

(19)



(11)

EP 4 510 163 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
19.02.2025 Bulletin 2025/08

(51) International Patent Classification (IPC):
H01H 9/04 (2006.01) H01H 23/06 (2006.01)

(21) Application number: **23191992.9**

(52) Cooperative Patent Classification (CPC):
H01H 23/143; H01H 9/04; H01H 23/06;
H01H 2221/066

(22) Date of filing: **17.08.2023**

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

(71) Applicant: **ABB SCHWEIZ AG**
5400 Baden (CH)

(72) Inventors:
• **EWERS, Manfred**
58239 Schwerte (DE)
• **KLOY, Olaf**
42389 Wuppertal (DE)
• **HOLMAN, Jiri**
46015 Liberec (CZ)
• **HABA, Jiri**
46602 Jablonec nad Nisou (CZ)

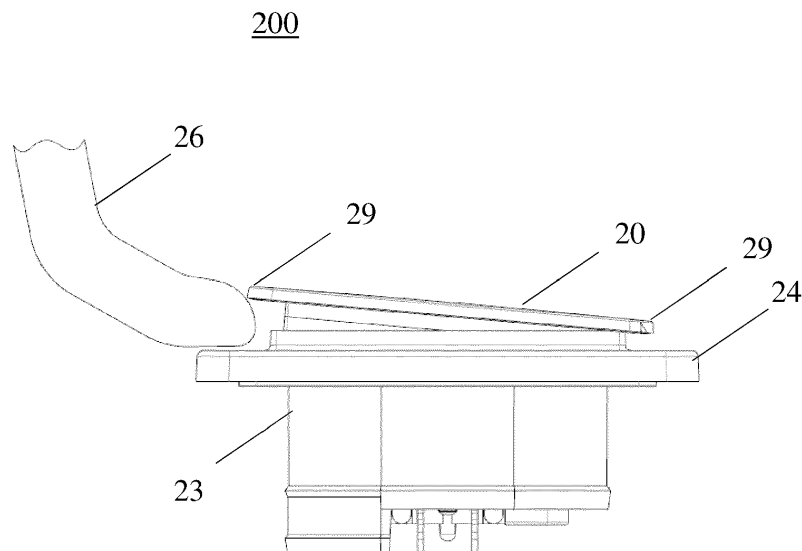
(74) Representative: **Zimmermann & Partner**
Patentanwälte mbB
Postfach 330 920
80069 München (DE)

(54) **SWITCHIG ASSEMBLY FOR DOMESTIC USE**

(57) A switching assembly for domestic use (200) is provided. The switching assembly comprises a design frame (24) and a switch insert (22). The switching assembly further comprises a functional element which is configured to attach the design frame to the switch insert. The switching assembly also comprises a cover element

(20) which is configured to be attached to the functional element and to be actuated by a user. The functional element is configured to prevent interfering objects from entering the switching assembly and to actuate the switch insert upon a user actuating the cover element.

Fig. 5



EP 4 510 163 A1

Description

TECHNICAL FIELD

[0001] The disclosure generally relates to a switching assembly which is configured for domestic use.

BACKGROUND

[0002] Electrical equipment, such as switches, are required to provide a certain degree of protection against interfering objects. Thereby, health and life risks should be prevented. The degree of protection is assessed and defined according to their exposure. For instance, the protection class DIN EN 60529 defines the protection requirements of electrical equipment within households. It requires, among other things, for a water spray test with following high-voltage test to remove all parts of a switching assembly that can be detached without tools.

[0003] Switching assemblies according to the conventional technology comply with the protection class. These switching assemblies usually include a design frame which accommodates a cover element or housing top in a way that it cannot be removed without tools.

[0004] Fig. 1 illustrates a switching assembly 100 for households according to the conventional technology. The switching assembly has a cover element 10 and design frame 12. The dimension of the cover element 10 matches the dimension of the design frame 12 in a piece-and-counter-piece manner. When assembled, the design frame 12 surrounds the cover element 10 in a way which impedes the finger of a user to grasp the cover element 10. Thereby, the switching assembly 100 prevents a user to remove the cover element 10 without the aid of tools. Thus, the switching assembly 100 undergoes the water spray test with the following high-voltage test assembled as shown.

[0005] There are, however, reasons to configure a switching assembly in a way which enables a user to grasp and remove the cover element. For instance, aesthetic and design purposes might lead to dimensions of the cover element that is easily to be grapped. Also, hygiene measures might require a cover element to be easily disposable without the aid of tools.

SUMMARY OF THE DISCLOSURE

[0006] According to an aspect, a switching assembly is provided. The switching assembly is configured for domestic use. The switching assembly comprises a design frame and a switch insert which has a baseplate. The switching assembly further comprises a functional element which is configured to attach the design frame to the switch insert. The switching assembly also comprises a cover element which is configured to be attached to the functional element and to be actuated by a user. The functional element is configured to prevent interfering objects from entering the switching assembly, to prevent

that water inserts the switching assembly and to actuate the switch insert upon a user actuating the cover element.

[0007] The switching assembly may be configured to be used for flush-mounted or for surface-mounted installations.

[0008] Interfering objects, as used herein, may refer to particles or items of environmental or man-made origin. Examples of interfering objects may include water, dust, splash water, condensed water, body parts of persons or animals, textile parts, metal parts, wooden parts, paper parts, or the like.

[0009] Switching assembly, as used herein, may refer to an interface between a domestic electrical network with a load and the cover element. At the network side, the switching assembly may be connected to the conductors of the electrical network via an electrical switch. The electrical switch may comprise electrical contacts to close a respective circuitry of the electrical network. To actuate the switching assembly, as used herein, may refer to actuate the electrical switch.

[0010] Cover element, as used herein, may refer to the outer part of the switching assembly and the interface for the user. The cover element may be adapted to hygienic and/or design requirements in terms of material, size and/or look. For instance, the material of the cover element may be germophobic and/or easily cleanable. It may be surface-tempered such that it is anti-fingerprint and/or reduces ethalitic stains. In instances, the cover element may be adapted to the environment of the switching assembly. It may, for instance, be UV-resistant or water-resistant.

[0011] Functional element, as used herein, refers to a middle piece between the cover element and the switch insert. The cover element may be movably mounted to the functional element while the functional element is permanently attached to the switch insert. The functional element may translate an input to from the cover element to the switch insert. For instance, a mechanical input to the cover element may be translated by the functional element to the electrical switch insert which may be opened or closed electrically, respectively. Herein, the terms functional element and rocker and refer to the same element. The functional element may have clamping and/or snap-in devices on its bottom side, i.e. its side facing the baseplate element. The clamping and/or snap-in devices may be configured to clamp or, respectively, snap-in to an inner rocker of the design frame. Tools, for instance a screw driver, may be necessary to remove the functional element.

[0012] The cover element and the functional element may be formed of the same material. The cover element and the functional element may be formed of different materials. The functional element may be formed of plastic, thermoplastic or resin. The cover element may be formed of disposable material, or biologically degradable material. The cover element may be formed of plastic, thermoplastic, duroplastic, resin, porcelain, pressed fiber boards, plastic, resin, glass, wood, bam-

boo, cardboard, copper, stainless steel, or any combination thereof.

[0013] In embodiments, the cover element of the switch assembly may comprise an outer layer of textile, plastic, paper, wallpaper, or coated paper. The cover element may be varnished. The surface of the cover element may be matt or glossy.

[0014] The baseplate of the design frame may be formed of the same material as the cover material.

[0015] Further features are derivable from the dependent claims.

[0016] In embodiments, the cover element may be configured to close or interrupt an electrical line.

[0017] According to embodiments, the functional element comprises a silicon sealing which is configured to seal the baseplate element.

[0018] The functional element may be a rocker element. The functional elements may be any of a pushbutton element, a wipe element, a slider element, a rotate element, a gesture element, a key element, a dimmer element, or a light sensor element.

[0019] The cover element may include a device, in particular any of a sensor such as a motion sensor, a luminosity sensor, a temperature sensor or a humidity sensor. It may comprise a light insert for ambient illumination. The light insert may include at least one light-emitting diode, LED.

[0020] The cover element and the functional element may form a two-part sub-system for switching assemblies that is adaptable to respective use cases and requirements. The cover element and the functional element are mutually adjusted. The functional element may be dimensioned to be accommodated by the design frame or housing cover when assembled. The design frame or housing cover may surround the functional element leaving no room for the introduction of fingers. Tools may be necessary to remove or to install the functional element.

[0021] The functional element may comprise at least one recess. The functional element may comprise at least one opening. The recess or opening may be configured for installation purposes.

[0022] In embodiments, the cover element may be configured to close the at least one opening of the functional element when the functional element is attached onto the design frame, thereby sealing the combination of the design frame and functional element.

[0023] In embodiments, the cover element may be removably attached to the functional element. The cover element may comprise clips, the clips being configured to engage with the functional element to attach the cover element to the functional element. The functional element may comprise recesses or opening into which the clips of the cover element may engage.

[0024] In embodiments, the functional element may be configured to be permanently attached to the design frame. The functional element may be attached to the design frame by screws.

[0025] In embodiments, the size of the cover element extends beyond the size of the functional element. The cover element may comprise a circumferential flange. The circumferential flange may be a flat protrusion of the cover element in a direction parallel to the cover element. In embodiments, the circumferential flange may extend in a dimension perpendicular to the cover element. The thickness of the circumferential flange may be homogeneous, or heterogeneous. In the latter case, it may include bumps.

[0026] The cover element may be configured to be graspable for a user and to be removeable upon a user grasping the cover element. For instance, the user may position his/her fingertips on the side of the circumferential flange which is turned away from him/her. The user may grasp the circumferential flange and pull the cover element towards him/her.

[0027] The shape of the cover element may be square, rectangular, round, oval, or radially. It may be symmetrical or asymmetrical. The dimension of the cover element may be any of 80 mm * 80 mm, 63 mm * 63 mm, 50 mm * 50 mm.

[0028] The flange of the cover element may have a height in a range of 2 - 20 mm, in particular of any of 5 mm, 7 mm, or 9 mm, in a direction perpendicular to the switching assembly. The functional element may be dimensioned in any of 60 mm * 60 mm, 50 mm * 50 mm, 40 mm * 40 mm, 30 mm * 30 mm.

[0029] The outer edges of the baseplate element may have any dimensions, for example 80 mm * 80 mm, 63 mm * 63 mm or 50 mm * 50 mm.

[0030] The baseplate element may have a height in a range of 10 - 20 mm, in particular of any of 11 mm, 14 mm, 18 mm, in a direction perpendicular to the switching assembly.

[0031] When assembled, the flange of the cover element may be spaced apart from the baseplate element in a direction perpendicular to the switching assembly. The space between the baseplate element and the cover element may allow for movement of the cover element and/or positioning of fingers. The space between the baseplate element and the cover element may be in a range of 3 - 13 mm, in particular any of 5 mm, 7 mm, 9 mm, 11 mm.

[0032] In embodiments, the switching assembly may comprise a flush-mounted element. The baseplate element of the switching assembly may be configured to be permanently attached to the flush-mounted element.

[0033] The switching assembly may be configured to comply with the protection grade DIN EN 60529. This means that even though the cover element has to be removed, the remaining switching assembly still passes a high-voltage test. In embodiments, the switching assembly meets the regulations for touch protection.

BRIEF DESCRIPTION OF THE DRAWINGS

[0034]

- Fig. 1a illustrates a schematic diagram of a switching assembly according to prior art in assembled form;
- Fig. 1b illustrates a schematic diagram of a switching assembly according to prior art in disassembled form;
- Fig. 1c illustrates a schematic diagram of a switching assembly according to prior art;
- Fig. 2 illustrates a schematic diagram of a switching assembly in assembled form according to an embodiment;
- Fig. 3 illustrates a schematic diagram of the switching assembly of Fig. 2 in partly disassembled form;
- Fig. 4 illustrates a schematic diagram of the switching assembly of Fig. 2 in disassembled form;
- Fig. 5 illustrates a schematic diagram of the switching assembly from a side perspective;
- Fig. 6 illustrates a schematic diagram of a cover element and a functional element according to an embodiment;
- Fig. 7 illustrates a schematic diagram of a cover element mounted to a functional element according to an embodiment.

DESCRIPTION OF EMBODIMENTS

[0035] In the following, embodiments are set forth to describe specific examples presented herein. The person skilled in the art will recognize that one or more other examples and/ or variations of these examples may be practiced without all the specific details outlined below. Also, well known features may not be described in detail so as not to obscure the description of the examples herein. For the ease of illustration, like reference numerals are used in different figures to refer to the same elements or additional instances of the same element. Features illustrated or described as part of one embodiment can be used on or in conjugation with any other embodiment to yield yet a further embodiment.

[0036] Referring now to the drawings, Fig. 1b presents a schematic diagram of a switching assembly 100 according to prior art in disassembled form. As exemplarily illustrated with Fig. 1b, the switching assembly 100 may be a rocker switching assembly. The switching assembly 100 may have a cover element 10 and a design frame 12. The dimension of the cover element 10 may match the dimension of the design frame 12 in a piece-and-counter-piece manner. When assembled, as shown in Fig. 1a, the design frame 12 may surround the cover element 10 in a way which may impede the fingers of a user to grasp the cover element 10. Thereby, the switching assembly 100 may prevent a user to remove the cover element 10 without the aid of tools.

[0037] A switching interface 18 of the switch insert may be designed in that way that a rocker with design features can be fixed on. The switching interface 18 may be mounted tiltable to the switching insert. When the cover

element 100 is actuated by a user, the switching interface 18 may close or open the electrical circuit of the domestic network and a load.

[0038] Now referring to Fig. 1c which also illustrates a schematic diagram of a switching assembly 100 according to prior art in a side perspective. The cover element 10 may integrated to the design frame 12 thereby preventing fingers 19 of a user to grasp and remove the cover element 10 of the switching assembly 100.

[0039] Fig. 2 illustrates a schematic diagram of a switching assembly 200 in assembled form according to embodiments described herein. The switching assembly 200 may have a cover element 20, and a design frame 24 with a baseplate 22.

[0040] Now referring to Fig. 3 which illustrates a schematic diagram of the switching 200 in partly disassembled form. Here, the cover element 20 is removed allowing to view the functional element 28. The functional element 28 may be fixed to the switching interface 18 of the switch insert during the water spray test. The functional element 28 may have openings 27 for re-installation purposes.

[0041] Fig. 4 illustrates a schematic diagram of the switching assembly 200 in disassembled form. The cover element 20 may be snapped onto the functional element 28. The functional element 28 may be dimensioned to fit into a recess of the design frame 24 and to be permanently fixed to the insert via the switching interface 18. The functional element 28 may have openings 27. Openings 27 may be configured to allow a screwdriver to enter and/or to allow to solve a rear detent. Openings 27 may be configured to allow clamping and/or snap-in devices to be unlocked, for instance with a screw driver.

[0042] Fig. 5 illustrates a schematic diagram of the switching assembly 200 from a side perspective. The cover element 20 may have a circumferential flange 29 allowing the fingers 26 of a user to be positioned on the backside of the cover element 20. The user may position his/her fingers between the circumferential flange 29 and the baseplate element 22. A user may apply a lever to the circumferential flange 29 and remove the cover element 20 from the switch insert. The circumferential flange 29 of the cover element may be spaced apart from the baseplate element 22 in a direction perpendicular to the switching assembly. The space may allow for movement of the cover element 20 and/or positioning of fingers. The switching assembly 200 may further comprise a soft sealing 23, for instance made of silicon.

[0043] Fig. 6 illustrates a schematic diagram of a cover element 20 and a functional element 28 according to an embodiment. The functional element 28 may have protrusions 32 to permanently fix the functional element 28 to a switching assembly and to translate an actuation of the switching assembly into an input to an electric switch. The protrusions 32 may accommodate screws. The protrusions may comprise clamping and/or snap-in devices 32. The clamping and/or snap-in devices 32 may be configured to clamp or, respectively, snap-in to an inner rocker

(not shown) of the design frame. The functional element 28 may have a recess or slot 30 or hole for installation of a status indicator or illumination device. The cover element 20 may have clips 34 to clip the cover element 20 to the functional element 28. Tools, for instance a screw driver, may be necessary to remove the functional element.

[0044] Fig. 7 illustrates a schematic diagram of a cover element 20 mounted to a functional element 28 according to an embodiment. The cover element 20 may have a circumferential flange 29 which may extend beyond the functional element 28 a dimension parallel to the cover element 20. The circumferential flange 29 may have a homogeneous thickness.

Claims

1. A switching assembly (200) for domestic use, comprising:

- a design frame (24),
- a switch insert (22),
- a functional element (28) configured to attach the design frame to the switch insert,
- a cover element (20) configured to be attached to the functional element and to be actuated by a user,

wherein the functional element is configured to prevent interfering objects from entering the switching assembly and is configured to actuate the switch insert upon a user actuating the cover element.

2. The switching assembly of claim 1, wherein the functional element comprises a silicon sealing configured to seal the switching assembly.
3. The switching assembly of any of the preceding claims, wherein the functional element comprises at least one recess.
4. The switching assembly of any of the preceding claims, wherein the functional element comprises at least one opening (27).
5. The switching assembly of the preceding claim, wherein the cover element is configured to close the at least one opening of the functional element when the functional element is attached onto the design frame, thereby sealing the combination of design frame and functional element.
6. The switching assembly of any of the preceding claims, wherein the functional element is a rocker element.
7. The switching assembly of any of the preceding claims, wherein the cover element is removably

attached to the functional element.

8. The switching assembly of any of the preceding claims, wherein the size of the cover element extends beyond the size of the functional element.
9. The switching assembly of any of the preceding claims, wherein the cover element comprises a circumferential flange (29).
10. The switching assembly of any of the preceding claims, wherein the cover element is configured to be graspable for a user and to be removeable upon a user grasping the cover element.
11. The switching assembly of any of the preceding claims, wherein the cover element comprises clips (34), the clips being configured to engage with the functional element to attach the cover element to the functional element.
12. The switching assembly of any of the preceding claims, wherein the functional element is configured to be permanently attached to the design frame.
13. The switching assembly of any of the preceding claims, further comprising a flush-mounted element, wherein the switch insert is configured to be permanently attached to the flush-mounted element.
14. The switching assembly any of the preceding claims, wherein the cover element is configured to pass a momentum onto the functional element upon a user actuating the cover element.
15. The switching assembly of any of the preceding claims, wherein the switching assembly is configured to comply with DIN EN 60529.

Fig. 1a

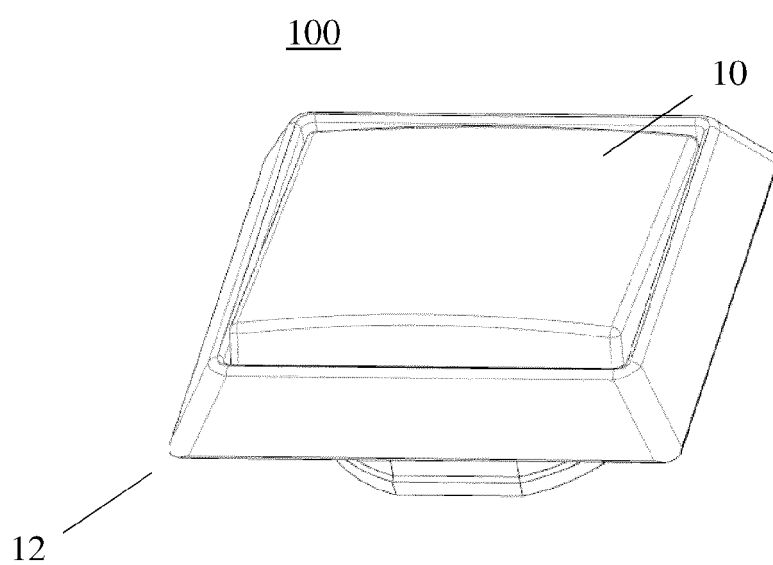


Fig. 1b

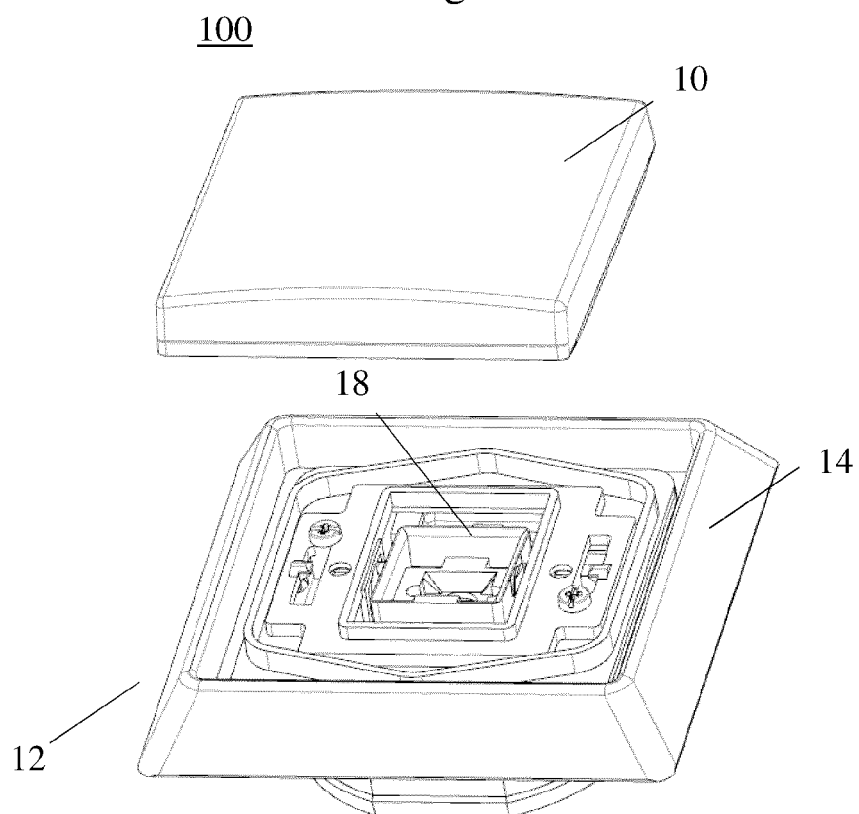


Fig. 1c

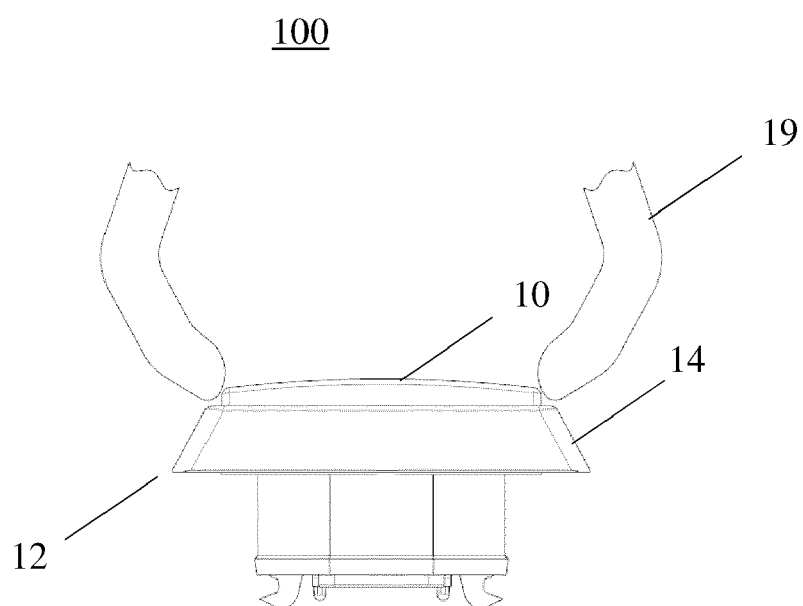


Fig. 2

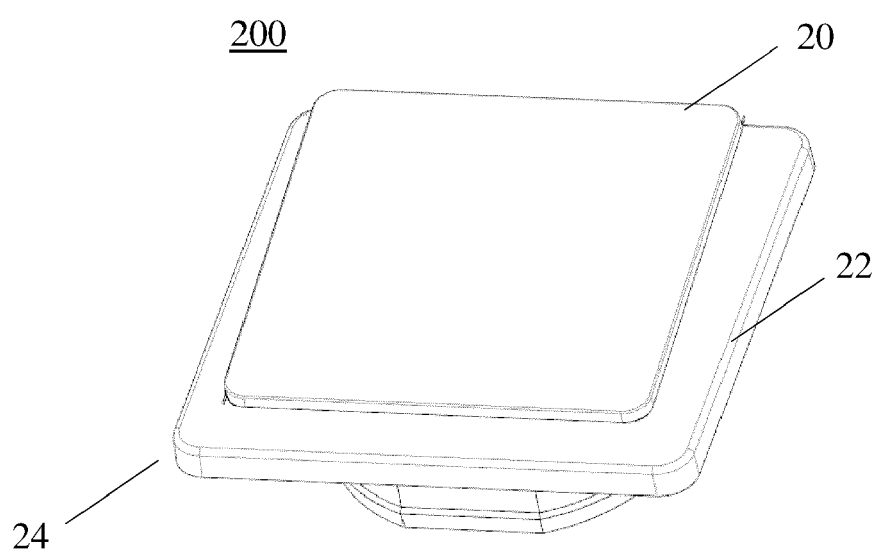


Fig. 3

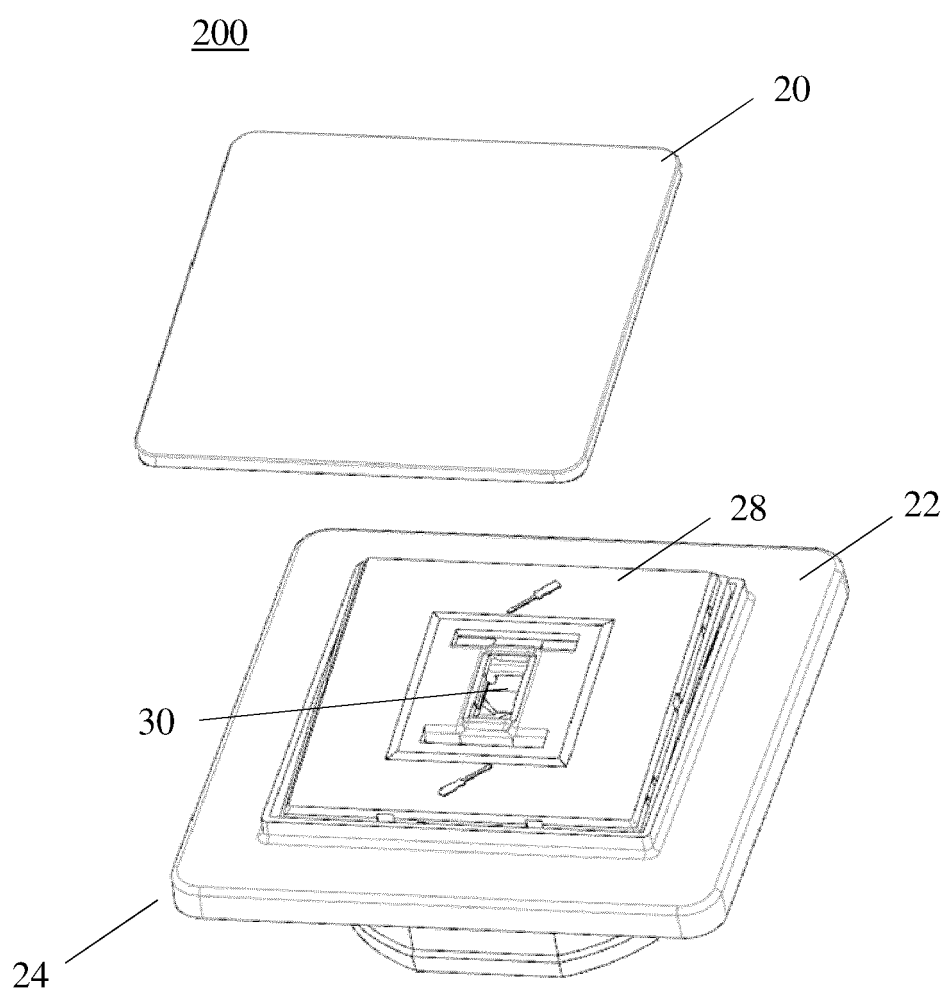


Fig. 4

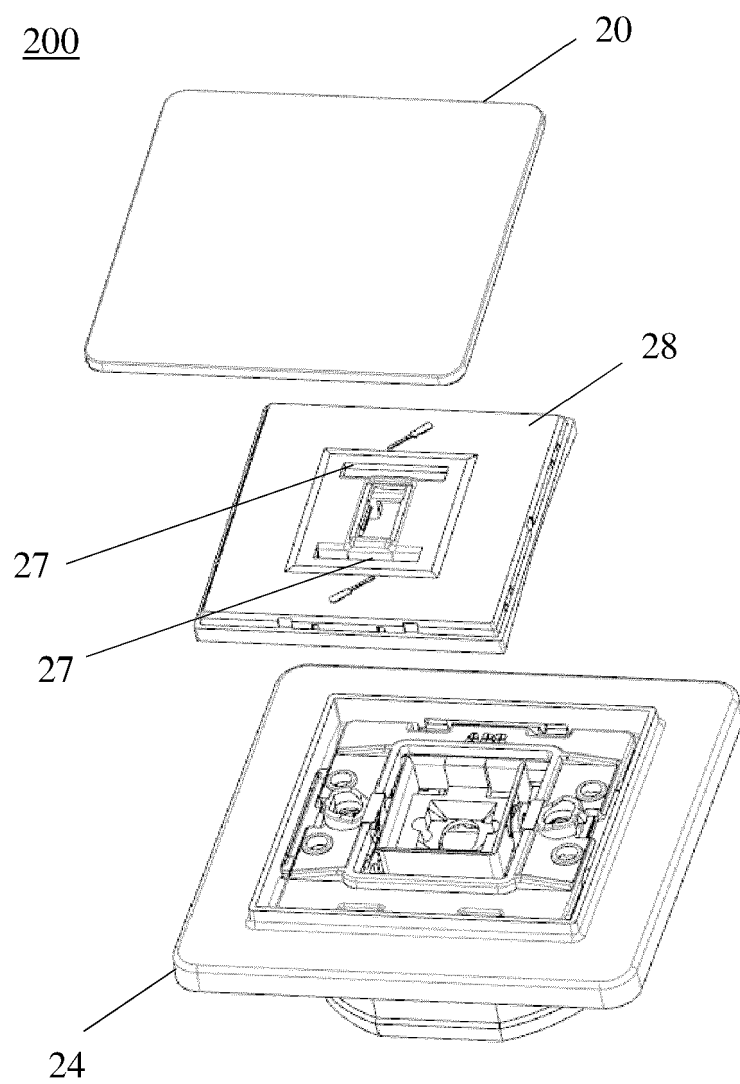


Fig. 5

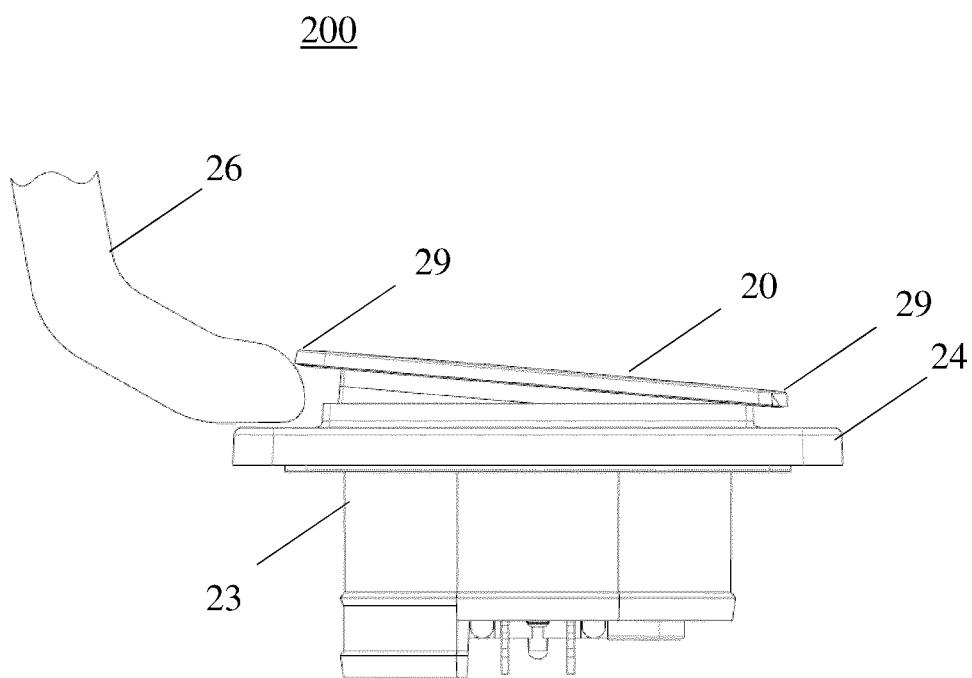
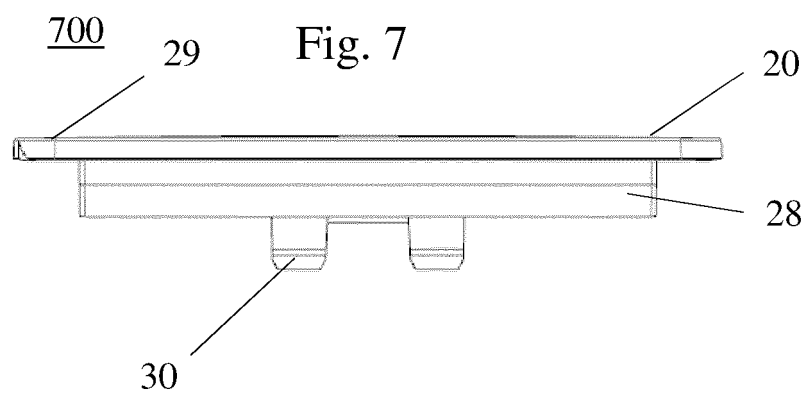
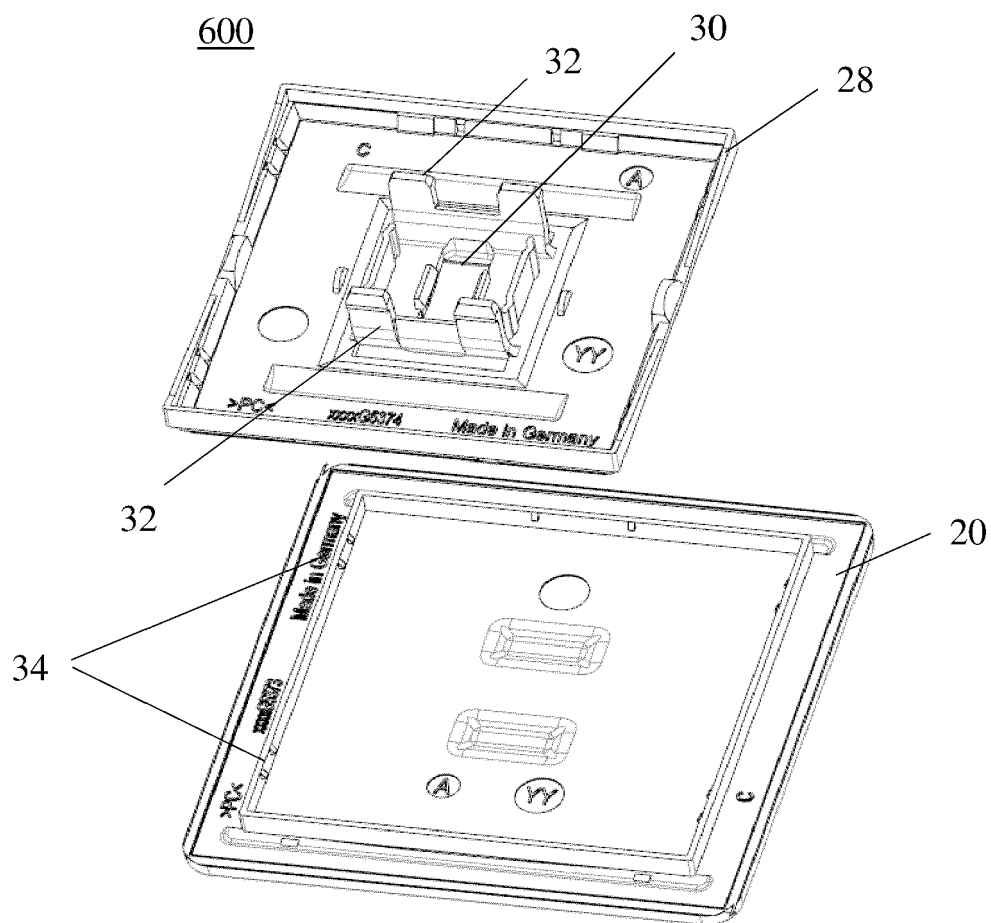


Fig. 6





EUROPEAN SEARCH REPORT

Application Number

EP 23 19 1992

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 833 420 B1 (GIERSIEPEN GIRA GMBH [DE]) 13 November 2002 (2002-11-13)	1-5, 7-10, 12-14 11,15	INV. H01H9/04 H01H23/06
Y	* paragraph [0010] - paragraph [0019]; claims 1-11; figures 1-7 *		
X	US 11 545 315 B1 (AARON STEPHEN [US] ET AL) 3 January 2023 (2023-01-03) * column 6, line 22 - column 11, line 56; figures 1-15 *	1,6-10, 14	
X	US 6 355 885 B1 (RINTZ WILLIAM J [US] ET AL) 12 March 2002 (2002-03-12) * column 5, line 2 - column 28, line 17; figures 1-48 *	1,6, 8-10,12	
Y	CN 116 031 083 A (GIERSIEPEN GIRA GMBH) 28 April 2023 (2023-04-28) * paragraph [0057]; figures 1,2,11 *	11	
Y	DE 10 2019 206287 A1 (GEZE GMBH [DE]) 5 November 2020 (2020-11-05) * paragraph [0024] - paragraph [0026]; figures 1-5 *	11,15	TECHNICAL FIELDS SEARCHED (IPC) H01H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 January 2024	Examiner Drabko, Jacek
CATEGORY OF CITED DOCUMENTS		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	
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			

EPO FORM 1503 03.82 (P04C01)

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

EP 23 19 1992

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.

12-01-2024

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0833420 B1	13-11-2002	AT E227895 T1	15-11-2002
		CZ 286021 B6	15-12-1999
		DE 29616958 U1	14-11-1996
		EP 0833420 A2	01-04-1998
US 11545315 B1	03-01-2023	US 11545315 B1	03-01-2023
		WO 2023141008 A1	27-07-2023
US 6355885 B1	12-03-2002	NONE	
CN 116031083 A	28-04-2023	CN 116031083 A	28-04-2023
		EP 4174889 A1	03-05-2023
DE 102019206287 A1	05-11-2020	CN 113631789 A	09-11-2021
		DE 102019206287 A1	05-11-2020
		EP 3963163 A1	09-03-2022
		KR 20210152570 A	15-12-2021
		SG 11202109994S A	28-10-2021
		WO 2020221538 A1	05-11-2020

EPO FORM P0459

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