected. Referring first to the external gutter profile 20 and the first connector section 403. The end edge 4330

of the bottom 43 is angled with respect to the transverse direction T whereby the portion of the end edge at the first side leg 41 extends further in the longitudinal direction than the portion at the second side leg 42. The first side leg 41 also extends further in the longitudinal direction L than the second side leg 42, hence the side legs are offset from each other in the longitudinal direction L. The bottom edge 4330 is the leading edge of the interior surface of the bottom 43 the first connector section, as it faces away from the connector in the longitudinal direction L. When the external gutter profile 20 is brought together with the first connector section 403, it will the bottom at the leading edge first at the junction of bottom 43 and side leg 41, which is a contact point where initial engagement is made. This is the first contact point 121 of the connector which has longitudinal position P1. As the end edge 4330 (leading edge) is angled with respect to the transverse direction T, the initial engagement is at the first contact point 121 and the external gutter profile 30 fully engages this leading edge at the opposite side of the bottom, i.e. at second side leg 42. This is then the contact point at which full engagement with the leading edge is achieved.

[0077] The side leg 41 also defines a number of engagement surfaces, one engagement surface is the major surface which faces the interior space 400. The edge 4132 of the first side leg 41 at the first end 401 is straight and is also a leading edge. This leading edge has one contact point as the external gutter profile 30 will simultaneously engage the relevant extent of the leading edge 4232. This contact point is also at longitudinal position P1.

[0078] The first side track 4131 also defines an engagement surface which faces opposite the engagement surface of the first side leg described above. The leading edge of this engagement surface of the first side track 4131 is defined by the bevelling 45. This bevelling 45 provides two contact points at the ends of the bevelling which have different longitudinal positions. One of them is indicated as the second contact point 122, which has longitudinal position P2. The second contact point 122 is the point at which the external gutter profile 30 fully engages the leading edge defined by the bevelling 45 at the first side track 4131.

[0079] The second side track 4231 also has a bevelling 45 and a third contact point 123 of the connector is at the end of the bevelling 45 at position P3. The third contact point 123 is also the point at which the external gutter profile 20 fully engages the leading edge of formed by the bevelling 45 at the second side track 4231. When the external gutter profile 20 is inserted in the first connector section 403, it will first contact the bottom 43 and the first side leg 41 at the longitudinal position P1 of the first contact point 121, then it will fully engage the first side track 4131 at the longitudinal position P2 of the second contact point 122, and then fully engage the second side track 4231 at the longitudinal position P3 of the third contact point 123. This staggered or sequential engagement guides the parts together and gradually increases en-

gagement to secure them in relation to each other, which may facilitate assembly. The second connector section 404 is also configured for staggered engagement, having three contact points 131, 132, 133 with different longitudinal positions P4, P5 and P6. The internal gutter profile 30 first engages the first contact point 131 at the end edge 4340 of the bottom which is angled with respect to the transverse direction. The second contact point 132 is at the engagement with a leading edge 4142 of the exterior track 4141 and the third contact point is at the initial engagement to the bevelling 45 of the second side leg 42.

[0080] The longitudinal positions P1-P6 of the contact points are indicated on the longitudinal axis in Fig. 12. In the first connector section, the positions of the first, second and third contact points are at positions P1, P2, P3 and the longitudinal distances from said points P1-P3 to the second end 402 is greatest for P1 and smallest for P3. In the second connector section, the positions of the first, second and third contact points are at positions P4, P5, P6 and the distances from said points P4-P6 to the first end 401 is greatest for P6 and smallest for P4.

[0081] As described above with reference to Figs 4-5, the first side leg 41 is provided with two snap-locks 44 for engaging apertures 24, 34 in the external gutter profile 20 and internal gutter profile 30 and with a schematic indication 48 which visually conveys to the user how to assemble the connector the internal and external gutter profiles. The bridge section 405 is in this embodiment short as the bridge portion 4250 extends at about 90° bridge angle to the longitudinal direction L, which means that the length of the bridge section is the thickness of the material forming the section 4250 of the second side leg 42. The lengths L1, L2 of the first connector section 403 and second connector section 404 is in the embodiment about 50 mm and the length of the bridge section 405 is seen to small, equal to the thickness of the material forming the second side leg 42.

[0082] Figs. 13 and 14 show another embodiment of the connector 4 from above and in a perspective view, respectively. In this embodiment, the portions 4150 of the first side leg 41 and the portions 4250 of second side leg 42 extending in the bridge section 405, extend at a respective bridge angles α_1 , α_2 with respect to the longitudinal direction L, reducing width of the interior space 400 from the first connector section 403 to the second connector section 404. In this embodiment, the bridge angle α_1 is approximately 5 degrees, and the bridge angle α_2 is approximately 20 degrees.

[0083] Fig. 15 shows an embodiment of the connector 4 where only the portion 4250 of the second side leg 42 extending in the bridge section 405 extends a bridge angle to the longitudinal direction. The bridge angle is here approximately 30 degrees. The first side leg 41 extends parallel to the longitudinal direction L in the first connector section 403, bridge section 404 and second connector section 404.

[0084] Fig. 16 shows a frontal view of a connector 4

which is similar to the one in Fig. 15 but including features to provide staggered engagement. The side legs 41, 42 are shown as see-through. Bevellings 45 are provided at each of the first side track 4131, the exterior track 4141, and top portion 4240. The end edges 4330, 4340 of the bottom 43 are angled at bottom angles with respect to the transverse direction T, and the end edge of the first side leg 41 at the second end 402 is non-linear, being comprised of two linear sections meeting at an angle 46, thus forming an angular section. The two vertical dashed lines delimit the bridge section 405. The length of the bridge section is indicated as LB, and the lengths of the first connector section as L1 and the length of the second connector section as L2. L1 and L2 is about 5 cm and LB is about 2 cm.

[0085] Fig. 17 shows a perspective view of a connector 4 which is similar to the one Fig. 16, but where the portion 4250 of the second side leg 42 extending in the bridge section extends at a bridge angle of about 90°.

[0086] Fig. 18 shows a perspective view of a connector which is similar to the one in Fig. 17, but where the tracks 4131, 4231, 4141 are provided with protrusions 47 only on one side, forming a ledge on which the top portions of the gutter profiles can engage.

[0087] Fig. 19 shows details of an embodiment of the connector, where the first side track 4131 has a protrusion 47 and a bevelling 45.

[0088] Fig. 20 shows another embodiment of the connector 4 wherein the first side leg 41 has an angular non-linear section 46 at the second connector section 404, where one portion 49 of the angular section 46 is parallel with the bevelling 45 at the top portion 4140.

[0089] Fig. 21 shows another embodiment of the connector 4 and gutter profiles 20, 30 in the assembled state in a view from the second end to the first end of the connector 4. The second connector section is received in the interior space of the internal gutter profile 30, with the first U-leg 31, bottom 33 and second U-leg 32 positioned on the exterior side of the second connector section. The gutter guide member 311 is received in the exterior track 4141, here shown as an overlay, but in practice the gutter guide member 311 and/or exterior track 4141 slightly deforms when engaged. The external gutter profile 20 is received in the interior space 400 of the connector at the first connector section 403, with the first side leg 41, bottom 43, and second side leg 42 positioned on the exterior side of the end section of the external gutter profile 20. The gutter guide member 211 is received in the first side track 4131 with the protrusion 47 engaging the gutter guide member 211. The second profile track 221 is received in a similar manner in the second side track 4231.

[0090] Fig. 22 shows a frontal view of a top connector 4' for connecting gutter profiles at angle in the non-assembled state. The connector 4' is here of a configuration where both connector sections are each configured for being received an internal gutter profile 30, i.e. a connector where both connector sections are as the second connector section as described above. Here the two gutter

profiles extend at angle to each other when connected to the top connector 4'. The angle may be such that the connector forms a convex shape as in Fig. 22. Drainage gutter kits including a top connector as in Fig. 22 may comprise connectors of both types, allowing the interconnection of two or more gutter profiles arranged on each side of the top connector, which may be advantageous in very large groups of windows where it might be difficult to achieve a proper inclination of a drainage gutter assembly draining only to one side.

[0091] Above the connectors 4 have been described as having the first connector section 403 at the left-hand side and the second connector section 404 at the right-hand side when seen from the second side leg 42 towards the first side leg 41, thus providing drainage gutter assemblies 1 designed for draining water to the right of a group of roof windows as seen in Fig. 2. It is, however, to be understood that the connectors 4 could be mirror inverted so that the resulting drainage gutter assembly was designed for draining water to the left. The drainage gutter kit can include both a connector designed for draining to the right and connector designed for draining to the left.

[0092] Although the connector 4 as described herein is configured to connect the internal and external gutter profiles of a telescopic drainage gutter, alternative connectors can be configured to connect other gutter profiles, such as identical gutter profiles or non-telescopic gutter profiles. As the skilled practitioner will understand from the teachings herein, such alternative connectors can be made by adjusting the dimensions and shape of the first and second connector sections according to the gutter profiles which are to be connected, while maintaining that the first connector section is configured for accommodating an end section of a gutter profile in the interior space of the first connector section, and that the second connector section is configured for being accommodated in the interior space of another gutter profile.

List of reference numerals

[0093]

1	Drainage gutter kit
2	Telescopic drainage gutter
2'	Further telescopic drainage gutter
20	External gutter profile
20'	Further external gutter profile
21	First U-leg
200	Interior space
210	Top portion
211	First profile track
22	Second U-leg
220	Top portion
221	Second profile track
23	Bottom
24,34	Aperture
30	Internal gutter profile

30'	Further internal gutter profile
31	First U-leg
300	Interior space
310	Top portion
5 311	First guide member
32	Second U-leg
320	Top portion
321	Second guide member
33	Bottom
10 4	Connector
4'	Top connector
400	Internal space
401	First end
402	Second end
15 403	First connector section
404	Second connector section
405	Bridge section
41	First side leg
4130	Top portion
20 4131	First side track
4132	First end edge of first side leg
4140	Top portion
4141	Exterior track
4150	First bridge side (portion of first side leg in bridge section)
25 42	Second side leg
4230	Top portion
4231	Second side track
4240	Top portion
30 4250	Second bridge side (portion of second side leg in bridge section)
43	Bottom of connector
4330	End edge of bottom of connector, leading edge
35 44	Snap-lock
45	Bevelling
46	Non-linear section
47	Protrusion
49	Portion of angular section
40 5	Underroof
6	Roof window
121-123	Contact points
131-133	Contact points
a1, a2	Bridge angles
45 L	Longitudinal direction
L1	Length of first connector section
L2	Length of second connector section
LB	Length of bridge section
T	Transverse direction
50 P1-P6	Longitudinal positions of contact points
D1,D2	Transverse distance/interior width
D2e	Exterior transverse distance
D20i, D20e	Interior and exterior transverse distance of external gutter profile
55 D30i, D30e	Interior and exterior transverse distance of internal gutter profile

Claims

1. A drainage gutter kit (1) for guiding water away from an aperture in an underroof, which drainage gutter kit (1) comprises

a telescopic drainage gutter (2) comprising an elongate external gutter profile (20) and an elongate internal gutter profile (30), wherein the internal gutter profile (30) and the external gutter profile (20) are configured for sliding in relation to each other along a longitudinal direction, wherein each of the external and internal gutter profiles (20, 30) extends in the longitudinal direction in an assembled state and has a U-shaped cross-section in a transverse plane perpendicular to the longitudinal direction, each profile (20, 30) comprising a bottom (23, 33) for guiding away water along the longitudinal direction, a first U-leg (21, 31), and a second U-leg (22, 32), the first U-leg (21, 31) and the second U-leg (22, 32) extending from the bottom (23, 33) toward a top of each respective gutter profile (20, 30) and being spaced apart in a transverse direction, the transverse direction being perpendicular to the longitudinal direction, so that an interior space (200, 300) is present between the first U-leg (21, 31) and the second U-leg (22, 32), and

where the internal gutter profile (30) is configured for sliding in the interior space (200) of the external gutter profile (20) along the longitudinal direction,

characterized in that the drainage gutter kit (1) further comprises a connector (4), said connector (4) comprising a first connector section (403) at a first end (401) and a second connector section (404) at a second end (402), said first end (401) and said second end (402) being opposite each other in the longitudinal direction, that the connector (4) comprises a bottom (43), a first side leg (41) and a second side leg (42) each extending from the first end (401) to the second end (402) of the connector, the first and second side legs (41, 42) extending from the bottom (43) of the connector toward a top of the connector and being spaced apart in the transverse direction, an interior space (400) of the connector being present between the first side leg (41) and second side leg (42),

that the first connector section (403) has a first substantially U-shaped cross-section in the transverse plane, and the second connector section (404) has a second substantially U-shaped cross-section in the transverse plane, that the first connector section (403) is configured for accommodating an end section of the external gutter profile (20) of the telescopic

drainage gutter (2) or of a further telescopic drainage gutter, allowing the end section to slide into the interior space (400) of the first connector section (403),

and that the second connector section (404) is configured for being accommodated in an end section of the internal gutter profile (30) of the telescopic drainage gutter (2) or of a further telescopic drainage gutter, allowing the second connector section to slide into the interior space (300) of the internal gutter profile (30).

2. A drainage gutter kit (1) according to claim 1,

wherein interior dimensions of the first connector section (403) correspond to exterior dimensions of the end section of the external gutter profile (20), which end section is received in the first connector section (403) in the assembled state,

and wherein exterior dimensions of the second connector section (404) correspond to interior dimensions of the end section of the internal gutter profile (30), which end section is received in the second connector section (404) in the assembled state.

3. A drainage gutter kit according to any one of the preceding claims, wherein a transverse distance (D1) between the first side leg (41) and second side leg (42) of the connector (4) at the first connector section (403) is greater than a corresponding transverse distance (D2) between the first side leg (41) and second side leg (42) of the connector (4) at the second connector section (402), both in the assembled state in a non-assembled state of the drainage gutter kit (1).

4. A drainage gutter kit according to any one of the preceding claims, wherein the connector (4) comprises a bridge section (405) extending between the first connector section (403) and the second connector section (404), wherein a portion of the first side leg (41) and/or a portion of the second side leg (42) extending in the bridge section extends at a bridge angle with respect to the longitudinal direction.

5. A drainage gutter kit according to claim 4, wherein the bridge angle of the first side leg and/or second side leg is in the range 80° to 90°, preferably 90°.

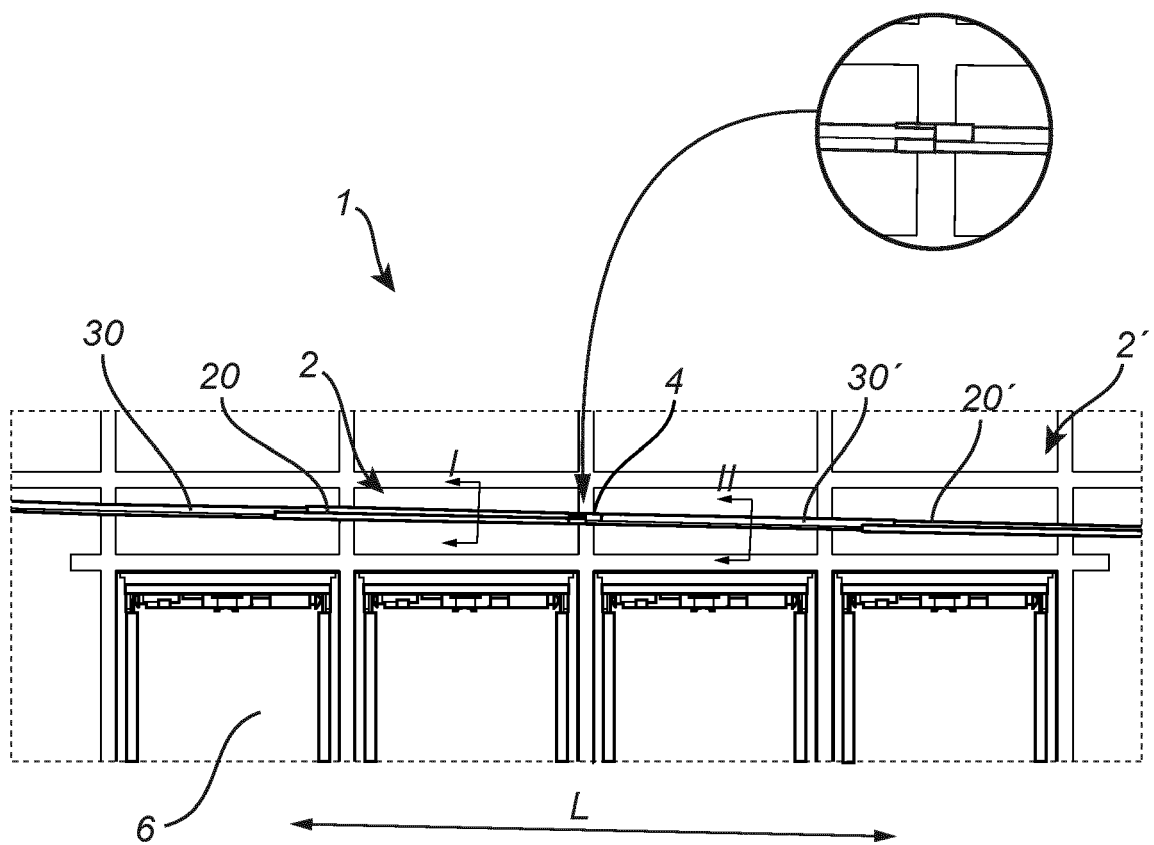
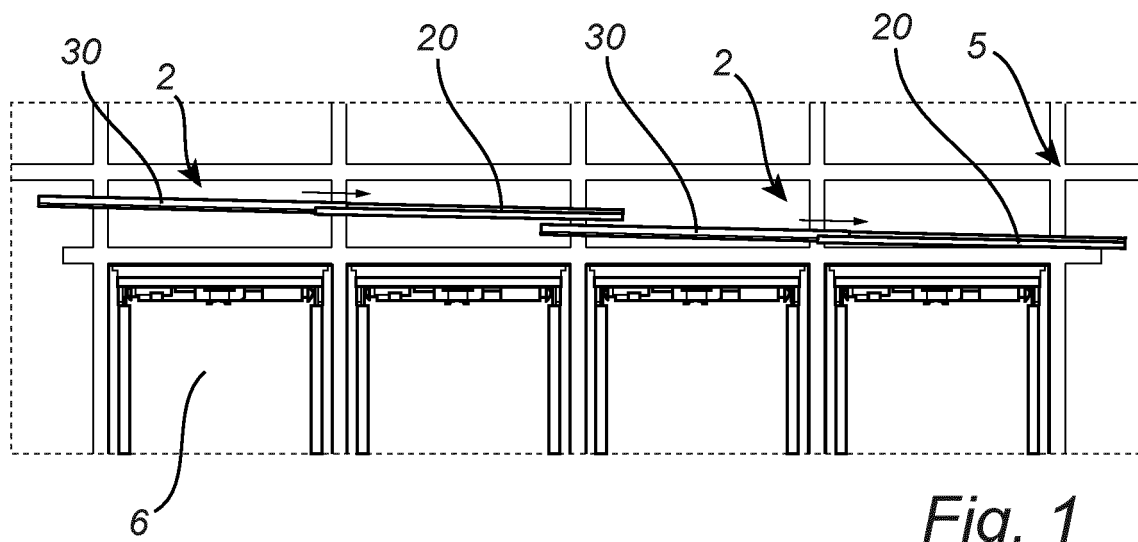
6. A drainage gutter kit according to any one of the preceding claims,

wherein a top portion (210) of the first U-leg (21) and a top portion (220) of the second U-leg (22) of the external gutter profile forms a first profile track (211) and a second profile track (221), re-

- spectively,
a top portion (310) of the first U-leg (31) and a top portion (320) of the second U-leg (321) of the internal gutter profile forms a first guide member (311) and a second guide member (321), respectively,
the first (211) and second profile tracks (221) of the external gutter profile being configured for receiving the first guide member (311) and second guide member (321) of the internal gutter, respectively.
7. A drainage gutter kit according to any one of the preceding claims, wherein a top portion (4130, 4230, 4140, 4240) of the first side leg and/or second side leg of the connector forms one or more tracks (4131, 4231, 4141) for receiving corresponding top portions of the first U-leg or second U-legs of the internal gutter profile and/or the external gutter profile.
8. A drainage gutter kit according to claim 7, wherein in the first connector section (403), the top portion (4130) of the first side leg (41) and/or the top portion (4230) of the second side leg (42) is/are folded toward the interior space (400) of the connector providing a first side track (4131) and/or a second side track (4231), which first and second side tracks (4131, 4231) are configured for receiving a top portion (210, 211) of the first U-leg (21) of the external gutter profile and a top portion (310, 311) of the second U-leg (22) of the external gutter profile, respectively.
9. A drainage gutter kit according to any one of claims 7 to 8, wherein in the second connector section (404), the top portion (4140) of the first side leg (41) and/or the top portion (4240) of the second side leg (42) is/are folded away from the interior (400) of the connector providing one or two exterior tracks (4141), the exterior track(s) (4141) being configured for receiving the top portion (310, 320) of the first U-leg (31) or second U-leg (32) of the internal gutter profile (30).
10. A drainage gutter kit according to any one of claims 7 to 9 wherein one or more of the tracks of the connector (4), such as the first side track (4131), second side track (4231) and/or exterior track(s) (4141), comprises a protrusion (47) protruding into an interior space of the at least one track.
11. A drainage gutter kit according to any one of the preceding claims, wherein an end edge (4330, 4340) of the bottom (43) of the connector at the first end (401) or at the second end (402) of the connector, or a part of said end edges (4330, 4340), extends at a bottom angle with respect the transverse direction.
12. A drainage gutter kit according to any one of the preceding claims,
wherein a top portion (4130, 4140, 4230, 4240) of the first side leg (41) and/or of the second side leg (42) comprises a bevelling (45), at the first end (401) or second end (402) of the connector.
13. A drainage gutter kit according to any one of the preceding claims, wherein an end edge of the first side leg (41) and/or of the second side leg (42) comprises a non-linear section (46), such as curved or angular section.
14. A drainage gutter kit according to any one of the preceding claims, wherein first connector section (403) and/or second connector section (404) each comprise three staggered contact points (121-123, 131-133), each of the contact points having different positions in the longitudinal direction,
a first (121, 131) of the contact points being at the bottom (43) of the connector,
a second (122, 132) of the contact points being at the top portion (4130, 4140) the first side leg (41), and
a third of the contact points (123, 133) being at the top portion (4230, 4240) of second side leg (42),
whereby at least one of the external gutter profile (30) and the internal gutter profile (20) will engage the three staggered contact points sequentially when being brought into engagement with the connector (4).
15. A drainage gutter kit according to any one of the preceding claims, wherein the first side leg (41) and/or the second side leg (42) comprises a snap-lock (44) for engaging with an aperture (24, 34) or projection in/on one of the U-legs of the internal gutter profile (20) and/or external gutter profile (30).
16. A connector (4) for connecting an external gutter profile of a telescopic drainage gutter and an internal gutter profile of the telescopic drainage gutter or of a further telescopic drainage gutter,
said connector (4) comprising a first connector section (403) at a first end (401) and a second connector section (404) at a second end (402), said first end (401) and said second end (402) being opposite each other in a longitudinal direction,
the connector (4) further comprising a bottom (43), a first side leg (41) and a second side leg (42) each extending from the first end (401) to the second end (402) of the connector, the first and second side legs (41, 42) extending from the bottom (43) of the connector toward a top of

the connector and being spaced apart in a transverse direction, the transverse direction being perpendicular to the longitudinal direction, an interior space (400) of the connector being present between the first side leg (41) and second side leg (42),
 the first connector section (403) having a first substantially U-shaped cross-section in a transverse plane perpendicular to the longitudinal direction, and the second connector section (404) has a second substantially U-shaped cross-section in the transverse plane,
 wherein the first connector section (403) is configured for accommodating an end section of the external gutter profile (20), allowing the end section to slide into the interior space (400) of the first connector section (403),
 and the second connector section (404) is configured for being accommodated in an end section of the internal gutter profile (30), allowing the second connector section to slide into the interior space (300) of the internal gutter profile (30).

17. A method for assembling a drainage gutter kit (1) according to any one of claims 1 to 15 and a further telescopic drainage gutter comprising a further external gutter profile and a further internal gutter profile, which method comprises the steps of
 sliding the end section of the external gutter profile (20) or the end section of the further external gutter profile into the interior space (400) of first connector section (403) of the connector (4), and
 sliding the second connector section (404) of the connector (4) into the interior space (300) of the internal gutter profile (30) or into the interior space of the further internal gutter profile, to provide an assembled drainage gutter.



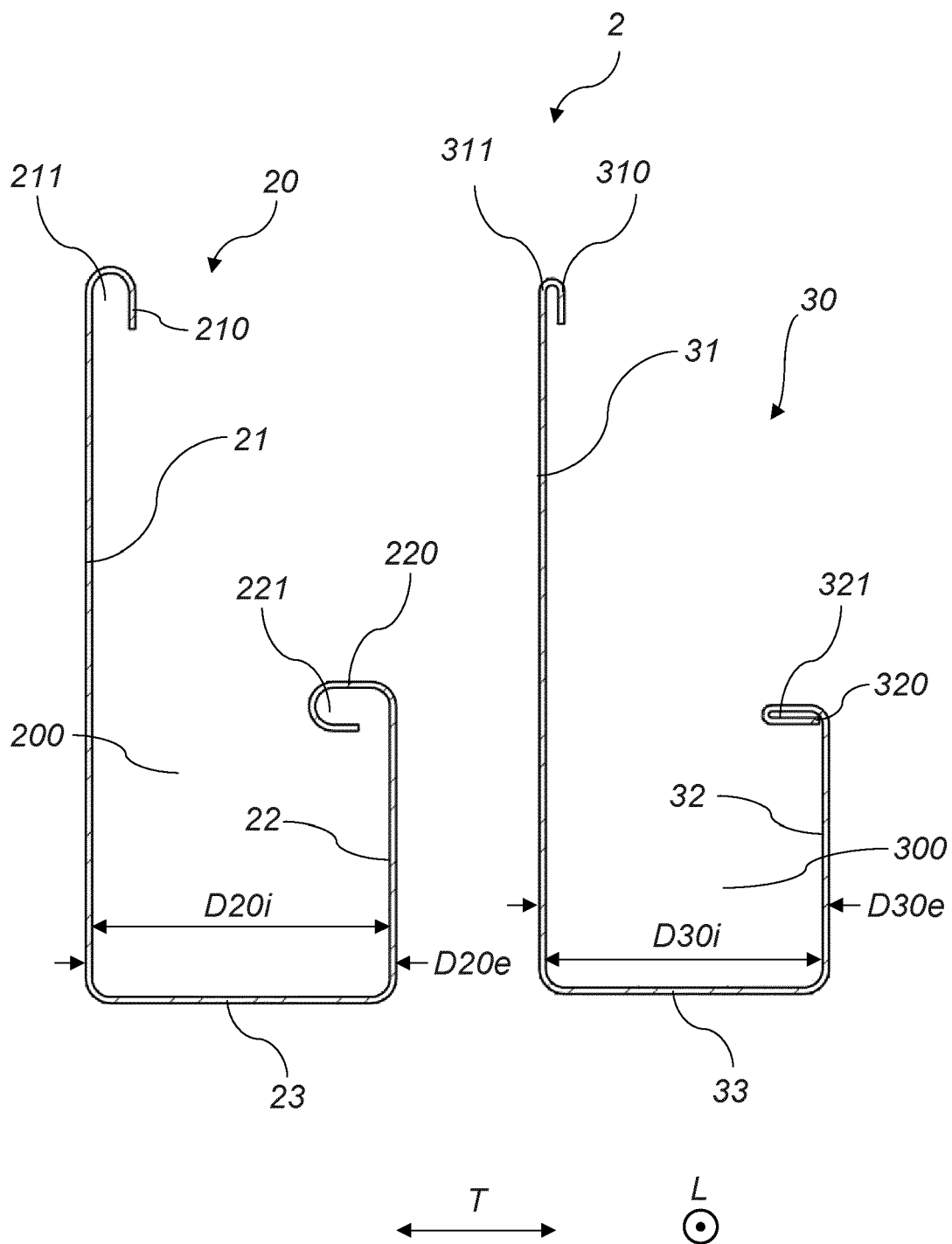
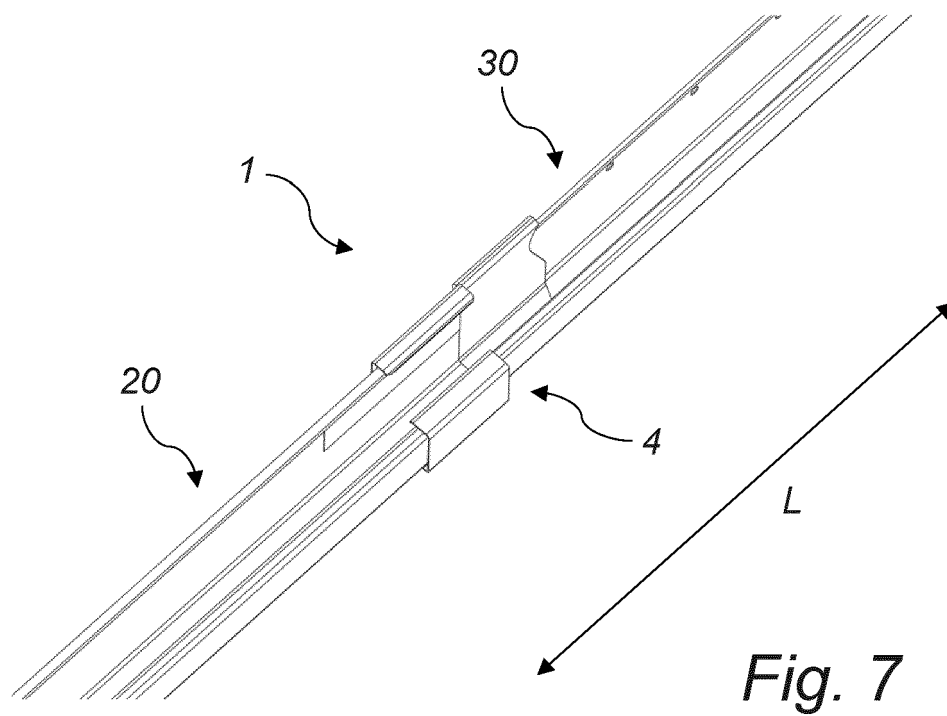
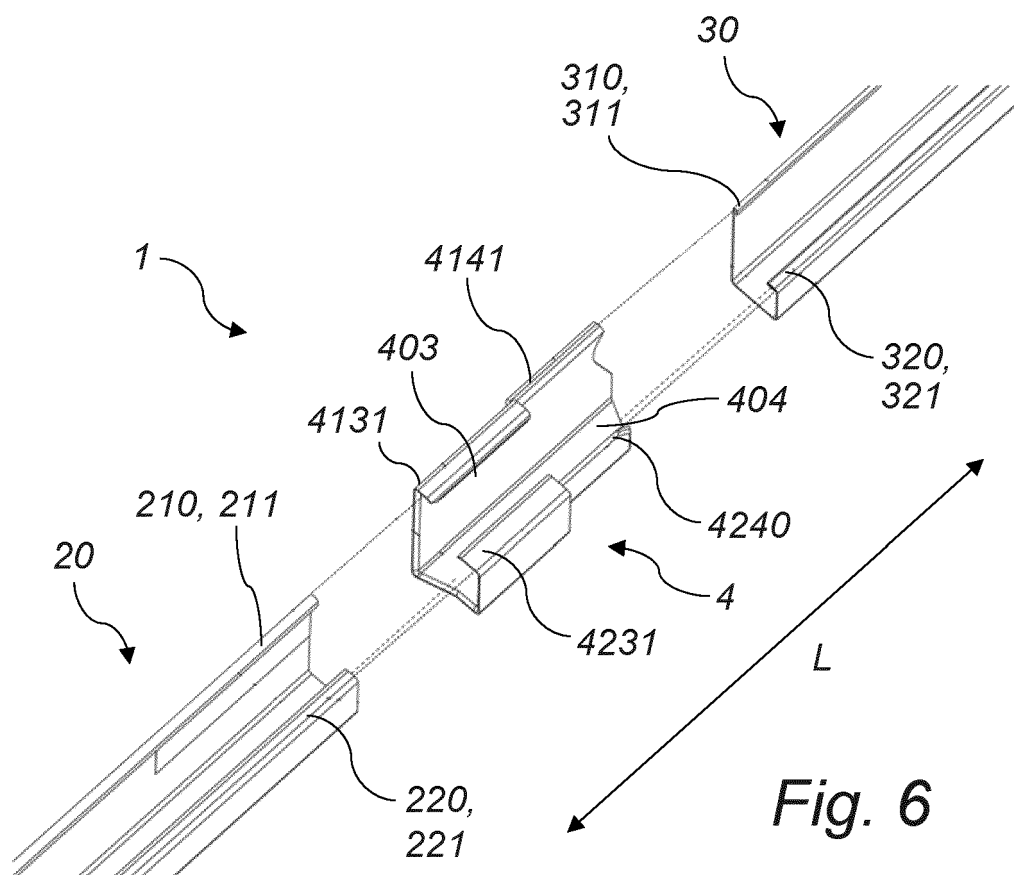
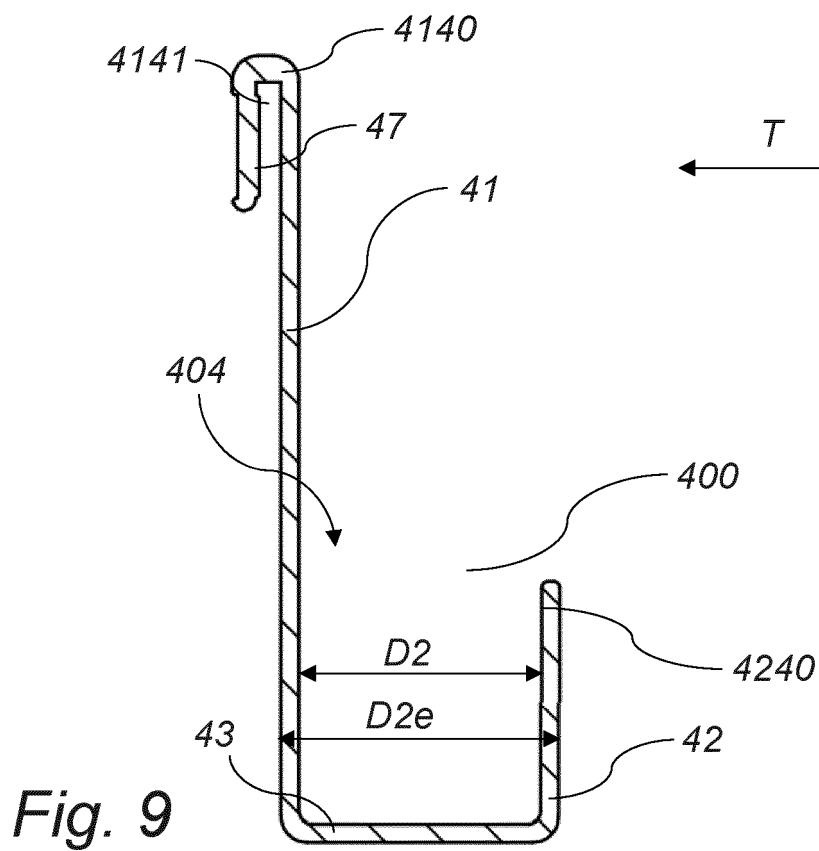
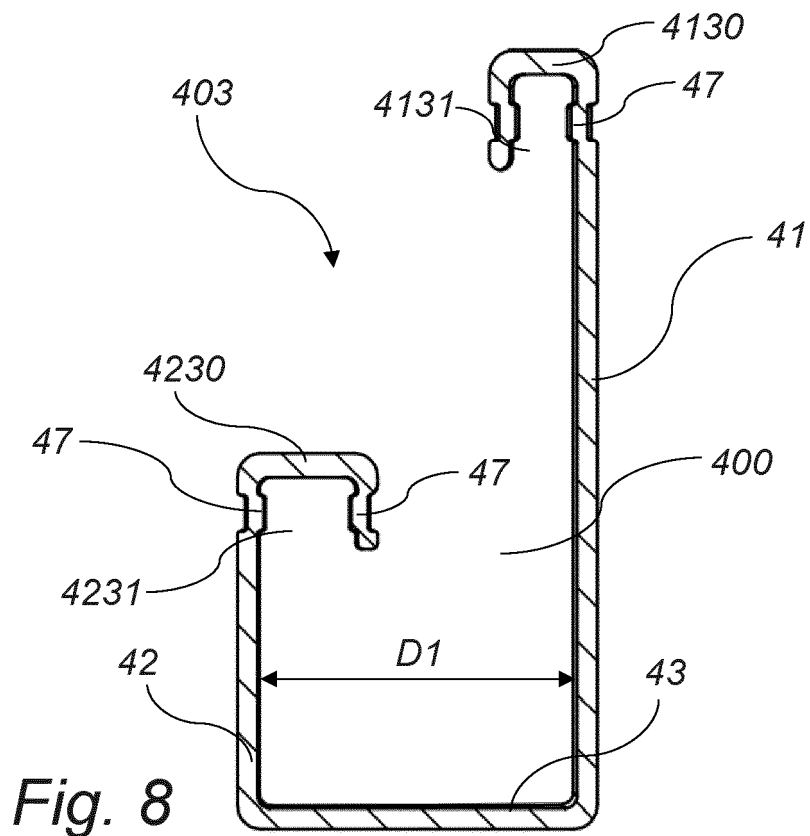


Fig. 3





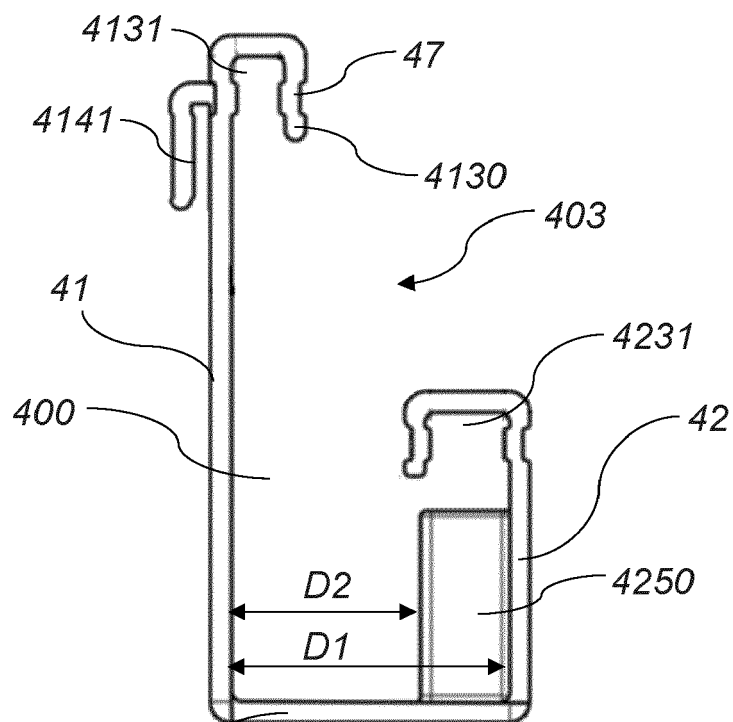


Fig. 10

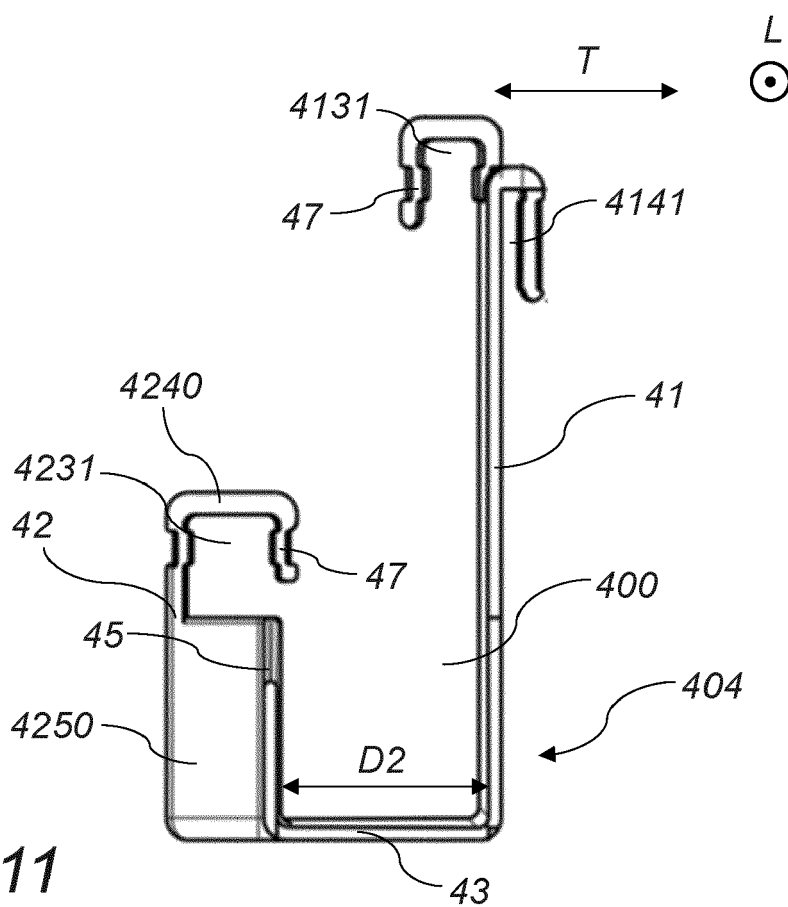


Fig. 11

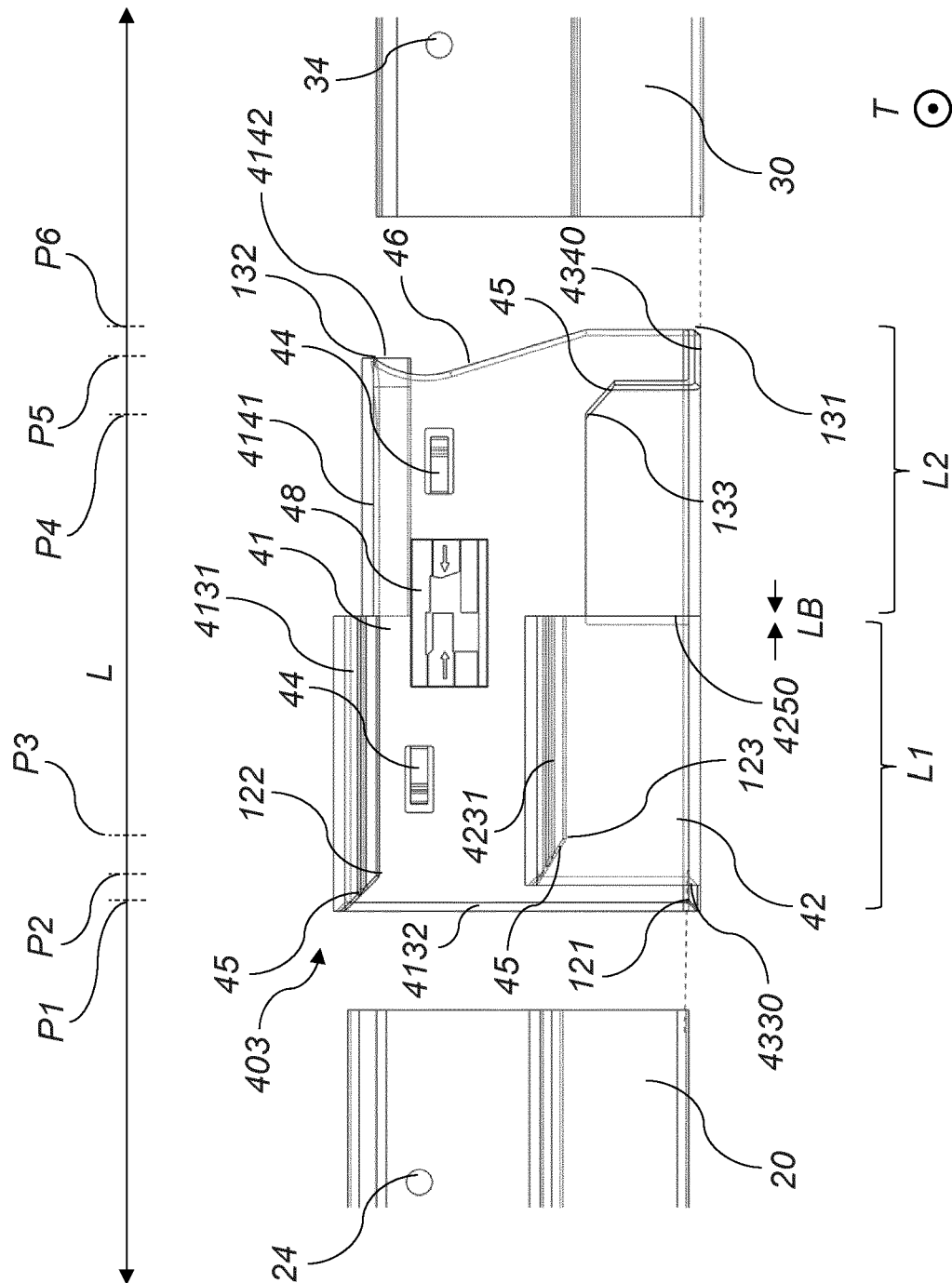


Fig. 12

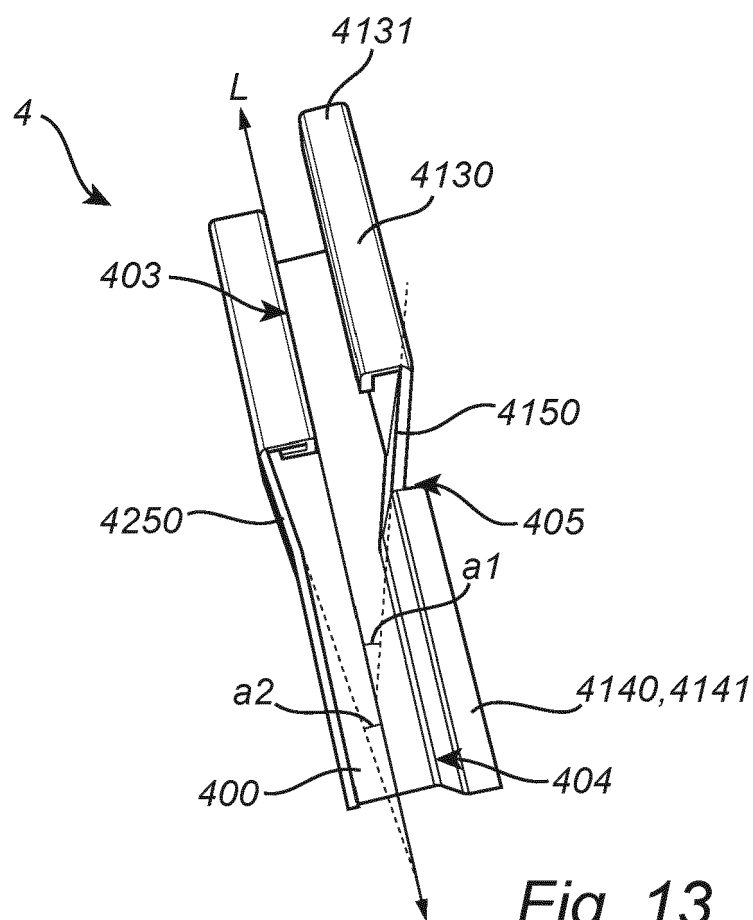


Fig. 13

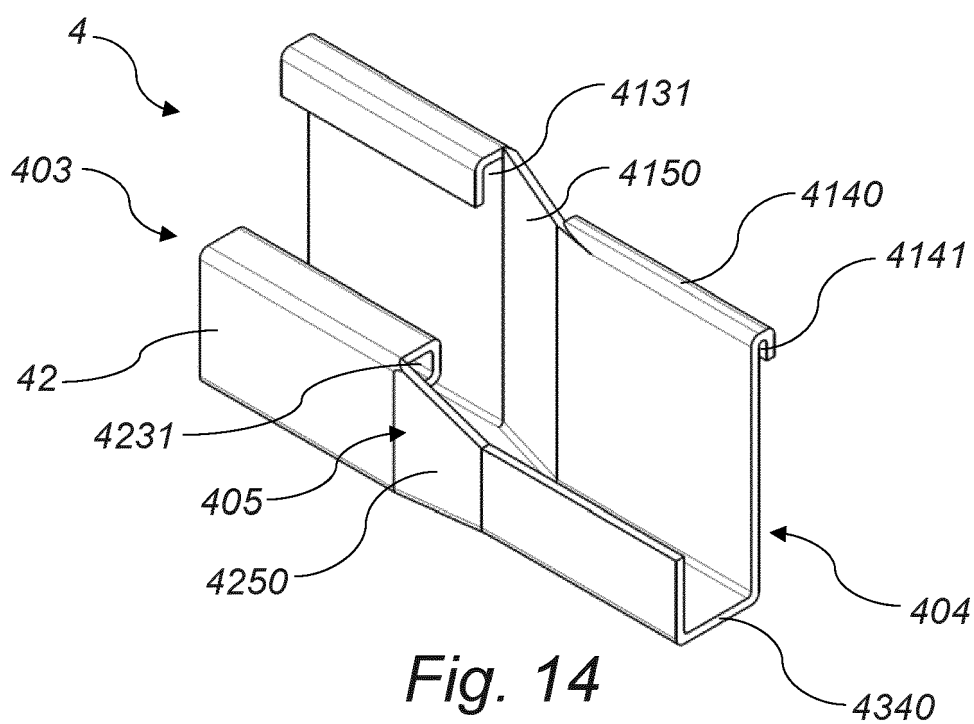


Fig. 14

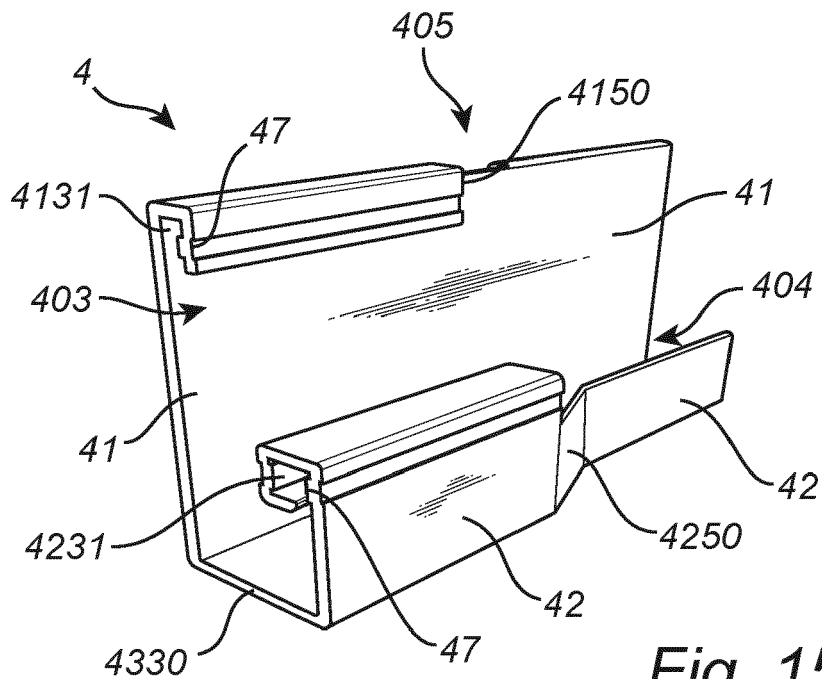


Fig. 15

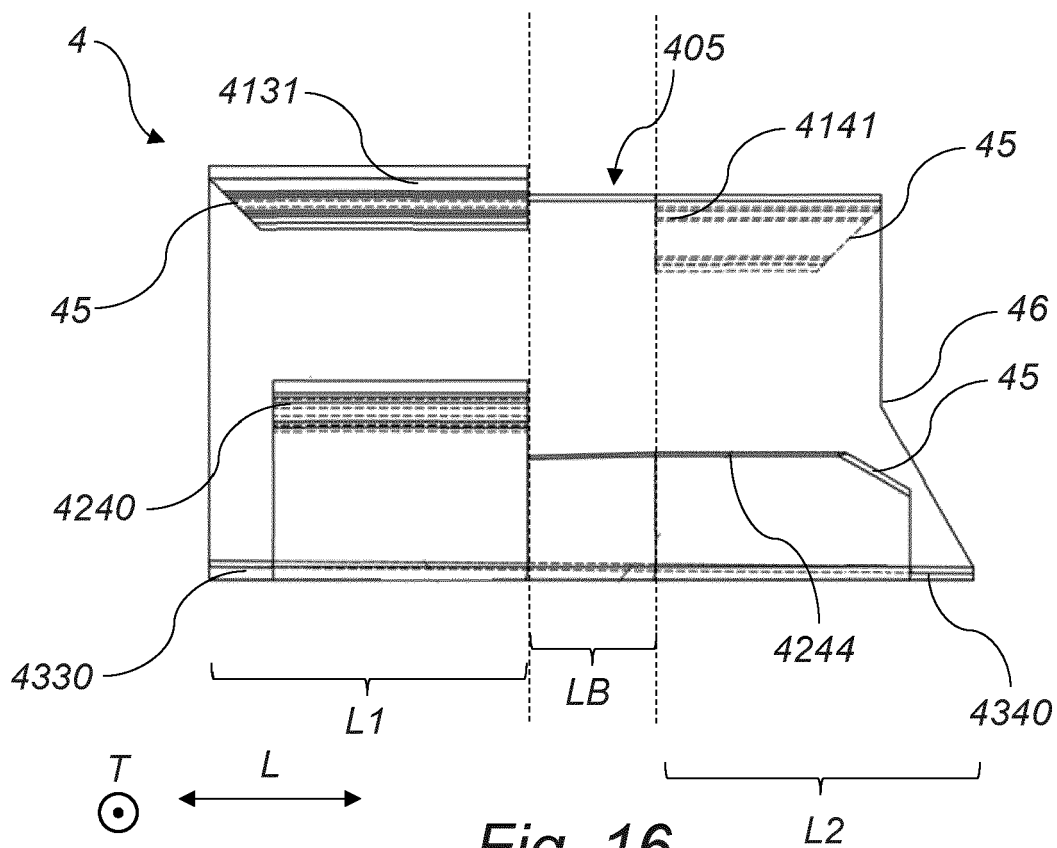


Fig. 16

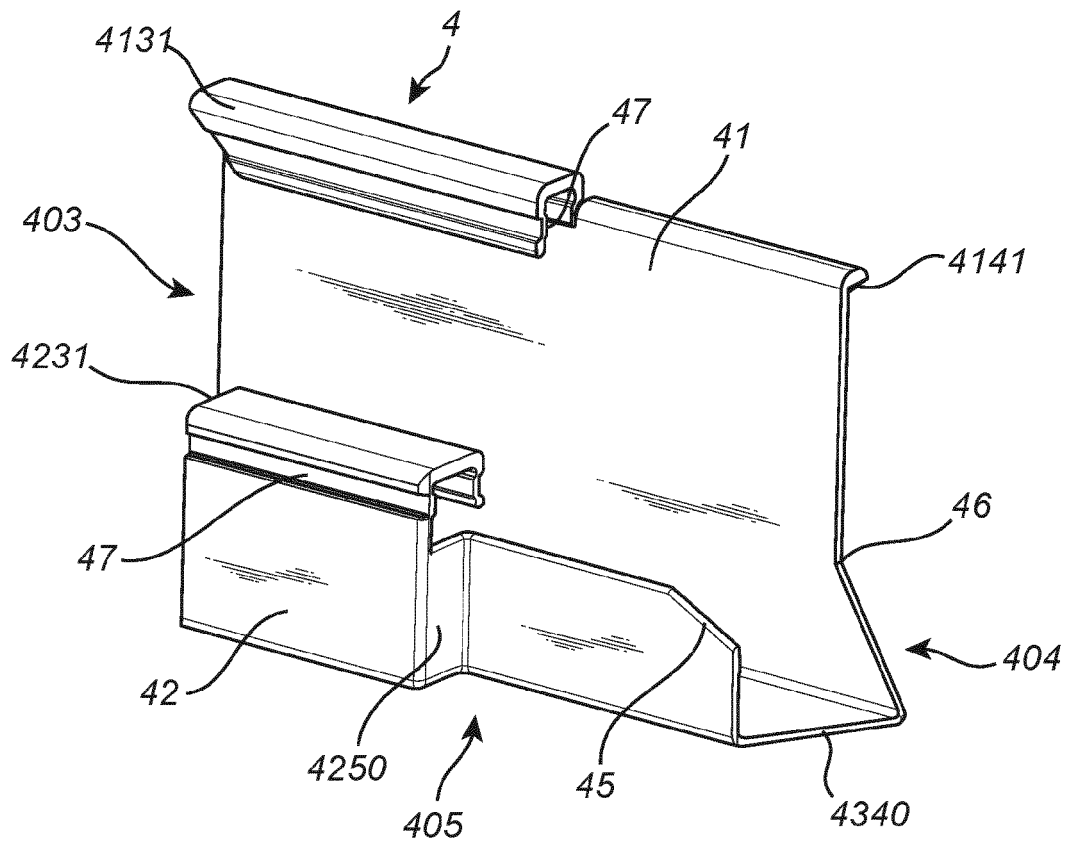


Fig. 17

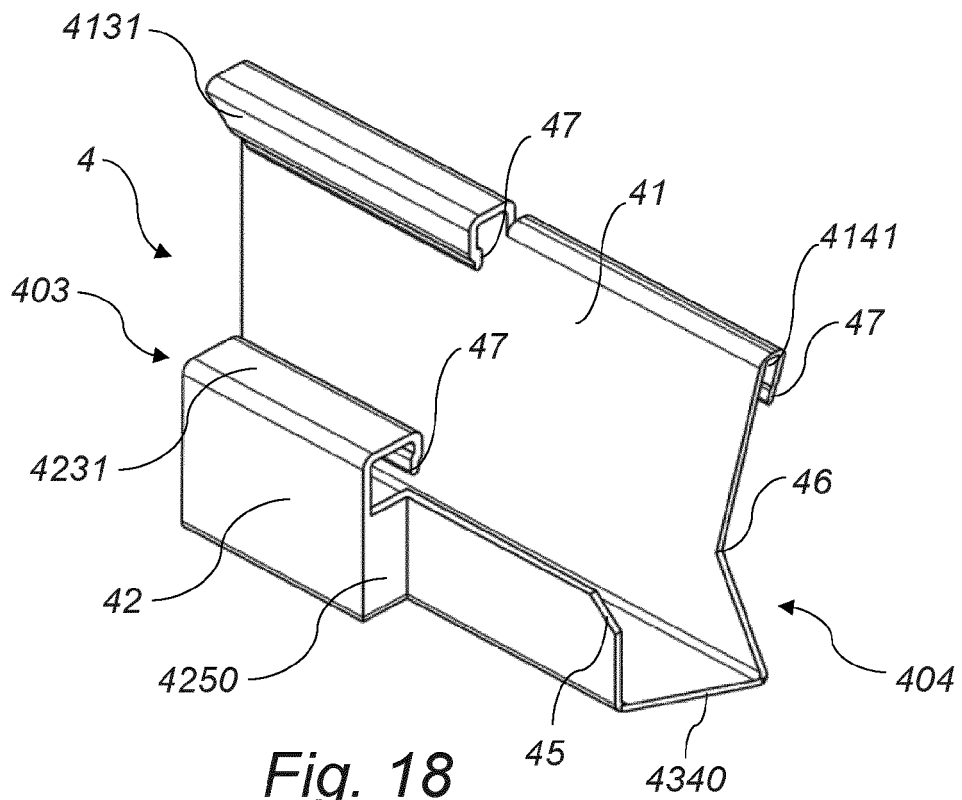


Fig. 18

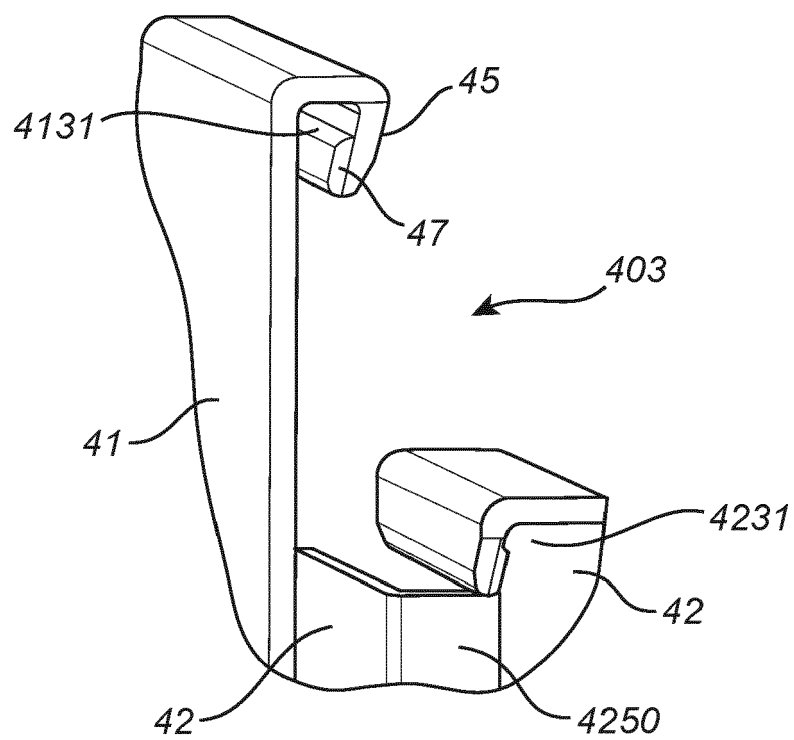


Fig. 19

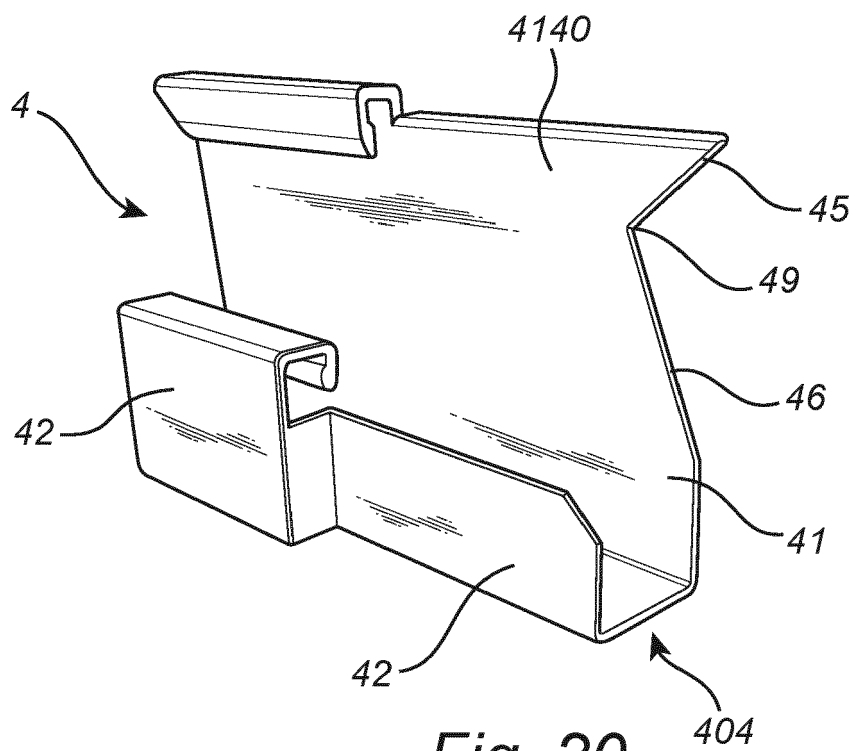


Fig. 20

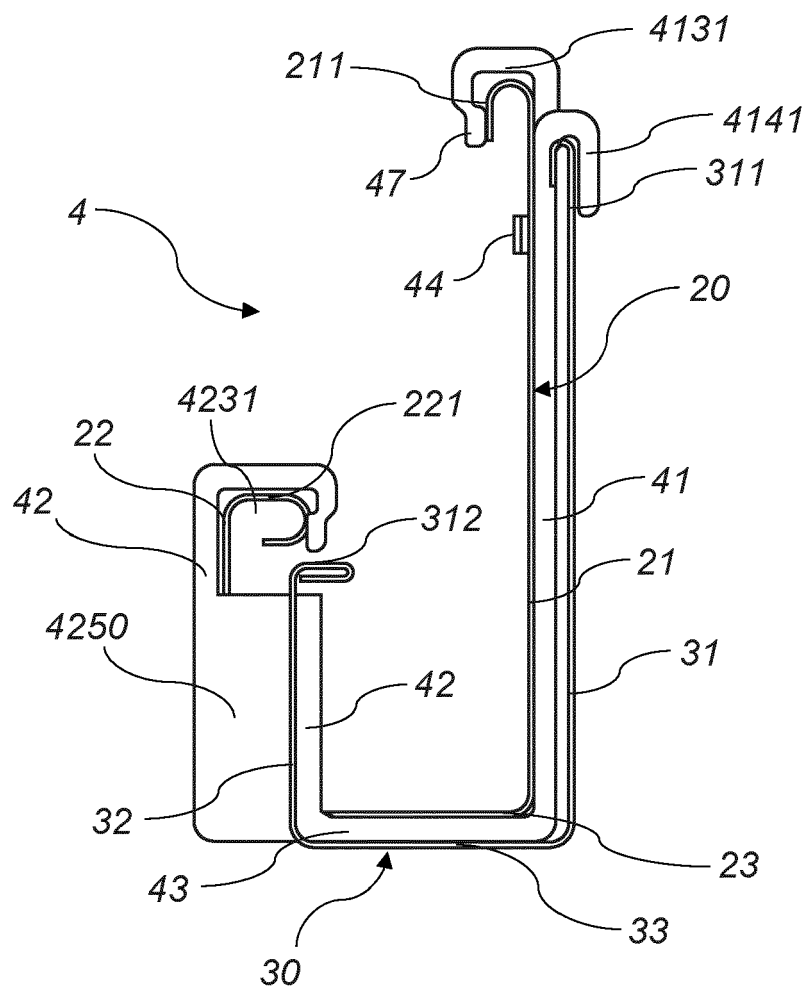


Fig. 21

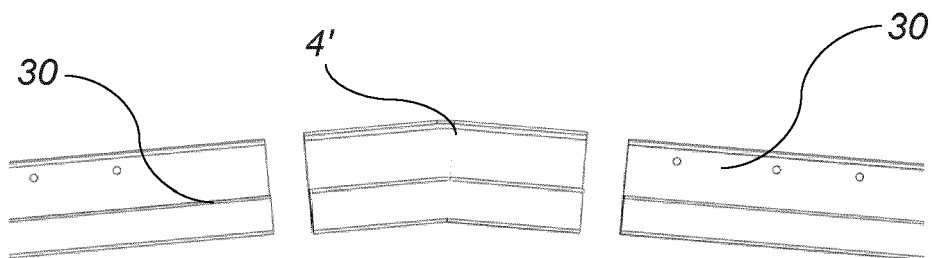


Fig. 22



EUROPEAN SEARCH REPORT

Application Number

EP 23 16 5847

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 1 682 840 A (FOERCH JR JOHN W) 4 September 1928 (1928-09-04) * figure 3 *	1-3, 12, 15-17 4-11, 14	INV. E04D13/068 E04D13/04
A	JP S52 91536 U (-) 8 July 1977 (1977-07-08) * figures 1, 3 *	1-3, 12, 13, 15-17 4-11, 14	
A	GB 1 091 467 A (PLASTIERS LTD) 15 November 1967 (1967-11-15) * figures *	1-17	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) E04D
Place of search	Date of completion of the search	Examiner	
The Hague	18 September 2023	Tran, Kim Lien	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 23 16 5847

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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18-09-2023

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JP S5291536	U	08-07-1977	JP S5291536 U 08-07-1977
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REFERENCES CITED IN THE DESCRIPTION

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