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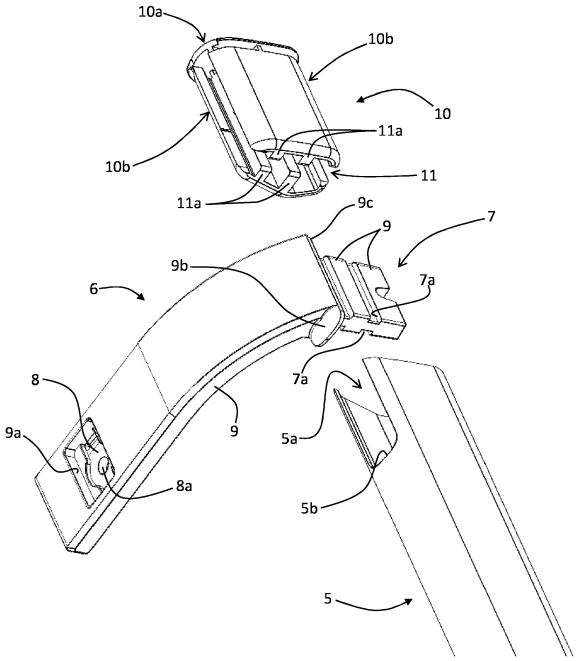
(54) DOOR HANDLE FOR A FURNITURE UNIT, IN PARTICULAR A REFRIGERATOR

(57) A door handle for the door of a furniture unit (1), comprises two support elements (6) that can be fixed to the door (3), and a grip element (5). Each support element (6) has, in a distal end region, a respective coupling portion (7) having a shaped lateral profile (7a). The grip element (5) has, at each longitudinal end region, an axial cavity (5a) and an axial lateral slot (5b) for receiving the coupling portion (7) of a respective support element (6) in such a way that the coupling portion (7) extends transversely in the axial cavity (5a).The handle (4) further comprises a pair of retention inserts (10), each of which is inserted at least partially in a respective axial cavity (5a) of the grip element (5), through the corresponding open longitudinal end.

Fig. 5



EP 3 040 660 A1

Description

Field of the invention

[0001] The present invention relates to handles for doors of furniture units and has been developed with particular reference to handles for doors for electrical household appliances, in particular, by way of example, refrigerating or cooking appliances.

State of the art

[0002] In the sector of electrical household appliances, use is known of handles provided with a generally elongated grip element, having two opposite end regions associated to which are respective support elements, which are in turn fixed on a lateral edge of the door of the electrical household appliance. This type of handles is typically used, for example, on refrigerating appliances, such as refrigerators, freezers, and refrigerator-freezers, with one or more doors.

[0003] Known from EP 0 948 275 A, on which the preamble of Claim 1 is based, is a handle of the type referred to above. In an embodiment described in the aforesaid document, the grip element is formed in a single full body, defined at two ends of which are axial lateral slots within which a portion of a respective plate-like support element can be received. The terminal portion of the support element is fixed in position via a threaded grubscrew, screwed in a corresponding threaded hole of the grip element. In a second embodiment, the grip element is axially hollow at its two opposite ends, at which also a respective axial lateral slot is provided. In this case, the distal end of the support elements is shaped in a way substantially complementary to the shape of the corresponding axial cavity of the grip element, and coupling between the parts does not require additional fixing elements.

[0004] The first embodiment described in the cited document is relatively simple but entails the use of grubscrews, which, for aesthetic reasons, must be of very small dimensions. This complicates to a certain extent the step of assembly of the handle. The solution also implies the risk of possible occasional sliding-out of the grip element from a support element, following upon repeated use of the handle. The second embodiment presupposes, instead, a very precise coupling between the ends of the support elements and the corresponding axial cavities and slots of the grip element: this complicates production of the components of the handle.

Object and summary of the invention

[0005] In its general terms, the aim of the present invention is to provide a handle of the type indicated above that is simple and inexpensive to produce and assemble.

[0006] These and other aims still, which will emerge more clearly hereinafter, are achieved, according to the present invention, by a door handle having the characteristics indicated in the annexed claims. The claims form an integral part of the technical teaching provided herein in relation to the invention.

Brief description of the drawings

[0007] Further aims, characteristics, and advantages of the invention will emerge clearly from the ensuing detailed description, with reference to the annexed drawings, which are provided purely by way of explanatory and non-limiting example and in which:

- Figure 1 is a schematic perspective view of a furniture unit that includes at least one handle according to the invention;
- Figure 2 is a schematic perspective view of a handle according to one embodiment of the invention;
- Figure 3 is an enlarged view of a portion of the handle of Figure 2;
- Figure 4 is a schematic perspective view of a support element of a handle according to one embodiment of the invention;
- Figures 5, 6, and 7 are partial and schematic exploded views of a handle according to one embodiment of the invention;
- Figure 8 is a partial and schematic sectioned view of a handle according to one embodiment of the invention;
- Figure 9 is a schematic exploded view of a handle according to a variant embodiment;
- Figure 10 is a partial and schematic exploded view of a handle according to a further variant embodiment of the invention; and
- Figure 11 is a partial and schematic perspective view of some components of a handle according to the variant embodiment of Figure 10.

Description of embodiments of the invention

[0008] Reference to "an embodiment" or "one embodiment" in the framework of the present description is meant to indicate that a particular configuration, structure, or characteristic described in relation to the embodiment is comprised in at least one embodiment. Hence, phrases such as "in an embodiment", "in one embodiment", and the like, that may be present in various points of this description do not necessarily all refer to one and the same embodiment. Moreover, the particular configurations, structures, or characteristics may be combined in any adequate way in one or more embodiments. The references used in what follows are only provided for convenience and not define the sphere of protection or the scope of the embodiments.

[0009] It is moreover pointed out that in some of the attached figures only one end portion of a handle according to the invention is illustrated, it being taken for granted that the opposite end of the handle can be made in an

identical way.

[0010] With initial reference to Figure 1, designated as a whole by 1 is a generic furniture unit provided with at least one door. In the example illustrated, the appliance 1 is a refrigerated cabinet for domestic use, comprising a load-bearing structure 2 associated to which are two front doors 3 for enabling access and closing of respective refrigerating compartments. In the example represented by way of non-limiting illustration, the refrigerated cabinet 1 is of the so-called "combo" type, with a refrigerating compartment set above of a freezing compartment. Each door 3 is articulated to the structure 2 - via hinges made in a way in itself known - so as to turn according to a generally vertical axis. Fixed to the longitudinal side 3a of the doors 3, opposite to the aforesaid hinges, are two handles, designated by 4, which here are assumed as being identical to one another.

[0011] A possible embodiment of a handle 4 may be seen in Figures 2 and 3. In the case illustrated, the handle 4 includes a grip element 5, having a generally elongated shape. Associated to each longitudinal end area of the grip element 5 is a support element 6, which can be fixed to a door 3, in particular at a side 3a thereof.

[0012] Shown in Figure 4 is a possible embodiment of a support element 6, which has, in a distal end region, a respective coupling portion, designated as a whole by 7, having a lateral profile, preferably a shaped lateral profile. The proximal end region of the element 6 is provided with corresponding means, described hereinafter, for fixing of the element 6 itself to the door 3, in particular at the corresponding side 3a. In a preferred embodiment, the element 6 has a generally curved shape, or in any case a shape such that its proximal and distal end regions extend in length in directions angled with respect to one another. In the example illustrated, for instance, the aforesaid end regions extend substantially orthogonal to one another. This geometry is particularly ergonomic for application on refrigerating appliances, the doors of which are articulated according to a vertical axis of rotation. In the case of application of the handle to cooking appliances, the doors of which are usually articulated according to a horizontal axis of rotation, the supports 6 may have a substantially rectilinear development.

[0013] The support element preferably has a generally flattened shape, i.e., the dimensions in length and width of which are greater than the dimension of thickness.

[0014] In a particularly advantageous embodiment, at least one support element 6 of the handle 4 has an internal core, overmoulded on which is a plastic material, to form a single body.

[0015] In the case exemplified - see for reference also Figure 8 - the aforesaid core is designated by 8 and is preferably constituted by a body shaped like a generally flat and elongated plate, made of metal material. In one embodiment, the core 8 is formed via shearing and shaping of a metal strap, for example made of steel or iron, having an adequate thickness for bestowing sufficient structural stiffness on the support element 6 as a whole. However, not excluded from the scope of the invention is the case of a core 8 made of a plastic material of adequate strength, for example a thermoplastic material with suitable filler or, again, the case of a support element 4 made entirely of one or more plastic materials.

[0016] With reference once again to the example illustrated in Figures 4 and 8, the plastic material moulded over the core 8 is designated by 9.

[0017] In the example of embodiment illustrated, the overmoulded plastic material 9 coats the majority of the metal core 8. This solution is particularly advantageous in so far as it affords the possibility of providing numerous aesthetic variants of the support elements, in terms of outer shapes and colours. Once again with reference to the case exemplified, and as will emerge hereinafter, the overmoulded material 9 practically constitutes the entire visible outer surface of the element 6, in the assembled condition of the handle 4, thereby avoiding the need for a treatment of surface finish of the core 8.

[0018] In a preferred embodiment, the metal core 8 has, in the proximal end region thereof, a through hole that can be engaged by a member for fixing the support element 4. Such a through hole is, for example, designated by 8a in Figures 4-7. The fixing member may, for example, be a screw or the like that is to engage in a corresponding threaded hole provided on the side 3a of the door 3. Advantageously, in such an embodiment, the plastic material 9 is overmoulded on the metal core 8 so as to define a housing seat, designated by 9a in Figures 5 and 8, for a head portion of the aforesaid fixing member. The seat 9a may be for example closed, for aesthetic purposes, by a purposely provided cover, for example fixed by snap action.

[0019] From the figures, and in particular from Figure 8, it may be noted how, in a preferred embodiment, the core 8 is shaped, in the proximal end portion, in such a way that a stretch of its surface is directly exposed also following upon overmoulding of the plastic material 9. This stretch of surface is preferably plane and is designed to rest on the side 3a of the door in order to guarantee precise fixing of the support element 6. As may be noted, the hole 8a and the seat 9a are provided at the aforesaid shaped stretch of the core 8.

[0020] The grip element 5 is open at its two opposite ends and has, at each longitudinal end region, an axial cavity 5a, visible for example in Figures 5-7. For this purpose, the grip element 5 may be entirely axially hollow, i.e., have a tubular structure, but not excluded from the scope of the invention is the case of a full element 5, in which two blind cavities are defined at its two open ends. The element 5 may, for example, be formed starting from a tubular body made of plastic or metal material, for example extruded aluminium. In the example illustrated, the cross section of the element 5 is not circular, but this possible shape is not excluded from the scope of the invention.

[0021] In each of its two opposite end regions, the element 5 has an axial lateral slot 5b. In the example, the

slot 5b extends starting from the open end of the element 5, but not excluded is the case of a slot in the form of an eyelet, i.e., one that terminates at a short distance from the open end. As will emerge more clearly hereinafter, the cavity 5a and the slot 5b have the function of receiving the coupling portion 7 of a respective support element 6 in such a way that the coupling portion will extend in a transverse direction in the cavity 5a, as may be seen, for example, in Figure 7.

[0022] According to the invention, the handle 4 further comprises a pair of retention inserts, each of which is designed to secure the coupling portion 7 of a support element 6 to the grip element 5. One of the aforesaid positioning inserts is designated in the figures by 10.

[0023] Each insert 10 is designed to be inserted at least partially in the respective axial cavity 5a of the grip element 5, through the corresponding open longitudinal end, and hence inserted in a direction generally transverse - in particular substantially orthogonal - to the direction of extension of the coupling portion 7.

[0024] Each insert 10 has an outer or peripheral profile shaped for obtaining a shape coupling with at least part of the respective axial cavity 5a of the grip element, as well as a transverse slot, which defines an inner profile of the insert 10 and is shaped in such a way as to obtain a shape coupling with at least part of the lateral profile of the coupling portion 7 of the respective support element 10.

[0025] With reference, for example, to Figures 5-7, in a preferred embodiment, the insert 10 has a body -for example made of moulded plastic material - having a head portion 10a extending from which are two vertical portions 10b, generally parallel or in any case set alongside one another at a certain distance, to delimit between them the aforesaid transverse slot, designated by 11. Each vertical portion 10b has an outer surface, which defines a respective portion of the peripheral profile of the insert 10, and an inner surface, which defines a respective portion of the inner profile of the insert 10, the aforesaid inner surfaces facing each other at a distance from one another so as to define the transverse slot 11.

[0026] As may be seen, for example, in Figures 4-6, in a preferred embodiment, the lateral profile of the coupling portion 7 is shaped and comprises one or more grooves 7a, which extend in an axial direction of the grip element 5, i.e., of the insert 10. Preferably, these grooves 7a are defined on both opposite major sides of the coupling portion 7. On the other side, the transverse slot 11 of the insert 10 comprises one or more reliefs 11 a, which extend in the same direction as the reliefs 7a. Also in this case, preferably, the reliefs 11 a are defined in both of the facing surfaces of the slot 11, i.e., in the inner surfaces of the insert 10. A reverse arrangement is of course possible, i.e., with the reliefs in the portion 7 and the grooves in the slot 11.

[0027] The reliefs 11 a and the grooves 7a contribute to rendering the ensemble more stable and to eliminate any possible play. However, not excluded is the possibility for the coupling portion 7 and the insert 10 to be interfaced more simply with one another via at least one pair of plane and continuous opposite surfaces.

[0028] In the preferred embodiment, the groove or each groove 7a of the coupling portion 7 of a support element 6 is delimited laterally by plastic material 9a moulded over the core 8. In such an embodiment, the bottom of the grooves 7a can be defined directly by the material of the core 8, as in the case represented in the figures, which makes it possible to reduce the amount of the overmoulded material. There is nothing in any case to rule out defining the grooves 7a completely in the overmoulded material 9.

[0029] The coupling portion 7 can have a length such that its front will bear upon the inner surface of the grip element 5 or else a smaller length so that the front of the portion 7 and the grip element will remain set at a distance from one another.

[0030] In one embodiment, each support element 6 has, substantially at an intermediate area thereof, from which the coupling portion 7 extends, one or more shaped portions, to obtain a shape coupling with at least one from among:

- the upper portion 10a of the retention insert 10;
- an edge portion of the axial slot 5b of the grip element 5;
- a portion of outer surface of the grip element 5.

[0031] Preferably, the aforesaid portion or portions are defined by the material 9 overmoulded on the core 8.

[0032] With reference to the embodiments illustrated in the figures (see, for example, Figure 3), one of the aforesaid shaped portions is designated by 9b and is defined in the lower part of the support element 6 so as to provide a shape coupling and a closure with respect to the edge of the bottom of the corresponding axial slot 5b of the grip element 5, as well as an end-of-travel position for the movement of insertion of the element 6 into the axial slot 5b. Designated by 9c is one of two lateral portions of the element 9, configured for providing a shape coupling in regard to the vertical edges of the axial slot 5b. Designated by 9d is an upper portion of the element 9, defined on the side opposite to the portion 9b, configured for providing a shape coupling in regard to a respective part of the peripheral profile of the upper portion 10a of the insert 10.

[0033] The presence of the aforesaid portions makes it possible to obtain a precise positioning between the parts involved, moreover facilitating the step of assembly of the handle 4.

[0034] Assembly of the handle 4 is very simple. The coupling portion 7 of each support element 6 is inserted in a transverse direction into the respective axial cavity 5a of the grip element 5, via the corresponding axial slot 5b, and then the corresponding retention insert 10 is inserted into the cavity 5a itself with an axial movement, through the open end of the grip element 5. In this way,

the outer surface of the portions 10b of the insert 10 cooperates with the peripheral surface of the cavity 5a, whereas the opposite surfaces of the slot 11 - provided with the reliefs 11a - mate with the opposite lateral surfaces of the coupling portion 7 - provided with the grooves 7a. Preferably, the relative dimensions between the parts involved (cavity 5, portions 10b, and portion 7) are chosen in such a way that coupling of the insert 10 with the cavity 5a and the coupling portion 7 will occur with at least a slight interference. Use of the retention inserts enables recovery in an extremely simple and precise way of any possible production and/or assembly tolerances.

[0035] Preferably, the insert 10 fills the gap between the coupling portion 7 and the grip element 5, thus guaranteeing stable fixing between the support element 6 and the grip element 5 so as to eliminate any possible mutual play, even minor relative rotation that might otherwise occur following upon application of a pulling force on the grip element 5 in order to open the door 3.

[0036] In a possible alternative version of assembly, the insert 10 is first fitted on the coupling portion 7, and next the insert and portion 7 are inserted axially into the cavity 5a, exploiting the end opening of the grip element 5 and the corresponding axial slot 5b.

[0037] After fixing of the support elements 6 to the grip element 5, the former can be fixed to the side of the door 3, in the ways described above, thereby guaranteeing mutual positioning of the parts involved. As may be appreciated, each insert 10 hence also provides a function of plug in regard to the open ends of the grip element 5, thus preventing accessibility to the space inside the grip element 5.

[0038] As may be appreciated, in the solution according to the invention, the presence of the retention insert 10 enables fixing of the support elements 6 with respect to the grip element 5 to be obtained, via an outer shape coupling (in regard to the cavity 5a) and an inner shape coupling (in regard to the coupling portion 7 of the element 6).

[0039] Figure 9 illustrates a variant embodiment of the invention, according to which the body of the retention insert 10 has a lateral extension, provided with at least one coupling element that can be engaged with a corresponding coupling element defined in the respective support element 6. In the case exemplified, the aforesaid lateral extension 12 extends from the upper portion 10a of the body of the insert 10 in order to follow the upper profile of a part of the support element 6 and has, at its lower surface, a longitudinal groove 12a, designed for coupling with a corresponding engagement portion 13 defined along a part of the upper profile of the element 6, in particular by the overmoulded material 9. In addition or as an alternative, the extension 12 may include also a lateral engagement tooth 12b, designed for engagement in a corresponding seat defined laterally in the element 6, in particular by the material 9. The presence of the aforesaid coupling elements may prove advantageous for the purpose of guaranteeing proper positioning of the retention inserts 10.

[0040] In the embodiments represented in Figures 1-9, the slot 11 of the insert 10 traverses the body of the latter in a transverse direction, but this does not constitute a characteristic that is essential for the purposes of implementation of the invention, it being possible for the slot to be closed at one end. For example, Figures 10 and 11 illustrate a variant embodiment in this sense, whereby the body of the retention insert 10 comprises a wall 10c, in a position generally opposite to the lateral slot 5b of the grip element 5, where the wall 10c joins together the two vertical portions 10b and closes the transverse slot at an end thereof. The wall 10c may have a limited thickness, for example 2 mm. The presence of the wall 10c makes it possible to increase further the extension of the shape coupling between the body of the insert and the peripheral surface of the cavity 5a and moreover renders the insert 10 structurally sturdier. Possibly, the inside of the wall 10c may include an axial relief or groove designed to mate with a relief or groove, respectively, defined at the front end of the coupling portion 7.

[0041] From the foregoing description, the characteristics of the present invention emerge clearly, as likewise do its advantages, amongst which in particular the simplicity and low cost of the handle proposed, in terms of production of the components and their assembly. Given that the retention insert is inserted into a corresponding axial cavity of the grip element, its presence does not constitute further encumbrance of the structure of the handle. Since the support elements, on one side, and the retention inserts, on the other side, may be identical to one another at the two ends of the grip element, there is obtained an advantage as regards the number of components to be provided. Since the retention insert is fitted in the grip element, there is obtained a very stable coupling that enables use of minimal thicknesses for the grip element, when this has a tubular structure.

[0042] It is clear that numerous variations may be made by the person skilled in the branch to the handle described by way of example, without thereby departing from the scope of the invention as defined in the annexed claims.

[0043] As already mentioned, in variant embodiments, the support elements 6 may be entirely made of plastic material, in particular moulded plastic material, even in the absence of a core. The support elements could on the other hand also be entirely made of metal material.

[0044] In other variant embodiments, the overmoulded material does not necessarily have to coat the majority of a core of the support elements. For example, in a variant embodiment, the overmoulded part may be limited to the coupling portion 7 alone and to the possible portions 9b-9d, in which case the remaining part of the core 8 will be preferably provided with a surface finish, in so far as it is directly in view.

[0045] As already mentioned, the handle according to the invention may be applied to electrical household appliances other than refrigerating appliances, such as for

example cooking ovens. In this case, the proximal end of the support elements, which is preferably substantially rectilinear, may be fixed to the front of the door in the proximity of its upper edge. In such an application the support elements may be entirely made of metal material, for example aluminium or steel.

Claims

1. A door handle for the door of a furniture unit (1), in particular a door of a refrigerating cabinet or of an oven, comprising two support elements (6) that can be fixed to the door (3) and a grip element (5) that is generally elongated and open at its two longitudinal ends,
wherein each support element (6) has, in a distal end region, a respective coupling portion (7) having a lateral profile (7a),
wherein the grip element (5) has, at each longitudinal end region, an axial cavity (5a) and an axial lateral slot (5b) for receiving the coupling portion (7) of a respective support element (6), in such a way that the coupling portion (7) extends transversally in the axial cavity (5a),
the handle (4) being **characterized in that** it also comprises one pair of retention inserts (10), each of which is inserted at least partially in a respective axial cavity (5a) of the grip element (5), through the corresponding open longitudinal end, each retention insert (10) having
a peripheral profile shaped for obtaining a shape coupling with at least part of the respective axial cavity (5a) of the grip element (5); and
a transverse slot (11) defining an inner profile of the retention insert (10) that is shaped for obtaining a shape coupling with at least part of the lateral profile of the coupling portion (7) of the respective support element (6).

2. The handle according to Claim 1, wherein each support element (6) has a core (8), preferably made of metal material, over which a plastic material (9) is moulded.

3. The handle according to Claim 2, wherein the lateral profile of the coupling portion (7) of the support element (6) is defined at least in part by plastic material (9) moulded over the core (8).

4. The handle according to any one of the preceding claims, wherein
the shaped lateral profile of the coupling portion (7) comprises at least one between a groove (7a) and a relief, respectively, which extends in an axial direction of the grip element (5); and
the inner profile of the retention insert (10) defined by the transverse slot (11) comprises at least one between a relief (11 a) and a groove, respectively, which extends in an axial direction of the grip element (5).

5. The handle according to Claim 4, wherein the groove or each groove (7a) of the coupling portion (7) is delimited at least laterally by plastic material (9) moulded over the core (8), or else the relief or each relief of the coupling portion (7) is formed by plastic material (9) moulded over the core (8).

6. The handle according to any one of the preceding claims, wherein the core (8) has, in a proximal end region thereof, a through hole (8) engageable by a member for fixing the support element (6), and wherein the plastic material (9) is moulded over the core (8) so as to define a housing seat (9a) for a head portion of the member for fixing.

7. The handle according to any one of the preceding claims, wherein the retention insert (10) has a body with a head portion (10a) from which there extend two vertical portions (10b), each having a first surface and a second surface, which define a respective portion of the peripheral profile and of the inner profile of the retention insert (10), respectively, the two second surfaces facing each other at a distance from one another to define the transverse slot (11).

8. The handle according to Claim 7, wherein the body of the retention insert (10) further comprises a wall (11c), in a position generally opposite to the axial lateral slot (5b) of the grip element (5), which joins to one another the two vertical portions (10b) and closes the transverse slot (11) at an end thereof.

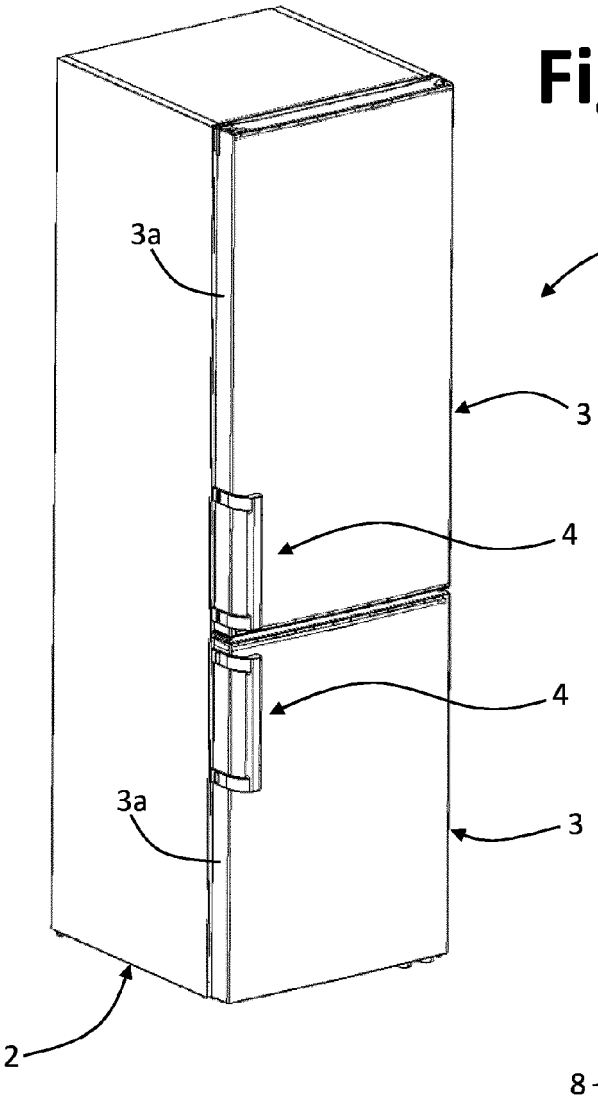
9. The handle according to any one of the preceding claims, wherein the body of the retention insert (10) has, in particular at an upper portion (10a) thereof, a lateral extension (12) provided with a coupling element (12a, 12b) engageable with a corresponding coupling element (13, 14) defined in the respective support element (6).

10. The handle according to any one of the preceding claims, wherein the support element (6) has, at an intermediate area thereof from which the coupling portion (7) substantially extends, at least one shaped portion (9b, 9c, 9d) for obtaining a shape coupling with at least one from among:

- an upper portion (10a) of the retention insert (10);
- an edge portion of the axial lateral slot (5b) of the grip element (5);
- a portion of an outer surface of the grip element (5).

11. A cooking or refrigerating appliance, comprising at least one door (3) and a handle (4) according to one or more of the preceding claims.

Fig. 1



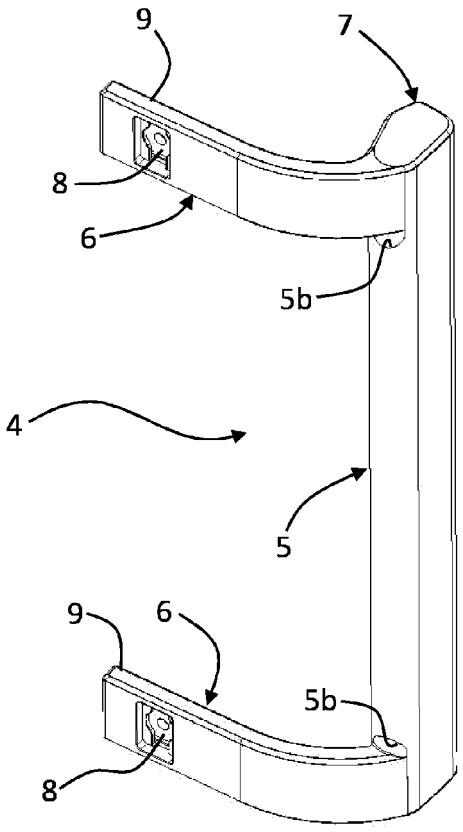
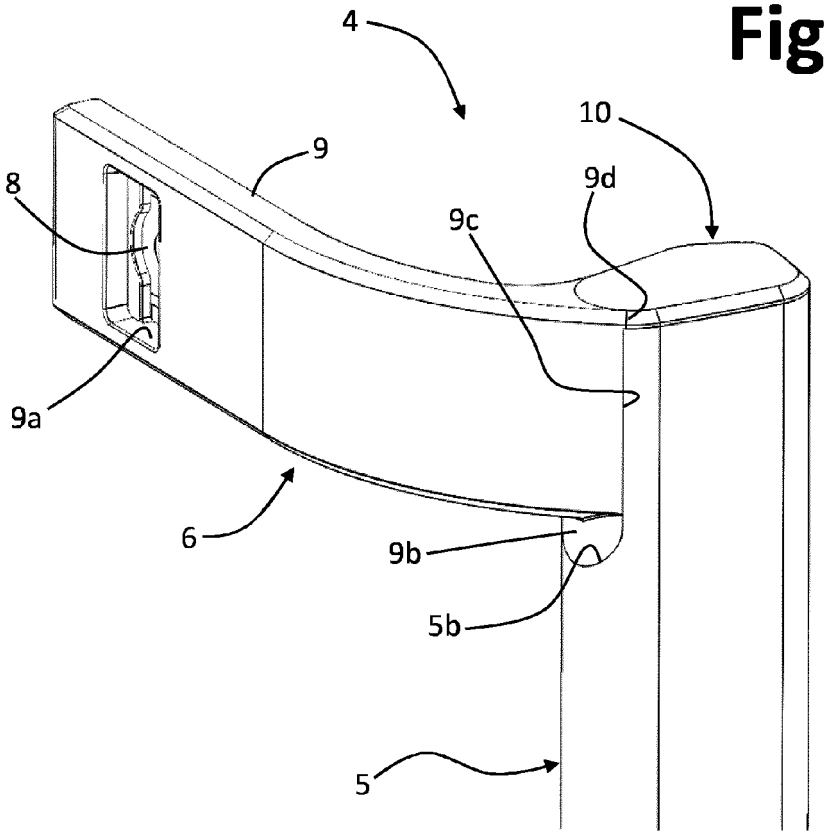


Fig. 2

Fig. 3



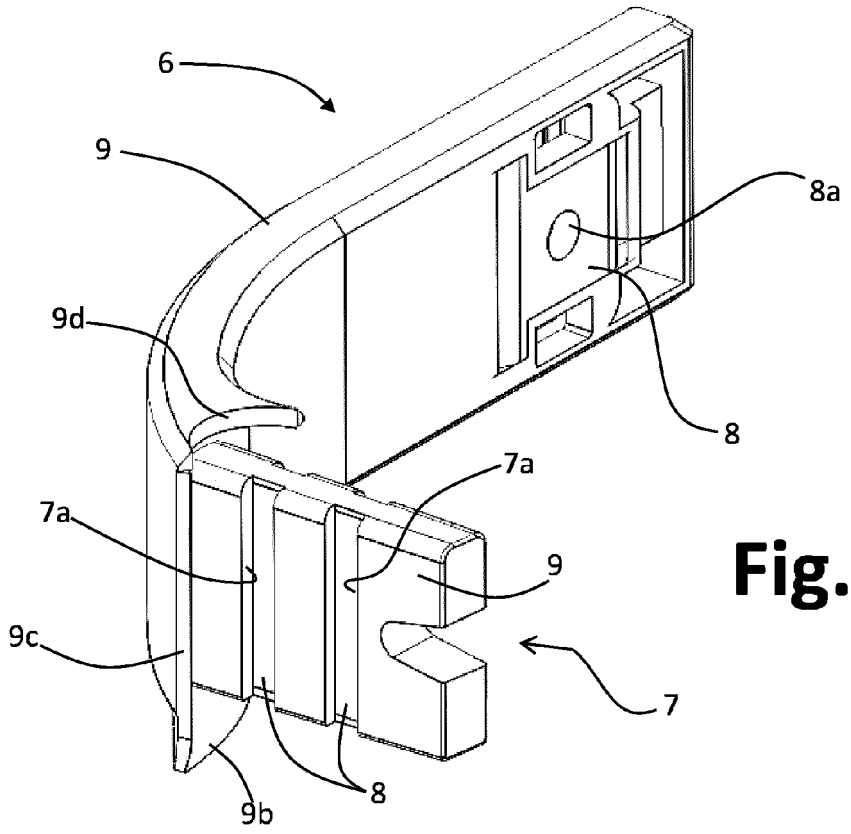


Fig. 4

Fig. 5

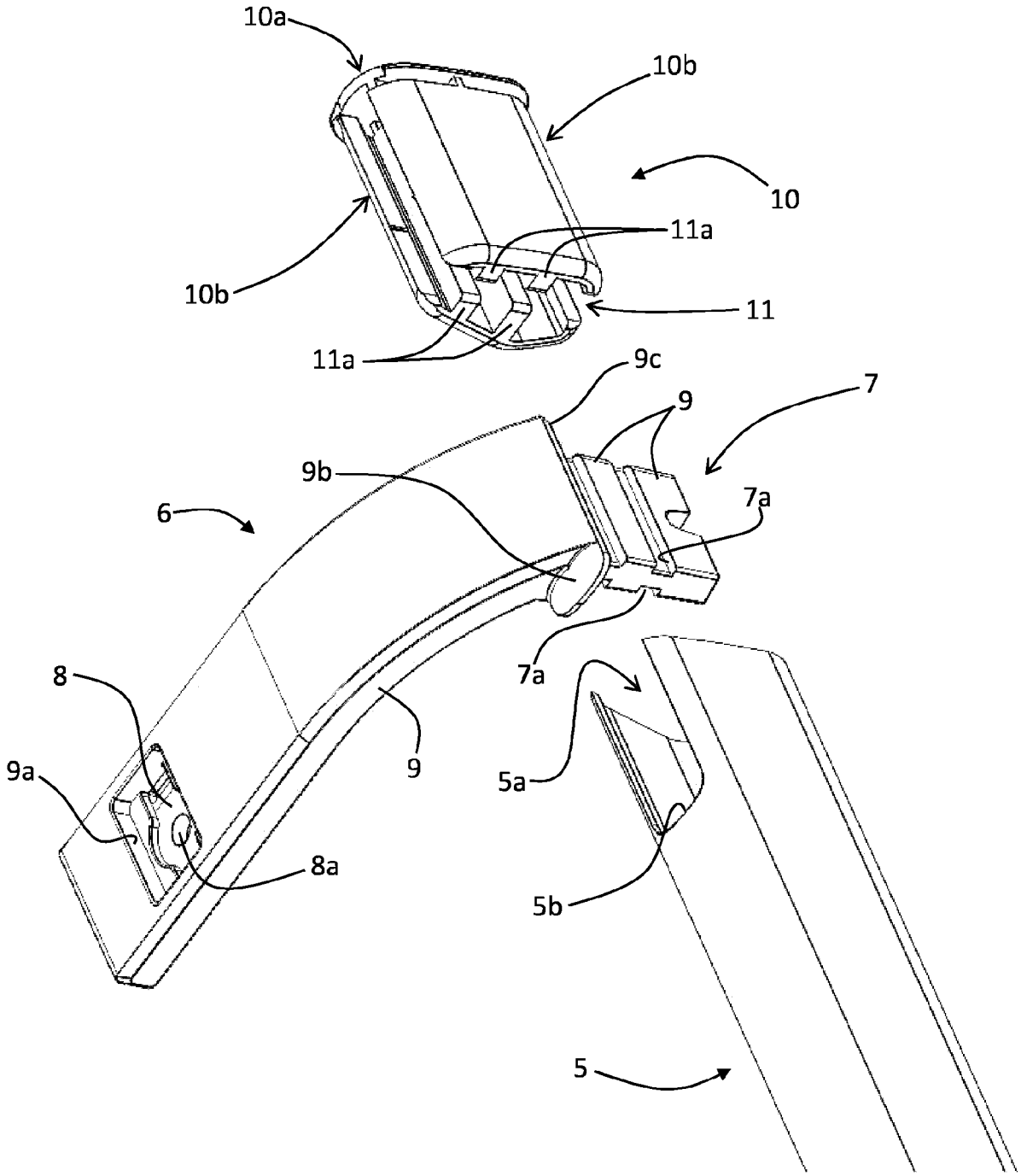
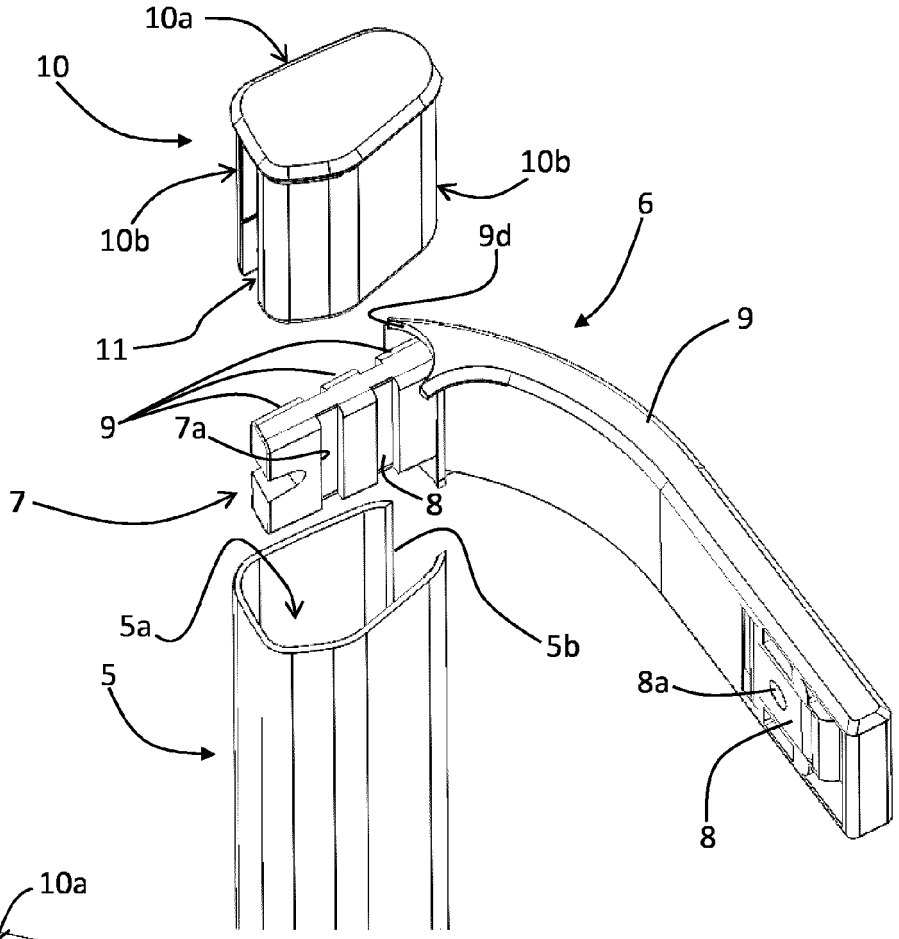


Fig. 6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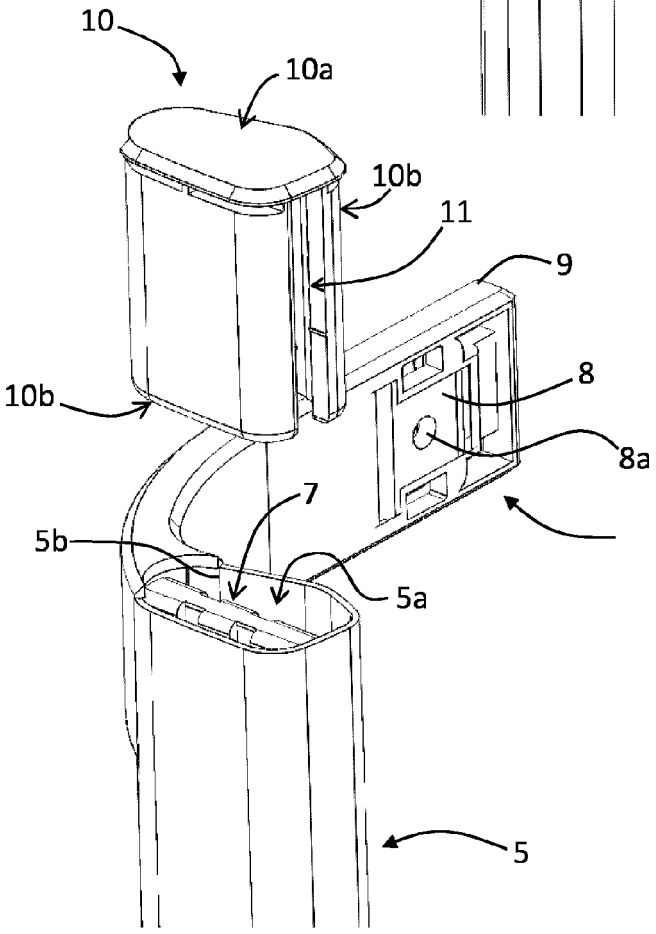
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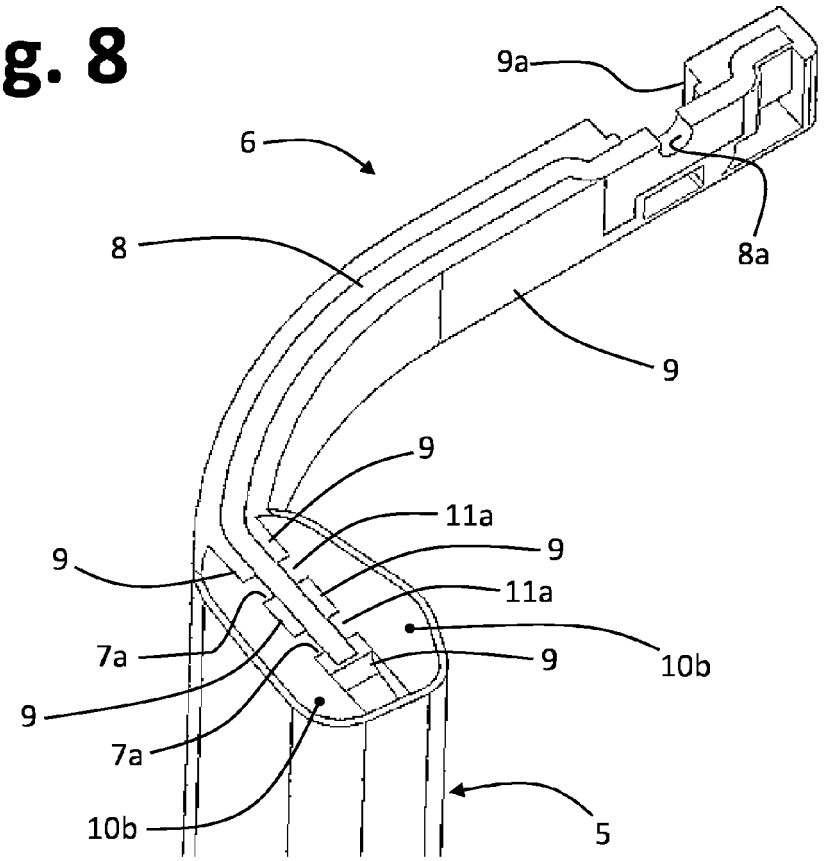
Fig. 7

Fig. 8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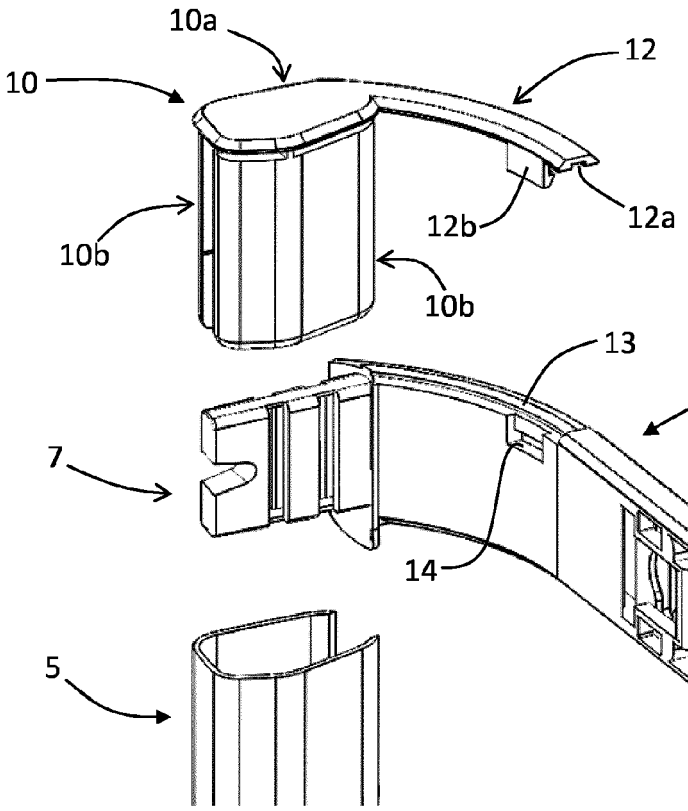
10a
12
10
12b
12a
10b
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Fig. 9

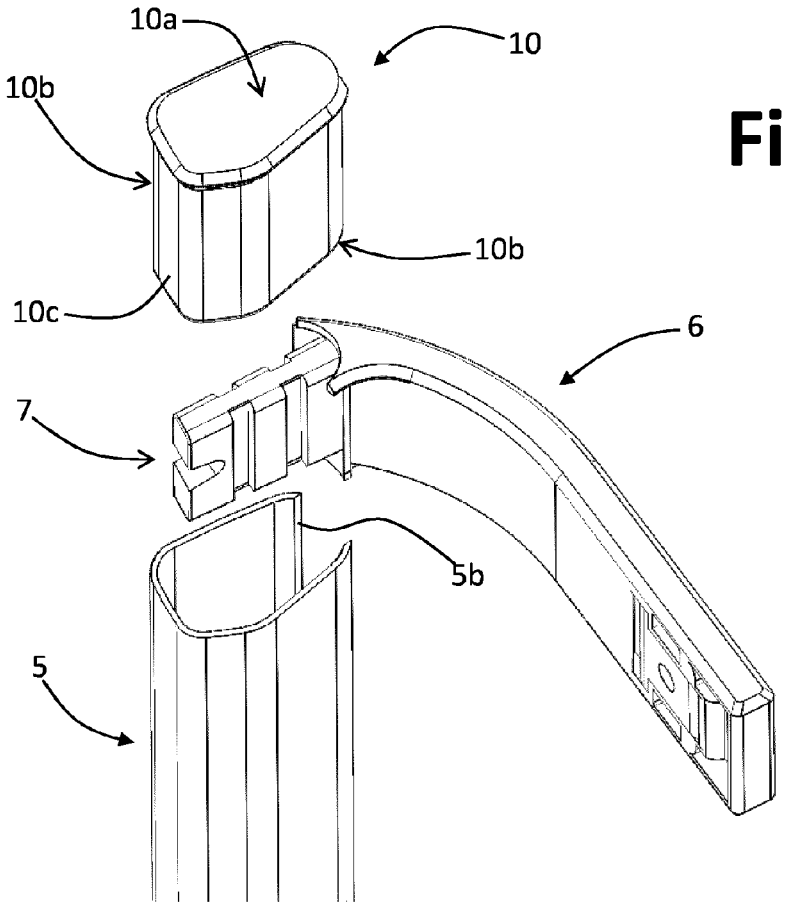

Fig. 10

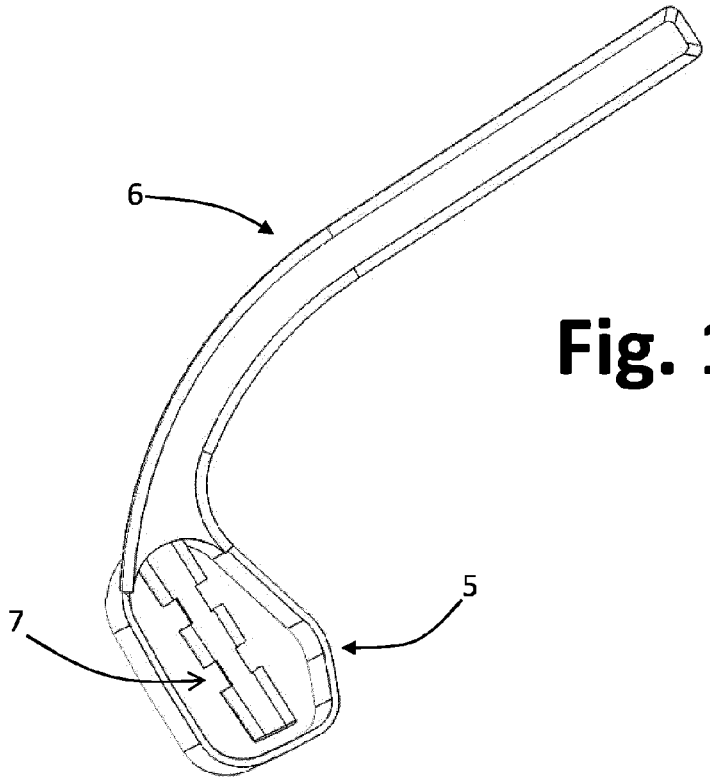

Fig. 11

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EUROPEAN SEARCH REPORT

Application Number
EP 15 20 0716

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 10 2011 087756 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 6 June 2013 (2013-06-06) * paragraphs [0057] - [0060]; figures 7,8 * -----	1-11	INV. F25D23/02 A47B95/02 E05B1/00 F24C15/02
A	US 5 144 718 A (OZAWA AKIO [JP]) 8 September 1992 (1992-09-08) * figures * -----	1,11	
A	NL 9 000 197 A (MAARTEN POST) 16 August 1991 (1991-08-16) * figures 1-3 * -----	1,11	
A	WO 2005/001351 A1 (ARCELIK AS [TR]; INAL TAYFUN [TR]; BAYIZ NIHAT [TR]) 6 January 2005 (2005-01-06) * figures * -----	1,11	
A	WO 2007/098818 A1 (ARCELIK AS [TR]; MAMATOGLU MURAT [TR]) 7 September 2007 (2007-09-07) * figures * -----	1	

TECHNICAL FIELDS SEARCHED (IPC)

F25D
A47B
E05B
F24C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	19 April 2016	Vigilante, Marco

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19-04-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 102011087756 A1	06-06-2013	NONE	
US 5144718 A	08-09-1992	JP H0424971 U	28-02-1992
		JP H0735057 Y2	09-08-1995
		US 5144718 A	08-09-1992
NL 9000197 A	16-08-1991	NONE	
WO 2005001351 A1	06-01-2005	AT 374346 T	15-10-2007
		DE 602004009183 T2	03-07-2008
		EP 1642071 A1	05-04-2006
		WO 2005001351 A1	06-01-2005
WO 2007098818 A1	07-09-2007	EP 1965681 A1	10-09-2008
		WO 2007098818 A1	07-09-2007

EPO FORM P0459

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Patent documents cited in the description

- EP 0948275 A **[0003]**