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(54) A DOOR STOP ASSEMBLY ARRANGED FOR DAMPING THE MECHANICAL IMPACT OF A CLOSING DOOR

(57) A door stop assembly (1) arranged for damping the mechanical impact of a closing door, the door stop assembly comprising a plate (14) provided with an elongated channel (18) extending up to a first opening (20a, 20b) in the sidewall (17) of the plate (14), and wherein the channel (18) forms a second opening (21) in one of the major surfaces (15, 16) of the plate (14), and a bumper strip (22) inserted in the channel (18) through the first opening (20a, 20b) and protruding from the channel (18) through the second opening (21), wherein the door stop assembly (1) further comprises an occluding device (3a, 3b) for maintaining the bumper strip (22) in the channel (18) by hindering the passage of the bumper strip (22) through the first opening (20a, 20b) back out of the channel (18).

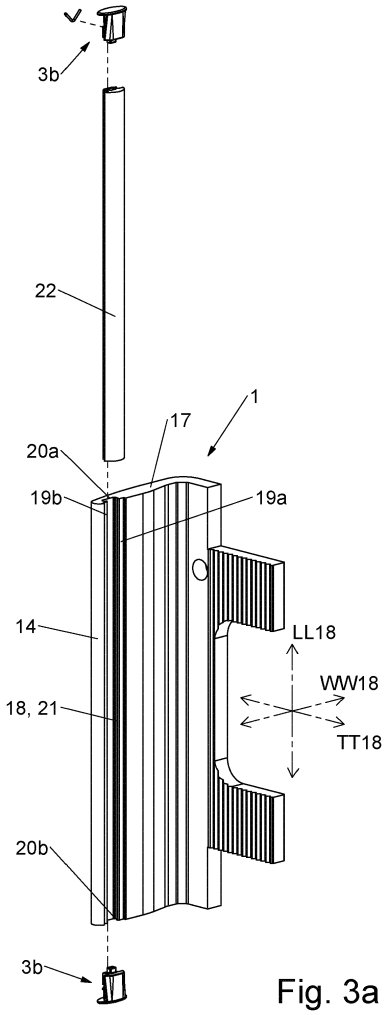

Fig. 3a

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Description

Field of the invention

[0001] The present invention relates to a door stop assembly. The invention in particular relates to a strike plate comprising the door assembly.

Background of the invention

[0002] In order to dampen the mechanical impact of a closing door, it is known in the prior art to provide door stop assemblies. Door stop assemblies generally comprise a plate which is provided with a bumper strip for dampening the impact of the closing door, wherein the plate is attached to the door enclosure, such as a frame or a pole, at a position where the closing door would hit the door stop assembly at a high speed. This position is generally at the side of the door enclosure where the strike plate of the door is provided. The strike plate of a door assembly is the element of the door assembly that receives a latch and/or dead bolt when locking and/or latching a door. Such door stop assemblies are known to dampen the impact of sliding doors, such as described in patent publication JP6068786, or of rotating doors, such as described in patent publication EP3239440.

[0003] The patent publication EP3239440 in particular discloses a strike plate comprising an "L"-shaped profile, wherein one of the legs of the "L"-shaped profile comprises the door stop assembly. The door stop assembly disclosed in patent publication EP3239440 comprises a plate having opposing major surfaces interconnected by a plate sidewall, i.e. one of the two legs of the "L"-shaped profile forms said plate. The plate is provided with an elongated rectilinear channel delimited by opposing channel sidewalls extending in an elongation direction between two opposing openings in the sidewall of the plate, also referred to as end openings. The channel forms a further opening, also referred to as bumper opening, in one of the major surfaces of the plate i.e. in the major surface of the plate on which the door impacts. The bumper opening in the major surface of the plate extends in the elongation direction. The door stop assembly comprises a bumper strip inserted in the channel and protruding from the channel through the bumper opening such as to come in contact with the closing door prior to the closing door impacting on the plate itself thereby optimally absorbing the impact of the closing door.

[0004] It has been found by the present inventors that during cold periods, the bumper strip tends to shrink, which causes the bumper strip to slide out of the channel along one of the end openings in the channel, in particular due to the mechanical vibrations caused by the impact of the closing door.

Description of the invention

[0005] It is an aim of the present invention to provide a door stop assembly arranged for damping the mechanical impact of a closing door wherein the problem of the prior art is solved. The present invention solves this aim by providing a door stop assembly comprising a plate having opposing major surfaces interconnected by a plate sidewall. The plate is provided with an elongated, preferably rectilinear, channel delimited by opposing channel sidewalls extending in an elongation direction up to a first opening in the sidewall of the plate. The openings of the channel in the sidewall of the plate are also referred to as an end openings. The channel forms a second opening in one of the major surfaces of the plate, i.e. in the major surface of the plate on which the door impacts, the second opening extending in the elongation direction. This opening of the channel is also referred to as the bumper opening. The door stop assembly further comprises a bumper strip inserted in the channel through the first opening and protruding from the channel through the second opening i.e. such as to come in contact with the closing door prior to the closing door impacting on the plate itself thereby optimally absorbing the impact of the closing door. The door stop assembly of the present invention further comprises an occluding device for maintaining the bumper strip in the channel by hindering the passage of the bumper strip through the first opening back out of the channel. To that end, the occluding device comprises an insertion part configured to be inserted into the channel through the first opening of the channel, wherein the insertion part comprises a main body extending in a length direction, in use parallel to the elongation direction of the channel, from a bumper end configured to lie adjacent to the bumper strip in the channel, up to a head end configured to lie adjacent to the first opening of the channel. The insertion part further comprises fixation means provided on the main body. The fixation means are arranged to fixate the position of the occluding device in the channel after insertion of the occluding device in the channel.

[0006] By fixing the occluding device in the channel between the first opening of the channel and the bumper strip, the bumper strip is no longer able to slip out of the channel through the first opening in the channel, even if the bumper strip substantially shrinks due to cold temperatures and even if the bumper strip is agitated by the mechanical vibrations of the impacting closing door.

[0007] The present invention has the further advantage that the bumper strip is maintained in the channel without degrading the aesthetics or quality of the door stop assembly. The bumper strip is in particular not secured in the channel by means of an adhesive the presence of which would not only be visually unpleasant for the user, but would also make the quality of the door stop assembly prone to deterioration in function of time and environmental influences. The bumper strip is in particular also not secured in the channel by pinching the plate such as to deform a part of the channel into an occlusion of the channel. Said pinching would after all damage the plate, which damage would be particularly visible when

the plate which is pinched has been coated such as powder coated.

[0008] The present invention has the further advantage that the width of the channel i.e. the dimension between the two channel sidewalls, can be increased without risking that the bumper strip slips out of the channel through the first opening. This has the advantage that the bumper strip can more easily be inserted into the channel, i.e. that the bumper strip can be pulled into the channel through one of the end openings with a smaller amount of force. This is particularly advantageous when the plate is coated, for example powder coated. When the plate is more or less coated, the width of the channel is respectively decreased or increased. In the past, the amount of coating of the plate had to be reduced in order to enable the insertion of the bumper strip inside of the channel. By increasing the width of the channel, the amount of coating can be increased, whilst keeping the insertion of the bumper strip in the channel easy.

[0009] The present invention has the further advantage that the variation of the length of the bumper strip, which for example occurs due to the inexact cutting of the bumper strip or due to the shrinking of the bumper strip at cold temperatures, is not visible. Indeed, in the present invention, the occluding element abuts on the ends of the bumper strip, thereby compacting the bumper strip to a more reduced length i.e. slightly longer bumper strips are shortened more than slightly shorter bumper strips up to the same reduced length of the bumper strip. In order to assure a compaction of the bumper strip by the occluding device, a slightly oversized bumper strip can be used with respect to the available length in the channel in the elongation direction i.e. the available length being the length of the channel in the elongation direction minus the lengths of the inserted occluding devices. Similarly, the cut ends of the bumper strip, which tend to be non-straight due to the inexact cutting of the bumper strips, are flattened upon abutment with the occluding device, thereby increasing the aesthetics of the device. The present invention has the further advantage that, because of the compaction of the bumper strip by the occluding device, the inside of the channel cannot be accessed by a user. This alleviates the risk of vandalism, wherein a vandal would grab the bumper strip from within the channel such as to rip the bumper strip out of the channel for example through the bumper opening.

[0010] According to an embodiment of the present invention, the term door not only refers to a conventional door provided in an opening of a wall, but also to other similar applications such as to a gate provided in the opening in a fence, or to a window provided in the opening of a wall etc. Typically, the door enclosure would be a frame in case the door is a conventional door or a window, and would be a pole or another support such as a wall in case the door is a fence/gate.

[0011] According to an embodiment of the present invention the fixation means comprises an abutment element protruding from the main body of the insertion part, in a direction transverse to the length direction of the main body, in particular in a width direction of the main body, such that upon insertion of the occluding device into the channel, the abutment element abuts the channel sidewall. Due to the abutment of the abutment element with the channel sidewall, a friction or interference fit is created.

[0012] According to an embodiment of the present invention, the abutment element is made of a different material than the main body of the insertion part. The main body of the insertion part and the abutment member being made of different materials enables to optimally adapt the material of each part for their intended function. Preferably, the main body of the insertion part is made from a plastic material enabling the cheap production of the main body, preferably a hard plastic material such as polycarbonate such as to avoid the deformation and consequential movement of the insertion part in the channel.

[0013] According to an embodiment of the present invention, the abutment element is configured to elastically deform upon insertion of the occluding device in the channel such as to exert an elastic restoring force on the channel sidewall such as to create an interference fit between the channel sidewall and the insertion part. Preferably, the abutment member is made from a plastic material such as rubber. Upon insertion of the occluding device in the channel, the plastic material is elastically compressed between the main body of the insertion part on the one hand and the channel sidewall on the other hand. According to a preferred alternative embodiment, the abutment element is a barb configured to resist removal of the occluding device from the channel after insertion of the occluding device in the channel by abutting the free end of the barb onto the channel sidewall. The barb is for example an element having a part attached to the main body and that extends over a certain length towards a free end. The free end of the barb protrudes away from the main body towards the channel sidewall i.e. laterally with respect to the length direction of the main body, i.e. along the width direction of the main body, and that furthermore protrudes in a direction opposite to the direction of insertion, i.e. the free end of the barb points along the length direction of the main body from the bumper end towards the head end such as to form an angle between the barb and the length direction which angle differs from 90°, i.e. a sharp angle. The angle is preferably comprised between 30° and 60°, preferably between 40°and 50°. This configuration of the barb allows to easily slide the insertion part into the channel through the first end opening, i.e. along the direction of insertion, whilst resisting after insertion the pulling out of the insertion part from the channel through said first end opening in a direction opposite to the direction of insertion. Upon pulling out of the insertion part from the channel through the first end opening through which the insertion part was inserted, the barb will open up, i.e. increase the angle between the barb and the length direction, such that the barb optimally anchors on the channel sidewall. The barb free

end has preferably a sharp edge or a sharp end i.e. a pointy end, such as to improve the anchoring of the barb into the channel sidewall. Preferably, the barb resists removal of the occluding device from the channel after insertion of the occluding device in the channel by digging the free end of the barb, in particular the sharp edge or sharp end, into the channel sidewall. Preferably the barb has a higher Mohs hardness than the material of the channel sidewall. This ensures that the barb will dig into the channel sidewall rather than that the channel sidewall wears the barb. Preferably, the channel sidewall is made from an aluminum alloy. Preferably the barb is made from steel. Preferably the barb is one of a rod or a plate. The barb has a width, which is preferably the diameter of the rod or the thickness of the plate. Preferably, the width of the barb is smaller than the length of the barb. Preferably, the width of the barb is smaller or equal than the thickness of the barb. The width of the barb is the width of the barb prior to insertion of the fixation groove as explained below. The width of the barb is preferably constant.

[0014] According to an embodiment of the present invention, in particular where the abutment element is a barb as described above, the fixation means further comprises a fixation groove provided in the main body of the insertion part. The fixation groove is preferably provided in a face of the main body that is not parallel to the channel sidewalls, preferably in a face of the main body that is substantially parallel to, and preferably engages, a bottom wall of the channel, i.e. the wall of the channel which extends between the two sidewalls thereof. The barb is inserted in the fixation groove. Preferably the fixation groove is substantially "V-shaped". The apex of the "V-shaped" groove points along the length direction toward the bumper end. Preferably the barb is substantially "V-shaped". According to an embodiment of the present invention, the fixation groove, in particular the fixation groove width i.e. the dimension of the fixation groove between opposing fixation groove sidewalls, is dimensioned such that the barb is moveable within the fixation groove between a retracted state and a deployed state. Preferably, in the deployed state the barb is less aligned along the length direction of the main body of the insertion part than in the retracted state i.e. the sharp angle between the barb and the length direction is smaller in the retracted state than in the deployed state. Preferably, the fixation means and the channel are dimensioned such that in the deployed state, the lateral dimension of the insertion part i.e. the dimension of the insertion part along the width direction of the channel, is larger than the width of channel i.e. the dimension between opposing channel sidewalls. In order to allow the movement of the barb between said states, the barb has a first, preferably constant, width as described above, the fixation groove has at least a section having a second width, wherein the first width is smaller than the second width. The section of the fixation groove having the second width is at least provided at the end of the fixation groove adjacent to the channel sidewall against which the abutment member is configured to abut. In a preferred implementation, the width of the fixation groove is substantially constant. In an alternative implementation, the fixation groove has a first section having a third width smaller than the second width, and a second section having the second width, wherein the second section lies closer to the channel sidewall against which the abutment member is configured to abut than the first section. In this alternative implementation, the third width is preferably substantially equal to the first width. Preferably, the first section is provided at the apex of the V-shaped fixation groove.

[0015] According to an embodiment of the present invention, in particular where the abutment element is a V-shaped barb, the barb on its own is biased towards the deployed state i.e. the barb itself in isolation the remaining components of the insertion part is biased to move out of the retracted position towards the deployed state. The present embodiment has the advantage that the barb always contacts the channel sidewalls such as to avoid removal of the occluding device from the channel, even if the occluding device would shrink for example due to low temperatures.

[0016] According to an embodiment of the present invention, the occluding device further comprises an occluding plate attached to the head end of the insertion part. The occluding plate is for example a flange provided on the head end of the main body of the insertion part. The occluding plate is configured to cover the first opening, for example the entire first opening, of the channel after insertion of the occluding device in the channel. This embodiment prevents dirt and water from entering into the channel through the first end opening of the channel. The occluding plate furthermore prevents the user from inserting the insertion part too deep into the channel. Preferably the occluding plate is integrally formed with the main body of the insertion part, e.g. through injection molding.

[0017] According to an embodiment of the present invention, the occluding device further comprises a spike provided on the bumper end of the main body of the insertion part. The spike extends in the length direction of the main body. The spike for example comprises a protrusion optionally provided with a cone pointing in in the length direction of the main body from the head end towards the bumper end. The bumper strip preferably comprises a bore extending in the elongation direction of the bumper strip, which in use is parallel to the elongation direction of the channel, wherein the spike of the insertion part enters the bore upon insertion of the occluding device in the channel. Preferably, the diameter of the bore in the bumper strip in its unstressed state is smaller than the diameter of the spike, for example of the cone of the spike. The present embodiment prevents that vandals would pull out the bumper strip from the channel through the bumper opening. The free ends of the bumper strip are also prevented from being pulled out of the channel when the bumper strip would be frozen against the door or gate. Preferably the spike is integrally formed with the

main body of the insertion part, e.g. through injection molding.

[0018] According to an embodiment of the present invention, the plate of the door stop assembly as well as the channel in said plate, are extruded, preferably along the elongation direction of the channel.

[0019] According to an embodiment of the present invention, the bumper strip is a mechanical shock absorbing strip, for example a rubber strip. Preferably, the bumper strip is an extruded strip.

[0020] According to an embodiment of the present invention the channel is further delimited by an upper wall extending in the elongation direction, wherein the second opening of the channel, i.e. the bumper opening, is an opening provided in the upper wall of the channel. Preferably, the part of the bumper strip protruding from the second opening and the part of the bumper strip within the channel clamp the upper wall of the channel. This embodiment prevents that the bumper strip would move in the channel in a direction perpendicular to the major surfaces of the plate, in particular it prevents movement in the thickness direction of the channel. Preferably, the occluding device comprises a protrusion which is provided on the main body of the insertion part. The protrusion extends through the bumper opening in the upper plate. Preferably, a flange is provided on the protrusion. Preferably, the protrusion and optionally the flange however do not extend further than the bumper strip in a direction perpendicular to the elongation direction of the channel, in particular in a thickness direction of the channel, such as to avoid that the closing door impacts on the insertion part prior to impacting on the bumper strip. Preferably, the upper wall prevents the removal of the occluding device from the channel in a direction perpendicular to the elongation direction of the channel, i.e. it prevents removal along the thickness direction of the channel. To that end, the width of the bumper opening is smaller than the maximal width of the main body that resides in the channel. Preferably, the width of the protrusion is smaller than the maximal width of the main body. Preferably, the flange has a larger width than the maximal width of main body. Preferably the protrusion and optionally the flange provided on the protrusion are integrally formed with the main body of the insertion part, e.g. through injection molding.

[0021] According to an embodiment of the present invention, the channel further extends in the elongation direction of the channel up to a third opening in the sidewall of the plate, i.e. a further end opening. Preferably, a further occluding device having the characteristics of the occluding device as described above is configured to be inserted into the channel through the third opening of the channel such as to maintain the bumper strip in the channel by hindering the passage of the bumper strip through the third opening back out of the channel. The bumper strip is preferably compressed between the occluding device and the further occluding device.

[0022] According to an embodiment of the present invention, the occluding device is inserted in the channel and the elongation direction of the channel is parallel to the length direction of the insertion part. In this embodiment, the thickness direction of the channel and width direction of the channel respectively correspond to the thickness direction and the width direction of the main body.

[0023] According to an embodiment of the present invention, a strike plate is provided, wherein the strike plate comprises the door stop assembly as previously described. Preferably, the strike plate comprises an "L-profile" having a first leg and a substantially perpendicular second leg, wherein the second leg is arranged to be connected to a door enclosure such as a frame or a pole, and wherein the first leg is the plate of the door stop assembly.

Figures

[0024]

Figure 1 is a perspective view of a pole comprising a strike plate provided with a door stop assembly according to an embodiment of the present invention.

Figure 2 is a perspective view of the strike plate shown in figure 1, wherein the strike element is omitted.

Figure 3a shows an exploded perspective view of the strike plate shown in figure 2.

Figure 3b shows an exploded perspective view of the occluding device shown in figure 2.

Figure 4 shows a cross-sectional view of the strike plate shown in figure 3 in a plane perpendicular to the elongation direction of the channel, wherein the bumper strip and occluding device are omitted. Figure 4 also shows an enlarged portion of the strike plate.

Figure 5 shows a view of the occluded face of the occluding device from figures 1-3, along a plane perpendicular to the thickness direction of the main body.

Figure 6 shows a cross-section view of the strike plate from figures 1-4 taken in a plane perpendicular to the thickness direction of the channel and lying within the plate of the door stop assembly such as to show the occluded face of the occluding device.

Figure 7 shows two cross-sections of the strike plate from figures 1-4 in a plane perpendicular to the elongation direction of the channel at position AA and at position BB as indicated in figure 6.

Description of the figures

[0025] Hereinafter the invention will be described in certain embodiments and in reference to the accompanying figures. The present invention is however not limited by the following description.

[0026] Figure 1 is a perspective view of a pole 10, for example a fence pole, supporting a strike plate 2 provided with a door stop assembly 1 according to an embodiment of the present invention. The strike plate 2 is the element of the door assembly that receives a latch and/or dead bolt when locking and/or latching a door. To that end the strike plate 2 comprises a strike element 11 of bended metal which is coupled to an aluminum based "L"-shaped profile, as is for example explained in the incorporated patent publication EP3239440. Figures 2 and 3 show more clearly the "L"-shaped profile of the strike plate 2 by omitting the pole 10 and the strike element 11. One leg 13 of the "L"-shaped profile is anchored to the pole 10, whilst the other leg 14 supports the door stop assembly 1 according to an embodiment of the present invention. The door stop assembly 1 is arranged to dampen the mechanical impact of a closing door. The door stop assembly comprise an extruded plate 14, i.e. formed by the leg 14 of the "L"-shaped profile. The figures show an elongation direction LL18, a width direction WW18 and a thickness direction TT18, wherein the elongation direction LL18, the width direction WW18 and the thickness direction TT18 are perpendicular to each other. These directions correspond to the length, width and thickness of the channel 18 as described below. The plate 14 is extruded along the elongation direction LL18. The plate 14 has a length along the elongation direction LL18, a width along the width direction WW18 and thickness along the thickness direction TT18, wherein the width is smaller than the length but larger than the thickness. The plate 14 has opposing major surfaces 15, 16, perpendicular to the thickness direction TT18. The major surfaces 15, 16 are interconnected by a plate sidewall 17. The plate 14 is provided with an elongated rectilinear channel 18, which is formed whilst extruding the plate 14. The channel 18 is delimited by opposing channel sidewalls 19a, 19b extending in the elongation direction LL18 from a first opening 20a in the sidewall 17 of the plate 14 to a second opening 20b in the sidewall 17 of the plate 14. The openings 20a, 20b of the channel 18 in the sidewall 17 of the plate 14 are also referred to as end openings. The channel 18 has a channel width w4 along the width direction WW18. The channel 18 forms a further opening 21 in the major surface 15 of the plate 14 that is on the inside of the "L"-shaped profile, i.e. in the major surface 15 of the plate 14 on which the door impacts. This opening 21 extends in the elongation direction LL18. This opening 21 of the channel 18 is also referred to as the bumper opening. The door stop assembly 1 further comprises a bumper strip 22 inserted in the channel 18 through one of the end openings 20a, 20b and protruding from the channel 18 through the bumper opening 21 i.e. such as to come in contact with the closing door prior to the closing door impacting on the plate 14 itself thereby optimally absorbing the impact of the closing door. As shown in more detail in figure 4, the channel 18 is furthermore delimited by an upper wall 23 and a bottom wall 24. The bumper opening 21 is provided in this upper wall 23. The part of the bumper strip 22 protruding from the bumper opening 21 and the part of the bumper strip 22 within the channel 18 clamp the upper wall 23 of the channel 18. The door stop assembly 1 further comprises two occluding devices 3a, 3b for maintaining the bumper strip 22 in the channel 18 by hindering the passage of the bumper strip 18 through the first and second end openings 20a, 20b back out of the channel 18. A more detailed view of the occluding device 3 corresponding to any one of occluding devices 3a, 3b is given in figures 5 and 6. A shown in the figures, the occluding device extends along a length direction LL3, a width direction WW3 and a thickness direction TT3, wherein the length direction LL3, the width direction WW3 and the thickness direction TT3 are perpendicular to each other. These dimensions in particular correspond to the length, width and thickness of the main body 6 as described below. Upon insertion of the occluding device 3 into the channel 18, the length direction LL3, the width direction WW3 and the thickness direction TT3 respectively coincide with the elongation direction LL18, the width direction WW18 and the thickness direction TT18 of the channel 18. The occluding device 3 comprises an insertion part 4 configured to be inserted into the channel 18 through the end opening 20a, 20b of the channel 18, wherein the insertion part 3 comprises a main body 6 extending in the length direction LL3 from a bumper end 5a configured to lie adjacent to the bumper strip 22 in the channel 18, up to a head end 5b configured to lie adjacent to the end opening 20a, 20b of the channel 18. The main body 6 is delimited by a major face, referred to as the occluded face 8, configured to face the bottom wall 24 of the channel 18. The occluded face 8 lies perpendicular to the thickness direction TT3. The occluding device 3 further comprises an occluding plate 25 attached to the head end 5b of the insertion part 4, i.e. is integrally formed with the main body 6. The occluding plate 25 is configured to cover the entire end opening 20a, 20b of the channel 18 after insertion of the occluding device 3a, 3b in the channel 18. The occluding device 3 further comprises a spike 26 attached to the bumper end 5a of the main body 6. The spike 26 extends in the length direction of the main body 6 of the insertion part 4. The spike 26 is integrally formed with the main body 6. The spike 26 of the insertion part 4 enters a elongated bore in the bumper strip 22 upon insertion of the occluding device 3 in the channel 18. A protrusion 33 (clearly shown in figure 7) that extends through the bumper opening 21 in the upper plate 23 is connected to the main body 6 of the insertion part 4, in particular on a face of the main body 6 opposite to the occluded face 24. The protrusion 33 is integrally formed with the main body 6. A flange 7 is provided on the protrusion 33. The flange 7 is integrally

formed with the protrusion 33. The protrusion 33 and the flange 7 however do not extend further in the thickness direction TT18 than the bumper strip 22, such as to avoid that the closing door impacts on the insertion part prior to impacting on the bumper strip. The maximum width w1 of the main body 6 is larger than the width w2 of the bumper opening 21 such as to avoid that the occluding device 1 is pulled out of the channel 18 in a direction perpendicular to the elongation direction, i.e. along the thickness direction TT18. The maximum width w1 of the main body 6 is substantially equal to the width w4 of the channel. The width w3 of the flange 7 is larger than the width of the main body 6. The insertion part 4 further comprises fixation means 9 provided on the main body 6. The fixation means 9 are arranged to fixate the position of the occluding device 3 in the channel 18 after insertion of the occluding device 3 in the channel 18. The fixation means 9 comprises an abutment element 27 protruding from the main body 6 of the insertion part 4 in the thickness direction TT3 such that upon insertion of the occluding device 3 into the channel 18, the abutment element 27 abuts the channel sidewall 19a, 19b. Due to the abutment of the abutment element 27 with the channel sidewall 19a, 19b, a friction or interference fit is created. The abutment element 27 is made of a different material than the main body 6 and the integrally formed elements of the main body 6 such as the spike 26, the protrusion and flange 7 and the occluding plate 25. The main body 6 and its integrally formed elements are for example made from plastic, for example through injection molding. The abutment element 27 is made from a metallic material, in particular steel. The abutment element 27 is a barb 27 configured to resist removal of the occluding device 3 from the channel 18 after insertion of the occluding device 3 in the channel 18 by abutting the free ends 28a, 28b of the barb 27 onto the channel sidewall 19a, 19b. The free ends 28a, 28b of the barb 27 protrude away from the main body 6 towards the channel sidewall 19a, 19b i.e. along the width direction WW3, and furthermore protrude in a direction opposite to the direction of insertion, i.e. the free ends 28a, 28b of the barb 27 point along the length direction LL3 from the bumper end 5a towards the head end 5b such as to form an acute angle α, i.e. which angle differs from 90°, between the protruding part of the barb 27 and the length direction LL3. This configuration of the barb 27 allows to easily slide the insertion part 4 into the channel 18 through an end opening 20a, 20b whilst resisting the pulling out of the insertion part 4 from the channel 18 through said end opening 20a, 20b after insertion. Upon pulling out of the insertion part 4 from the channel 18 through the end opening 20a, 20b through which the insertion part 4 was inserted, the barb 27 will open up, i.e. increase the angle α between the protruding part of the barb 27 and the length direction LL3, such that the barb 27 optimally anchors on the channel sidewall 19a, 19b. The barb free end 28a, 28b has a sharp edge, i.e. a circular sharp edge, such as to improve the anchoring of the barb 27 into the channel sidewall 19a, 19b. In particular, the barb 27 resists removal of the occluding device 3 from the channel 18 after insertion of the occluding device 3 in the channel 18 by digging the sharp edge of the free end 28a, 28b of the barb 27 into the channel sidewall 19a, 19b. Therefore, the barb 27 has a higher Mohs hardness than the material of the channel sidewall 19a, 19b. The barb 27 is therefore made from steel. This ensures that the barb 27 will dig into the channel sidewall 19a, 19b rather than that the channel sidewall 19a, 19b wears the barb 27. The barb 27 is a cylindrical rod having a constant diameter w5, i.e. referred to as the width of the barb 27. The barb 27 is substantially "V-shaped" such that it has an apex 30 and two legs 32a, 32b ending in the free ends 28a, 28b. Each one of the two legs 32a, 32b acts as an individual barb by anchoring in the channel sidewall 19a, 19b. The fixation means 9 further comprises a fixation groove 29 provided in the occluded face 8 of the main body 6 of the insertion part 4. The fixation groove 29 is substantially "V-shaped". The apex 31 of the "V-shaped" groove 29 points along the length direction LL3 toward the bumper end 5a of the main body 6. The barb 27 is inserted in the fixation groove 29. The fixation groove 29 has a constant width w6 i.e. the dimension of the fixation groove 29 between opposing fixation groove sidewalls. The fixation groove 29 width w6 is dimensioned such that the barb 27 is moveable within the fixation groove 29 between a retracted state and a deployed state. In particular, the apex 30 of the barb 27 acts as a rotation point around which the two legs 32a, 32b of the V-shaped barb 27 rotate in and out of alignment with the length direction LL3. In the deployed state the legs 32a, 32b of the barb 27 are less aligned along the length direction LL3 than in the retracted state i.e. the sharp angle α between the legs 32a, 32b of the barb and the length direction LL3 is smaller in the retracted state than in the deployed state. The fixation means 9 and the channel 18 are dimensioned such that in the deployed state, the lateral dimension of the insertion part 4 i.e. the dimension of the insertion part along the width direction WW18 of the channel 18, is larger than the width w4 of channel 18. In order to allow the movement of the barb 27 between said states, the fixation groove width w6 is larger than the barb width w5. The barb 27 on its own is biased towards the deployed state i.e. the barb 27 itself in isolation the remaining components of the insertion part 4 is biased to move out of the retracted position towards the deployed state. This has the advantage that the barb 27 always contacts the channel sidewalls 19a, 19b such as to avoid removal of the occluding device 3 from the channel 18, even if the occluding device 3 would shrink for example due to low temperatures. Figure 7 shows two cross-sections of the strike plate 2 from figures 1-4 in a plane perpendicular to the elongation direction LL18 at position AA and at position BB as indicated in figure 6 These cross-sections clearly demonstrate how the protrusion 33 and the flange 7 do not extend further in the thickness direction TT18 than the bumper strip 22 , such as to avoid that the closing door impacts on the

insertion part prior to impacting on the bumper strip 22. The maximum width w1 of the main body 6 is larger than the width w2 of the bumper opening 21 such as to avoid that the occluding device 1 is pulled out of the channel 18 in a direction perpendicular to the elongation direction, i.e. along the thickness direction TT18.

Claims

1. A door stop assembly (1) arranged for damping the mechanical impact of a closing door, the door stop assembly comprising

a. a plate (14) having opposing major surfaces (15, 16) interconnected by a plate sidewall (17), the plate (14) being provided with an elongated channel (18) delimited by opposing channel sidewalls (19a, 19b) extending in an elongation direction (LL18) up to a first opening (20a, 20b) in the sidewall (17) of the plate (14), and wherein the channel (18) forms a second opening (21) in one of the major surfaces (15, 16) of the plate (14), the second opening (21) extending in the elongation direction (LL18), and
b. a bumper strip (22) inserted in the channel (18) through the first opening (20a, 20b) and protruding from the channel (18) through the second opening (21),
characterized in that
the door stop assembly (1) further comprises an occluding device (3a, 3b) for maintaining the bumper strip (22) in the channel (18) by hindering the passage of the bumper strip (22) through the first opening (20a, 20b) back out of the channel (18), the occluding device (3a,3b) comprising an insertion part (4) configured to be inserted into the channel (18) through the first opening (20a, 20b) of the channel (18), wherein the insertion part (4) comprises a main body (6) extending in a length direction (LL3) from a bumper end (5a) configured to lie adjacent to the bumper strip (22) in the channel (18), up to a head end (5b) configured to lie adjacent to the first opening (20a, 20b) of the channel (18), and wherein the insertion part (4) further comprises fixation means (9) provided on the main body (6), wherein the fixation means (9) are arranged to fixate the position of the occluding device (3a, 3b) in the channel (18) after insertion of the occluding device (3a, 3b) in the channel (18).

2. The door stop assembly (1) according to the first claim wherein the fixation means (9) comprises an abutment element (27) protruding from main body (6) of the insertion part (4) in a direction (WW3) transverse to the length direction (LL3) of the main body (6) of the insertion part (4) such that upon insertion of the occluding device (3a, 3b) into the channel (18), the abutment element (27) abuts the channel sidewall (19a, 19b), and wherein the abutment element(27) is made of a different material than the main body (6) of the insertion part (4).

3. The door stop assembly (1) according to the preceding claim, wherein the abutment element (27) is a barb (27) configured to resist removal of the occluding device (3a, 3b) from the channel (18) after insertion of the occluding device (3a,3b) in the channel (18) by abutting the free end (28a, 28b) of the barb (27) onto the channel sidewall (19a, 19b), wherein the barb (27) has a higher Mohs hardness than the material of the channel sidewall (19a, 19b), and wherein the channel sidewall (19a, 19b) is preferably made from an aluminum alloy, and wherein preferably the barb (27) is made from steel.

4. The door stop assembly (1) according to any one of the preceding claims, wherein the fixation means (9) further comprises a fixation groove (29) provided in the main body (6) and wherein the barb (27) is inserted in the fixation groove (29), wherein the fixation groove (29) is substantially "V-shaped" and wherein the barb (27) is substantially "V-shaped".

5. The door stop assembly (1) according to the preceding claim wherein the fixation groove (29) is dimensioned such that the barb (27) is moveable within the fixation groove (29) between a retracted state and a deployed state wherein in the deployed state the barb (27) is less aligned along the length direction (LL3) of the main body (6) than in the retracted state, and wherein the barb on its own, is biased towards the deployed state.

6. The door stop assembly (1) according to the preceding claim wherein the barb (27) has a first width, wherein the fixation groove (29) has at least a section having a second width, and wherein the first width is smaller than the second width.

7. The door stop assembly (1) according to preceding claim wherein the fixation groove (29) has a first section having a third width smaller than the second width, and a second section having the second width, wherein the second section lies closer to the channel sidewall (19a, 19b) against which the barb (27) is configured to abut than the first section.

8. The door stop assembly (1) according to any one of the preceding claims wherein the occluding device (3a, 3b) further comprises an occluding plate (25) attached to the head end (5b) of the main body (6), wherein the occluding plate (25) is configured to cover the entire first opening (20a, 20b) of the channel (18) after insertion of the occluding device (3a, 3b)

in the channel (18).

9. The door stop assembly (1) according to any one of the preceding claims wherein the occluding device (3a, 3b) comprises a spike (26) provided on the bumper end (5a) of the main body (6), wherein the spike (26) extends in the length direction (LL3) of the main body (6), wherein the bumper strip (22) comprises a bore extending in the elongation direction of the bumper strip (22), and wherein the spike (26) enters the bore upon insertion of the occluding device (3a, 3b) in the channel (18).

10. The door stop assembly (1) according to any one of the preceding claims wherein the channel (18) is further delimited by an upper wall (23) extending in the elongation direction (LL18) of the channel (18), wherein the second opening (21) of the channel (18) is an opening provided in the upper wall (23) of the channel (18).

11. The door stop assembly (1) according to the preceding claim, wherein the part of the bumper strip (22) protruding from the second opening (21) and the part of the bumper strip (22) within the channel (18) clamp the upper wall (23) of the channel (18).

12. The door stop assembly (1) according to any one of the preceding claims wherein the channel (18) further extends in the elongation direction (LL18) up to a third opening (20a, 20b) in the sidewall (17) of the plate (14), and wherein a further occluding device (3a, 3b) having the characteristics of the occluding device (3a, 3b) in anyone of the preceding claims is configured to be inserted into the channel (28) through the third opening (20a, 20b) of the channel (18) such as to maintain the bumper strip (22) in the channel (18) by hindering the passage of the bumper strip (22) through the third opening (20a, 20b) back out of the channel (18), the bumper strip (22) being preferably compressed between the occluding device (3a, 3b) and the further occluding device (3a, 3b).

13. The door stop assembly (1) according to any one of the preceding claims wherein the plate (14) and channel (18) are extruded.

14. A strike plate (2) of a door assembly, the strike plate (2) comprising the door stop assembly (1) according to any one of the preceding claims.

15. The strike plate (2) according to the preceding claim wherein the strike plate (2) comprises an "L-profile" having a first leg (14) and a substantially perpendicular second leg (13), wherein the second leg (13) is arranged to be connected to a door enclosure such as a frame or a pole (10), and wherein the first leg (14) is the plate (14) of the door stop assembly (1).

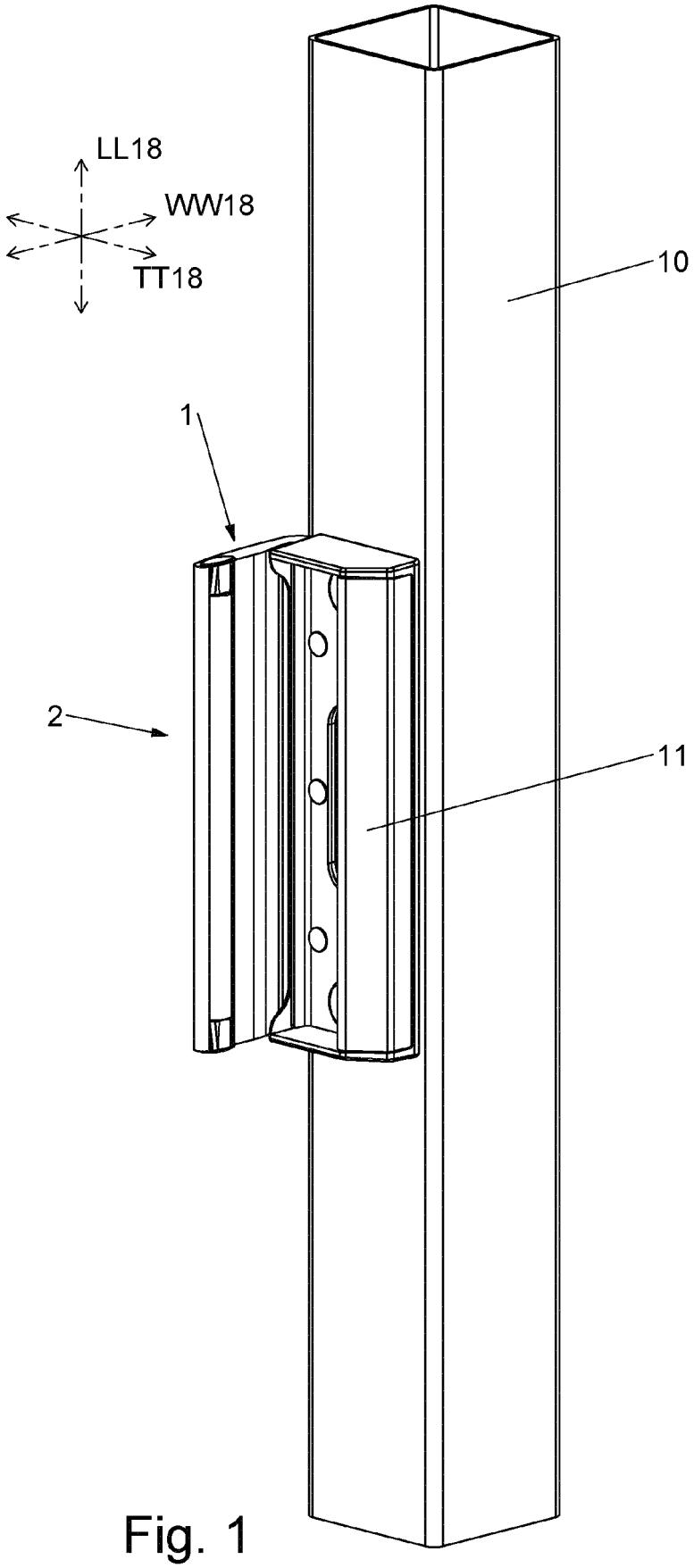


Fig. 1

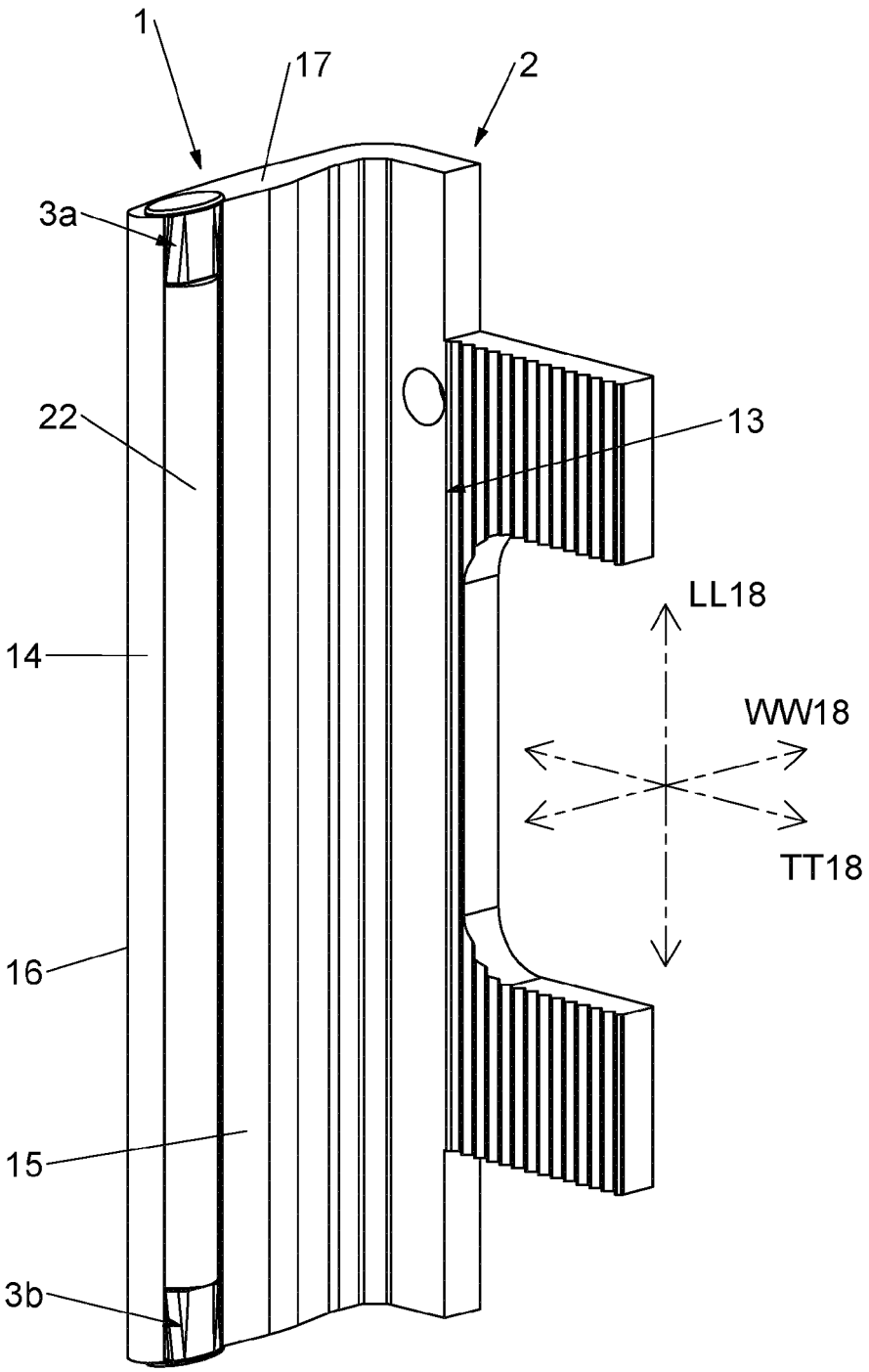


Fig. 2

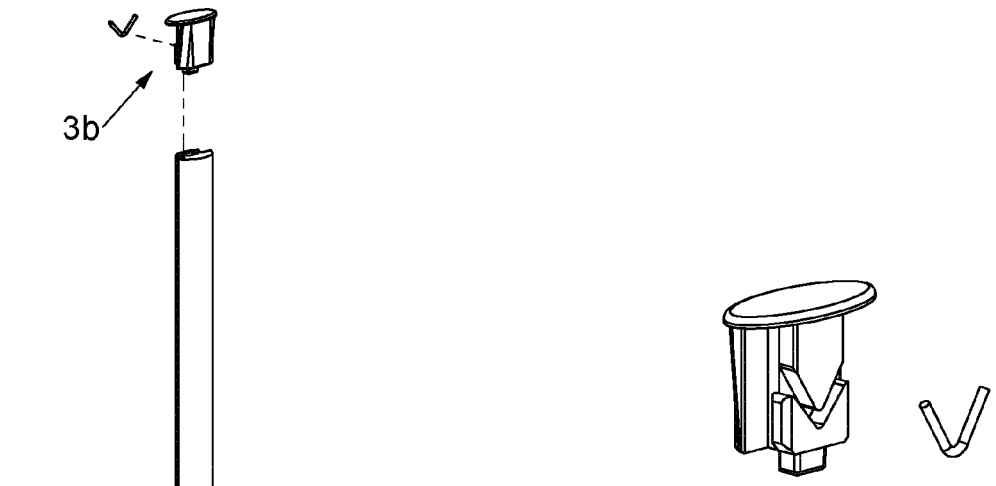


Fig. 3b

Fig. 3a

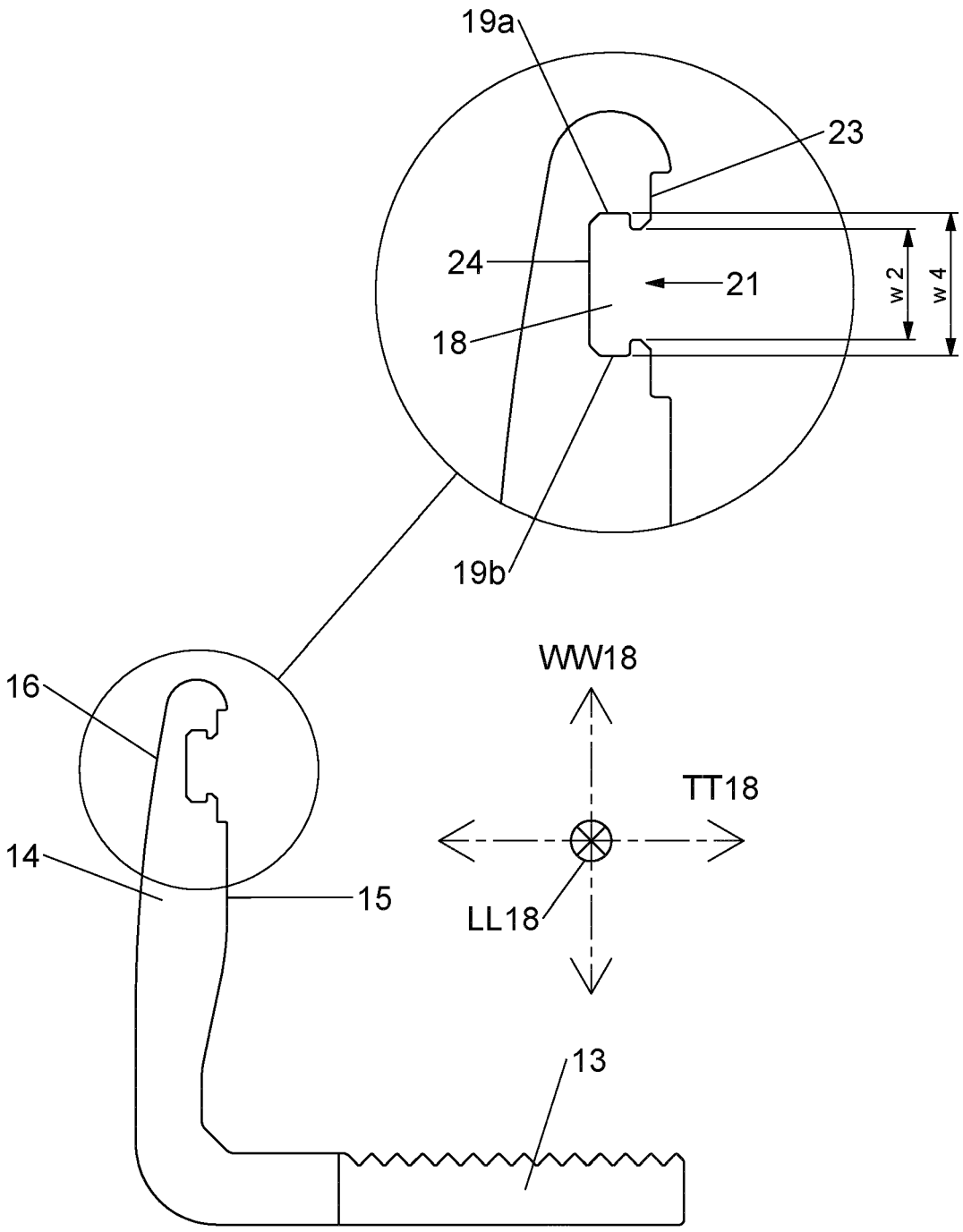
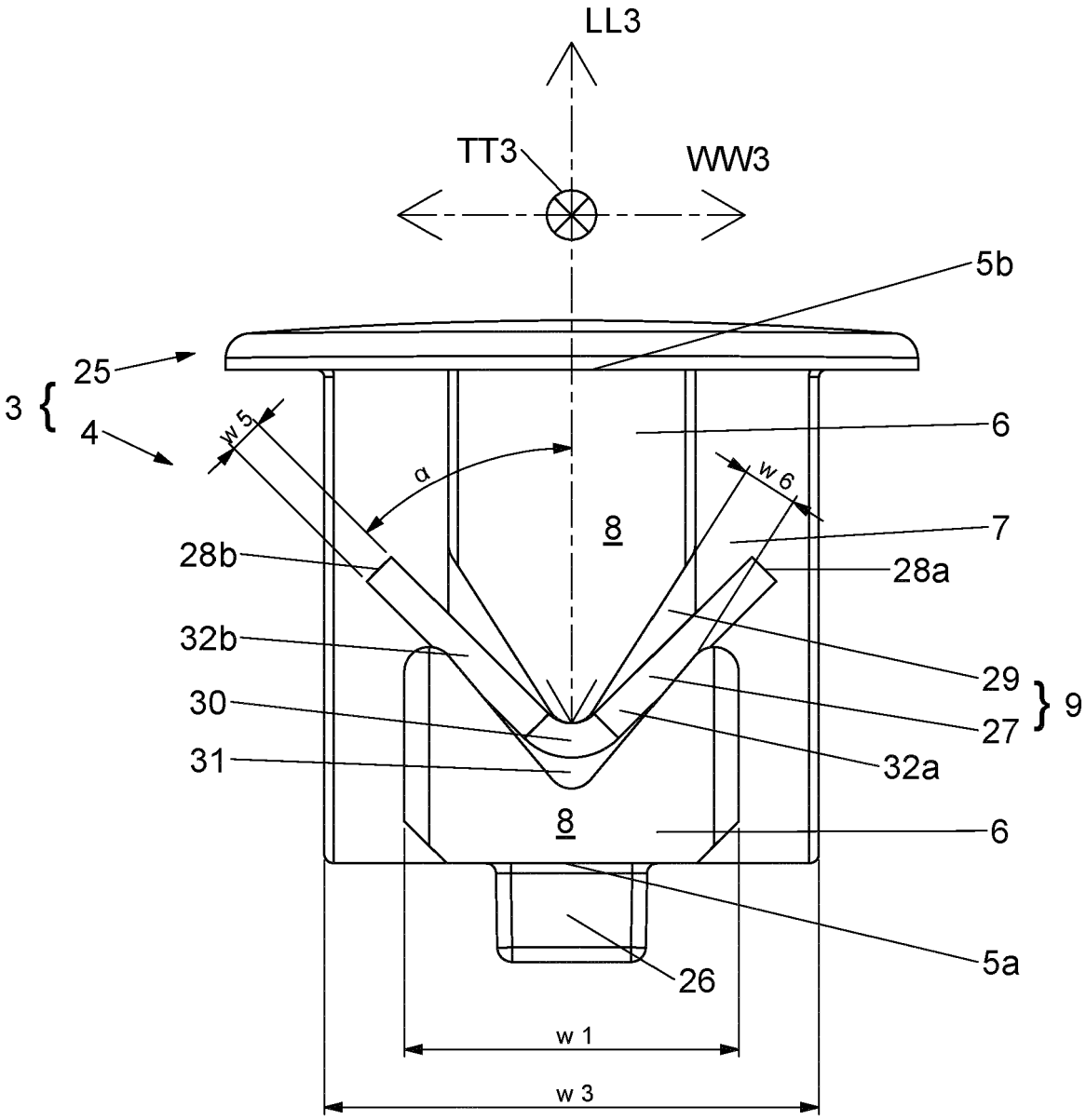


Fig. 4


LL3
TT3
WW3
5b
25
3
4
w 5
α
6
w 6
8
7
28b
28a
32b
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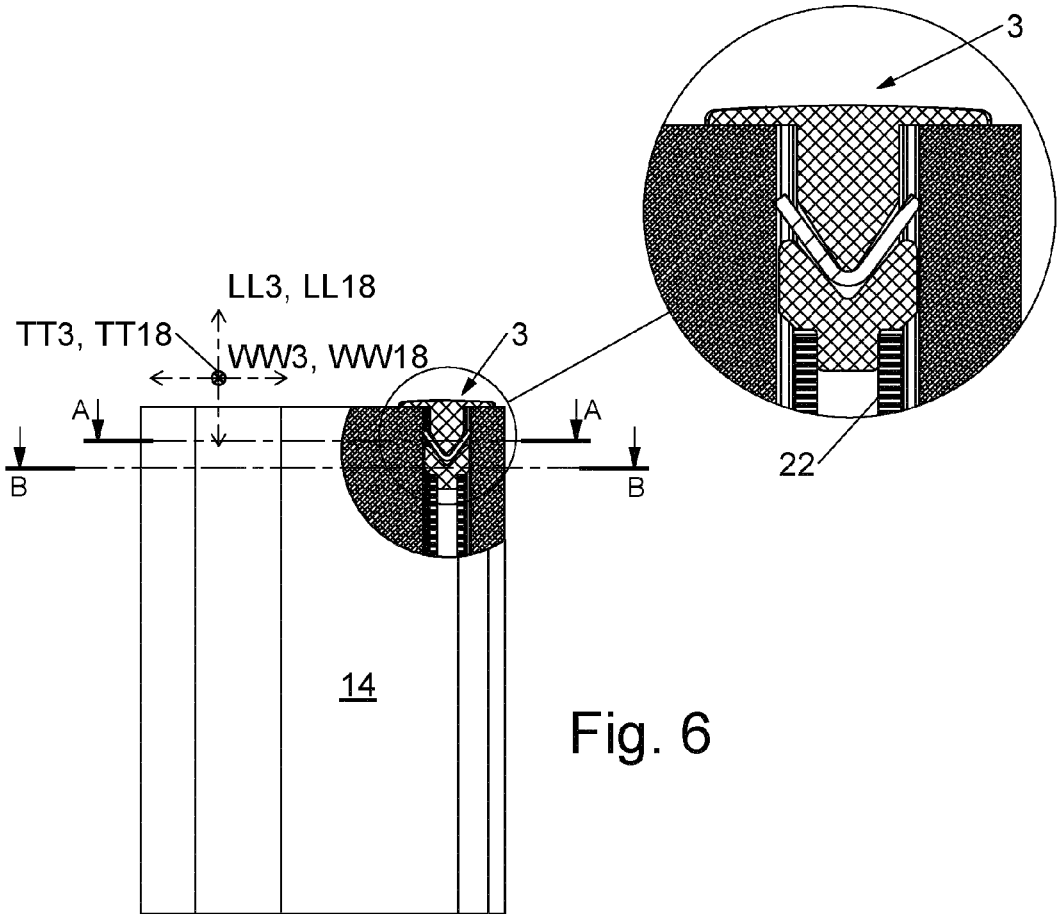
32a
8
6
5a
26
w 1
w 3

Fig. 5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LL3, LL18
TT3, TT18
WW3, WW18
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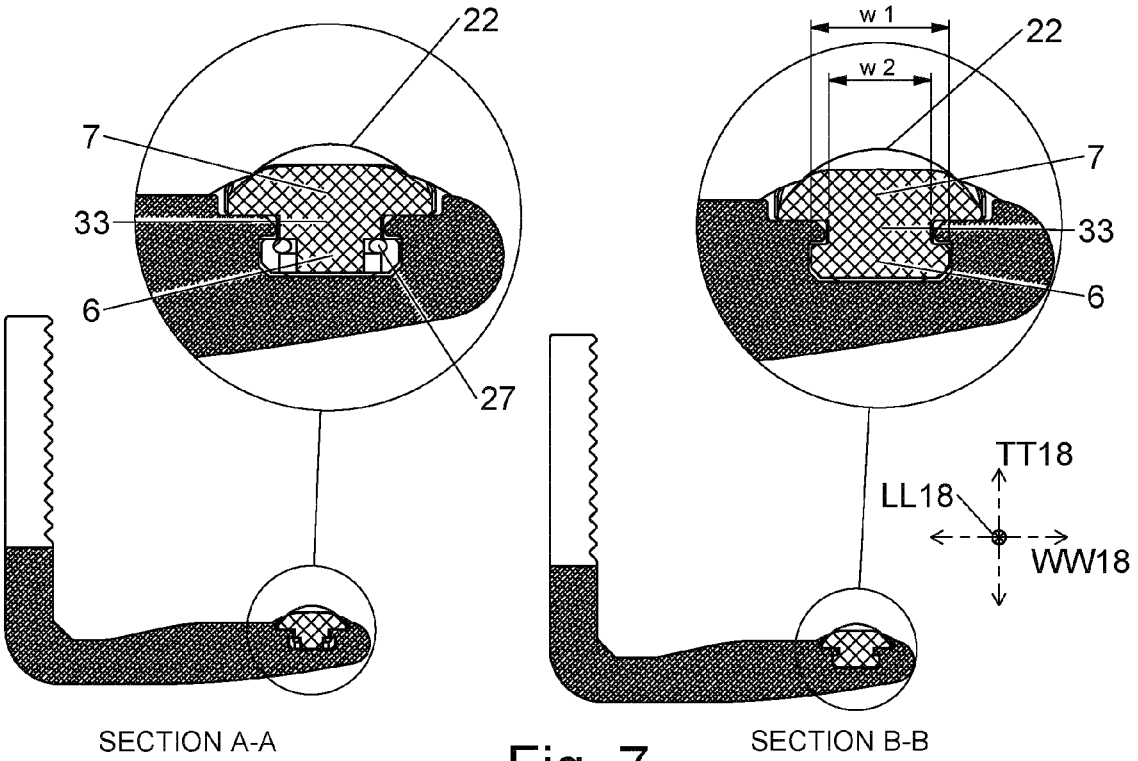
A
B
B
22
14

Fig. 6


22
7
33
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27
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TT18
LL18
WW18
SECTION A-A
SECTION B-B

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 20 21 1338

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E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	19 May 2021	Cruyplant, Lieve

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