



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
18.08.2021 Bulletin 2021/33

(51) Int Cl.:
A47B 95/02 (2006.01) **A47F 3/04** (2006.01)
E05B 1/00 (2006.01) **E06B 5/00** (2006.01)

(21) Application number: **21156919.9**

(22) Date of filing: **12.02.2021**

(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 MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(72) Inventors:
• **VEENEMAN, Jan Peter**
3044 EN Rotterdam (NL)
• **VAN IPEREN, Ferry**
3044 EN Rotterdam (NL)
• **KRIJGSMAN, Pieter Sietze**
3044 EN Rotterdam (NL)

(74) Representative: **Jilderda, Anne Ayolt**
LIOC Patents & Trademarks
Zwaanstraat 31 L
5651 CA Eindhoven (NL)

(30) Priority: **13.02.2020 NL 2024899**

(71) Applicant: **Polyplastic Group B.V.**
3044 EN Rotterdam (NL)

(54) **COOLING CABINET AND HANDLE DEVICE THEREFOR**

(57) A cooling cabinet comprises a conditioned space (10) with an access door (30). The access door comprises a first, substantially flat plate body (31) and a substantially plane-parallel second plate body (32), which second plate body comprises a central part (35) which lies offset over a step (s) relative to a peripheral edge part (34). The access door is provided with a handle device (60) whereby the access door can be manually manipulated between a closed position and an opened

position. The handle device comprises a base member (61) which is connected permanently to a free surface of the first plate body (31), and a grip member (62) which can be connected to the base member (61). The base member (61) extends no further than a height (h) above the surface of the first plate part (31), which height (h) is smaller than the step (s) of the central part (35) of the second plate body (32) relative to the edge part (34).

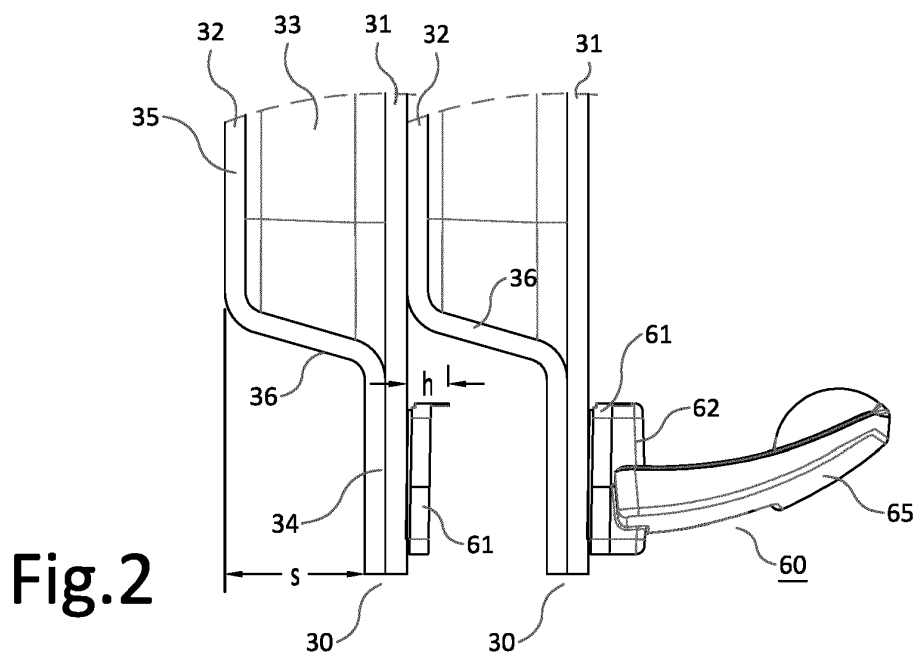


Fig.2

Description

[0001] The present invention relates to a cooling cabinet comprising a conditioned space with an access door, which access door comprises a first, substantially flat plate body and a substantially plane-parallel second plate body, which second plate body comprises a central part which lies offset over a step relative to a peripheral edge part and encloses with the first plate body a cavity, wherein the access door is provided with a handle device whereby the access door can be manually manipulated between a closed position and an opened position.

[0002] Such a cooling cabinet generally comprises a climate-controlled, cooled interior space which can be closed by means of one or more access doors in order to thus erect a thermodynamic barrier between the cool internal climate in the space and the external climate of the surrounding area. An important application here is that of a cooled display case in a shop and other locations where food products and beverages to be cooled are distributed. Transparent access doors are preferably used here so that the wares to be displayed will be clearly visible from the outside. Known from a previous patent application by applicant is an at least almost wholly transparent access door for such a cooled display case. This known access door comprises essentially a set of plane-parallel plate bodies of a transparent plastic which are glued to each other at their periphery, thus enclosing a thermally insulating cavity. An outer of the two plate bodies is completely flat, while the other plate body comprises a central part which lies offset over a height relative to a peripheral edge part and which transposes via a transition part into the edge part. The thus obtained door panel for an access door is essentially frameless and transparent over a whole surface.

[0003] It has been found desirable in practice to equip an access door for a cooling cabinet with a handle device in the form of a handgrip. This is then mounted against the flat outer plate and allows a user to manipulate the door panel between a closed position and an opened position. A drawback of the use of the known handle on the flat outer plate is however that the packing density of the door panels is thereby at least partially lost in that, due to the protruding handle, additional intermediate space must be saved between successive panels in a stack. This is undesirable from a viewpoint of both storage and transport.

[0004] The present invention therefore has for its object, among others, to provide an access door for a cooling cabinet which can be equipped with an effective handle device while maintaining packing density.

[0005] In order to achieve the intended objective a cooling cabinet of the type described in the preamble has the feature according to the invention that the handle device comprises a base member which is connected permanently to a free surface of the first plate body at the position of the edge part of the second plate body via a first connection, that the handle device comprises a

grip member which can be connected to the base member without tools via a second connection, and that the base member extends no further than a height above the surface of the first plate part, which height is smaller than the step of the central part of the second plate body relative to the peripheral edge part thereof.

[0006] The base member of the handle device is here connected permanently to the door panel and thus provides a reliable mounting base for the grip member to be mounted thereon. Because the base member takes a relatively flat form, meaning that a height thereof is smaller than the step of the central part relative to the edge part, the base member is able to nestle between successive panels in a stack of panels. The base member can thus already be arranged beforehand without having an adverse effect on a packing density of such a stack. By finally coupling the grip member to the base member a complete handle device is assembled. The grip members intended therefor can be supplied separately and, if desired, be adapted here to a field of application of the access door and/or the desired corporate identity.

[0007] In a preferred embodiment the cooling cabinet according to the invention is characterized in that the first plate body and the second plate body are formed wholly from a transparent plastic, particularly from polymethyl methacrylate, and are glued to each other at the edge part. This material for both plate bodies is not only a highly suitable candidate for the cooling cabinet from a viewpoint of raw material cost price and processability, it furthermore produces door panels which will take a largely frameless form and are relatively light-weight. This makes the product highly suitable for a door closure of a cooled display case.

[0008] Various connecting techniques are per se suitable for a mechanical connection between the base member and the grip member of the handle device. The two members can thus for instance be screwed onto each other. A preferred embodiment of the cooling cabinet however has the feature that both members of the handle device can be permanently coupled to each other manually, without tools. For this purpose a particular embodiment of the cooling cabinet according to the invention is characterized in that the base member and the grip member are mutually connected via at least one dovetail connection, comprising a dovetail cavity and a dovetail member receivable therein, which can be slid into each other substantially parallel to the surface and fix the base member and grip member to each other transversely of the surface.

[0009] Owing to such a dovetail connection, the two members can be slid into each other in simple manner and thereby enter into the second mutual connection which already combines the two members in each other transversely of the surface. This connection resists a mutual separation under a load directed transversely of the surface, as is mainly to be expected during use of a handle device. A preferred embodiment of the cooling cabinet according to the invention is characterized in that the

at least one dovetail connection comprises a number of dovetail connections which are distributed over the base member and grip member in a longitudinal direction. Said load is thereby distributed more uniformly over the two members, which enhances the lifespan and strength of the mutual (second) connection.

[0010] A further embodiment of the cooling cabinet is characterized here in that provided between the base member and the grip member are snap means which are able and configured to mutually connect the two members and combine them into the handle device in substantially clearance-free manner. Such a mutual snap connection provides not only for a clearance-free locking of the two members in or on each other, but moreover provides a locking which prevents the two members from then being unintentionally separated from each other. In a further preferred embodiment the cooling cabinet has the feature here that the snap means comprise at least a snap member and a complementary snap cavity, wherein the snap member engages behind a wall of the snap cavity in a mutually connected position, and that a space is provided along which the snap member can be accessed so as to be forced out of the snap cavity. The snap connection, which prevents a separation of the two members of the handle device, can thus if desired be released by forcing the snap member out of the snap cavity so that the two members can then be taken apart.

[0011] In a first particular embodiment the cooling cabinet has the feature according to the invention that the access door comprises a sliding panel which is received for sliding in a guide of the cooling cabinet, and that the grip member comprises a shoulder which extends transversely of the first plate body. The shoulder placed transversely of the surface thus provides an engaging surface whereby a force on the panel can be exerted laterally, parallel to the surface, in order to displace the panel in the guide.

[0012] In a second particular embodiment the cooling cabinet according to the invention is characterized in that the access door comprises a swing panel which is mounted in the cooling cabinet for pivoting about a pivot axis, and that the grip member comprises a handle which maintains a finger space to the first plate body. The handle can thus be gripped in ergonomic manner so as to exert transversely of the surface a force whereby a rotation about the pivot axis can be imparted to the panel.

[0013] The invention also relates to a handle device for a door panel in the above described cooling cabinet, comprising a base member intended and configured to be connected permanently to a surface of a door panel, and a grip member which can be mechanically connected thereto without tools.

[0014] The invention will be further elucidated hereinbelow with reference to an exemplary embodiment and an accompanying drawing. In the drawing:

Figure 1 is a perspective view of a part of an exemplary embodiment of a cooling cabinet ac-

cording to the invention;

Figure 2 is a cross-section through a part of a set of door panels for use in the cooling cabinet of figure 1;

5 Figure 3 is a perspective view of a handle device as applied in the cooling cabinet of figure 1;

Figure 4 is an exploded view of the handle device of figure 3 in top view; and

10 Figure 5 is an exploded view of the handle device of figure 3 in bottom view.

[0015] It is otherwise noted here that the figures are purely schematic and not always drawn to (the same) scale. Some dimensions in particular may be exaggerated to greater or lesser extent for the sake of clarity. Corresponding parts are designated in the figures with the same reference numeral.

[0016] Figure 1 shows schematically a perspective view of a cooling cabinet according to the present invention. Of the cooling cabinet, only a set of mounting strips 10 is drawn in the figure, but the remaining construction is assumed sufficiently known to a person with ordinary skill in the art to not require further elucidation here. In this case the cooling cabinet comprises a door system of four successive door panels 30, although in practice the cooling cabinet can be embodied having from a single door panel to even more than the four door panels 30 shown here. Owing to hinges 40, 50 provided for this purpose on opposite sides the door panels 30 are suspended pivotally about a vertical pivot axis. For this purpose these hinge devices 40, 50 are each mounted in a mounting profile 20, which is in turn mounted permanently on the frame 10 of the cooling cabinet. Mounting profile 20 moreover provides space for a doorstop device which a free side 70 of door panel 30 comes up against resiliently when it is closed in order to thus impose a defined, mutually identical, closed position on door panels 30.

[0017] Such a cooling cabinet can be utilized mainly as vertical cooled display case, as used in many supermarkets and other shops. Owing to the closure by the door system, energy is saved in that the cooled interior space of the climate-controlled cooling cabinet is then no longer in open communication with the surrounding area. The cooling cabinet comprises an interior space over which is usually distributed a number of shelves placed adjacently of and one above the other, wherein the whole space is accessible owing to the outward-swinging doors 30.

[0018] The example is based on double-walled door panels 30, see figure 2, each formed from a first plate body 31 and a second plate body 32, enclosing a thermally insulating cavity 33. The two plate bodies 31, 32 are formed from a transparent plastic, for which use is made in this example of polymethyl methacrylate (PMMA) or polycarbonate. A first of the two plate bodies 31 is completely flat, while the other of the two plate bodies 32 is thermally deformed so that it comprises substan-

tially a central part 35 which transposes all around into a deeper-lying edge part 34. The central part 35 thus lies offset over a step s relative to the edge part 34, wherein the two part 35, 34 transpose gradually into each other via an intermediate area 36. Edge part 34 is adhered over a whole periphery of the door panel 30 to a corresponding edge part of the first plate body 31 by gluing it thereto while exerting an appropriate pressure force. This results in a completely transparent, frameless door panel which counteracts condensation owing to the insulating action of the cavity and provides an unobstructed view of the wares displayed in the cooling cabinet.

[0019] Edge part 34 of door panel 30 moreover provides a stable mounting base for mounting a handle device 60, which enables a user to open and close the relevant door panel. According to the invention, the handle device comprises a base member 61 which is connected permanently to door panel 30 via a first connection. This base member 61 can for instance already be pre-mounted on the first plate body 31 of door panel 30 during manufacture of the door panel, and is therein arranged at the position of the offset in the second plate body 32, i.e. at the position of the peripheral edge part 34. The handle device further comprises a grip member 62 which can be connected to base member 61 without tools by means of a second connection.

[0020] Figure 2 shows an embodiment hereof in detail, wherein a stack of two door panels 30 is shown. An as yet uncovered base member 61 is nestled in an intermediate space between the two panels 30. For the purpose of illustration the other base member 61 is equipped with a grip member 62 in the drawing. This grip member 62 provides together with a shoulder a handle 65 whereby the door panel can be manipulated between a closed position and an opened position. In contrast to base member 61, this grip member 65 is in practice first arranged during final assembly of the door panel in the cooling cabinet so that it is not detrimental to a packing density of successive door panels during storage and transport.

[0021] It is important here that a height h of base member 61 is smaller than the step s between the central part 35 of the formed second plate body 32 and the edge part 34. This step s creates in the stack, see figure 2, an intermediate space which in this case provides space for this base member without having an adverse effect on the packing density of the panels 30 relative to each other. Grip members 62 can be supplied separately and are eventually only mounted on a base member on site.

[0022] For this purpose the two members 61, 62 provide a mutual dovetail connection which can be realized in simple manner by hand and without additional tools. This is shown in further detail in perspective view in figures 3-5. Figure 3 shows here the handle device in assembled form, wherein grip member 62 with shoulder 65 has been slid onto base member 61. Grip member 62 and base member 61 are shown separately in figure 4, wherein the base member is directed with a set of dovetail

fingers 63 toward grip member 62. Grip member 62 in turn comprises on its side directed toward base member 61 complementary dovetail cavities 64 in which the dovetail fingers 63 of base member 61 are axially receivable and engage therein when the two members 61, 62 are slid into each other. As can be seen in the figure, the dovetail connections are uniformly distributed in a longitudinal direction over both member 61, 62 of the handle device in order to thus optimally distribute a force transmission therebetween.

[0023] The two members 61, 62 of the handle device are also both provided with snap means in the form of a set of resilient snap fingers 67 on the base member and a set of snap cavities 68 in grip member 62. If the two members 61, 62 are slid wholly into each other, the fingers 67 snap with their outer end behind an edge of the corresponding snap cavity 68 and thus lock the above described dovetail connection. The fingers 67 remain accessible via a set of openings 66 in the cover of the grip member so that, if desired, this snap connection can be released by freeing the outer end of the relevant finger 67 from the cavity 68 using a tool provided for this purpose, such as a pin. The two members 61, 62 of the device can thus optionally be taken apart if desired.

[0024] Base member 61 can be connected to the flat wall 31 of the door panel in diverse ways. Base member 61 can thus be mounted by means of screws or be glued to the surface of panel 31. Application of a double-sided adhesive tape 80, of which use is made in this example, is particularly practical in this respect.

[0025] Although the invention has been further elucidated above on the basis of only a single exemplary embodiment, it will be apparent that the invention is by no means limited thereto. On the contrary, many variations and embodiments are still possible within the scope of the invention for a person with ordinary skill in the art.

Claims

1. Cooling cabinet comprising a conditioned space with an access door, which access door comprises a first, substantially flat plate body and a substantially plane-parallel second plate body, which second plate body comprises a central part which lies offset over a step relative to a peripheral edge part and encloses with the first plate body a cavity, wherein the access door is provided with a handle device whereby the access door can be manually manipulated between a closed position and an opened position, **characterized in that** the handle device comprises a base member which is connected permanently to a free surface of the first plate body at the position of the edge part of the second plate body, that the handle device comprises a grip member which can be connected to the base member, and that the base member extends no further than a height above the surface of the first plate part, which

height is smaller than the step of the central part of the second plate body relative to the peripheral edge part thereof.

configured to be connected permanently to a surface of the door panel, and a grip member which can be mechanically connected thereto without tools.

2. Cooling cabinet according to claim 1, **characterized in that** the first plate body and the second plate body are formed wholly from a transparent plastic, particularly from polymethyl methacrylate, and are glued to each other at the edge part. 5
10
3. Cooling cabinet according to one or more of the preceding claims, **characterized in that** the base member and the grip member are mutually connected via at least one dovetail connection, comprising a dovetail cavity and a dovetail member receivable therein, which can be slid into each other substantially parallel to the surface and fix the base member and grip member to each other transversely of the surface. 15
4. Cooling cabinet according to claim 3, **characterized in that** the at least one dovetail connection comprises a number of dovetail connections which are distributed over the base member and grip member in a longitudinal direction. 20
25
5. Cooling cabinet according to one or more of the preceding claims, **characterized in that** provided between the base member and the grip member are snap means which are able and configured to mutually connect the two members and combine them into the handle device in substantially clearance-free manner. 30
6. Cooling cabinet according to claim 5, **characterized in that** the snap means comprise at least a snap member and a complementary snap cavity, wherein the snap member engages behind a wall of the snap cavity in a mutually connected position, and that a space is provided along which the snap member can be accessed so as to be forced out of the snap cavity. 35
40
7. Cooling cabinet according to one or more of the preceding claims, **characterized in that** the access door comprises a sliding panel which is received for sliding in a guide of the cooling cabinet, and that the grip member comprises a shoulder which extends transversely of the first plate body. 45
8. Cooling cabinet according to one or more of the claims 1-5, **characterized in that** the access door comprises a swing panel which is mounted in the cooling cabinet for pivoting about a pivot axis, and that the grip member comprises a handle which maintains a finger space to the first plate body. 50
55
9. Handle device for a door panel as applied in the cooling cabinet according to one or more of the preceding claims, comprising a base member intended and

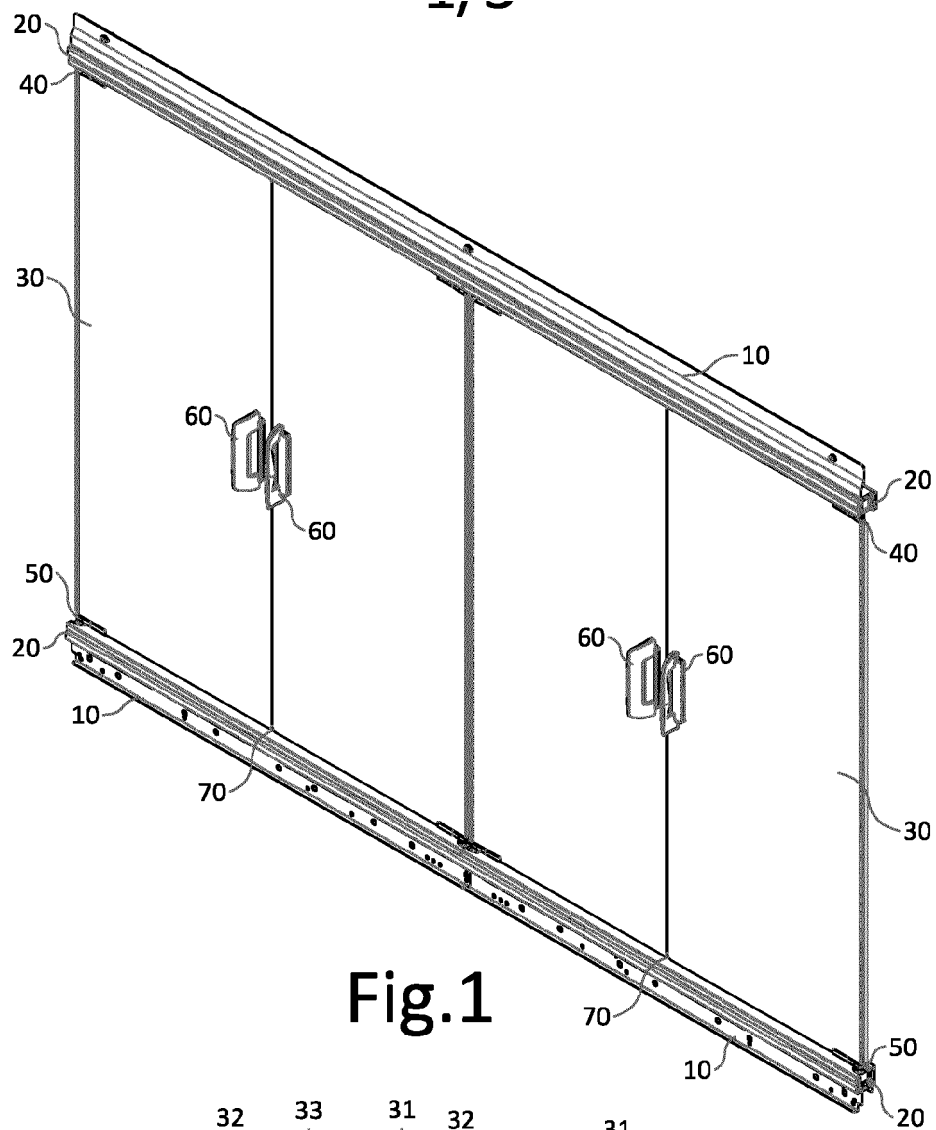


Fig.1

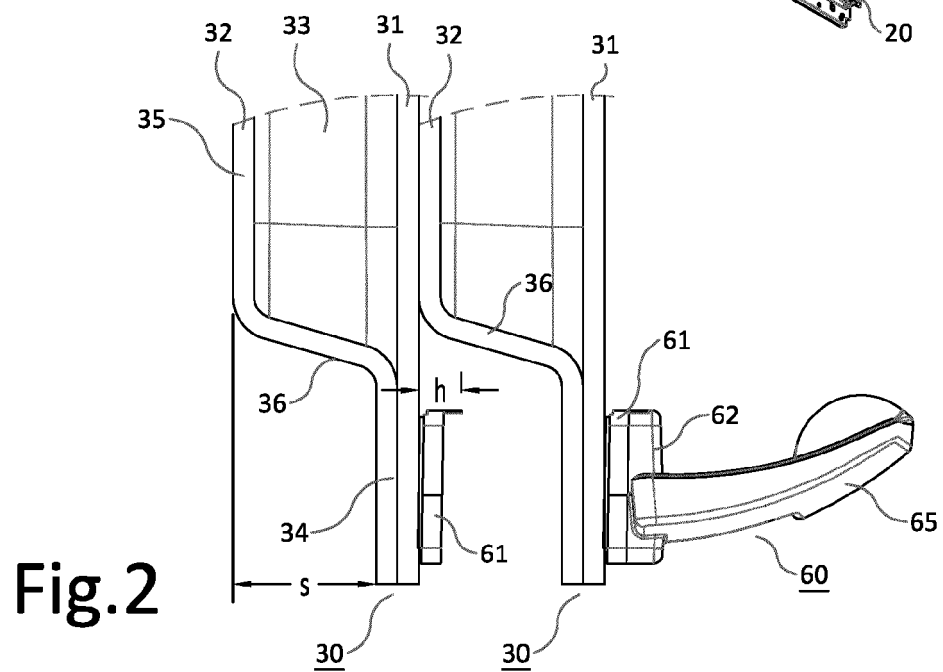


Fig.2

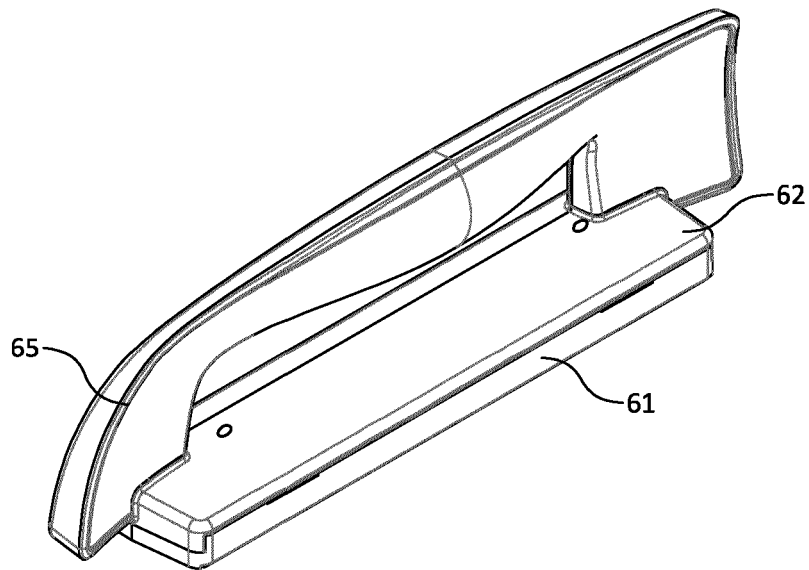


Fig.3

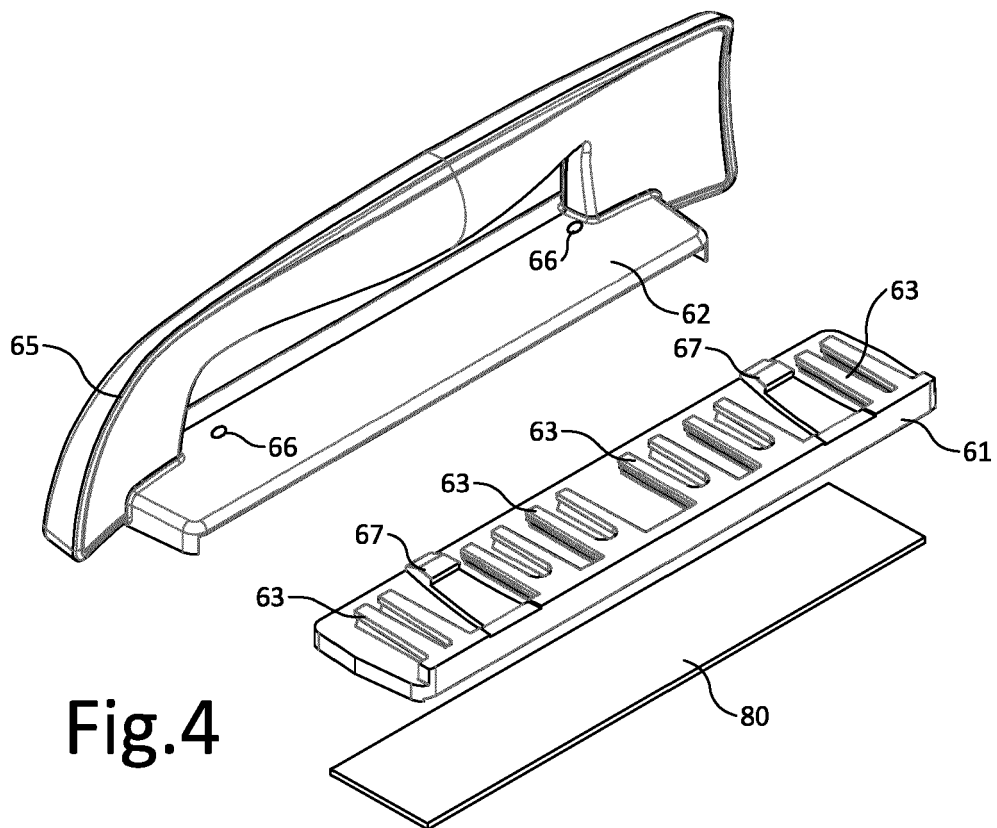


Fig.4

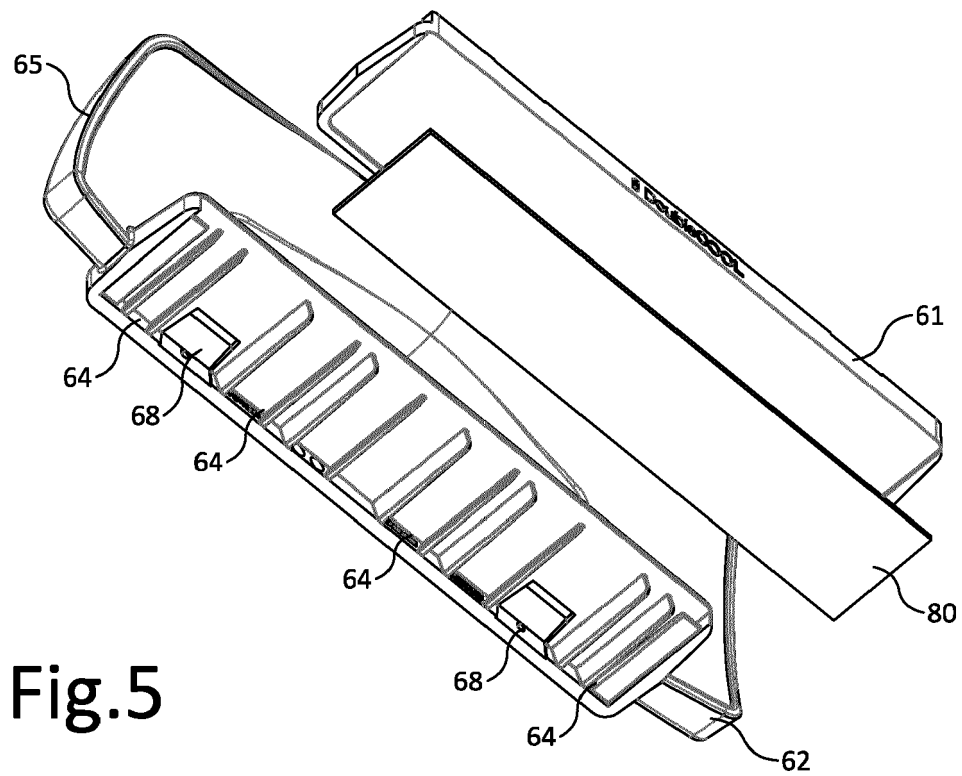


Fig.5



EUROPEAN SEARCH REPORT

Application Number
EP 21 15 6919

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 2019/261785 A1 (ARTWOHL PAUL J [US] ET AL) 29 August 2019 (2019-08-29) * paragraph [0041] - paragraph [0043]; figures 1-7 * * paragraph [0049] * * paragraph [0051] *	1-8	INV. A47B95/02 A47F3/04 E05B1/00 E06B5/00
X	US 2005/161461 A1 (SHIN DONG-IN [KR] ET AL) 28 July 2005 (2005-07-28) * paragraph [0026] - paragraph [0036]; figures 2-4C *	9	
Y		1-8	
A	EP 2 345 859 A2 (LG ELECTRONICS INC [KR]) 20 July 2011 (2011-07-20) * the whole document * * paragraph [0039] *	1,9	
			TECHNICAL FIELDS SEARCHED (IPC)
			A47B E05C E06B A47F E05B F25D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 25 June 2021	Examiner Jacquemin, Martin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

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

EP 21 15 6919

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

25-06-2021

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2019261785 A1	29-08-2019	US 2019261785 A1	29-08-2019
		US 2020060437 A1	27-02-2020
US 2005161461 A1	28-07-2005	KR 20050077470 A	02-08-2005
		US 2005161461 A1	28-07-2005
EP 2345859 A2	20-07-2011	CN 102216707 A	12-10-2011
		EP 2345859 A2	20-07-2011
		WO 2010056017 A2	20-05-2010