



(11)

EP 4 817 749 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
07.10.2026 Bulletin 2026/41

(51) International Patent Classification (IPC):
B05C 17/00 ^(2006.01) **B05C 5/02** ^(2006.01)
B05C 17/005 ^(2006.01)

(21) Application number: **25168089.8**

(52) Cooperative Patent Classification (CPC):
B05C 17/002; **B05C 5/0216**; **B05C 5/0254**;
B05C 17/00516

(22) Date of filing: **02.04.2025**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA
Designated Validation States:
GE KH LA MA MD TN

(72) Inventors:
• **BERWICK, Andrew**
40531 Göteborg (SE)
• **OLSSON, Emil**
40531 Göteborg (SE)

(74) Representative: **Kransell & Wennborg KB**
P.O. Box 2096
403 12 Göteborg (SE)

(71) Applicant: **Volvo Car Corporation**
405 31 Göteborg (SE)

(54) **SEALANT APPLICATOR TOOL**

(57) The disclosure relates to a sealant applicator tool (1) for use in a gap (130) between body parts (110, 120) of a vehicle body (100) of a vehicle, in particular between a fender (110) and a door (120) comprising an inward step (123) configured to push the fender (110) outward during a frontal collision of the vehicle, wherein the sealant applicator tool (1) comprises:
an inlet portion (10) comprising an inlet (12), the inlet portion (10) being configured to receive a sealant from a sealant supply source;
a nozzle portion (30) comprising an outlet (31) for applying the sealant onto one of the body parts (110, 120);
an intermediate portion (20) connecting the inlet portion (10) with the nozzle portion (30), wherein the intermediate portion (20) comprises an internal channel (26) fluidically connecting the inlet (12) to the outlet (31), the intermediate portion (20) is arranged at an angle (α_{30}) relative to the nozzle portion (30), and the intermediate portion (20) comprises a non-linear profile along its extension between the inlet portion (10) and the nozzle portion (30).

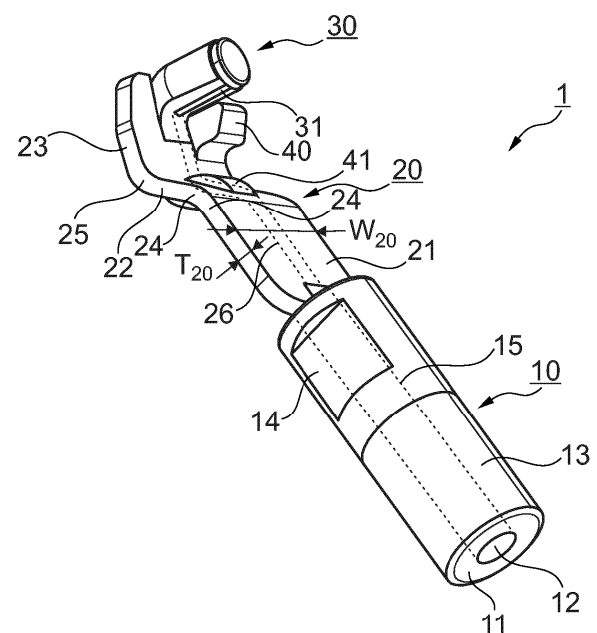


Fig. 3

EP 4 817 749 A1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to a sealant applicator tool, a method for manufacturing a vehicle body of a vehicle using the sealant applicator tool, and a vehicle body manufactured by the method.

SUMMARY

[0002] In the manufacturing of vehicle bodies or vehicles, different body parts are being assembled with one another. These body parts may comprise several components, which may be joined to each other. For example, a vehicle door as body part may comprise two or more components in the form of panels, which can be joined to one another along a welding line formed by a welded seam, specifically by a laser welded seam. In this case, there may be a risk of corrosion at the welded seam. Specifically in the case of laser welded seams, the gas created during welding of the panels may leave a porous seam, which can create corrosion after it was painted.

[0003] To prevent corrosion at the welded seam after the paint has been applied, a sealant can be applied along the painted welded seam using a sealant applicator tool.

[0004] However, the inventors have found that the current sealant applicator tools are limited in that they cannot be reliably used for all body parts. Specifically, the current sealant applicator tools may be limited to sealing welded seams of specific body parts, where the welded seam can be easily reached, and the sealant applicator tool can be easily guided along the welded seam. This issue has been found by the inventors to be present mostly when the sealant applicator tool needs to be guided through a tight gap or, in other words, confined space between body parts of the vehicle body to reach the welded seam due to the limitation that the body part is not provided by itself but is assembled with the vehicle body and painted, which can make accessing the welded seam by the sealant applicator tool rather difficult.

[0005] For example, in the case of welded seams of panels of vehicle doors after their attachment to the vehicle body and after the vehicle door is painted, an inner welded seam connecting the panels of the vehicle doors is typically obstructed by hinges connecting the vehicle door to the vehicle body. In this case, it is difficult to guide the sealant applicator tool along the entire length from inwards the vehicle door. Thus, the sealant applicator tool is typically guided from outwards the vehicle door in the gap formed between the fender and door.

[0006] However, there may be additional constraints in tight gaps or confined spaces which make it difficult to apply the sealant continuously and uniformly along the entire length of the welded seam.

[0007] Specifically, it has been found by the inventors that when the body parts forming the gap in between

them have a complex geometric shape or complex dimensions, the current sealant applicator tools are limited in their ability to provide for sufficient and uniform sealing along the entire welded seam. In this case, it may be necessary to divide the welded seam into different parts without covering areas that are difficult to access by the current sealant applicator tools. However, this may compromise the structural integrity of the welded body parts.

[0008] For example, it has been found by the inventors that in doors with inward steps or, in other words, crash steps, the gap has a complex geometric shape due to the inward step. The inward step is configured to push the fender outward during a frontal collision of the vehicle, thereby ensuring that the vehicle door can be opened after frontal collision to allow a passenger to exit the vehicle through the door. Current applicator tools may not be able to uniformly apply the sealant along such gap. They may potentially even spill sealant onto the hinges or places, where it would consequently need to be removed, which creates a lot of additional effort.

[0009] The problem is at least partially solved or alleviated by the subject matter of the independent claims of the present disclosure, wherein further examples are incorporated in the dependent claims.

[0010] According to a first aspect, there is provided a sealant applicator tool for use in a gap between body parts of a vehicle body of a vehicle, in particular between a fender and a door comprising an inward step configured to push the fender outward during a frontal collision of the vehicle. The sealant applicator tool comprises an inlet portion comprising an inlet. The inlet portion is configured to receive a sealant from a sealant supply source. The sealant applicator tool further comprises a nozzle portion comprising an outlet for applying the sealant onto one of the body parts. The sealant applicator tool further comprises an intermediate portion connecting the inlet portion with the nozzle portion, wherein the intermediate portion comprises an internal channel fluidically connecting the inlet to the outlet. Further, the intermediate portion is arranged at an angle relative to the nozzle portion. The intermediate portion comprises a non-linear profile along its extension between the inlet portion and the nozzle portion.

[0011] By virtue of the intermediate portion comprising the non-linear profile along its extension between the inlet portion and the nozzle portion, the sealant applicator tool can be guided or, in other words, maneuvered steadily and consistently through complex tight gaps or, in other words, confined spaces, such as but not limited to gaps between fenders and vehicle doors with inward steps.

[0012] Specifically, by virtue of the non-linear profile, the intermediate portion of the sealant applicator tool may be guided steadily in a defined position relative to the welded seal of one of the body parts within the gap.

[0013] The non-linear profile may at least partially mimic the shape of one of the body parts or both of the body parts or generally the gap formed in between these. More

particular, the non-linear profile may correspond in shape to the complex gap shape formed by the body parts and thus be optimally aligned with its nozzle portion above the welded seam. A worker may be constantly guiding or, in other words, maneuvering the sealant applicator tool. The sealant applicator tool may simultaneously and constantly apply the sealant onto the welded seam, thereby creating a substantially uniform and uninterrupted seal along the welded seam, in particular uniform in thickness and/or width along the entire welded seam.

[0014] The proposed sealant applicator tool is not limited to the use in between a fender and a vehicle door comprising an inward step. However, using the sealant applicator tool for the gap formed between these body parts is particularly advantageously. Still, the proposed sealant applicator tool may be used at any vehicle door irrespective of whether it has an inward step or not. More specifically, the sealant applicator tool may be used at any vehicle door or any other body part of a vehicle with a thereto adjacent further body part forming a gap in between the respective body parts, where the gap has a complex geometry and shape and can benefit from the non-linear profile of the intermediate portion of the sealant applicator tool to provide for a steady and stable maneuverability along the welded seam of the body part to be sealed.

[0015] In an example, the non-linear profile of the intermediate portion may be an angled profile. The angled profile may comprise two angled transitions along its extension. Specifically, the intermediate portion may comprise two or more angled transitions or exactly two angled transitions. By having two angled transitions, the angled profile can particularly well conform to stepped or edged profiles of body parts, such as but not limited to the inward step or crash step of a vehicle door, ensuring that the sealant applicator tool can be guided in a steady way to create a uniform seal on welded seams of body parts with such complex profiles.

[0016] The non-linear profile is herein to be understood as a profile that is not completely linear or straight in extension but can have at least one and any number of bends, angles, steps, curves, and/or similar along its extension. In particular, the non-linear profile or angled profile may be a stepped and/or curved profile. Such stepped and/or curved profile may comprise step-like or curved transitions as angled transitions. Step-like transition may transition in the form or shape of a step at any angle between sections, specifically straight sections, along the profile. Curved transitions may have a curvature in the transition between sections, specifically straight sections, along the profile.

[0017] In an example, a first angled transition may be an outwardly angled transition adjacent to the inlet portion or, in other words, near or next to the inlet portion, specifically closer to the inlet portion than to the nozzle portion. A second angled transition may be an inwardly angled transition adjacent to the nozzle portion or, in other words, near or next to the nozzle portion, specifi-

cally closer to the nozzle portion than to the inlet portion. Outwardly and inwardly angled may be understood in particular with reference to a length or longitudinal axis of the sealant applicator tool, which may be extending completely through the inlet portion and towards to nozzle portion. In this regard, an outwardly angled transition of the intermediate portion is one that is away or outward of that axis or length and an inwardly angled transition of the intermediate portion is one that is towards or inward of that axis or length.

[0018] In an example, the intermediate portion may comprise three substantially straight intermediate sections, including a first intermediate section in between the inlet portion and the first angled transition, a second intermediate section in between the first angled transition and the second angled transition, and a third intermediate section in between the second angled transition and the nozzle portion. The second intermediate section may be extending relatively outward from the extension of the first intermediate section due to the outwardly angled transition in between these. The third intermediate section may be extending relatively inward from the extension of the second intermediate section due to the inwardly angled transition in between these.

[0019] In an example, a void or, in other words, cavity or indentation, may be formed in between one of the two angled transitions, in particular an angled transition relatively closer to the nozzle portion than to the inlet portion or adjacent to the nozzle portion, and the nozzle portion. The void may be configured or shaped to at least partially accommodate an edge of one of the two body parts, in particular the inward step of the door. Thereby, the sealant applicator tool may correspond in shape by its void formed between the angled transition and the nozzle portion to the inward step of a door or any other edge or step of a body part, facilitating the guiding of the sealant applicator tool along the gap. Additionally, a further indentation or void may be formed between one of the two angled transition, specifically an angled transition relatively closer to the inlet portion than to the nozzle portion or adjacent to the inlet portion, and the inlet portion. This further indentation or void may be opposite of the void, cavity or indentation between the angled transition and the nozzle portion. Thereby, the sealant applicator tool may be guided along the edge of the other body part as well, such as an edge or end of a fender.

[0020] In an example, the third intermediate section may be inwardly angled relative to the first intermediate section. Specifically, the first intermediate section may be extending along a common axis with the inlet portion or generally along the herein mentioned length or longitudinal axis of the sealant applicator tool. The third intermediate section on the other hand may be angled relative to the first intermediate section or its extension, wherein the angle is inward or, in other words, towards the extension of the first intermediate section or the axis of the sealant applicator tool.

[0021] In an example, the intermediate portion may

comprise at least one positioning tab configured to provide a reference point for positioning the sealant applicator tool within the gap during sealant application. Specifically, the at least one positioning tab may be positioning the sealant applicator tool in reference to the body parts or gap while maneuvering the sealant applicator tool along the gap. Thereby, the reference point provided by the at least one positioning tab can ensure that the sealant applicator tool is consistently positioned with its nozzle portion and outlet above the welded seam to fully and continuously seal the welded seam with the sealant.

[0022] The nozzle portion with its outlet may be arranged at an end of the sealant applicator tool opposite of the inlet or inlet portion. Thereby, the nozzle portion can be located towards or at interior surfaces of one of the body parts, in particular but not limited to the vehicle door, for applying the sealant there. Specifically, the outlet may be arranged facing the inlet portion. In other words, the outlet may be arranged inwardly relative to the inlet portion. Thereby, the outlet may release the sealant from atop the welded seam and onto the welded seam while the sealant applicator tool is being maneuvered along the gap.

[0023] In an example, the at least one positioning tab may extend in parallel to the nozzle portion. Specifically, the at least one positioning tab may extend in length in parallel to the extension in length of the nozzle portion. Further, the at least one positioning tab may be arranged adjacent to the nozzle portion, in particular directly adjacent to the nozzle portion. Specifically, the at least one positioning tab may be arranged adjacent to the nozzle portion in a direction transverse to the length of the at least one positioning tab and/or the nozzle portion. Thereby, the at least one positioning tab is provided in proximity to the nozzle portion, specifically such that the nozzle portion may follow the at least one positioning tab during the guiding along the gap. Thereby, if the at least one positioning tab should somehow scratch the area of the welded seam, the consequent application of sealant seals the scratch and prevents corrosion at the location of the scratch.

[0024] In an example, the at least one positioning tab may be located at an end of a first longitudinal segment of the intermediate portion. The nozzle portion may be connected to an end of a second longitudinal segment of the intermediate portion. The first longitudinal segment and the second longitudinal segment may extend in parallel to each other, in particular along the length or axis of the sealant applicator tool. Thereby, the at least one positioning tab and the nozzle portion may be provided adjacently to one another on adjacent longitudinal segments, which may span along two or all three of the intermediate sections.

[0025] In an example, at least the at least one positioning tab may comprise a non-metal material. Thereby, it may be prevented that the at least one positioning tab scratches the paint of the body part along which it is positioned as reference point while it is being guided

along the gap. For example, the non-metal material may be any one or more of a rubber material, a plastic material such as polyurethan, felt, and Polytetrafluoroethylene (PTFE). The at least one positioning tab may be made entirely from the non-metal material or comprise the non-metal material, for example as a protective layer of the non-metal material provided on a surface of the at least one positioning tab, where the surface may be configured to align with or touch the body part for positioning and as a reference point.

[0026] Generally, the sealant applicator tool may be formed or made from any material, such as metals, non-metals like plastics, and similar, or the sealant applicator tool may comprise a material mix. For example, the sealant applicator tool may be a 3D-printed tool or generally may be a monolithically designed tool. However, it is also possible to provide additional material, e.g. in the form of protective layers, onto one or more portions of the sealant applicator tool, such as in the location of the one or more positioning tabs.

[0027] In an example, the outlet may be configured as a slit. The slit may be extending along a length of the nozzle portion and positioned at a bottom side of the nozzle portion. Accordingly, during the sealant application, the nozzle portion may be positioned above the welded seam of the body part to be sealed with the sealant and the sealant supplied to the nozzle portion may exit the outlet via the slit, providing a sealant with a width corresponding to the length of the slit. In this way, the welded seam may be reliably sealed along its entire width. The length of the slit may correspond to at least the width of the welded seam or it may be longer than the width or a typical width of a welded seam. For example, the length of the slit may be in the range of 3 mm to 12 mm, more specifically in the range of 4 mm to 10 mm, further specifically in the range of 5 mm to 8 mm, for example 6 mm.

[0028] In an example, the intermediate portion may comprise a width in the range of 8 mm to 40 mm. Specifically, the width may be in the range of 10 mm to 30 mm, and more specifically in the range of 12 mm to 20 mm, for example 15 mm. Thereby, in addition to a choice of a relatively stiff material such as a metal or hard plastic of the intermediate portion or generally the sealant applicator tool, the stiffness of the intermediate portion that is inserted into and guided through the gap may be increased. This can ensure that the nozzle portion does not move unsteadily during the maneuvering through the gap and is always optimally positioned above the welded seam of the body part.

[0029] The inlet portion may be configured to attach to the sealant supply source for supplying sealant to the inlet. For this purpose, the inlet portion may comprise a connection or attachment section. The connection or attachment section or generally the inlet portion may in particular be configured to receive a have thereto connected or attached one or more of a hose, pipe, connector (e.g. quick connector), sealant flow control device, and similar. By means of such hose, pipe, connector and

similar, the inlet portion may be fluidically attached to the sealant supply source. The sealant supply source may for example be a container filled with sealant supply.

[0030] In an example, the inlet portion may comprise a connection section comprising a threaded area for attaching a quick connector thereto. The threaded area may be located on an outer surface of the inlet portion. Specifically, the threaded area may be an outwardly threaded area, which may be coupled to a quick connector for corresponding equipment, such as a sealant flow control device and/or hose coupled to the sealant supply source.

[0031] According to a second aspect, there is provided a method for manufacturing a vehicle body of a vehicle, wherein the method comprises:

- providing the vehicle body with two body parts attached to each other and comprising a gap in between them; and
- continuously guiding the sealant applicator tool of the first aspect of this disclosure along the gap and simultaneously applying a sealant onto a welded seam of one of the body parts.

[0032] In an example, the body parts may be a fender and a door comprising an inward step configured to push the fender outward during a frontal collision of the vehicle. The welded seam may be a laser-welded seam. The fender may for example comprise an end located opposite of the inward step and forming therebetween the gap. The end of the fender opposite of the inward step may be bent, e.g. by 120° or more, e.g. about 180°. Thereby, the end of the fender may be substantially round.

[0033] According to a third aspect, there is provided a vehicle body manufactured by the method of the second aspect of this disclosure.

[0034] According to a fourth aspect, there may be provided a vehicle comprising the vehicle body of the third aspect of this disclosure.

[0035] According to a fifth aspect, there may be provided a sealant applicator system comprising the sealant applicator tool. The sealant applicator system may be comprising at least a sealant flow control device. Such sealant flow control device may for example be in the form of a gun. Such gun may be including a handle, a trigger mechanism for controlling the flow of sealant, and/or a connection portion to connect to the sealant supply source, e.g. by a hose. The activation of the trigger mechanism may cause dispensing the sealant through the outlet of the nozzle portion onto the welded seam during the guiding of the sealant applicator tool through the gap. The sealant applicator system may further comprise a quick connector. The inlet portion may be configured to attach to the quick connector. The quick connector may facilitate fast attachment and detachment of the sealant flow control device and/or the hose to the inlet portion. The hose of the sealant applicator system may be fluidically connected to the sealant flow control device

and/or hose and to the sealant supply source. The hose may be enabling the flow of sealant from the sealant supply source to the sealant flow control device and from there to the nozzle portion of the sealant applicator tool.

The sealant supply source may be configured to store and deliver the sealant through the hose and sealant flow control device to the nozzle portion. Any technique for moving the sealant from the sealant supply source towards the outlet and dispense it from there may be used, such as a pressurized sealant supply source, a pump, and similar. The sealant supply source may generally be pressurized or non-pressurized.

[0036] It is noted that the above examples may be combined with each other irrespective of the aspect involved.

[0037] These and other aspects of the present disclosure will become apparent from and elucidated with reference to the examples described hereinafter.

BRIEF DESCRIPTION OF DRAWINGS

[0038] Examples of the disclosure will be described in the following with reference to the following drawings.

- Figure 1 shows a perspective view on an example of a sealant applicator tool inside a gap between two body parts of a body vehicle of a vehicle;
- Figure 2 shows a side view on another example of a sealant applicator in between the contours of the body parts of Fig. 1;
- Figure 3 shows a perspective view of the sealant applicator of Fig. 2; and
- Figure 4 shows another perspective view of the sealant applicator of Figs. 2 and 3.

DETAILED DESCRIPTION

[0039] The Figures are merely schematic representations and serve only to illustrate examples of the disclosure. Identical or equivalent elements are in principle provided with the same reference signs.

[0040] Figure 1 shows a sealant applicator tool 1 used in a gap 130 or, in other words, a confined space between body parts 110, 120 of a vehicle body 100 of a vehicle.

[0041] In this non-limiting example, the body part 110 is a fender 110 and the body part 120 is a door 120. The door 120 comprises two components in the form of panels 121, 122 attached to one another along a welded seam 124, in particular a laser welded seam. The door 120 and the fender 110 form part of the vehicle body 100. Specifically, the fender 110 and the door 120 are attached to the remainder of the vehicle body 100 (not shown), and the body parts 110, 120 are painted, including paint on the welded seam 124.

[0042] Further, in this example, the door 120 comprises an inward step 123 configured to push the fender 110 outward during a frontal collision of the vehicle.

[0043] In Fig. 1, the sealant applicator tool 1 is substantially continuously guided by a worker from outwards or outside the vehicle body 100, or outwards or outside the door 120 and fender 110 along the gap to simultaneously apply sealant onto the welded seam 124.

[0044] Figure 2 shows another example of a sealant applicator tool 1 similar to the one of Fig. 1 and in a side perspective view inside the gap 130 between the body parts 110, 120 of Fig. 1. Figures 3 and 4 show the sealant applicator tool 1 of Fig. 2 in different perspective views.

[0045] The sealant applicator tool 1 comprises an inlet portion 10 comprising an inlet 12. The inlet portion may for example comprise a length in the range of 10 to 50 mm, further for example in the range of 20 to 40 mm.

[0046] The inlet portion 10 is configured with a connection section 13 comprising a threaded area to attach to a sealant supply source (not shown) for supplying sealant to the inlet 12, specifically via a quick connector (not shown) that can be attached to the connection section 13 and to a sealant flow control device and a hose coupled to the sealant supply source (not shown). The inlet portion 10 exemplarily comprises a cylindrical shape. Further, in this example, the inlet 12 is located at an end face 11 of the inlet portion 10. Also, the inlet portion 10 comprises flat sides 14 on an outer perimeter for gripping the sealant applicator tool 1 through a wrench or similar.

[0047] Further, the sealant applicator tool 1 comprises a nozzle portion 30 comprising an outlet 31 for applying the sealant onto the welded seam 124 while guiding the sealant applicator tool 1 inside the gap and along the welded seam 124.

[0048] The sealing applicator tool 1 further comprises an intermediate portion 20 connecting the inlet portion 10 with the nozzle portion 30, wherein the intermediate portion 20 comprises an internal channel 26 fluidically connecting the inlet 12 to the outlet 31. More specifically, the internal channel 26 connects to an inlet channel 15 inside the inlet portion 10, wherein the inlet channel 15 is a further internal channel in the inlet portion 10 fluidically connected to the inlet 12. Accordingly, the sealant may enter the inlet 12, flow through the internal channel 26 to the outlet 31 and exit the outlet 31 to be disposed or, in other words, applied onto the welded seam 124, thereby forming a sealant line on the welded seam 124. The sealant can be any sealer suitable to be applied onto a painted welded seam or metal part, such as but not limited to non-metallic sealers like spot sealers or epoxy-based sealants.

[0049] In the example of Figs. 2 to 4, the outlet 31 is shown as a slit enabling to dispose or apply the sealant with a width corresponding to the length of the slit onto the welded seam 124. For example, the length of the slit may be in the range of 4 to 8 mm, thereby allowing to apply a correspondingly wide sealant line onto the welded seam 124. Specifically, the sealant applicator tool 1 may be moved by a worker along the gap 130, thereby applying the sealant along the entire length of the welded seam 124 without discontinuation and with a substantially

equal width and thickness. For this purpose, the sealant applicator tool 1 may be attached to a hand-held sealant flow control device, e.g. in the form of a gun, which can be fluidically coupled to the sealant supply source and actuated or triggered by the worker during the guiding of the sealant applicator tool 1 to apply the sealant onto the welded seam 124 while moving the sealant applicator tool 1 through the gap and along the welded seam 124.

[0050] As may be seen in Fig. 2, in this example, the intermediate portion 20 is arranged at an angle α_{30} relative to the nozzle portion 30. Specifically, an extension E_{30} , in particular a longitudinal extension, of the nozzle portion 30 is arranged at the angle α_{30} relative to an extension E_{23} , in particular a longitudinal extension, of a third straight intermediate section 23 of the intermediate portion 20. The angle α_{30} may for example be in the range of 60° to 120° , more specifically in the range of 70° to 110° , and more specifically in the range of 80° to 100° , for example about 90° .

[0051] Further, the intermediate portion 20 comprises a non-linear profile along its extension between the inlet portion 10 and the nozzle portion 30. Specifically, the non-linear profile may be an angled profile and more particularly a stepped and/or curved profile. The non-linear or angled profile in the example of Figs. 2 to 4 comprises two angled transitions 24, 25 along its extension in length following a longitudinal axis A of the sealant applicator tool 1 or generally the length of the sealant applicator tool 1, which may follow the longitudinal axis A. Specifically, the longitudinal axis A may align or coincide with the extension E_{21} of the first straight intermediate section 21.

[0052] The first angled transition 24 is an outwardly angled transition adjacent to the inlet portion 10. Specifically, the first angled transition 24 is located between a first straight intermediate section 21 and a second straight intermediate section 22, wherein an angle α_{24} is formed between the sections 21, 22 or their respective extensions E_{21} , E_{22} in length. In other words, the two sections 21, 22 are arranged at angle α_{30} relative to one another. For example, the angle α_{24} may be in the range of 90° to 170° , more specifically in the range of 100° to 160° , and more specifically in the range of 110° to 150° .

[0053] The second angled transition 25 is an inwardly angled transition adjacent to the nozzle portion 30. Specifically, the second angled transition 25 is located between the second straight intermediate section 22 and the third straight intermediate section 23, wherein an angle α_{25} is formed between the sections 22, 23. In other words, the two sections 22, 23 are arranged at angle α_{25} relative to one another. For example, the angle α_{25} may be in the range of 90° to 170° , more specifically in the range of 100° to 160° , and more specifically in the range of 110° to 150° . Both, the first angled transition 24 and the second angled transition 25 may be step-like and/or curved transitions 24, 25.

[0054] Thereby, the non-linear profile of the intermediate portion 20 corresponds to the shape or geometry of

the inward step 123 of the door 120, which allows to guide the sealant applicator tool 1 with its intermediate portion 20 in a constant and stable way along the gap 130 or, in other words, between the inward step 123 and the fender 110 or a round end thereof as seen in Fig. 2 while continuously applying the sealant onto the welded seam 124.

[0055] In the example of Figs. 2 to 4, and different from the example of Fig. 1, the intermediate portion 20 comprises two positioning tabs 40, 41 configured to provide a reference point for positioning the sealant applicator tool 1 within the gap 130 during sealant application. However, alternatively, only one of these two position tabs 40, 41, or more than these two positioning tabs 40, 41 may be provided.

[0056] One of the two shown positioning tabs 40, 41 is an upper positioning tab 40 arranged adjacently to the nozzle portion 30 and extends in length in parallel to the length of the nozzle portion 30. As shown in Fig. 2, this positioning tab 40 may provide a reference point on an upper side of the inward step 123, thereby guiding the sealant applicator tool 1 with respect to the upper side of the inward step 123.

[0057] The additional and optional positioning tab 41 is a lower positioning tab 41 arranged at the second straight intermediate section 22 and provides a reference point on a lower side of the inward step 123 opposite of the upper side, thereby guiding the sealant applicator tool 1 with respect to the lower side of the inward step 123.

[0058] Any one of the positioning tabs may be provided with a non-metal material to prevent scratching the paint on the welded seam 124. For example, a protective layer comprising the non-metal material may be provided on the surface of any one of the positioning tabs 41, 42 that faces any one of the body parts 110, 120, specifically the inward step 123 of the door 120.

[0059] As seen in Fig. 4, the intermediate portion 20 may comprise three longitudinal segments 27, 28, 29, wherein the upper positioning tab 40 may be located or provided at an end of a first longitudinal segment 27 of the intermediate portion 20. The nozzle portion 30 may on the other hand be provided at or connected to an end of a second longitudinal segment 28 of the intermediate portion 20, wherein the first longitudinal segment 27 and the second longitudinal segment 28 extend in parallel to each other along the length or axis A of the sealant applicator tool 1. A third longitudinal segment 29 provides additional width to the intermediate portion 20 for increased stability during the guiding or maneuvering of the sealant applicator tool 1 along the gap 130. The overall width W_{20} of the intermediate section 20 may for example be about 15 mm, whereas the thickness T_{20} of the intermediate section 20 may be much smaller. Specifically, the intermediate section 20 may be relatively thin in thickness T_{20} transverse to its width W_{20} . For example, the intermediate section may be comprising a thickness T_{20} in the range of 0.5 mm to 5 mm, more particularly in the range of 1 mm to 4 mm, and further in particular in the range of 1.5 mm to 3 mm. Thereby, the intermediate section 20 may

be easily maneuvered through relatively narrow gaps 130.

[0060] As used herein, the phrase "at least one," in reference to a list of one or more entities should be understood to mean at least one entity selected from any one or more of the entities in the list of entities, but not necessarily including at least one of each and every entity specifically listed within the list of entities and not excluding any combinations of entities in the list of entities. This definition also allows that entities may optionally be present other than the entities specifically identified within the list of entities to which the phrase "at least one" refers, whether related or unrelated to those entities specifically identified. Thus, as a non-limiting example, "at least one of A and B" (or, equivalently, "at least one of A or B," or, equivalently "at least one of A and/or B") may refer, in one example, to at least one, optionally including more than one, A, with no B present (and optionally including entities other than B); in another example, to at least one, optionally including more than one, B, with no A present (and optionally including entities other than A); in yet another example, to at least one, optionally including more than one, A, and at least one, optionally including more than one, B (and optionally including other entities). In other words, the phrases "at least one," "one or more," and "and/or" are open-ended expressions that are both conjunctive and disjunctive in operation. For example, each of the expressions "at least one of A, B, and C," "at least one of A, B, or C," "one or more of A, B, and C," "one or more of A, B, or C," and "A, B, and/or C" may mean A alone, B alone, C alone, A and B together, A and C together, B and C together, A, B, and C together, and optionally any of the above in combination with at least one other entity.

[0061] Other variations to the disclosed examples can be understood and effected by those skilled in the art in practicing the claimed disclosure, from the study of the drawings, the disclosure, and the appended claims. In the claims the word "comprising" does not exclude other elements or steps and the indefinite article "a" or "an" does not exclude a plurality. Any reference signs in the claims should not be construed as limiting the scope of the claims.

LIST OF REFERENCE SIGNS

[0062]

1	sealant applicator tool
10	inlet portion
11	end face
12	inlet
13	connection section
14	flat side
15	inlet channel
20	intermediate portion
21	first intermediate section
22	second intermediate section

23	third intermediate section
24	first angled transition
25	second angled transition
26	internal channel
27	first longitudinal segment
28	second longitudinal segment
29	third longitudinal segment
30	nozzle portion
31	outlet
100	vehicle body
110	first body part, fender
120	second body part, door
121	first panel
122	second panel
123	inward step
124	welded seam
130	gap
α	angles
A	axis
E	extensions
W_{20}	width of the intermediate portion
T_{20}	thickness of the intermediate portion

Claims

1. A sealant applicator tool (1) for use in a gap (130) between body parts (110, 120) of a vehicle body (100) of a vehicle, in particular between a fender (110) and a door (120) comprising an inward step (123) configured to push the fender (110) outward during a frontal collision of the vehicle, wherein the sealant applicator tool (1) comprises:

an inlet portion (10) comprising an inlet (12), the inlet portion (10) being configured to receive a sealant from a sealant supply source;
 a nozzle portion (30) comprising an outlet (31) for applying the sealant onto one of the body parts (110, 120);
 an intermediate portion (20) connecting the inlet portion (10) with the nozzle portion (30), wherein the intermediate portion (20) comprises an internal channel (26) fluidically connecting the inlet (12) to the outlet (31), the intermediate portion (20) is arranged at an angle (α_{30}) relative to the nozzle portion (30), and the intermediate portion (20) comprises a non-linear profile along its extension between the inlet portion (10) and the nozzle portion (30).

2. The sealant applicator tool (1) of claim 1, wherein the non-linear profile of the intermediate portion (20) is an angled profile, which comprises two angled transitions (24, 25) along its extension.
3. The sealant applicator tool (1) of claim 2, wherein a first angled transition (24) is an outwardly angled

transition adjacent to the inlet portion (10) and a second angled transition (25) is an inwardly angled transition adjacent to the nozzle portion (30).

4. The sealant applicator tool (1) of claim 3, wherein the intermediate portion (20) comprises three substantially straight intermediate sections (21, 22, 23), including a first intermediate section (21) in between the inlet portion (10) and the first angled transition (24), a second intermediate section (22) in between the first angled transition (24) and the second angle transition (25), and a third intermediate section (23) in between the second angled transition (25) and the nozzle portion (30).

5. The sealant applicator tool (1) of any one of claims 2 to 4, wherein a void is formed in between one of the two angled transitions (24, 25) and the nozzle portion (30) to at least partially accommodate an edge of one of the two body parts (110, 120), in particular the inward step (123) of the door (120).

6. The sealant applicator tool (1) of any one of the previous claims, wherein the intermediate portion (20) comprises at least one positioning tab (40, 41) configured to provide a reference point for positioning the sealant applicator tool (1) within the gap (130) during sealant application.

7. The sealant applicator tool (1) of claim 6, wherein the at least one positioning tab (40, 41) extends in parallel to the nozzle portion (30) and is arranged adjacent to the nozzle portion (30).

8. The sealant applicator tool (1) of claim 7, wherein the at least one positioning tab (40, 41) is located at an end of a first longitudinal segment (27) of the intermediate portion (20) and the nozzle portion (30) is connected to an end of a second longitudinal segment (28) of the intermediate portion (20), wherein the first longitudinal segment (27) and the second longitudinal segment (28) extend in parallel to each other.

9. The sealant applicator tool (1) of any one of claims 6 to 8, wherein at least the at least one positioning tab (40, 41) comprises a non-metal material.

10. The sealant applicator tool (1) of any one of the previous claims, wherein the outlet (31) is configured as a slit.

11. The sealant applicator tool (1) of any one of the previous claims, wherein the intermediate portion (20) comprises a width (W_{20}) in the range of 8 mm to 40 mm.

12. The sealant applicator tool (1) of any one of the

previous claims, wherein the inlet portion (10) comprises a connection section (13) comprising a threaded area for attaching a quick connector thereto.

5

- 13.** Method for manufacturing a vehicle body (100) of a vehicle, wherein the method comprises:

- providing the vehicle body (100) with two body parts (110, 120) attached to each other and comprising a gap (130) in between them; and
- continuously guiding the sealant applicator tool (1) of any one of the previous claims along the gap (130) and simultaneously applying a sealant onto a welded seam (124) of one of the body parts (110, 120).

10

15

- 14.** The method of claim 13, wherein the body parts (110, 120) are a fender (110) and a door (120) comprising an inward step (123) configured to push the fender (110) outward during a frontal collision of the vehicle, and wherein the welded seam (124) is a laser-welded seam.

20

- 15.** A vehicle body (100) manufactured by the method of claim 13 or 14.

25

30

35

40

45

50

55

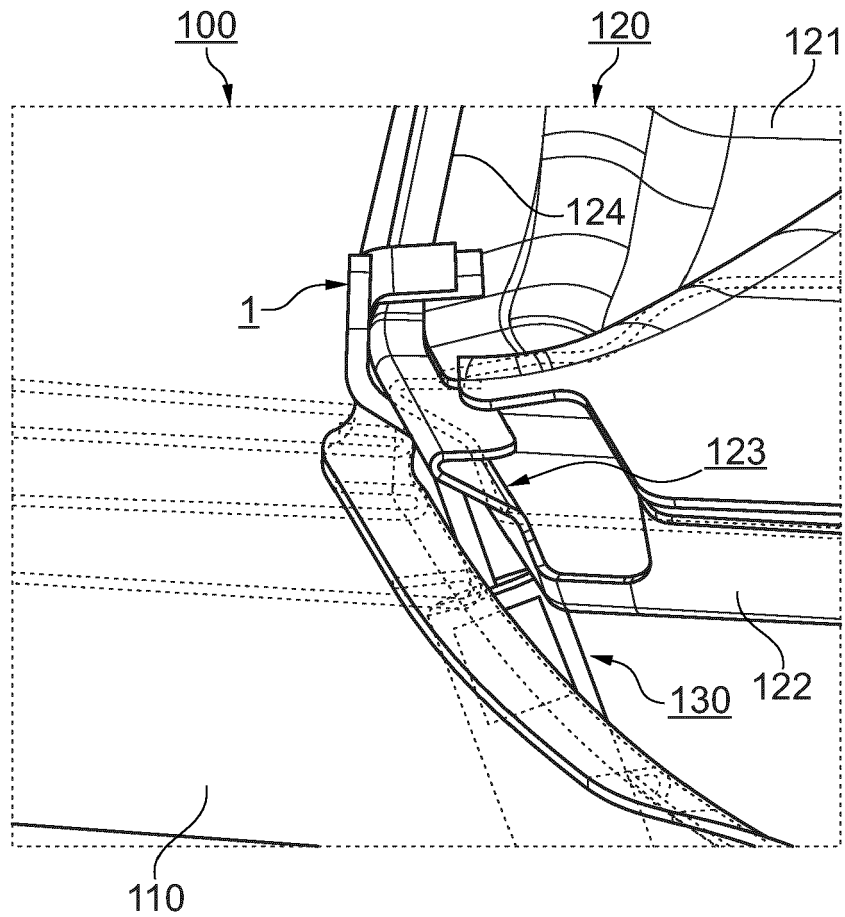


Fig. 1

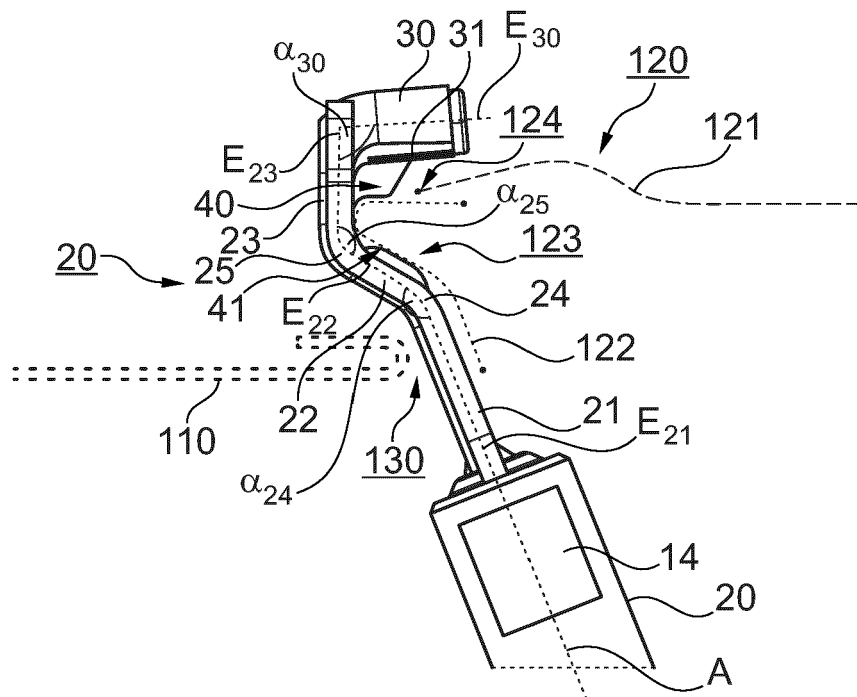


Fig. 2

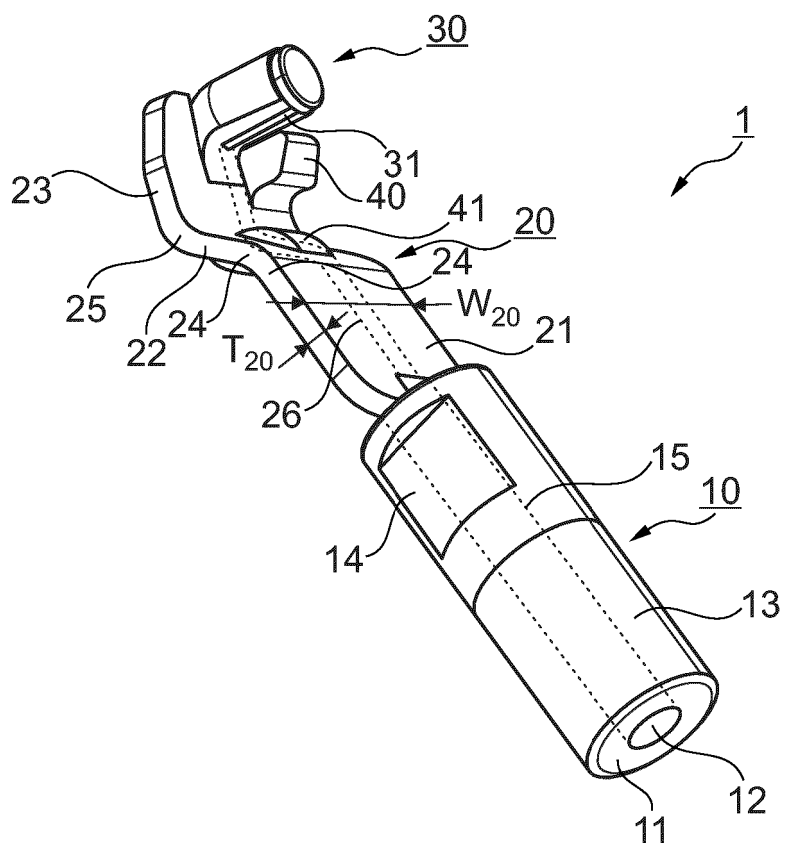


Fig. 3

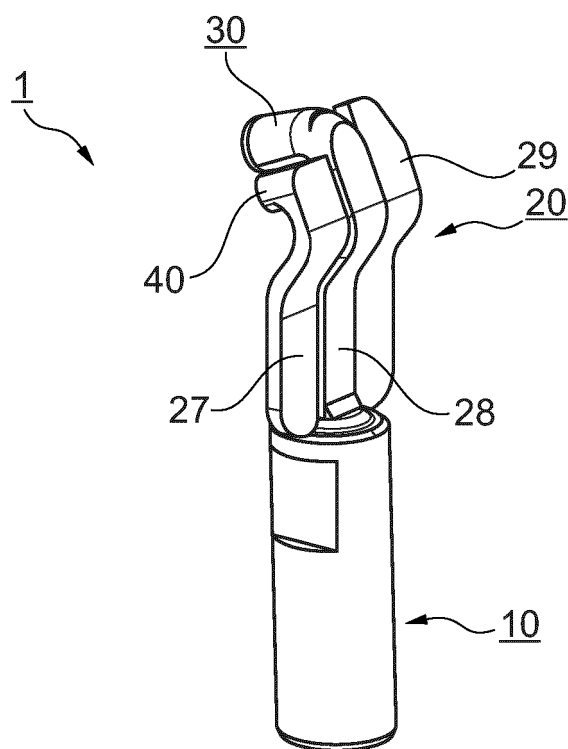


Fig. 4



EUROPEAN SEARCH REPORT

Application Number

EP 25 16 8089

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 2019/329283 A1 (RADEMACHER LOTHAR [DE] ET AL) 31 October 2019 (2019-10-31) * paragraph [0055] - paragraph [0057] * * figures *	1-15	INV. B05C17/00 ADD. B05C5/02 B05C17/005
X	CN 108 889 547 B (SHENZHEN ZHONGXIN TECH CO LTD) 10 March 2020 (2020-03-10) * the whole document *	1-5	
X	US 10 814 346 B2 (BOEING CO [US]) 27 October 2020 (2020-10-27) * column 18 - line 47 * * figure 11 *	1-5	
			TECHNICAL FIELDS SEARCHED (IPC)
			B05C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		16 September 2025	Roldán Abalos, Jaime
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
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			

EPO FORM 1503 03.82 (P24C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 25 16 8089

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

16-09-2025

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2019329283 A1	31-10-2019	CN 109952158 A	28-06-2019
		DE 102017001780 B3	12-04-2018
		EP 3525939 A1	21-08-2019
		ES 2879357 T3	22-11-2021
		KR 20190121295 A	25-10-2019
		PL 3525939 T3	25-10-2021
		US 2019329283 A1	31-10-2019
		WO 2018153663 A1	30-08-2018

CN 108889547 B	10-03-2020	NONE	

US 10814346 B2	27-10-2020	BR 102017023383 A2	17-07-2018
		CN 108212678 A	29-06-2018
		EP 3332878 A2	13-06-2018
		EP 3693088 A2	12-08-2020
		US 2018161802 A1	14-06-2018
		US 2019143364 A1	16-05-2019

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82