

(19)



(11)

EP 4 353 420 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

30.04.2025 Bulletin 2025/18

(51) International Patent Classification (IPC):

B25G 1/10 ^(2006.01) **B25G 1/08** ^(2006.01)

(21) Application number: **22201037.3**

(52) Cooperative Patent Classification (CPC):

B25G 1/102; B25G 1/08

(22) Date of filing: **12.10.2022**

(54) **TOOL, DEVICE AND METHOD FOR INSTALLING COMPONENTS**

WERKZEUG, VORRICHTUNG UND VERFAHREN ZUR MONTAGE VON BAUTEILEN

OUTIL, DISPOSITIF ET PROCÉDÉ D'INSTALLATION DE COMPOSANTS

(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**

(43) Date of publication of application:

17.04.2024 Bulletin 2024/16

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Description

[0001] The invention relates to a tool for installing components. Furthermore, the invention relates to a device for installing components. The invention also relates to a method for installing components.

[0002] US 7 776 118 B2 shows a cap for hermetically sealing a receiver dryer. Furthermore DE 101 48 493 B4 shows a plug for closing an opening. Moreover, US 2 497 827 shows a closure button adapted for engagement with apertured supports of varying thickness.

[0003] US 2018/311804 A1 shows a multi-tool apparatus and discloses the preamble of claim 1.

[0004] It is an object of the present invention to provide a tool, a device and a method such that components can be installed by a person in a particularly ergonomic way.

[0005] This object is solved by a tool having the features of patent claim 1, a device having the features of patent claim 8, a device having the features of patent claim 9, and a method having the features of patent claim 10. Advantageous embodiments with expedient developments of the invention are indicated in the other patent claims.

[0006] A first aspect of the present invention relates to a tool for installing components. For example, the components may be configured as plugs, clips or other components or parts. The tool according to the present invention comprises a connecting portion configured to be arranged between two fingers of a hand of a person. For example, the person may install the components with the help of the tool, in particular by holding the connecting portion between said two fingers. The connecting portion comprises a first longitudinal extension. This means that the connecting portion extends longitudinally along a first longitudinal direction such that the first longitudinal extension extends along the first longitudinal direction. Furthermore, the tool according to the present invention comprises an installing portion configured to be supported on a first side of said fingers between which the connecting portion is arranged. The installing portion comprises a second longitudinal extension which extends angularly, in particular obliquely or perpendicularly, to the first longitudinal extension. This means that the installing portion extends longitudinally along a second longitudinal direction such that the second longitudinal extension extends along the second longitudinal direction. The second longitudinal direction extends angularly, in particular obliquely or perpendicularly, to the first longitudinal direction. Thus, for example, the installing portion and the connecting portion, in particular when viewed alone, form a T, i.e. form a T-shape. For example, a first one of said fingers is the forefinger. Moreover, for example, a second one of the fingers is the middle finger. Alternatively, for example, the first finger may be the middle finger, wherein, for example, the second finger may be the ring finger. Moreover, for example, the first finger may be the ring finger, wherein, for example, the second finger may be the little finger, i. e. the pinky.

[0007] The tool according to the present invention comprises a supporting portion comprising a third longitudinal extension extending angularly, in particular obliquely or perpendicularly, to the first longitudinal extension. This means that the supporting portion extends longitudinally along a third longitudinal horizontally direction such that the third longitudinal extension extends along the third longitudinal direction. Preferably, the second and third longitudinal directions and thus the second and third longitudinal extensions may extend parallel to each other. The installing portion and the supporting portion are connected with each other by the connecting portion such that, for example, the connecting portion is arranged between the installing portion and the supporting portion. Thus, for example, the installing portion, the connecting portion and the supporting portion form an I, i. e. form an I-shape. In other words, for example, the connecting portion and the supporting portion, when viewed alone, form a T, i. e. a T-shape.

[0008] The supporting portion is configured to be supported on the palm of the hand and/or to be embraced by said fingers extending between the installing and supporting portions. Thereby, a third side of the supporting portion is supported on a second side of the fingers, wherein the second side of the fingers face away from the first side of the fingers, and wherein the third side faces towards the installing portion. Alternatively or additionally, by supporting the supporting portion on the palm and/or by embracing the supporting portion by said fingers, a fourth side of the supporting portion is supported on the palm of the hand or on the fingertips of the fingers, wherein the fourth side faces away from the installing portion. Thus, for example, a first force acting on the installing portion in the direction of the connecting portion may be supported via the installing portion on the first side of the fingers and/or may be guided via the installing portion and the connecting portion to the supporting portion to the palm or the fingertips such that the force may be supported on the palm or fingertips. Moreover, for example, a second force exerted by the palm or the fingertips on the fourth side of the supporting portion may be guided via the supporting portion and the connecting portion to the installing portion and from the installing portion to the respective component which may be supported on the installing portion. Thus, in order to install the respective component, the respective component is brought into support with the installing portion such that the respective component is at least indirectly, in particular directly, supported on the installing portion, in particular on a fifth side of the installing portion, wherein the fifth side faces away from the supporting and connecting portions. Subsequently, the person may exert said second force or a third force on the tool via hand. For example, the second or third force is transferred from the fingers via the first side to the installing portion and/or from the palm or the fingertips via the fourth side the supporting portion and from the supporting portion via the connecting portion to the installing portion. The second or

third force is transferred from the installing portion to the respective component supported on the installing portion, in particular on the fifth side such that the second or third force is exerted on the respective component supported on the installing portion, in particular the fifth side. As a consequence, by the second or third force the respective component may be installed. The second force and the third force are also referred to as installation forces. In this regard, for example, said first force is a reaction force resulting from the installation force. The reaction force can be supported on the hand of the person via the tool in a particularly advantageous way such that the person can install the components with the help of the tool in a particularly ergonomic way.

[0009] For example, the respective component is installed in such a way that the respective component is inserted or plugged into a corresponding opening or onto a corresponding stud, in particular by said installation force. In conventional solutions, the respective component is installed in such a way that a person exerts a force for installing the component via a thumb of a hand of said person. This may result in a high load or strain on the thumb, wherein, by the invention, an excessive load on the thumb or another finger of that hand of the person can be avoided.

[0010] Since the supporting portion can be embraced by said fingers, the person installing the components can grasp and thus wear or hold the tool. Thus, the tool according to the present invention is a wearable part insertion device by which, for example, the respective component may be inserted or plugged into a respective corresponding opening. It was found that inserting components such as plugs into corresponding openings in such a way that a person exerts a force on the respective component via a thumb of a hand of the person may lead to disadvantages. Thus, basically, a thumb protector limiting a hyperextension of the thumb may be used. In comparison with such a thumb protector, the tool according to the present invention ensures an even better distribution of a load or a force exerted on the hand when installing the respective component. Thus, the components may be installed in a particularly ergonomic way. Particularly, the tool according to the present invention helps keep away excessive loads from joints of the hand of the person. Furthermore, the tool according to the present invention may be carried and used in one hand such that the other hand of the person is free for other tasks. Thus, the components may be installed in a particularly ergonomic way.

[0011] For example, the tool may be worn on the hand, the tool transferring said installation force to said fingers or to more than the two fingers near their base and/or to the palm of the hand thereby keeping away excessive loads from joints of the hand. Moreover, the connecting portion may be worn between the fingers such that the tool may be worn on the hand of the person while the other hand is free for other tasks. For example, such another task that may be performed with the other hand of

the person is to pick up the respective component and bring the respective component into contact with the installing portion, in particular the fifth side. Thus, the tool does not need to be put down and picked up after installing one of the components and before installing another one of the components.

[0012] In the invention, the installing portion comprises said fifth side facing away from the supporting portion. The respective component may be supported on the fifth side such that the installation force for installing the respective component may be exerted on the respective component by the person via the tool in a particularly ergonomic way.

[0013] In the invention, the fifth side is made of a self-adhesive polymer material. This means that the respective components adheres or sticks to the fifth side without using any separate glue between the fifth side and the respective component which may be made of a plastic material. Thus, the respective component may be brought into contact with the fifth side wherein, subsequently, the respective component sticks to the fifth side. Consequently, the person may simultaneously handle the tool and the respective component sticking to the fifth side with the hand whilst the other hand is free for other tasks. For example, said installation force is a push force by which the component is inserted into a corresponding opening thereby installing the component. Thus, for example the respective component may stick to the fifth side whilst the component is pushed into the opening by the person via the tool. For example, the self-adhesive polymer material is or forms a polymer layer of the tool, the polymer layer forming the fifth side.

[0014] In the invention, the tool comprises a base body made of a first material. For example, the first material may be a plastic material. Furthermore, the base body is encased by a layer. For example, the base body is coated by said layer. For example, the base body is fully enclosed or encased by said layer. The layer is made of a second material different from the first material. For example, the second material is a plastic material. Thus, a high rigidity or stability of the tool may be realized. Moreover, the person may grasp and handle the tool in a particularly ergonomic way since, for example, the second material may be softer than the first material. Thus, excessive loads on the hand of the person may be avoided. Moreover, parts and other components may thereby be protected from scratches and scuffs which may be caused by to the harder base body itself.

[0015] In the invention, the tool comprises a first member made of the self-adhesive polymer material such that the first member forms or comprises the fifth side. The tool preferably also comprises a second member comprising the base body and the layer. Preferably, the first member is formed separately from the second member and connected to the second member. Thus, for example, if the first member is damaged, the first member may be detached from the second member and replaced by a new first member which is connected with the second

member. Moreover, advantageous different characteristics of said members may be realized such that, for example, the respective component may stick to the first member in a particularly advantageous way, and the person may use and handle the second member and, while the second member the first member in a particularly ergonomic way. In the invention, the layer forms an outer shell of the tool, wherein the outer shell is configured to be brought into direct contact with the fingers and thus the person. In other words, the person can directly touch the outer shell and thus the layer such that the person can handle tool in a particularly comfortable and ergonomic way.

[0016] In an advantageous embodiment of the invention, the fifth side comprises a first portion extending in a first plane which extends angularly, in particular obliquely, to the first longitudinal extension. Moreover, the fifth side may comprise a second portion extending a second plane which extends angularly, in particular obliquely, to the first longitudinal extension. Preferably, the first plane and the first longitudinal extension enclose a first angle, and the second plane and the first longitudinal extension enclose a second angle. Preferably, the first angle corresponds to the second angle, in other words, preferably, the first angle and the second angle are equal. Moreover, preferably, the first portion and the second portion of the fifth side extend towards each other and away from the connecting portion such that, for example, the first portion and second portion of the fourth side and/or the installing portion form or are a chevron. Thereby, the installation force may be exerted on the respective component by the fifth side in precise and defined way, such that the respective component can be installed in a particularly ergonomic way.

[0017] In a further embodiment, the first portion and the second portion of the fifth side meet and form an edge of the fourth side such that, via the edge, the installation force may be exerted on the respective components supported on the fifth side in particularly advantageous way.

[0018] In an alternative, particularly advantageous embodiment of the invention, the fifth side has a third portion arranged between the first portion and the second portion. The third portion extends in a third plane which extends perpendicularly to the first longitudinal extension. Thus, the respective component may be supported on the third portion and thus on installing portion in a particularly advantageous way such that the components may be installed in a particularly ergonomic way.

[0019] In a further embodiment of the invention, the self-adhesive polymer material is a nanogel being a polymer-based, crosslinked hydrogel particle on sub-micron scale. Thus, particularly advantageous self-adhesive characteristics of the fifth side may be realized such that the respective component sticks to the fifth side without using any separate glue between the fifth side and the respective component. As a consequence, the person can handle the respective component supported

on and sticking to the fifth side in a particularly advantageous way.

[0020] In order to realize a particularly high stability of the tool, in a further embodiment, the first material is a fiber-reinforced plastic. For example, the fiber-reinforced plastic is a glass fiber-reinforced plastic. By encasing the first material by the second material a direct contact between the first material and elements on which the components are installed may be avoided such that scratches or other damages of that elements may be avoided.

[0021] Preferably, the second material is a foam material such that the person may handle the tool in a particularly comfortable, easy and ergonomic way. Preferably, the second material is a polyurethane (PU). For example, the first material may be over-molded with the second material. For example, the first material may be a plastic material such that the base body is a plastic core which may be over-molded by the second material. Thus, a padding to the hand may be provided, and that elements on which the components are installed may be protected from scratches, marks and/or other damages while installing the components.

[0022] Preferably, the self-adhesive polymer material may be covered by removable film which may be configured as a thin film and/or plastic film, the film protecting the self-adhesive polymer material until it is used. Before using the tool to install the components, the film is removed such that the respective components may stick to the fourth side which, consequently may hold the respective component during its insertion.

[0023] The explanations for the self-adhesive polymer material may also be transferred to the springy fingers and vice versa. Thus, for example, the springy fingers are formed by the first member which is formed separately from the second member and connected to the second member. Thus, the springy fingers may be detached from the second member and replaced by new springy fingers if, for example, the springy fingers are damaged.

[0024] Preferably, the installing portion, the connecting portion and the supporting portion form opposing or opposite receptacles for the fingers. This means that the person may place the fingers in the receptacles such that the connecting portion is arranged between the fingers. Subsequently, the fingers may embrace the supporting portion such that the person may install the components with the help of the tool in a particularly comfortable, easy and ergonomic way.

[0025] A second aspect of the present invention relates to a device for installing components such as, for example, the above-mentioned components. The device according to the second aspect of the present invention comprises at least one tool according to the first aspect of the present invention. Furthermore, the device according to the second aspect of the present invention comprises at least one ink pad saturated with alcohol. The ink pad is covered by a cloth for cleaning the tool. Advantages and advantageous embodiments of the first aspect of the

present invention are to be regarded as advantages and advantageous embodiments of the second aspect of the present invention and vice versa. The alcohol the ink pad is saturated with can be transferred via that cloth onto the tool by bringing the tool into direct contact with the cloth and by for example, moving the tool in relation to the cloth while the tool is in direct contact with the cloth. Particularly, the installing portion, in particular the fifth side and thus, for example, the self-adhesive polymer material can be cleaned by the alcohol. Particularly, dust can be removed from the fourth side thereby, for example, re-establishing the self-adhesive characteristics of the fifth side. For example, that alcohol is or comprises an isopropyl alcohol (IPA) such that, for example, that alcohol is or comprises an IPA solution. Moreover, by the ink pad, the cloth and the alcohol, the tool, in particular the fifth side, can be cleaned and rehydrated. Particularly, the self-adhesive polymer material can be rehydrated when dust and oil is accumulated on it. As an alternative or in addition to the ink pad, an alcohol soaked cloth or wipe may be used to clean the tool, in particular the fifth side such that, for example, the ink pad may be omitted.

[0026] Preferably, the tool has a profile that is concave in order to reduce or avoid interference with objects held in the hand. For example, the concave profile comprises that receptacles for the fingers such that the tool can be handled in a particularly easy, comfortable and ergonomic way.

[0027] Preferably, the installing portion comprises a sixth side facing away from the fifth side. Thus, for example, the sixth side faces towards the supporting portion. Preferably, the sixth side is formed by padding via which, for example, that reaction force may be transferred to the fingers, in particular the first side of the fingers, in a particularly advantageous way. Particularly, the reaction force may be spread across a dorsal surface of the fingers such as, for example, that first side of the fingers. Thereby, excessive loads on the fingers can be avoided. For example, the padding is made from a third material different from the first material and different from the second material. For example, the third material is softer than the first material and softer than the second material. Thus, for example, that base body is partially encased by the second material and partially encased by the third material. Thus, for example, the second material forms a first part of that outer shell of the tool, wherein, for example, the third material forms a second part of the outer shell. Thus, the tool can be handled in a particularly comfortable and ergonomic way.

[0028] A third aspect of the present invention relates to a device for installing components such as, for example, the above-mentioned components. The device according to the third aspect of the present invention comprises several variants of a tool according to the first aspect of the present invention. Advantages and advantageous embodiments of the first and second aspects of the present invention are to be regarded as advantages and advantageous embodiments of the third aspect of

the present invention and vice versa. In the third aspect of the present invention, the variants differ from each other in at least one size of the installing portion and/or at least one size of the connecting portion and/or at least one size of the supporting portion. In other words, the variants are provided in several sizes to fit various fingers and hands and not fall off the hand. Thus, different persons can use the different variants such that each person can install the components particularly advantageously with the help of one of the variants.

[0029] As can be gathered from the explanations above, the fifth surface is a working surface that extends from the hand when the tool is worn by the person in the described way. The working surface and thus the tool enable installation of the components at locations adjacent to, for example, flanges, ridges or other protuberances that would otherwise contact the hand. Thus, the components can be installed in a particularly ergonomic, comfortable and easy way. Moreover, for example, the portions of the fifth side form a center peak of the fourth side to apply the installation force in a progressive manner as, for example, the components are pushed and thereby installed. Moreover, that center peak allows the components to be applied or installed at several angles.

[0030] A fourth aspect of the present invention is a method for installing components such as, for example, the above-mentioned components. In the method, the components are installed by a tool, i. e. by using a tool according to the first aspect of the present invention. Advantages and advantageous embodiments of the first, second and third aspects of the present invention are to be regarded as advantages and advantageous embodiments of the fourth aspect of the present invention and vice versa. Thus, disclosed is also a use of a tool according to the first aspect of the present invention, wherein the tool is used for installing components such as, for example, plugs, clips or other parts.

[0031] For example, in that use, the tool is worn by a person in such a way that the connecting portion is arranged between two adjacent fingers of a hand of the person, wherein the installing portion is supported on said first side of the fingers. The fingers extend between the installing and supporting portions thereby supporting the supporting portion, in particular a third side of the supporting portion, on a second side of the fingers, wherein the second side faces away from the first side, and wherein the third side faces towards the installing portion. Furthermore, the fingers of the hand embrace the supporting portion such that the fingertips of the fingers are supported on a fourth side of the supporting portion, or the fourth side is supported on the palm of the hand. The fourth side faces away from the installing portion and thus, from the first and second sides of the fingers.

[0032] Further details of the invention will be adherent from the following description of preferred embodiments and the accompanying drawings. The drawings show in:

Fig. 1 a schematic side view of a first embodiment of

- a tool for installing components;
- Fig. 2 a schematic side view of the tool according to the first embodiment and a method for installing the components;
- Fig. 3 a further schematic side view of the tool according to the first embodiment in that method;
- Fig. 4 a further schematic side view of the tool according to the first embodiment in that method;
- Fig. 5 a schematic side view of second embodiment of the tool;
- Fig. 6 a schematic side view of a third embodiment of the tool;
- Fig. 7 a schematic side view of a fourth embodiment of the tool;
- Fig. 8 schematic perspective views of an installing portion of the tool;
- Fig. 9 a schematic side view of a fifth embodiment of the tool;
- Fig. 10 a schematic side view of a sixth embodiment of the tool worn on a hand of a person;
- Fig. 11 a schematic perspective view of a seventh embodiment of the tool;
- Fig. 12 a schematic perspective view of the first embodiment of a device for installing the components, the device comprising the tool and an inkpadd arrangement;
- Fig. 13 a schematic perspective view of the inkpadd arrangement,
- Fig. 14 a schematic side view of a second embodiment of the device;
- Fig. 15 a schematic perspective view of the tool used in a method for installing the components; and
- Fig. 16 a further schematic perspective view of the tool used in that method.

[0033] In the figures the same elements or elements having the same function are indicated by the same reference signs.

[0034] Fig. 1 shows in a schematic side view a first embodiment of a tool 1 for installing components 2 (Figs.

2-4). For example, the components 2 are used to manufacture at least one product such as, for example, a vehicle. For this purpose, for example, the components 2 are installed on at least one element of the vehicle. Figs. 15 and 16 show a method for installing the components 2. For example, said element on which the components 2 can be installed is a part 3 of a body 4 of the vehicle which may be configured as a passenger vehicle. For example, the body 4 may be an integral body. Moreover, for example, the part 3 may be a side sill of the body 4. As can be seen from Figs. 15 and 16, the part 3 comprises several openings 5 which may be configured as through openings. In the embodiment shown in the figures, the components 2 are plugs which are used to close the openings 5. For this purpose, into each opening 5, a respective one of the components 2 is at least partially inserted or plugged. In order to insert the respective component 2 into the respective opening 5, an installation force, in particular a push force, is to be exerted on the respective component 2. In other words, the respective component 2 is installed on the part 3, i. e. inserted into the respective opening 5 in such a way that the respective component 2 is pushed at least partially into the respective opening 5. As can be seen from Figs. 15 and 16, the components 2 are installed on the part 3 by a person 6 which exerts the respective installation force on the respective component 2 in order to insert the respective component 2 at least partially into the respective opening 5. In the method, the person 6 uses the tool 1 to install the components 2 in such a way that the installation force provided by the person 6 is transferred to or exerted on the respective component 2 via the tool 1. This will be explained in greater detail below.

[0035] As can be gathered from Fig. 1, the tool 1 comprises a connecting portion 7 which is also referred to as a web. In other words, the connecting portion 7 is a web of the tool 1. As can be seen from Figs. 10, 15 and 16, the connecting portion 7 is configured to be arranged between two adjacent fingers 8 and 9 of a hand 10 of the person 6. In the embodiment shown in the figures, the finger 8 is the fore finger of the hand 10, and the finger 9 is the middle finger of the hand 10. Thus, in said method, the connecting portion 7 is arranged between the adjacent fingers 8 and 9 of the hand 10 of the person 6. As shown in Fig. 1, the connecting portion 7 comprises a first longitudinal direction illustrated by double arrow 11.

[0036] The tool 1 further comprises an installing portion 12 which is also referred to as an installation portion. As can be gathered from Figs. 10, 15 and 16, the installing portion 12 is configured to be supported on a first side 13 of the fingers 8 and 9. For example, the first side 13 is a dorsal side of the fingers 8 and 9. Thus, in the method, the installing portion 12 is supported on the first side 13 of the fingers 8 and 9, the first side 13 facing towards the installing portion 12. As shown in Fig. 1, the installing portion 12 comprises a second longitudinal extension illustrated by double arrow 14. In the first embodiment, the second longitudinal extension (double arrow 14) ex-

tends perpendicularly and thus angularly to the first longitudinal extension (double arrow 11) of the connecting portion 7.

[0037] Furthermore, the tool 1 comprises a supporting portion 15 comprising a third longitudinal extension. The third longitudinal extension is illustrated by the double arrow 14. Thus, in the first embodiment, the third longitudinal extension extends perpendicularly and thus angularly to the first longitudinal extension. Moreover, the second longitudinal extension and the third longitudinal extension extend parallel to each other. The installing portion 12 and the supporting portion 15 are connected with each other by the connecting portion 7. In the first embodiment, at least respective parts of the installing portion 12, the connecting portion 7 and the supporting portion 15 are formed in one piece with each other, i. e. are integrally formed such that the installing portion 12 and the supporting portion 15 are connected with each other by the connecting portion 7. As can be gathered from Figs. 10, 15 and 16, the supporting portion 15 is configured to be supported on the palm 16 of the hand 10 and/or to be embraced by the fingers 8 and 9 extending between the installing and supporting portions 12 and 15. In other words, the person 6 can either support the supporting portion 15 on the palm 16 or embrace the supporting portion 15 with the fingers 8 and 9. As shown in Figs. 10, 15 and 16, in said method, the fingers 8 and 9 extend between the installing and supporting portions 12 and 15 since the connecting portion is arranged between the adjacent fingers 8 and 9. In Fig. 10, the person 6 embraces the supporting portion 15 with the fingers 8 and 9 such that, on a second side 17 of the fingers 8 and 9, a third side 18 of the supporting portion 15 is supported. As can be seen in Fig. 10, the second side 17 of the fingers 8 and 9 faces away from both the installing portion 12 and the first side 13. Moreover, the third side 18 of the supporting portion 15 faces towards the side 17 and the installing portion 12. Moreover, in Fig. 10, by embracing the supporting portion 15 with the fingers 8 and 9, the fingertips 19 of the fingers 8 and 9 are supported on a fourth side 20 of the supporting portion 15. As can be gathered from Fig. 10, the fourth side 20 of the supporting portion 15 faces away from the installing portion 12. Thus, in Fig. 10 the supporting portion 15 is arranged between the fingertips 19 and the side 17.

[0038] As shown in Fig. 1, the person 6 does not need to embrace the supporting portion 15 with the fingers 8 and 9, but the person 6 may hold the tool 1 in such a way that the supporting portion 15 is supported on the side 17 of the fingers 8 and 9 and on the palm 16 of the hand 10. Thus, in Fig. 16, the third side 18 of the supporting portion 15 is supported on the second side 17 of the fingers 8 and 9. Moreover, in Fig. 16, the fourth side 20 of the supporting portion 15 is supported on the palm 16 of the hand 10.

[0039] As shown in Figs. 2 to 4, the respective component 2 can be supported on the installing portion 12. Thereby, the installation force can be transferred from the hand 10 to the tool 1 via the supporting portion 15

and/or the installing portion 12, and from the installing portion 12 to the respective component 2 supported on the installing portion 12 in a particularly comfortable and ergonomic way since excessive loads on the hand 10, in particular on joints of the hand 10, can be avoided. For example, from the installation force used to insert the respective component 2 into the respective opening 5, a reaction force results, the reaction force acting from the component 2 on the tool 1 via the installing portion 12. Due to the advantageous design of the tool, the reaction force can be transferred from the tool 1 to the hand 10 in such a particularly advantageous way that excessive loads on sensitive areas such as joints of the hand 10 can be avoided.

[0040] As shown in Fig. 1, the installing portion 12 comprises a fifth side 21 facing away from the supporting portion 15. For example, in Fig. 10 and thus in said method the fifth side 21 faces away from the side 13 when the tool 1 is worn in or on the hand 10 of the person 6. Particularly, excessive loads on the thumb 22 of the hand 10 can be avoided.

[0041] In the first embodiment shown in Fig. 1, the fifth side 21 comprises a first portion 23 extending in a first plane which extends angularly to the first longitudinal extension (double arrow 11). The fifth side 21 further comprises a second portion 24 extending in a second plane which extends angularly to the first longitudinal extension. For example, the first plane and the first longitudinal extension enclose a first angle, and, for example, the second plane and the first longitudinal extension enclose a second angle. Preferably, the first angle is the smallest angle enclosed by the first plane and the first longitudinal extension. Moreover, for example, the second angle is the smallest angle enclosed by the second plane and the first longitudinal extension. Preferably, the first angle and the second angle are equal. As shown in Fig. 1, the first and second portions 23 and 24 extend towards each other and away from the connecting portion 7 thereby forming a center peak 25 of the side 21 and thus the installing portion 12. As shown in Fig. 2, the component 2 can be arranged and thus supported on the center peak 25 such that the installation force can be transmitted from the tool 1 to the component 2 particularly advantageously via the center peak 25. For example, in the first embodiment, the portions 23 and 24 directly meet thereby forming an edge 26 of the side 21. For example, the edge 26 has a fourth longitudinal extension extending in both the first plain and the second plain. Moreover, the fourth longitudinal extension extends perpendicularly to the first longitudinal extension, to the second longitudinal extension and to the third longitudinal extension.

[0042] As shown in Figs. 3 and 4, more than one of the components 2 can be simultaneously supported on the side 21 which is also referred to as an installing side or an installation side. For example, the several components 2 simultaneously supported on the side 21 may be installed successively, 20.20 successively inserted into a respective opening 5. Especially for components smaller than

the components 2 shown in Fig. 4, such smaller components may be held and installed simultaneously by the tool 1.

[0043] Fig. 5 shows a second embodiment of the tool 1. In the second embodiment, the fifth side 21 comprises a third portion 27 arranged between the portions 23 and 24, in particular along the second longitudinal extension (double arrow 14). In the second embodiment, the third portion 27 extends in a third plane which extends perpendicularly to the first longitudinal extension. As shown in Fig. 5, the portion 27 may have a width 28 extending in the second longitudinal extension. For example, the width 28 may be 8 mm. Moreover, for example, the portion 27 may be flat. Fig. 6 shows a third embodiment of the tool 1. For example, in the third embodiment, the width 28 may be 16 mm.

[0044] Fig. 7 shows a fourth embodiment of the tool 1. Preferably, the fifth side 21 is made of a self-adhesive polymer material such as, for example, a nanogel. In other words, preferably, the fifth side 21 is formed by a self-adhesive polymer material such as, for example, a nanogel. Thereby, elements such as the respective component 2 adhere to the side 24 when bringing the respective component 2 into direct contact with the side 21, wherein the respective component 2 adheres to the side 21 without using a separate glue between the side 21 and the component 2 supported on the side 21. Since the tool 1 can be easily, comfortably and ergonomically worn on the hand 10 of the person 6, the other hand of the person 6 is free for other tasks. For example, the person 6 can use their other hand to pick up the respective component 2 and to bring the respective component 2 into direct contact with the surface 21 whilst the person 6 wears the tool 1 in or on the hand 10. After bringing the respective component 2 into direct contact with the side 21, the component 2 directly contacting the side 21 sticks to the side 21 and thus the tool 1 due to the self-adhesive characteristics of the side 21. Thus, the person 6 can move the other hand away from the component 2 once the component 2 sticks to the side 21 due to the self-adhesive characteristics of the side 21.

[0045] Consequently, the person 6 can move their hand 10 and thus the tool 1 and the component 2 sticking to the side 21 such that the person 6 can easily move and handle the tool 1 and while the tool 1 the component 2 sticking to the side 21. Thus, the tool 1 is an installation aid for installing the components 2 such that, by the tool 1, the components 2 can be installed in a particularly easy, comfortable and ergonomic way.

[0046] As shown in Fig. 7, the installing portion 12 has a sixth side 29 facing away from the fifth side 21 and towards the supporting portion 15, in particular towards the side 18 of the supporting portion 15. The side 29 has two areas 30 and 31, wherein the connecting portion 7 is arranged between the areas 30 and 31 along this second longitudinal extension (double arrow 14). As can be gathered from Figs. 10 and 16, in the method, the areas 30 and 31 and thus the side 29 are arranged on the side

13 such that, in the method, the installing portion 12 is supported on the side 13 of the fingers 8 and 9 via the side 29, 20.20 via the areas 30 and 31 of the side 29. For example, the areas 30 and 31 are formed by paddings or cushions such that a particularly ergonomic handling of the tool 1 can be realized. For example, the respective component 2 is made of a plastic material such that the respective component 2 adheres to the surface 21 in a particularly advantageous way.

[0047] For example, the tool 1 comprises a base body which is, in particular completely, encased by a layer. For example, the base body is made of a first material which may be a plastic material. For example, the base body is formed in one piece. In other words, preferably, the base body is an integral part. The layer may be made of at least or exactly one second material different from the first material. Moreover, for example, the layer may be made of at least or exactly two materials, namely a second material and a third material. For example, the first material and the second material are different from each other and, for example, the first material and the third material are different from each other. Moreover, for example, the second material and the third material are different from each other. In Fig. 7, the layer is designated by 32. For example, a first part 33 of layer 32 is made of that second material. In Fig. 7 the layer 32 comprises a second part 34 and a third part 35. For example, the part 34 forms the area 30 of the side 29, and, for example, the part 35 forms the area 31 of the side 29. For example, the first part 33 of the layer 32 is made of that second material, and, for example, the parts 34 and 35 are made of that third material. For example, the second material and/or the third material is a plastic material. Moreover, for example, the third material is softer than the second material. Moreover, preferably, the second material is softer than the first material. Preferably, the first material is a fiber-reinforced plastic, in particular a glass fiber-reinforced plastic. Moreover, for example, the second material and/or the third material is a film such as, for example, a polyurethane film (PU film). First, the layer 32 protects the base body such that direct contacts between the base body and that element on which the components 2 are to be installed can be avoided. Thereby, scratches, scrubs and other damages of the element may be avoided. For example, in the first embodiment, the layer 32 comprises one single part, namely the part 33 which encases the base body, in particular completely, such that, for example, the part 33 and thus the second material also form the areas 30 and 31.

[0048] For example, the side 21 is formed by a first member 36 of the tool 1, such that, for example, the first member 36 is made of the self-adhesive polymer material. Moreover, for example, the tool 1 may comprise a second member 37 comprising the base body and the layer 32. In the fourth embodiment, the layer 32 comprises the parts 33, 34 and 35. For example, the layer 32 encases the complete base body. Preferably, the mem-

bers 36 and 37 are formed separately from each other, wherein the members 36 and 37 are connected with each other. For example, the member 36 is a film, in particular a polymer film. Thus, preferably, the member 36 may be detached from the member 37 and replaced by new first member when the member 36 is damaged and/or lost its self-adhesive characteristics.

[0049] As shown in Fig. 8, a protective film 38 may be used to protect the self-adhesive side 21. For example, the protective film 38 is a polymer film which, at first, adheres to the side 21 due to the self-adhesive characteristics of the side 21. Before using the tool 1 to install the components 2, the protective film 38 is removed from the side 21, preferably in such a way that the protective film 38 is peeled of the side 21. This can be established by the person 6, in particular by the other hand of the person 6 whilst the person 6 rise or holds the tool 1 in the hand 10 in the manner shown in Fig. 10 or 16.

[0050] Fig. 11 shows a seventh embodiment of the tool 1. As can be gathered from Fig. 11, the connecting portions 7, the installing portion 12 and the supporting portion 15 form or bound opposite receptacles 39 and 40 through which the fingers 8 and 9 extend when the tool 1 is worn on the hand 10 in the manner shown in Fig. 10 and 16. The receptacles 39 and 40 are arranged opposite each other along the second and third longitudinal extensions (double arrow 14). Thus, along the second and third longitudinal extensions, the connecting portion 7 is arranged between the receptacles 39 and 40. In other words, the receptacles 39 and 40 are separated from each other along the second and third longitudinal extensions by the connecting portion 7. As shown in Fig. 11, the respective receptacle 39, 40 is concave such that one has a concave profile. Moreover, the side 20 of the supporting portion 15 may be concave such that the person 6 can use the tool 1 in a particularly ergonomic way.

[0051] Fig. 9 shows a fifth embodiment of the tool 1. In the fifth embodiment, the fifth side 21 may be self-adhesive, or the fifth side 21 may not have self-adhesive characteristics. In a fifth embodiment, the fifth side 21 comprises spring elements in the form of springy fingers 41 configured to hold the respective component 2 on the tool 1, in particular in contact with an installing portion 42 of the side 21. In other words, the springy fingers 41 may hold the component 2 on the tool 1. The installation force may be transferred from the tool 1 to the component 2 holding the tool 1 by the springy fingers 41 via the installing portion 42 of the side 21. By pushing the component 2 into the opening 5, the springy fingers 41 release the component 2 such that the component 2 is held on the part 3 (element) and released from the tool 1. Subsequently, the tool 1 can be used to install another one of the components 2.

[0052] Fig. 12 shows a first embodiment of a device 43 for installing the components 2. The device 42 comprises the tool 1. In other words, the device 42 may comprise at least or exactly one variant of the tool 1, or the device 43

may comprise several, different variants of the tool 1. Furthermore, the device 43 comprises an inkpad 44 saturated with alcohol. For example, that alcohol may be part of an alcohol solution such as an IPA solution. Moreover, the device 43 comprises a cloth 45 covering the inkpad 44. The inkpad 44 and the cloth 45 are parts of an inkpad arrangement 46 comprising the inkpad 44 and the cloth 45 carrying the inkpad 44. The inkpad arrangement 46 is also shown in Fig. 13. By the inkpad arrangement 46, the tool 1, in particular the self-adhesive side 21, can be cleaned in such a way that the tool 1, in particular the side 21, is brought into direct contact with the cloth 45. The alcohol in the inkpad 44 may be transferred via the cloth 45 to the tool 1, in particular onto the side 21. Moreover, the tool 1, in particular the side 21, may be moved in relation to the cloth 45 whilst the tool 1, in particular the side 21, is in direct contact with the cloth 45. Thus, dust, oils and/or other stains may be wiped of the tool 1, in particular the side 21.

[0053] Fig. 14 shows a second embodiment of the device 43. In the second embodiment, the device 43 comprises different variants V1, V2 and V3 of the tool 1. For example, the variants V1, V2 and V3 differ from each other in at least one size of the installing portion 12 and/or at least one size of the connecting portion 7 and/or at least one size of the supporting portion 15. Thus, a person which is about to install the components 2 can choose one of the variants V1, V2 and V3 for example, the respective person can choose the one of the variants V1, V2 and V3 that fits best in their hand.

List of Reference Signs

[0054]

1	tool
2	component
3	part
4	body
5	openings
6	person
7	connecting portion
8	finger
9	finger
10	hand
11	double arrow
12	installing portion
13	first side
14	double arrow
15	supporting portion
16	palm
17	second side
18	third side
19	fingertip
20	fourth side
21	fifth side
22	thumb
23	first portion

24 second portion
 25 peak
 26 edge
 27 third portion
 28 width
 29 sixth side
 30 area
 31 area
 32 layer
 33 part
 34 part
 35 part
 36 first member
 37 second member
 38 protective film
 39 receptacle
 40 receptacle
 41 springy finger
 42 portion
 43 device
 44 inkpad
 45 cloth
 46 inkpad arrangement
 V1 variant
 V2 variant
 V3 variant

5

10

15

20

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Claims

1. A tool (1) for installing components (2), the tool (1) comprising:

- a connecting portion (7) configured to be arranged between two fingers (8, 9) of a hand (10) of a person (6), the connecting portion (7) comprising a first longitudinal extension (11);
 - an installing portion (12) configured to be supported on a first side (13) of the fingers (8, 9), the installing portion (12) comprising a second longitudinal extension (14) extending angularly to the first longitudinal extension (11); and
 - a supporting portion (15) comprising a third longitudinal extension (14) extending angularly to the first longitudinal extension (11), wherein the installing portion (12) and the supporting portion (15) are connected with each other by the connecting portion (7), wherein the installing portion (12) comprises a fifth side (21) facing away from the supporting portion (15), and wherein the supporting portion (15) is configured to be supported on the palm (16) of the hand (10) and/or to be embraced by the fingers (8, 9) extending between the installing and supporting portions (12, 15), thereby:

◦ supporting, on a second side (17) of the fingers (8, 9), a third side (18) of the supporting portion (15), the third side (18) facing

towards the installing portion (12); and
 ◦ supporting, on the palm (16) of the hand (10) or on the fingertips (19) of the fingers (8, 9), a fourth side (20) of the supporting portion (12), the fourth side (20) facing away from the installing portion (12);

characterized in that:

- the fifth side (21) is made of a self-adhesive polymer material;
 - the tool (1) comprises a base body made of a first material, the base body being encased by a layer (32) made of a second material different from the first material, wherein the layer (32) forms an outer shell of the tool (1), wherein the outer shell is configured to be brought into direct contact with the fingers (8, 9);
 - the tool (1) comprises a first member (36) made of the self-adhesive polymer material;
 - the tool (1) comprises a second member (37) comprising the base body and the layer (32);
 - the first member (36) is formed separately from the second member (37) and connected to the second member (37).

2. The tool (1) according to claim 1, wherein:

- the fifth side (21) comprises a first portion (23) extending in a first plane which extends angularly to the first longitudinal extension (11);
 - the fifth side (21) comprises a second portion (24) extending in a second plane which extends angularly to the first longitudinal extension (11); and
 - the first and second portions (23, 24) extend towards each other and away from the connecting portion (7).

3. The tool (1) according to claim 2, wherein the first and second portions (23, 24) meet and form an edge (26) of the fifth side (21).

4. The tool (1) according to claim 2, wherein the fifth side (21) has a third portion (27) arranged between the first and second portions (23, 24), and wherein the third portion (27) extends in a third plane extending perpendicularly to the first longitudinal extension (11).

5. The tool (1) according to anyone of the preceding claims, wherein the self-adhesive polymer material is a nanogel.

6. The tool (1) according to anyone of the preceding claims, wherein the first material is a fiber-reinforced plastic.

7. The tool (1) according to anyone of the preceding claims,
wherein the second material is a foam material.
8. A device (43) for installing components (2), the device (43) comprising: 5
- at least one tool (1) according to anyone of the preceding claims; and
 - at least one ink pad (44) saturated with alcohol and covered by a cloth (45) for cleaning the tool (1). 10
9. A device (43) for installing components (2), the device (43) comprising several variants (V1, V2, V3) of a tool (1) according to anyone of claims 1 to 7, wherein the variants (V1, V2, V3) differ from each other in: 15
- at least one size of the installing portion (12); and/or 20
 - at least one size of the connecting portion (7); and/or
 - at least one size of the supporting portion (15). 25
10. A method for installing components (2), wherein the components (2) are installed by a tool (1) according to anyone of claims 1 to 7. 30

Patentansprüche

1. Werkzeug (1) zur Montage von Bauteilen (2), wobei das Werkzeug (1) Folgendes umfasst: 35
- einen Verbindungsabschnitt (7), der dazu ausgelegt ist, zwischen zwei Fingern (8, 9) einer Hand (10) einer Person (6) angeordnet zu werden, wobei der Verbindungsabschnitt (7) eine erste Längserstreckung (11) aufweist; 40
- einen Montageabschnitt (12), der dazu ausgelegt ist, auf einer ersten Seite (13) der Finger (8, 9) abgestützt zu werden, wobei der Montageabschnitt (12) eine zweite Längserstreckung (14) aufweist, die sich winklig zur ersten Längserstreckung (11) erstreckt; und 45
- einen Stützabschnitt (15), der eine dritte Längserstreckung (14) aufweist, die sich winklig zur ersten Längserstreckung (11) erstreckt, wobei der Montageabschnitt (12) und der Stützabschnitt (15) durch den Verbindungsabschnitt (7) miteinander verbunden sind, wobei der Montageabschnitt (12) eine fünfte Seite (21) aufweist, die vom Stützabschnitt (15) abgewandt ist, und wobei der Stützabschnitt (15) dazu ausgelegt ist, auf der Handfläche (16) der Hand (10) abgestützt zu werden und/oder von den Fingern (8, 9) umfasst zu werden, die sich zwischen dem 50

Montage- und dem Stützabschnitt (12, 15) erstrecken, wodurch:

- o auf einer zweiten Seite (17) der Finger (8, 9) eine dritte Seite (18) des Stützabschnitts (15) abgestützt wird, wobei die dritte Seite (18) zum Montageabschnitt (12) hin gewandt ist; und
- o auf der Handfläche (16) der Hand (10) oder auf den Fingerspitzen (19) der Finger (8, 9) eine vierte Seite (20) des Stützabschnitts (12) abgestützt wird, wobei die vierte Seite (20) vom Montageabschnitt (12) abgewandt ist;

dadurch gekennzeichnet, dass:

- die fünfte Seite (21) aus einem selbstklebenden Polymermaterial hergestellt ist;
- das Werkzeug (1) einen Basiskörper aus einem ersten Material aufweist, wobei der Basiskörper von einer Schicht (32) aus einem zweiten Material umhüllt ist, das sich von dem ersten Material unterscheidet, wobei die Schicht (32) eine äußere Schale des Werkzeugs (1) bildet, wobei die äußere Schale dazu ausgelegt ist, in direkten Kontakt mit den Fingern (8, 9) gebracht zu werden;
- das Werkzeug (1) ein erstes Element (36) aus dem selbstklebenden Polymermaterial aufweist;
- das Werkzeug (1) ein zweites Element (37) aufweist, das den Basiskörper und die Schicht (32) umfasst;
- das erste Element (36) getrennt von dem zweiten Element (37) ausgebildet und mit dem zweiten Element (37) verbunden ist.

2. Werkzeug (1) nach Anspruch 1, wobei:

- die fünfte Seite (21) einen ersten Abschnitt (23) aufweist, der sich in einer ersten Ebene erstreckt, die sich winklig zur ersten Längserstreckung (11) erstreckt;
- die fünfte Seite (21) einen zweiten Abschnitt (24) aufweist, der sich in einer zweiten Ebene erstreckt, die sich winklig zur ersten Längserstreckung (11) erstreckt; und
- der erste und der zweite Abschnitt (23, 24) sich aufeinander zu und von dem Verbindungsabschnitt (7) weg erstrecken.

3. Werkzeug (1) nach Anspruch 2, wobei sich der erste und der zweite Abschnitt (23, 24) treffen und eine Kante (26) der fünften Seite (21) bilden. 55

4. Werkzeug (1) nach Anspruch 2,
wobei die fünfte Seite (21) einen dritten Abschnitt
(27) aufweist, der zwischen dem ersten und dem
zweiten Abschnitt (23, 24) angeordnet ist, und wobei
sich der dritte Abschnitt (27) in einer dritten Ebene 5
erstreckt, die sich rechtwinklig zu der ersten Längs-
erstreckung (11) erstreckt.
5. Werkzeug (1) nach einem der vorhergehenden
Ansprüche, 10
wobei das selbstklebende Polymermaterial ein Na-
nagel ist.
6. Werkzeug (1) nach einem der vorhergehenden
Ansprüche, 15
wobei das erste Material ein faserverstärkter Kunst-
stoff ist.
7. Werkzeug (1) nach einem der vorhergehenden
Ansprüche, 20
wobei das zweite Material ein Schaumstoffmaterial
ist.
8. Vorrichtung (43) zur Montage von Bauteilen (2),
wobei die Vorrichtung (43) Folgendes umfasst: 25
 - mindestens ein Werkzeug (1) nach einem der
vorhergehenden Ansprüche; und
 - mindestens ein mit Alkohol gesättigtes und mit
einem Tuch (45) zum Reinigen des Werkzeugs 30
(1) bedecktes Tintenkissen (44).
9. Vorrichtung (43) zur Montage von Bauteilen (2),
wobei die Vorrichtung (43) mehrere Varianten (V1,
V2, V3) eines Werkzeugs (1) nach einem der An- 35
sprüche 1 bis 7 umfasst, wobei sich die Varianten
(V1, V2, V3) voneinander unterscheiden in:
 - mindestens einer Größe des Montageab-
schnitts (12); und/oder 40
 - mindestens einer Größe des Verbindungsab-
schnitts (7); und/oder
 - mindestens einer Größe des Stützabschnitts
(15). 45
10. Verfahren zur Montage von Bauteilen (2), wobei die
Bauteile (2) durch ein Werkzeug (1) nach einem der
Ansprüche 1 bis 7 montiert werden. 50

Revendications

1. Outil (1) d'installation de composants (2), l'outil (1)
comprenant : 55
 - une partie de liaison (7) conçue pour être
disposée entre deux doigts (8, 9) d'une main
(10) d'une personne (6), la partie de liaison (7)

comprenant une première extension longitudi-
nale (11) ;
- une partie d'installation (12) conçue pour être
supportée sur un premier côté (13) des doigts (8,
9), la partie d'installation (12) comprenant une
deuxième extension longitudinale (14) s'éten-
dant angulairement par rapport à la première
extension longitudinale (11) ; et
- une partie de support (15) comprenant une
troisième extension longitudinale (14) s'éten-
dant angulairement par rapport à la première
extension longitudinale (11), la partie d'installa-
tion (12) et la partie de support (15) étant reliées
l'une à l'autre par la partie de liaison (7), la partie
d'installation (12) comprenant un cinquième
côté (21) tourné à l'opposé de la partie de sup-
port (15), et la partie de support (15) étant
conçue pour être supportée sur la paume (16)
de la main (10) et/ou pour être embrassée par
les doigts (8, 9) s'étendant entre les parties
d'installation et de support (12, 15), ce qui per-
met de :

- supporter, sur un deuxième côté (17) des
doigts (8, 9), un troisième côté (18) de la
partie de support (15), le troisième côté (18)
étant tourné vers la partie d'installation
(12) ; et
- supporter, sur la paume (16) de la main
(10) ou sur le bout (19) des doigts (8, 9), un
quatrième côté (20) de la partie de support
(12), le quatrième côté (20) étant tourné à
l'opposé de la partie d'installation (12) ;

caractérisé en ce que :

- le cinquième côté (21) est en un matériau
polymère auto-adhésif ;
- l'outil (1) comprend un corps de base en un
premier matériau, le corps de base étant
enveloppé d'une couche (32) en un second
matériau différent du premier matériau, la
couche (32) formant une coque extérieure
de l'outil (1), la coque extérieure étant
conçue pour être mise en contact direct
avec les doigts (8, 9) ;
- l'outil (1) comprend un premier élément
(36) en matériau polymère auto-adhésif ;
- l'outil (1) comprend un second élément
(37) comprenant le corps de base et la
couche (32) ;
- le premier élément (36) est formé séparé-
ment du second élément (37) et relié au
second élément (37).

2. Outil (1) selon la revendication 1,
wherein:

- le cinquième côté (21) comprenant une première partie (23) s'étendant dans un premier plan qui s'étend angulairement par rapport à la première extension longitudinale (11) ;
 - le cinquième côté (21) comprenant une seconde partie (24) s'étendant dans un second plan qui s'étend angulairement par rapport à la première extension longitudinale (11) ; et
 - les première et deuxième parties (23, 24) s'étendant l'une vers l'autre et à l'opposé de la partie de liaison (7). 10
3. Outil (1) selon la revendication 2, les première et deuxième parties (23, 24) se rejoignant et formant un bord (26) du cinquième côté (21). 15
4. Outil (1) selon la revendication 2, le cinquième côté (21) comportant une troisième partie (27) disposée entre les première et deuxième parties (23, 24), et la troisième partie (27) s'étendant dans un troisième plan s'étendant perpendiculairement à la première extension longitudinale (11). 20
5. Outil (1) selon l'une quelconque des revendications précédentes, le matériau polymère auto-adhésif étant un nanogel. 25
6. Outil (1) selon l'une quelconque des revendications précédentes, le premier matériau étant un plastique renforcé par des fibres. 30
7. Outil (1) selon l'une quelconque des revendications précédentes, le second matériau étant un matériau de mousse. 35
8. Dispositif (43) d'installation de composants (2), le dispositif (43) comprenant :
- au moins un outil (1) selon l'une quelconque des revendications précédentes ; et
 - au moins un tampon encreur (44) saturé d'alcool et recouvert d'un chiffon (45) pour nettoyer l'outil (1). 40
- 45
9. Dispositif (43) d'installation de composants (2), le dispositif (43) comprenant plusieurs variantes (V1, V2, V3) d'un outil (1) selon l'une quelconque des revendications 1 à 7, les variantes (V1, V2, V3) différant les unes des autres par : 50
- au moins une dimension de la partie d'installation (12) ; et/ou
 - au moins une dimension de la partie de liaison (7) ; et/ou
 - au moins une dimension de la partie de support (15). 55
10. Procédé d'installation de composants (2), les composants (2) étant installés par un outil (1) selon l'une quelconque des revendications 1 à 7.

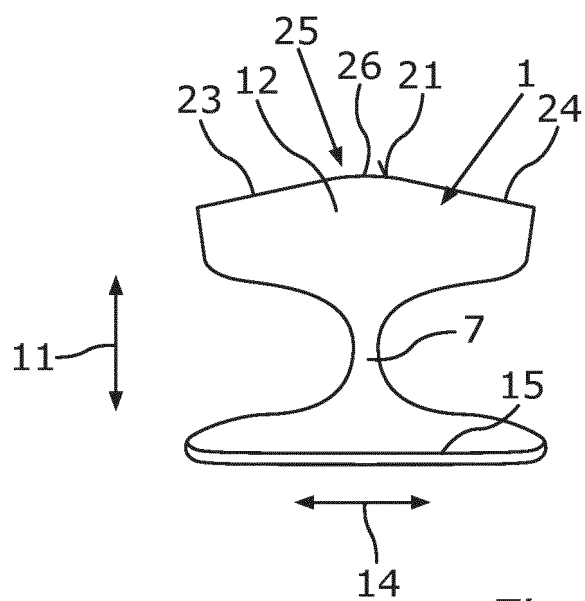


Fig. 1

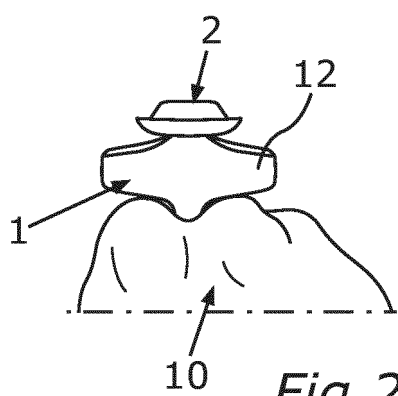


Fig. 2

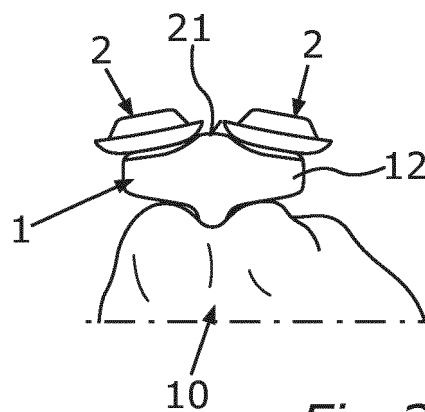


Fig. 3

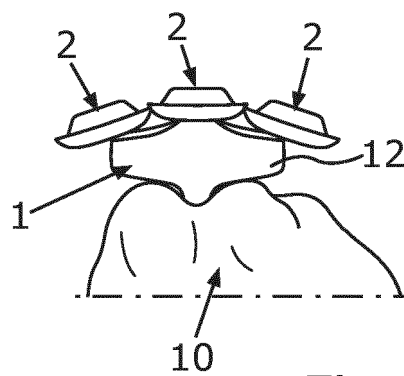
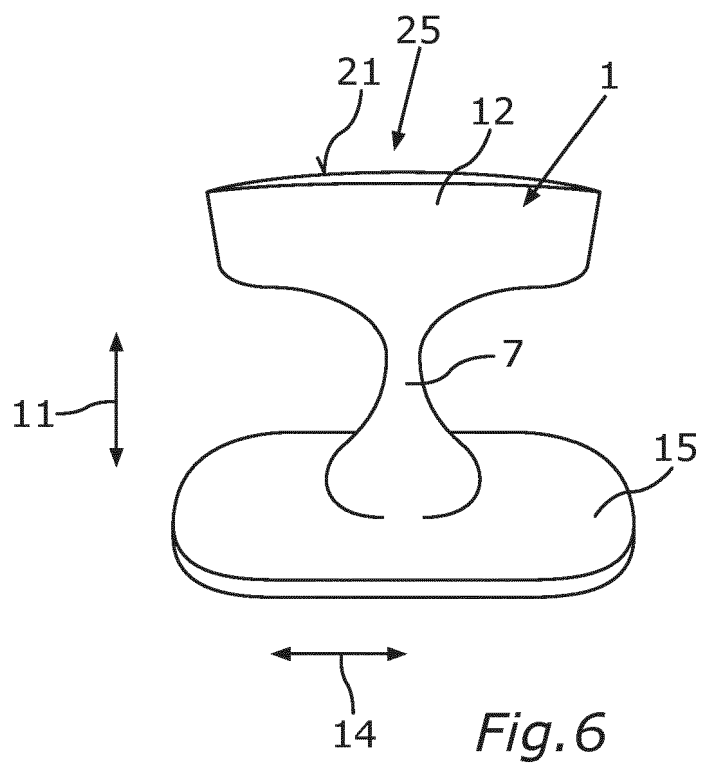
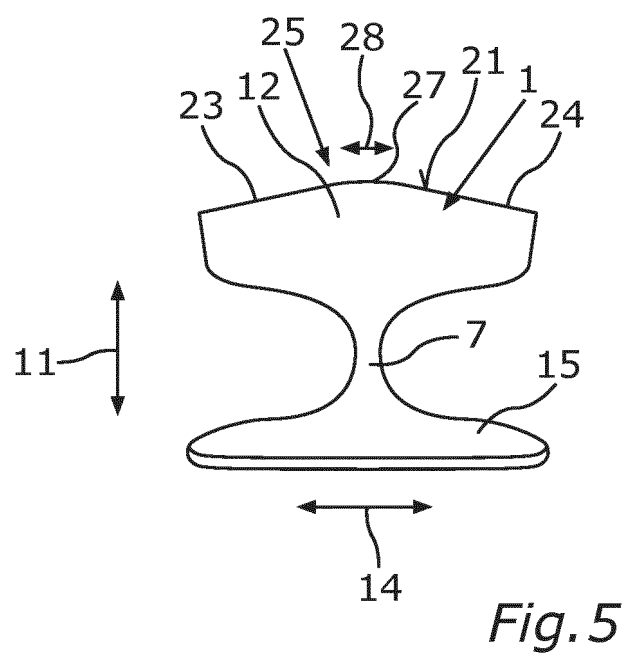


Fig. 4



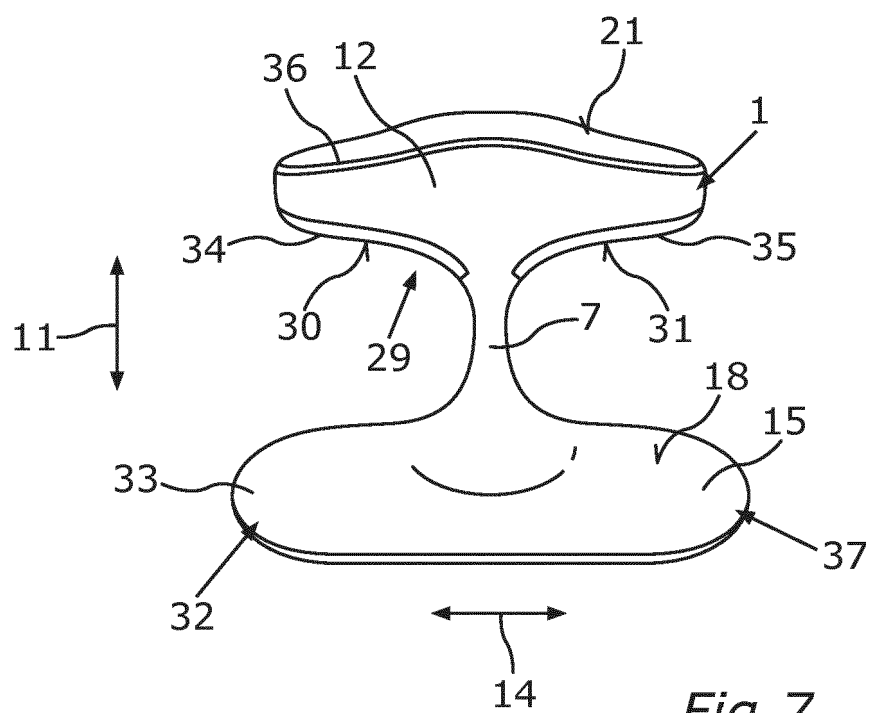


Fig. 7

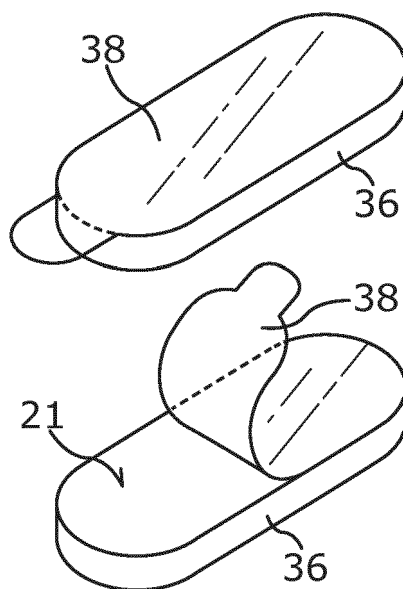


Fig. 8

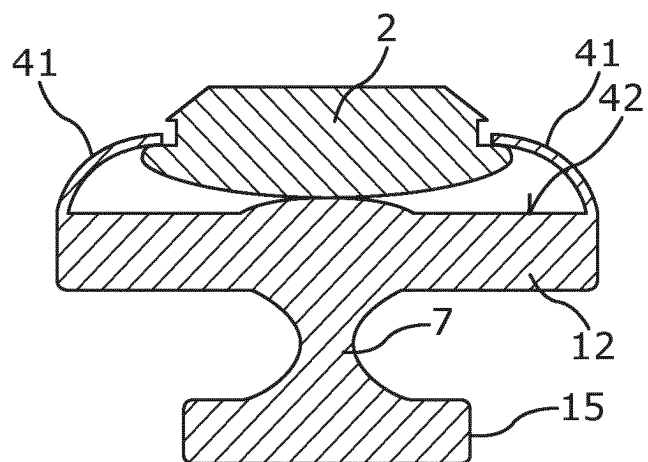


Fig. 9

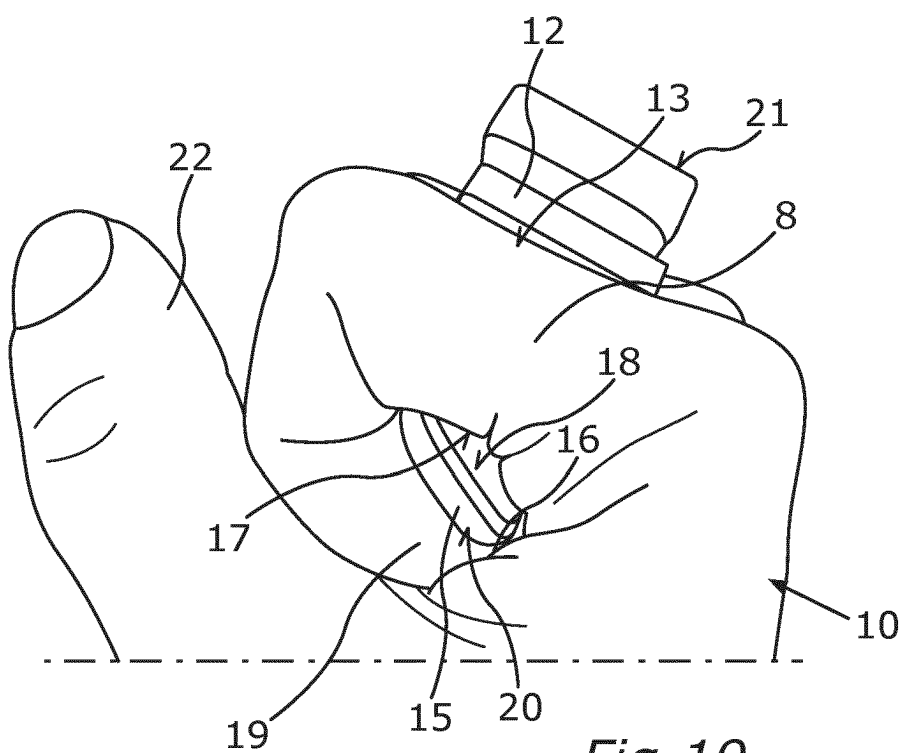


Fig. 10

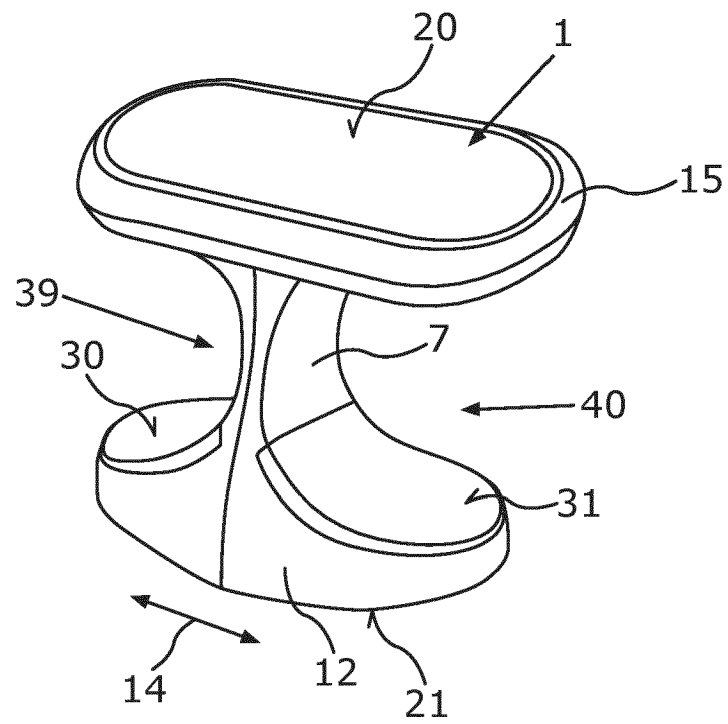


Fig. 11

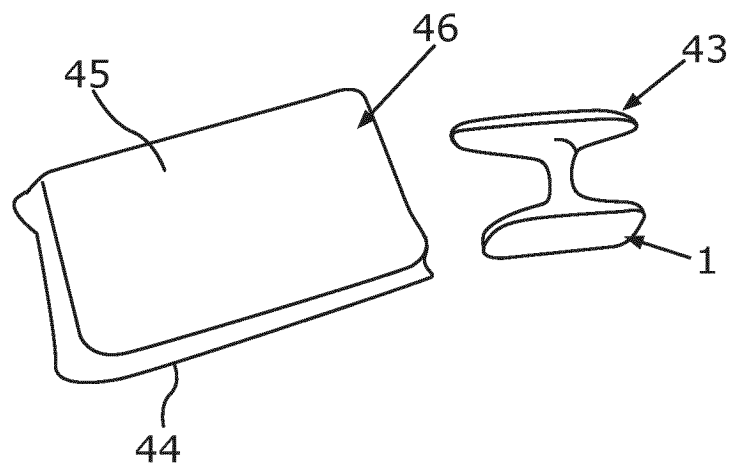


Fig. 12

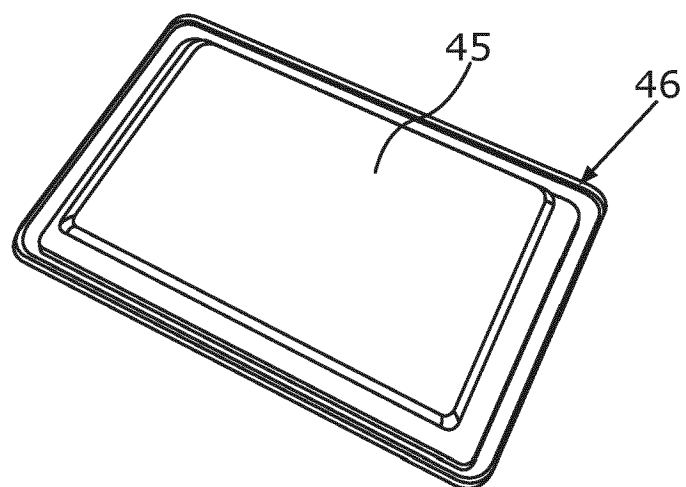


Fig. 13

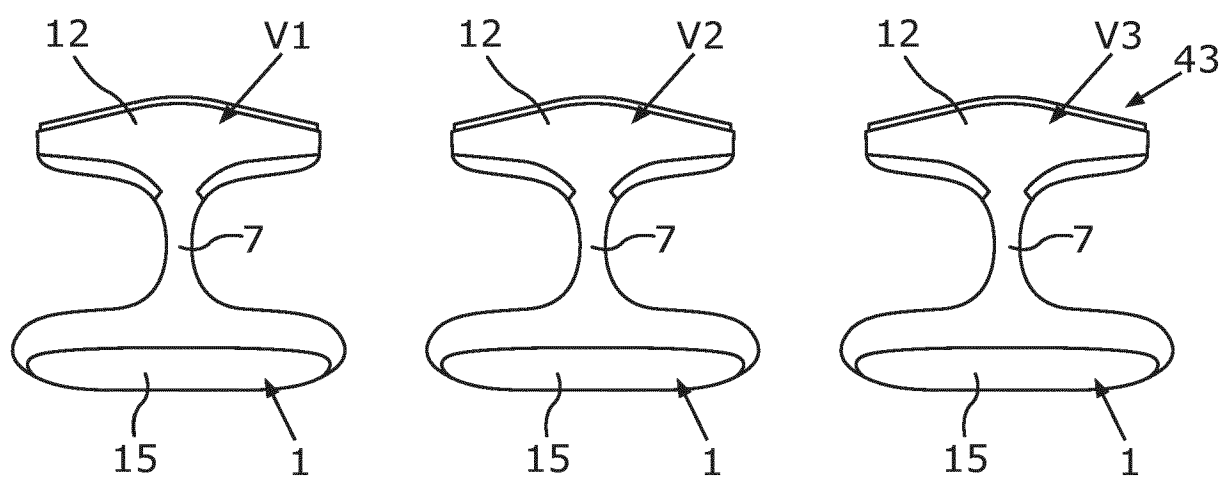


Fig. 14

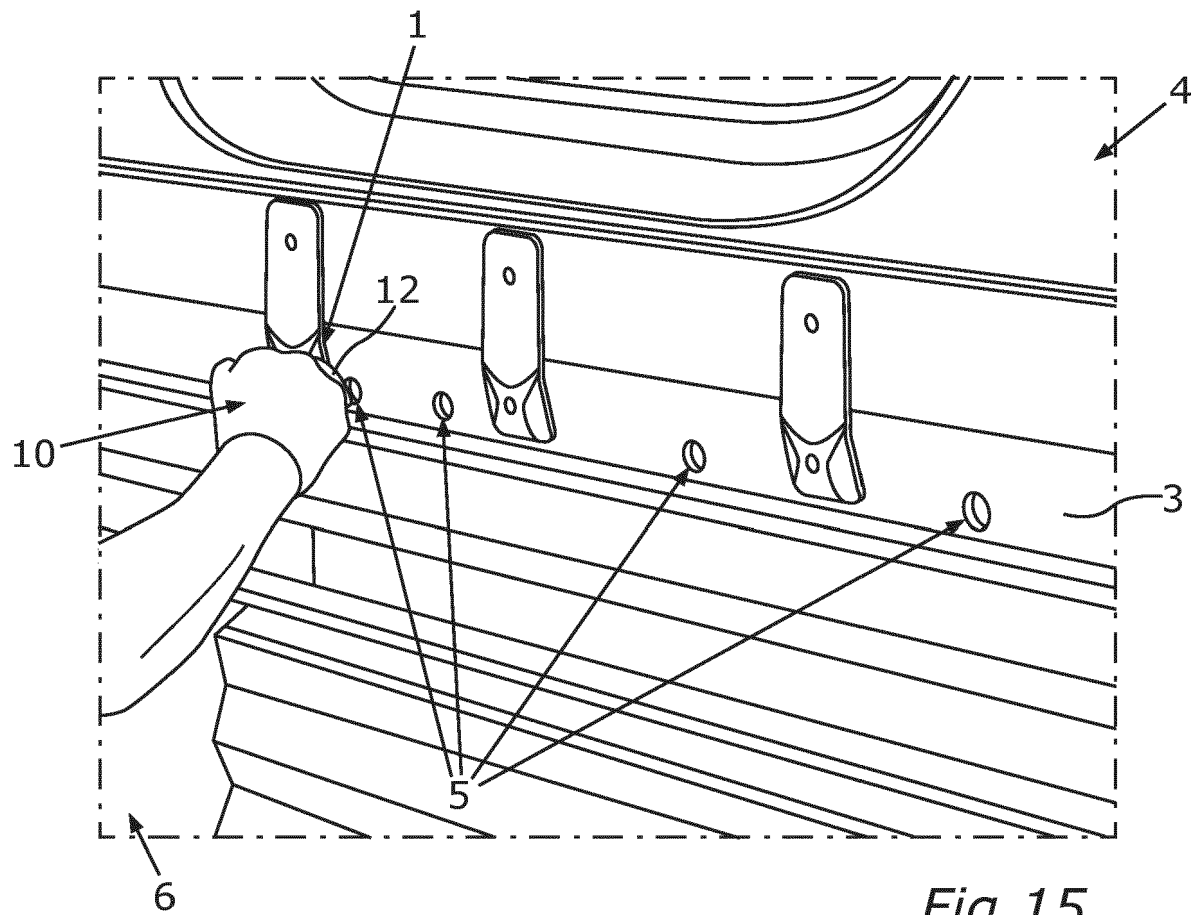


Fig. 15

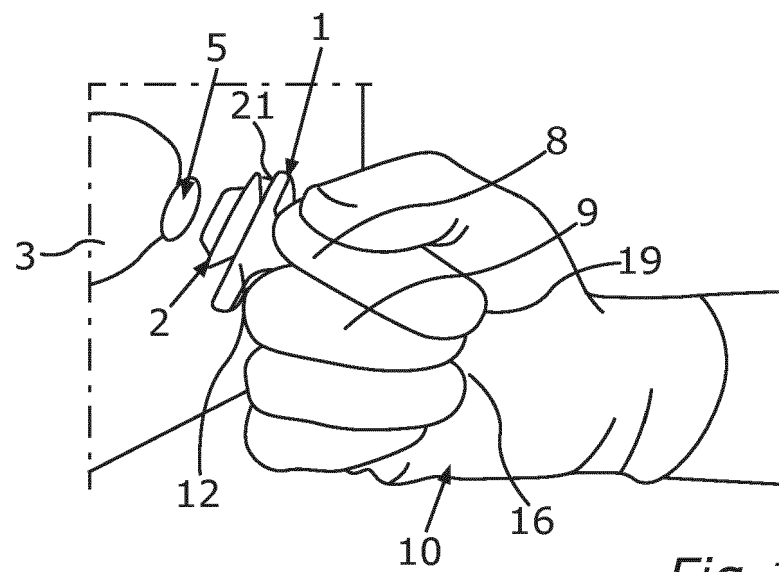


Fig. 16

REFERENCES CITED IN THE DESCRIPTION

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