



(11)

EP 2 851 916 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
09.11.2016 Bulletin 2016/45

(51) Int Cl.:
H01H 9/08 (2006.01) **H01H 9/18** (2006.01)
H01H 13/83 (2006.01) **H01H 9/16** (2006.01)

(21) Application number: **14380029.0**

(22) Date of filing: **23.09.2014**

(54) ARRANGEMENT OF PUSHBUTTON SWITCHES WITH A PROGRAMMABLE DISPLAY

ANORDNUNG AUS TASTENSCHALTERN MIT PROGRAMMIERBARER ANZEIGE

AGENCEMENT D'INTERRUPTEURS BOUTONS-POUSOIRS AVEC UN AFFICHAGE
PROGRAMMABLE

(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**

(30) Priority: **23.09.2013 ES 201331096 U**

(43) Date of publication of application:
25.03.2015 Bulletin 2015/13

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Description

Field of the art

[0001] The present invention relates to an arrangement of pushbutton switches with a programmable display, in particular a display with OLED (short for "organic light-emitting diode") diodes included in the push-button head and supported on a push-button actuator member having limited linear shift play inside an enclosure body that has an affixed micro switch, which is activated by said linear shift when the push-button is operated.

[0002] The invention provides, to that effect, a support structure of a plurality of pushbutton switches that are coupled to a printed circuit board forming a functional arrangement, so that any of the pushbutton switches of the arrangement may be easily replaced without the need of handling connection cables.

[0003] Each of the pushbutton switches further comprises an enclosure body made of a light-conducting material that is associated in said support structure to lighting LED diodes so as to provide lighting to a frame of said enclosure body. Said LED diodes may in turn be connected via said printed circuit board to a control unit for their dynamic activation, generating movement effects in the luminous aureole provided.

State of the prior art

[0004] Switching devices that include a display in their head are known from documents EP-A1-1347363 and EP-A1-1589551.

[0005] Patent applications EP-A1- 2110833 and EP-A1- 2211361 describe such pushbutton switches with and OLED display.

[0006] US-B1-8410383 describes, as prior art, a plurality of pushbutton switches grouped together in a unit via a support structure according to the general characteristics defined in the preamble of claim 1, i.e. formed by an assembly panel, a printed circuit board and a shielding plate fixed to one another in a sandwich arrangement, but where each pushbutton switch is coupled to the support structure through auxiliary boards and support frames attached to the printed circuit board, so that when there is a need of removing one of the pushbutton switches, for example in order to substitute it because of malfunctioning, such a substitution task is a very laborious task, because in order to carry it out it is necessary, first, uncoupling the whole support structure so that the assembly panel can be removed and, then, individually uncoupling the damaged pushbutton switch from its respective support frame.

[0007] In connection with the latter background art, the invention proposes a support structure and integration means of a plurality of push-buttons in an assisting and/or connecting printed circuit board (it may include local control units) that involve a remarkable simplification with respect to said background art and an improvement of

the capabilities, especially with respect to the mentioned substitution of a damaged pushbutton switch, being possible to perform such a task in a simple manner without having to uncouple the whole support structure but only individually the pushbutton switch.

[0008] Document US 2008073190 A1 discloses a push button switch for use in an amusement or gaming machine and an arrangement of such push button switches. The push button switch includes an enclosure body to which a micro switch is affixed, an actuator member having limited linear shift play inside the enclosure body, the micro switch being activated by said linear shift when the push button is operated, and a lamp or a programmable display attached to the enclosure body for illuminating the actuator member. The micro switch and the lamp or programmable display are fixed to terminals projecting from the enclosure body. The enclosure body has a bezel and immobilizing means. The arrangement of push button switches includes an assembly panel having a plurality of openings for arranging therethrough the enclosure body of each push button switch, and a printed circuit board including control elements for controlling the micro switch and the lamp or programmable display of each push button switch and connection elements to which the terminals of each push button switch are connected. The enclosure body of each push button switch is attached to the assembly panel by the immobilizing means and with the bezel supported on the assembly panel.

Disclosure of the invention

[0009] According to what has been set forth above, the invention is intended for grouping an arrangement of pushbutton switches with a programmable display in an operating unit or block, each of which comprises a display, visible from outside, installed in an actuator member of the push-button that exhibits limited linear shift play inside an enclosure body that has an affixed micro switch, which is activated by said linear shift when the push-button is operated. Said display is covered by a lens and by a transparent cover.

[0010] In order to group a plurality of pushbutton switches with a display and even other standard pushbutton switches, a support structure has been provided comprising:

- an assembly panel with a plurality of openings for arranging there through the enclosure body of each pushbutton switch of the arrangement, with the support of a bezel on the sides of said opening, on said panel;
- a printed circuit board wherein connection and/or control elements of said display and micro switches of said plurality of pushbutton switches are arranged;
- a shielding plate of said printed circuit board; and
- separating or spacing columns and attachment means linking said panel, printed circuit board and plate in an overlapping arrangement.

[0011] According to the proposal of this invention, the enclosure body of each pushbutton switch comprises, in turn:

- an appendix intended to be arranged through through-openings defined in said panel, printed circuit board and plate, said through-openings facing each other (for example being vertically aligned) in said support structure; and

[0012] the enclosure body includes, attached or integrated thereto, a first insertion connector that is opposite to and engaged with, in an assembled situation, a second connector provided and arranged in said printed circuit board for connecting the corresponding display and the micro switch.

[0013] In addition, removable immobilizing means of said appendix with respect to said shielding plate have been provided, through which each enclosure body is attached to said support structure. According to a preferred embodiment, said immobilizing means comprise a nut with a coupling configuration to be coupled to said tubular shaft by a respective complementary coupling configuration integrated with or attached to the tubular shaft, so that said nut is tight against said shielding plate, suitably securing the pushbutton switch. Said coupling configurations are, for a preferred embodiment, bayonet coupling configurations, although, for other embodiments, less preferred, other kind of coupling configurations are possible, such as those formed by complementary screw threads.

[0014] The printed circuit board includes one or several LEDs that, in an assembled situation, are close to walls of said enclosure body of each of the pushbutton switches, said enclosure being made of a light-conducting material so that the lighting of said LEDs is transferred through the enclosure body to said bezel above the panel.

[0015] Other characteristics of the invention will appear in the following detailed description of some embodiments.

Brief description of the drawings

[0016] The above and other advantages and characteristics will be more fully understood from the following detailed description of embodiments in reference to the attached drawings, which are to be taken by way of illustration, not limitation, wherein:

Fig. 1A shows an axonometric view of an arrangement of pushbutton switches with a programmable display included in a support structure, the side provided with the push-buttons being visible;

Fig. 1 B shows an axonometric view of an arrangement of pushbutton switches with a programmable display included in a support structure, the side provided with the shielding plate and the securing nuts of the push-buttons being visible;

Fig. 2 is an exploded axonometric view wherein the elements conforming the support structure are shown, as well as an exploded view of the first push-button with its main components, a second push-button with the elements conforming the actuator member being mounted, while it is shown removed from the enclosure body, and a third fully mounted push-button, shown removed from the support structure;

Fig. 3 shows an enlarged exploded axonometric view of all the main components of the push-button, together with a portion of the printed circuit board provided with LEDs wherein said push-button is included;

Fig. 4 shows an enlarged cross-sectional view of a push-button engaged with the support structure.

Detailed description of embodiments

[0017] The invention proposes an arrangement of pushbutton switches with a programmable display, wherein, said display 54, visible from the outside, is arranged in an actuator member of the push-button 58 having limited linear shift play inside an enclosure body 50 that includes an affixed micro switch, which is activated by said linear shift when the push-button is operated.

[0018] Said arrangement of pushbutton switches is formed by means of a support structure 70 that comprises, as shown in Figures 1 and 2:

- an assembly panel 10 provided with a plurality of openings 11, 12 for arranging there through the enclosure body 50 of each pushbutton switch of the arrangement, with the support of a bezel 50a on said panel 10;
- a printed circuit board 20 wherein connection and/or control elements of said display 54 and switch are arranged;
- a shielding plate 30 of said printed circuit board 20; and
- separating columns 40 41 and attachment means 42 linking said panel 10, printed circuit board 20 and plate 30 in an overlapping arrangement.

[0019] According to this invention, the enclosure body 50 of each of the pushbutton switches comprises, as shown in Figure 3 and especially in Figure 4:

- at least one appendix being arranged through openings 11, 23, 31 defined in said panel 10, printed circuit board 20 and plate 30, said openings 11, 23, 31 facing each other in said support structure 70, as shown in Figure 4; and
- at least one connector 57 attached to the enclosure body 50 that is opposite to and engaged with, in an assembled situation, a connector 21 provided and arranged in the printed circuit board 20 for connecting said display 54 and said micro switch 16.

[0020] Each enclosure body 50 is attached to the support structure 70 by removable immobilizing means of said appendix relative to said shielding plate 30.

[0021] The enclosure body 50, according to a structure known per se, has a cup shaped configuration that incorporates a connector 56 in its bottom for a flexible, flat, multifilament conductor 55 of said display 54, and said appendix is made up by a tubular shaft 51 that extends from the bottom of the enclosure body 50.

[0022] For the embodiment shown in Figure 4, the enclosure body 50 comprises a second connector 56a for the connection of the micro switch 16, being both connectors 56, 56a electrically connected to the connector 57.

[0023] For another embodiment, not illustrated, at the bottom of the enclosure body 50 a small printed circuit board is arranged, to which the connector 56 and the micro switch 16 are attached (the latter, directly or through the second connector 56a), and their metallic terminals are welded to conductive tracks of the small circuit printed board, said small printed circuit board being configured and arranged to electrically connect the connector 57 with the connector 56 (and thus with the display 54) and with the micro switch 16.

[0024] On the other hand, although not shown in the appended figures, two connectors are arranged at the lower face of the printed circuit board 20, one for electrical supply thereof and the other for bidirectional data communication (such as a USB connector) with a "host" of central computer, for example of an amusement machine, allowing the hot connexion/disconnection, i.e. the hot swap, of the whole assembly with respect to said host, to which purpose the latter must be prepared, both at a hardware (electrical protection devices) and at a software level.

[0025] Said immobilizing means comprise, in a preferred embodiment, a nut 60, for instance a bayonet coupling one, associable to said tubular shaft 51, which includes a complementary coupling configuration, so that said nut 60 is tight against said shielding plate 30.

[0026] The printed circuit board 20 includes one or several LEDs 22 that, in an assembled situation, are close to walls of said enclosure body 50, which is made of a light-conducting material so that the lighting of said LEDs is transferred through the enclosure body 58 to said bezel 50a above the panel 10. This printed circuit board and/or an auxiliary board includes a microcontroller 25 (in figure 2 it is the auxiliary board 24 the one which includes the microcontroller 25) governing all the displays 54 and the operation of the lighting LEDs 22 of the pushbutton switches of the arrangement. The printed circuit board 20 further includes, in its face opposite the push-buttons, connectors for connecting other standard pushbutton switches lacking an OLED display.

[0027] The display 59 of each pushbutton switch is made up by a set of organic light-emitting diodes OLEDs, and the control device of each display is arranged on the printed circuit board 20 or on said auxiliary board 24 con-

nected to said printed circuit board 20, for example through a connector 24a of the auxiliary board 24 to be coupled to a complementary connector (not shown) of the printed circuit board 20. The display 54 is retained inside an actuator body 58 (constituting the above called actuator member 58) by a support 59 presenting jambs that are clamped by side elastic pins of the push-button actuator 58. The actuator body 58 comprises a first housing for said display 54 and a second housing above thereof for a lens 53 and a cover 52.

[0028] As can be seen in Fig. 2, the panel 10 comprises openings 11, 12 of at least two sizes so as to house push-button bodies 50 of different dimensions.

Claims

1. An arrangement of pushbutton switches with a programmable display, each pushbutton switch comprising:

- an enclosure body (50);
- a micro switch (16) affixed to said enclosure body (50);
- an actuator member (58) having limited linear shift play inside the enclosure body (50), said micro switch (16) being activated by said linear shift when the push-button is operated; and
- a programmable display (54) arranged, visible from the outside, in the enclosure body (50),

said arrangement of pushbutton switches including a support structure (70) comprising:

- an assembly panel (10) provided with a plurality of openings (11, 12) for arranging therethrough the enclosure body (50) of each push-button switch of the arrangement, the enclosure body (50) being attached to said support structure (70) by immobilizing means with the support of a bezel (50a) on said assembly panel (10); and
- a printed circuit board (20) wherein connection and/or control elements of said programmable display (54) and micro switch (16) are arranged wherein each pushbutton switch further comprises:
 - at least one connector (57) attached to the enclosure body (50) that is opposite to and engaged with, in an assembled situation, a connector (21) provided and arranged in the printed circuit board (20) for connecting said programmable display (54) and said micro switch (16);

characterised in that said support structure (70) further comprises:

- a shielding plate (30) of said printed circuit board (20);

- separating columns (40) (41) and attachment means (42) linking said assembly panel (10), said printed circuit board (20) and said shielding plate (30) in an overlapping arrangement,
- wherein the assembly panel (10), the printed circuit board (20) and the plate (30) have respective through-openings facing each other, and **in that** each of the pushbutton switches further comprises:
- at least one appendix attached to the enclosure body (50) and arranged through said through-openings (11, 23, 31) of the assembly panel (10), the printed circuit board (20) and shielding plate (30);

and **in that**:

- the programmable display (54) of each pushbutton switch is arranged in the actuator member (58); and
 - said removable immobilizing means attach said appendix of each enclosure body (50) to the support structure (70) with respect to said shielding plate (30).
2. The arrangement of pushbutton switches according to claim 1 **characterised in that** said enclosure body (50) has a cup shaped configuration that incorporates a connector (56) in its bottom for a flexible, flat, multifilament conductor (55) of said display (54), and a second connector (56a) for connecting said micro switch (16), and **in that** said appendix is made up by a tubular shaft (51) that extends from the bottom of the enclosure body (50).
 3. The arrangement of pushbutton switches according to claim 2 **characterised in that** said immobilizing means comprise a nut (60) with a coupling configuration to be coupled to said tubular shaft (51) by a respective complementary coupling configuration integrated with or attached to the tubular shaft (51), so that said nut (60) is tight against said shielding plate (30).
 4. The arrangement of pushbutton switches according to claim 3, **characterised in that** said complementary configurations are bayonet coupling configurations.
 5. The arrangement of pushbutton switches according to claim 1, **characterised in that** said printed circuit board (20) includes one or several LEDs (22) that, in an assembled situation, are close to walls of said enclosure body (50), which is made of a light-conducting material so that the lighting of said LEDs (22) is transferred through the enclosure body (50) to said bezel (50a) above the panel (10).

6. The arrangement of pushbutton switches according to claim 1 **characterised in that** said display (54) is made up by a set of organic light-emitting diodes OLEDs, and **in that** the control device of each display is arranged on the printed circuit board (20) or on an auxiliary board (24) connected to said printed circuit board (20).
7. The arrangement of pushbutton switches according to claim 1 **characterised in that** said display (54) is retained inside an actuator body (58), which constitutes said actuator member (58), by a support (59) presenting jambs that are clamped by side elastic pins of the push-button actuator body (58).
8. The arrangement of pushbutton switches according to claim 1 **characterised in that** said actuator body (58) comprises a first housing for said display (54) and a second housing above thereof for a lens (53) and a cover (52).
9. The arrangement of pushbutton switches according to claim 1 **characterised in that** said printed circuit board (20) includes connectors for connecting other standard pushbutton switches lacking an OLED display.
10. The arrangement of pushbutton switches according to claim 1 **characterised in that** said assembly panel (10) comprises openings (11, 12) of at least two sizes so as to house push-button bodies (50) of different dimensions.
11. The arrangement of pushbutton switches according to claim 1 **characterised in that** said printed circuit board (20) and/or said auxiliary board (24) includes a microcontroller (25) governing all the displays (54) of the pushbutton switches of the arrangement.

Patentansprüche

1. Anordnung aus Tastenschaltern mit programmierbarer Anzeige, wobei jeder Tastenschalter Folgendes umfasst:
 - einen Gehäusekörper (50);
 - einen Mikroschalter (16), der an dem genannten Gehäusekörper (50) befestigt ist;
 - ein Aktuatorelement (58) mit begrenztem Spiel für eine lineare Bewegung innerhalb des Gehäusekörpers (50), wobei der genannte Mikroschalter (16) durch die genannte lineare Bewegung aktiviert wird, wenn die Taste betätigt wird und;
 - eine programmierbare Anzeige (54), welche im Gehäusekörper (50) angeordnet ist, so dass sie von außen sichtbar ist,

wobei die genannte Anordnung aus Tastenschaltern eine Stützstruktur (70) enthält, welche Folgendes umfasst:

- ein Montagepaneel (10), welches mit einer Vielzahl von Öffnungen (11, 12) versehen ist, um durch sie hindurch den Gehäusekörper (50) von jedem Tastenschalter der Anordnung anzuordnen, wobei der Gehäusekörper (50) mit der genannten Stützstruktur (70) durch Immobilisierungsmittel mit der Unterstützung eines abgeschrägten Rahmens (50a) auf dem genannten Montagepaneel (10) verbunden ist; und
- eine Leiterplatte (20), in welcher Anschluss- und/oder Steuerelemente der genannten programmierbaren Anzeige (54) und des genannten Mikroschalters (16) angeordnet sind; wobei jeder Tastenschalter zusätzlich Folgendes umfasst:
- mindestens ein Anschlussstück (57), welches mit dem Gehäusekörper (50) verbunden ist, und das in einem montierten Zustand dem Anschlussstück (21) entgegengesetzt ist und in dasselbe eingreift, welches in der Leiterplatte (20) vorgesehen und angeordnet ist, für den Anschluss der genannten programmierbaren Anzeige (54) und des genannten Mikroschalters (16);

dadurch gekennzeichnet, dass die genannte Stützstruktur (70) zusätzlich Folgendes umfasst:

- eine Abschirmplatte (30) der genannten Leiterplatte (20);
- Trennsäulen (40) (41) und Verbindungsmittel (42), welche das genannte Montagepaneel (10), die genannte Leiterplatte (20) und die genannte Abschirmplatte (30) in einer überlappenden Anordnung aneinander befestigen,
- wobei das Montagepaneel (10), die Leiterplatte (20) und die Platte (30) jeweilige Durchgangsöffnungen aufweisen, welche einander zugewandt sind,

und dass jeder der Tastenschalter zusätzlich Folgendes umfasst:

- mindestens einen Fortsatz, welcher mit dem Gehäusekörper (50) verbunden ist und durch die genannten Durchgangsöffnungen (11, 23, 31) des Montagepaneels (10), der Leiterplatte (20) und der Abschirmplatte (30) angeordnet ist;

und dass:

- die programmierbare Anzeige (54) von jedem Tastenschalter im Aktuatorelement (58) angeordnet ist; und

- die genannten lösbaren Immobilisierungsmittel den genannten Fortsatz von jedem Gehäusekörper (50) mit der Stützstruktur (70) in Bezug auf die genannte Abschirmplatte (30) verbinden.

2. Anordnung aus Tastenschaltern nach Anspruch 1, **dadurch gekennzeichnet, dass** der genannte Gehäusekörper (50) eine topfförmige Ausbildung aufweist, welche ein Anschlussstück (56) in dessen Boden für einen flexiblen, flachen, Multifilamentleiter (55) der genannten Anzeige (54), und ein zweites Anschlussstück (56a) für den Anschluss des genannten Mikroschalters (16) einschließt, und dass der genannte Fortsatz aus einem Rohrschaft (51) gebildet ist, welcher sich von dem Boden des Gehäusekörpers (50) aus erstreckt.
3. Anordnung aus Tastenschaltern nach Anspruch 2, **dadurch gekennzeichnet, dass** die genannten Immobilisierungsmittel eine Mutter (60) mit einer Kopplungsbildung umfassen, für deren Kopplung mit dem genannten Rohrschaft (51) durch eine jeweilige komplementäre Kopplungsbildung, welche im Rohrschaft (51) integriert ist oder mit demselben verbunden ist, so dass die genannte Mutter (60) dicht gegen die genannte Abschirmplatte (30) anliegt.
4. Anordnung aus Tastenschaltern nach Anspruch 3, **dadurch gekennzeichnet, dass** die genannten komplementären Ausbildungen Bajonett-artige Kopplungsbildungen sind.
5. Anordnung aus Tastenschaltern nach Anspruch 1, **dadurch gekennzeichnet, dass** die genannte Leiterplatte (20) eine oder mehrere LEDs (22) einschließt, welche, in einem montierten Zustand, nahe an den Wänden des genannten Gehäusekörpers (50) sind, welcher aus einem lichtleitenden Material hergestellt ist, so dass die Beleuchtung der genannten LEDs (22) durch den Gehäusekörper (50) zum genannten abgeschrägten Rahmen (50a) über dem Paneel (10) übertragen wird.
6. Anordnung aus Tastenschaltern nach Anspruch 1, **dadurch gekennzeichnet, dass** die genannte Anzeige (54) aus einem Satz von organischen Leuchtdioden, OLEDs, gebildet ist, und dass die Steuervorrichtung von jeder Anzeige auf der Leiterplatte (20) oder auf einer Hilfsplatte (24), welche an die genannte Leiterplatte (20) angeschlossen ist, angeordnet ist.
7. Anordnung aus Tastenschaltern nach Anspruch 1, **dadurch gekennzeichnet, dass** die genannte Anzeige (54) innerhalb eines Aktuatorkörpers (58), welcher das genannte Aktuatorelement (58) bildet, durch eine Stütze (59) gehalten wird, welche Pfosten aufweist, die durch seitliche elastische Zungen des

Tastenaktuatorkörpers (58) festgeklemmt sind.

8. Anordnung aus Tastenschaltern nach Anspruch 1, **dadurch gekennzeichnet, dass** der genannte Aktuatkörper (58) eine erste Aufnahme für die genannte Anzeige (54) und eine zweite Aufnahme über derselben für eine Linse (53) und eine Abdeckung (52) umfasst. 5
9. Anordnung aus Tastenschaltern nach Anspruch 1, **dadurch gekennzeichnet, dass** die genannte Leiterplatte (20) Anschlussstücke einschließt, für den Anschluss von anderen gewöhnlichen Tastenschaltern, welchen es an einer OLED-Anzeige mangelt. 10
10. Anordnung aus Tastenschaltern nach Anspruch 1, **dadurch gekennzeichnet, dass** das genannte Montagepaneel (10) Öffnungen (11, 12) mit mindestens zwei Größen umfasst, um Tastenkörper (50) mit unterschiedlichen Abmessungen aufzunehmen. 15 20
11. Anordnung aus Tastenschaltern nach Anspruch 1, **dadurch gekennzeichnet, dass** die genannte Leiterplatte (20) und/oder die genannte Hilfsplatte (24) einen Mikrocontroller (25) einschließt, welcher die gesamten Anzeigen (54) der Tastenschalter der Anordnung regelt. 25

Revendications 30

1. Un ensemble d'interrupteurs à poussoir ayant un affichage programmable, chaque interrupteur à poussoir comportant: 35
 - un boîtier (50);
 - un micro-interrupteur (16) fixé sur ce boîtier (50);
 - un élément actionneur (58) ayant un jeu de déplacement linéaire limité à l'intérieur du boîtier (50), ce micro-interrupteur (16) étant activé par ce déplacement linéaire lorsque l'on appuie sur le poussoir; et
 - un affichage programmable (54) agencé, visible de l'extérieur, dans le boîtier (50), 45

cet ensemble d'interrupteurs à poussoir comprenant une structure de support (70) comportant:

- un panneau d'assemblage (10) pourvu d'une pluralité d'ouvertures (11, 12) pour y faire entrer le boîtier (50) de chaque interrupteur à poussoir de l'ensemble, le boîtier (50) étant fixé à cette structure de support (70) par des moyens de blocage avec le support d'un biseau (50a) sur ce panneau d'assemblage (10); et 50
- une carte à circuit imprimé (20) où sont aménagés les éléments de connexion et/ou de con-

trôle de cet affichage programmable (54) et le micro-interrupteur (16);

où chaque interrupteur à poussoir comporte en plus:

- au moins un connecteur (57) fixé sur le boîtier (50) qui est en face et engagé, assemblé, dans un connecteur (21) prévu et aménagé dans la carte à circuit imprimé (20) pour connecter cet affichage programmable (54) et ce micro-interrupteur (16);

caractérisé en ce que cette structure de support (70) comporte en plus:

- une tôle de protection (30) de cette carte à circuit imprimé (20);
- des colonnes de séparation (40) (41) et des moyens de fixation (42) reliant ce panneau d'assemblage (10), cette carte à circuit imprimé (20) et cette tôle de protection (30) en chevauchement;
- où le panneau d'assemblage (10), la carte à circuit imprimé (20) et la tôle (30) ont des ouvertures traversantes se faisant face,

et en ce que chacun des interrupteurs à poussoir comporte en plus:

- au moins un appendice fixé sur le boîtier (50) et engagé dans ces ouvertures traversantes (11, 23, 31) du panneau d'assemblage (10), de la carte à circuit imprimé (20) et de la tôle de protection (30);

et en ce que:

- l'affichage programmable (54) de chaque interrupteur à poussoir est aménagé dans l'élément actionneur (58); et
- ces moyens de blocage amovibles fixent cet appendice de chaque boîtier (50) sur la structure de support (70) par rapport à cette tôle de protection (30).

2. L'ensemble d'interrupteurs à poussoir conformément à la revendication 1 **caractérisé en ce que** ce boîtier (50) à la forme de coupelle incorporant un connecteur (56) à sa base pour un conducteur flexible, plat, multifilament (55) de cet affichage (54) et un deuxième connecteur (56a) pour connecter ce micro-interrupteur (16) **et en ce que** cet appendice est formé par un manche tubulaire (51) s'étendant depuis la base du boîtier (50).

3. L'ensemble d'interrupteurs à poussoir conformément à la revendication 2 **caractérisé en ce que** ces moyens de blocage comportent un écrou

- (60) ayant une configuration de couplage pour être couplé à ce manche tubulaire (51) par une configuration de couplage complémentaire respective intégrée à ou fixée sur le manche tubulaire (51) de sorte que cet écrou (60) est serré contre cette tôle de protection (30). 5
4. L'ensemble d'interrupteurs à poussoir conformément à la revendication 3 **caractérisé en ce que** ces configurations complémentaires sont des configurations couplées à baïonnette. 10
5. L'ensemble d'interrupteurs à poussoir conformément à la revendication 1 **caractérisé en ce que** cette carte à circuit imprimé (20) comporte un ou plusieurs LED (22) qui, assemblés, se trouvent proches à des parois de ce boîtier (50), qui est fait en un matériau conducteur de la lumière de sorte que la lumière de ces LED (22) est transférée à travers le boîtier (50) à ce biseau (50a) au-dessus du panneau (10). 15 20
6. L'ensemble d'interrupteurs à poussoirs conformément à la revendication 1 **caractérisé en ce que** cet affichage (54) est formé par un jeu de diodes électroluminescentes organiques OLED et **en ce que** le dispositif de contrôle de chaque affichage est aménagé sur la carte à circuit imprimé (20) ou sur une carte auxiliaire (24) reliée à cette carte à circuit imprimé (20). 25 30
7. L'ensemble d'interrupteurs à poussoirs conformément à la revendication 1 **caractérisé en ce que** cet affichage (54) est retenu à l'intérieur d'un corps actionneur (58) constituant cet élément actionneur (58), par un support (59) présentant des jambages qui sont fixés par des goupilles élastiques du corps actionneur (58) de l'interrupteur. 35
8. L'ensemble d'interrupteurs à poussoirs conformément à la revendication 1 **caractérisé en ce que** ce corps actionneur (58) comporte un premier carter pour cet affichage (54) et un deuxième carter au-dessus de celui-ci pour une lentille (53) et un couvercle (52). 40 45
9. L'ensemble d'interrupteurs à poussoirs conformément à la revendication 1 **caractérisé en ce que** cette carte à circuit imprimé (20) comprend des connecteurs pour connecter d'autres interrupteurs à poussoir standard n'ayant pas d'affichage OLED. 50
10. L'ensemble d'interrupteurs à poussoirs conformément à la revendication 1 **caractérisé en ce que** ce panneau d'assemblage (10) comporte des ouvertures (11, 12) d'au moins deux tailles de sorte à y loger des corps d'interrupteur (50) de tailles différentes. 55
11. L'ensemble d'interrupteurs à poussoirs conformément à la revendication 1 **caractérisé en ce que** cette carte à circuit imprimé (20) et/ou cette carte auxiliaire (24) comportent un microcontrôleur (25) gérant tous les affichages (54) des interrupteurs à boutons à poussoirs de l'ensemble.

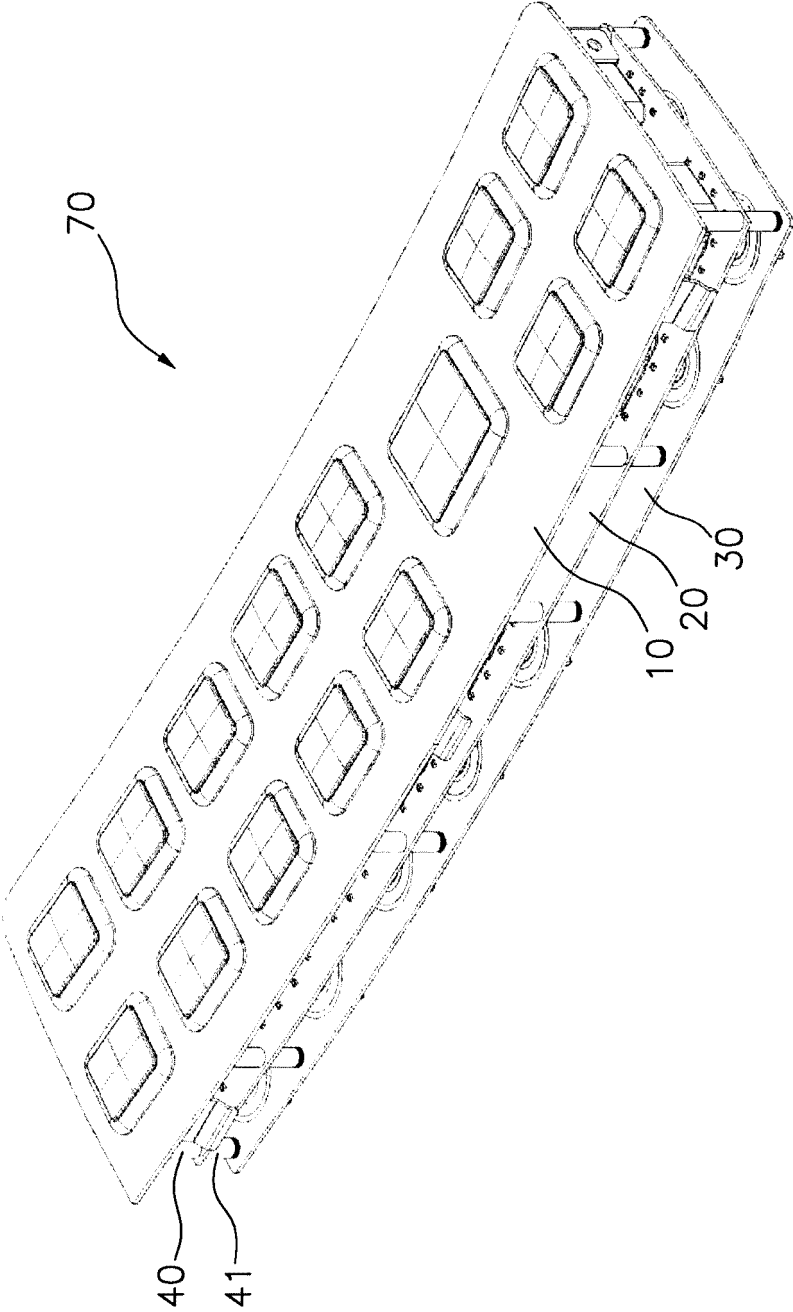


Fig. 1a

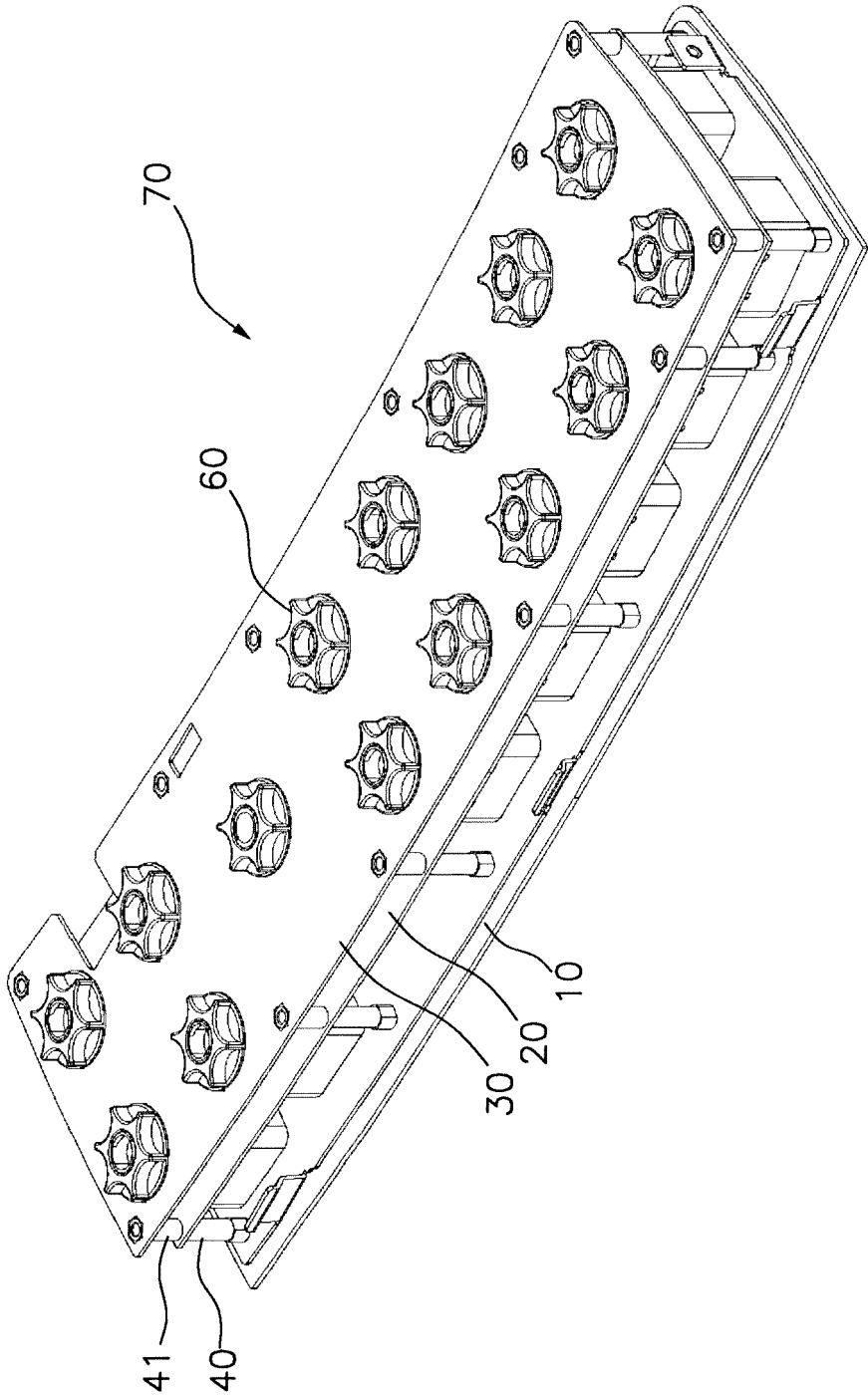


Fig. 1b

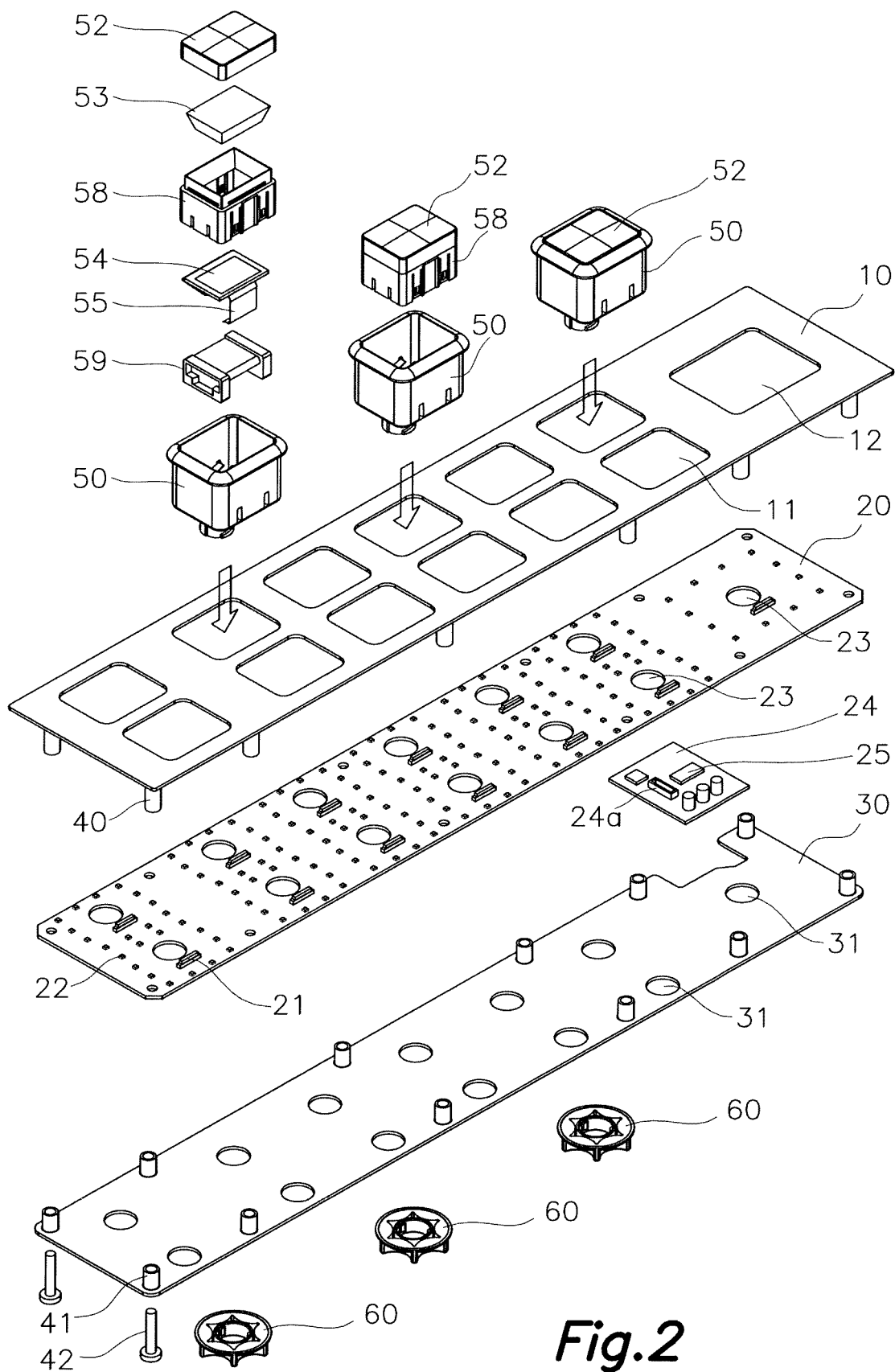


Fig.2

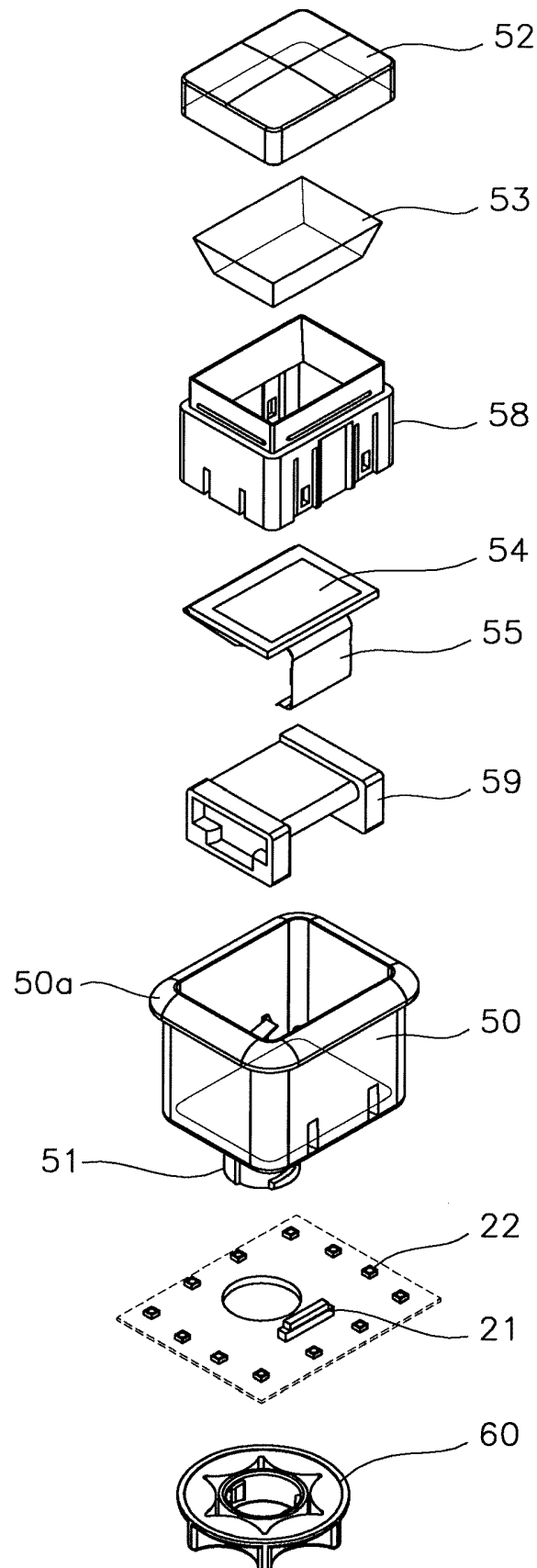


Fig.3

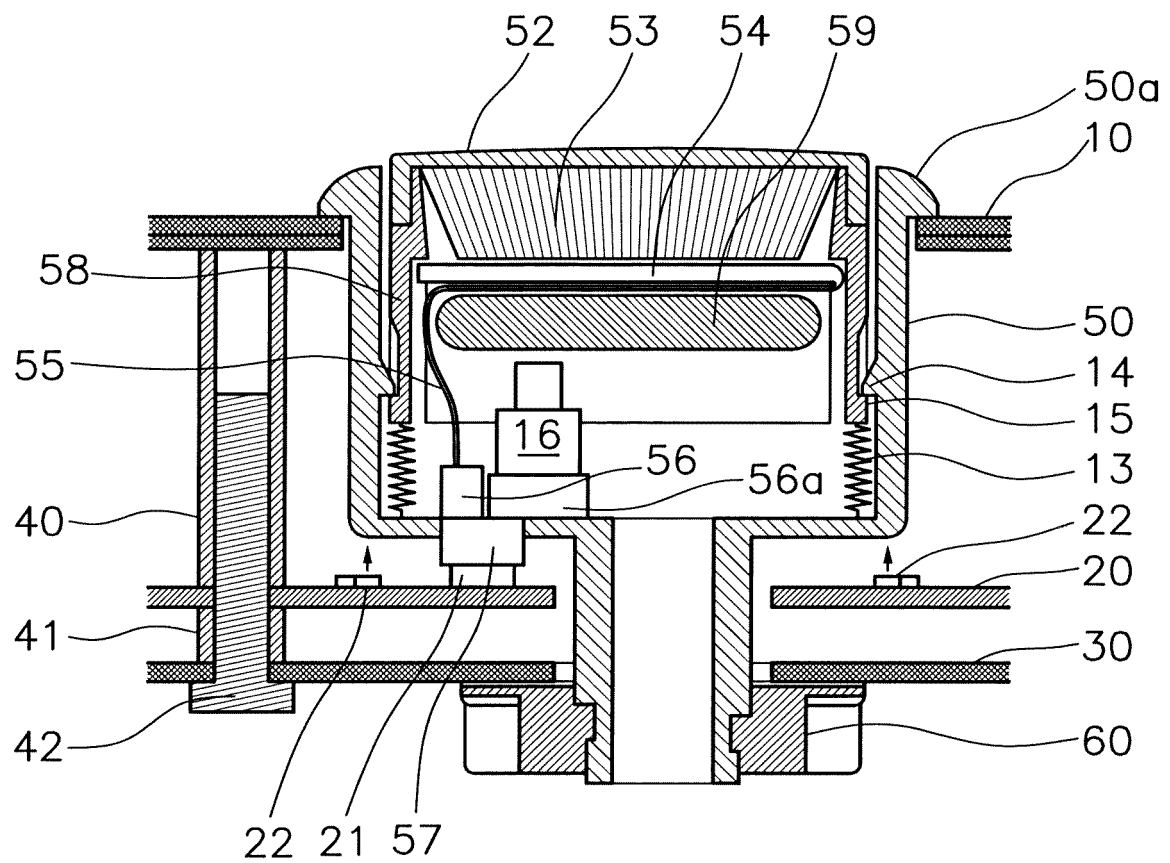


Fig.4

REFERENCES CITED IN THE DESCRIPTION

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