



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
21.10.2015 Bulletin 2015/43

(51) Int Cl.:
H01H 21/00 (2006.01) H01H 9/02 (2006.01)

(21) Application number: **13863084.3**

(86) International application number:
PCT/JP2013/005798

(22) Date of filing: **28.09.2013**

(87) International publication number:
WO 2014/091651 (19.06.2014 Gazette 2014/25)

(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

(72) Inventors:
• **KATO, Kazuhiro**
Osaka-shi, Osaka 540-6207 (JP)
• **KAWAI, Atsushi**
Osaka-shi, Osaka 540-6207 (JP)

(30) Priority: **13.12.2012 JP 2012271896**

(74) Representative: **Appelt, Christian W.**
Boehmert & Boehmert
Anwaltpartnerschaft mbB
Patentanwlte Rechtsanwälte
Pettenkoferstrasse 20-22
80336 Mnchen (DE)

(71) Applicant: **Panasonic Intellectual Property Management Co., Ltd.**
Osaka-shi, Osaka 540-6207 (JP)

(54) **SWITCH DEVICE**

(57) A switch device includes: a push-button switch of which contact is switched to ON/OFF by a pressing operation of a push-button disposed on a front surface thereof; a piano handle of which one end is rotatably supported by the push-button switch, and which presses the push-button down when another end thereof is pressed down; and a decorative plate having a window hole for exposing the piano handle to a front surface side, and is disposed in front of the push-button switch with the piano handle exposed to the front surface side through the window hole. A height of a front surface of the piano handle from a front surface of the decorative plate with the piano handle not operated is approximately the same throughout an entire surface thereof, and an indicator that indicates an ON/OFF state of the push-button switch is disposed in a pressing region of the piano handle.

FIG. 1A

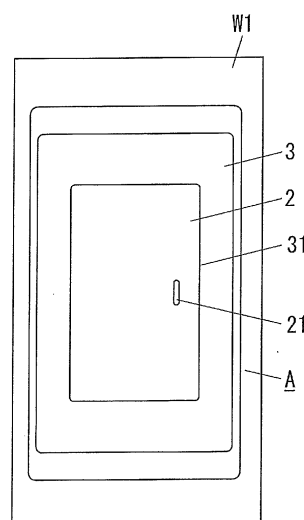
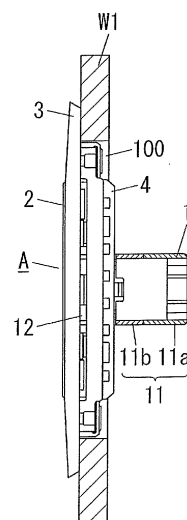


FIG. 1B



Description

TECHNICAL FIELD

[0001] The present invention relates to a switch device.

BACKGROUND ART

[0002] Document 1 (JP Pub No. 2001-176354), for example, discloses a switch device that is mounted on a building material such as a wall. This switch device includes a push-button switch that switches the contact of a contact portion by a pressing operation of a push-button handle, and a piano handle of which one end is rotatably supported on the front surface of the push-button switch, and which presses the push-button handle down when the other end thereof is pressed down. The switch device also includes a decorative plate that has a window hole for exposing the piano handle to the front surface side, and is disposed in front of the push-button switch.

[0003] In the state of this switch device being mounted on the wall, the piano handle is exposed to the front surface side through the window hole of the piano handle, and the contact portion of the push-button switch is switched to ON/OFF by pressing the other end of the piano handle down.

[0004] In the switch device disclosed in Document 1, the operating position can be easily recognized since the other end side of the piano handle protrudes forward from the one end side in the state of the piano handle not being operated. However, the appearance is not good because the amount of protrusion of the piano handle from the decorative plate is different depending on the location.

DISCLOSURE OF THE INVENTION

[0005] With the foregoing in view, it is an object of the present invention to provide a switch device of which appearance is improved while the operating position is still easy to recognize.

[0006] A switch device according to a first aspect of the present invention includes: a push-button switch of which contact is switched to ON/OFF by a pressing operation of a push-button disposed on a front surface thereof; a piano handle of which one end is rotatably supported by the push-button switch, and which presses the push-button down when another end thereof is pressed down; and a decorative plate that has a window hole for exposing the piano handle to a front surface side thereof, and is disposed in front of the push-button switch in a state of the piano handle being exposed to the front surface side through the window hole. A height of a front surface of the piano handle from a front surface of the decorative plate in a state of the piano handle not being operated is approximately the same throughout an entire surface thereof. An indicator that indicates an ON/OFF state of the push-button switch is disposed in a pressing region of the piano handle.

[0007] Regarding a switch device according to a second aspect of the present invention, in the first aspect, the indicator is constituted by an indication window that emits light, having different colors corresponding to the ON/OFF state of the push-button switch, toward the front surface side using a plurality of light emitting diodes which emits light of different colors, and displays the ON/OFF state of the push-button switch corresponding to a color of the light that is emitted toward the front surface side through the indication window.

[0008] Regarding a switch device according to a third aspect of the present invention, in the first or second aspect, the front surface of the piano handle and the front surface of the decorative plate are on a same plane in a state of the piano handle not being operated.

[0009] Regarding a switch device according to a fourth aspect of the present invention, in the first or second aspect, the front surface of the piano handle protrudes forward from the front surface of the decorative plate in a state of the piano handle not being operated.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

Fig. 1A is a front view of a state when a switch device of an embodiment is mounted on a wall, and Fig. 1B is a side view of a state when the switch device of the embodiment is mounted on the wall;

Fig. 1A is a cross-sectional view of the switch device of the embodiment viewed from the lower side in the state of not operating the piano handle, and Fig. 1B is a cross-sectional view of the switch device of the embodiment viewed from the lower side in the state of operating the piano handle; and

Fig. 1A is a perspective view of the switch device of the embodiment in the state of not operating the piano handle, and Fig. 1B is a perspective view of the switch device of the embodiment in the state of operating the piano handle.

BEST MODE FOR CARRYING OUT THE INVENTION

[0011] An embodiment of the switch device will be described with reference to Fig. 1 to Fig. 3. As illustrated in Fig. 1A and Fig. 1B, for example, the switch device A of this embodiment is mounted on a wall W1 in a state of the rear surface side thereof being embedded through an embedded hole 100 disposed on the wall W1. In the following description, the vertical and horizontal directions are those of Fig. 1A unless otherwise specified, and a front-back direction is a direction perpendicular to the paper surface of Fig. 1A. A first direction is a direction perpendicular to the front-back direction (horizontal direction in Fig. 1A), and a second direction is a direction perpendicular to the front-back direction and the first direction (vertical direction in Fig. 1A).

[0012] As illustrated in Fig. 1B, the switch device A of

this embodiment includes a push-button switch 1 (piano switch), a piano handle 2 (operation handle), a decorative plate 3 and a mounting frame 4. The push-button switch 1 has a plurality of light emitting diodes (not illustrated) that emits different colors of light.

[0013] As illustrated in Fig. 2A, the push-button switch 1 has a box 11 combining a body 11a which has a rectangular box shape of which front surface is open, and a cover 11b which has a rectangular box shape of which rear surface is open. A push-button 12, for switching ON/OFF of a contact (not illustrated) enclosed inside, is disposed to the right on the front surface side of the box 11.

[0014] A red light emitting diode and a green light emitting diode (both not illustrated) that turn ON or OFF corresponding to the ON/OFF state of the contact are disposed to the left on the front surface side of the box 11 as well. In other words, the light emitting diodes of the push-button switch 1 are the red light emitting diode and the green light emitting diode which emit different colors of light in this embodiment, and the light is emitted from the red light emitting diode or the green light emitting diode corresponding to the ON/OFF state push-button switch 1.

[0015] The combination of the light emitting diodes is not limited to the combination of the red light emitting diode and the green light emitting diode, but may be a combination of a red light emitting diode or a green light emitting diode and a light emitting diode that emits a color of light other than red and green. A combination of light emitting diodes that emit a color of light different from red and green may be used.

[0016] This push-button switch 1 has a configuration that is similar to the push-button switch of the above mentioned switch device according to Document 1, hence detailed description thereof is omitted.

[0017] In this push-button switch 1, the contacts are connected in series between a power supply (not illustrated) and a load (not illustrated), so that power is supplied from the power supply to the load when the contact is turned ON, and the power from the power supply to the load is shut OFF when the contact is turned OFF.

[0018] The piano handle 2 is formed into a rectangular plate shape which is long in the vertical direction, as illustrated in Fig. 1A, and one end of the piano handle 2 (left side in Fig. 2A) in the horizontal direction is rotatably supported by the push-button switch 1. By pressing the other end (right side in Fig. 2A) of the piano handle 2 in the horizontal direction toward the rear surface side (lower side in Fig. 2A), the push-button 12 of the push-button switch 1 is pressed down (see Fig. 2B). The mounting structure of the piano handle 2 is also similar to the switch device disclosed in the above mentioned Document 1, hence detailed description is omitted.

[0019] The decorative plate 3 is formed in a rectangular plate shape which is long in the vertical direction, as illustrated in Fig. 1A, and a window hole 31, which exposes the piano handle 2 to the front surface side, is disposed

approximately at the center of the decorative plate 3 (see Fig. 2A and Fig. 2B). The decorative plate 3 is mounted on the later mentioned mounting frame 4 from the front surface side, using an appropriate mounting means, such as mounting screws.

[0020] The mounting frame 4 is a mounting frame for embedded wiring devices standardized by JIS, for example, and has a configuration similar to the mounting frame used for the switch device disclosed in the above mentioned Document 1, hence detailed description thereof is omitted.

[0021] Here an indication window 21 (indicator) is disposed approximately at the center in the vertical direction and at the right end in the horizontal direction of the piano handle 2 (see Fig. 1A), and the light from the above mentioned red light emitting diode or the green light emitting diode is guided to the indication window 21 via a light guide (not illustrated).

[0022] According to this embodiment, when the contact (not illustrated) of the push-button switch 1 is turned ON, the power is supplied from the power supply to the load and the red light emitting diode is turned ON, and when the contact is turned OFF, the power from the power supply to the load is shut OFF and the green light emitting diode is turned ON. As a result, the red light or the green light is emitted from the indication window 21 of the piano handle 2 corresponding to the ON/OFF state of the contact. The indication window 21 is disposed in the pressing region of the piano handle 2, and the operating position can be easily recognized by the red light or the green light emitted from this indication window 21.

[0023] Fig. 2A and Fig. 3A show a state of the piano handle 2 not being operated, and in this case, the height of the front surface of the piano handle 2 from the front surface of the decorative plate 3 is approximately the same throughout the entire surface in the front-back direction (vertical direction in Fig. 2A). As a result, appearance is better compared with the case of one side of the switch device protruding, as in the case of the switch device disclosed in the above mentioned Document 1.

[0024] The push-button 12 is pressed to the rear by pressing the piano handle 2 to the rear, as illustrated in Fig. 2B and Fig. 3B, whereby the contact is switched to ON or OFF. At this time, the red light emitting diode or the green light emitting diode is turned ON corresponding to the state of the contact, that is, corresponding to the operating state of the load, and the red light or the green light is emitted toward the front surface side through the indication window 21.

[0025] According to this embodiment, in a state of the piano handle 2 not being operated, the front surface of the piano handle 2 protrudes from the front surface of the decorative plate 3, but the front surface of the piano handle 2 and the front surface of the decorative plate 3 may be on a same plane. The configuration of the indicator is not limited to this embodiment, but may be another configuration only if the operating position of the piano handle 2 can be recognized thereby.

[0026] The switch device of this embodiment includes the push-button switch 1, the piano handle 2 and the decorative plate 3. The ON/OFF of the contact of the push-button switch 1 is switched by the pressing operation of the push-button 12 disposed on the front surface thereof. One end of the piano handle 2 is rotatably supported by the push-button switch 1, and the piano handle 2 presses the push-button 12 down when the other end thereof is pressed down. The decorative plate 3 has a window hole 31 for exposing the piano handle 2 to the front surface side thereof, and is disposed in front of the push-button switch 1 in a state of the piano handle 2 being exposed to the front surface side through the window hole 31. The height of the front surface of the piano handle 2 from the front surface of the decorative plate 3 in the state of the piano handle 2 not being operated is approximately the same throughout the entire surface. The indication window 21 (indicator) that indicates the ON/OFF state of the push-down switch 1 is disposed in the pressing region of the piano handle 2.

[0027] As in the case of the switch device of this embodiment, it is preferable that the indicator is constituted by the indication window 21 that emits light having different colors corresponding to the ON/OFF state of the push-button switch 1 toward the front surface side using a plurality of light emitting diodes which emit light of different colors. In this case, the ON/OFF state of the push-button switch 1 is displayed corresponding to the color of the light that is emitted toward the front surface side through the indication window 21.

[0028] As in the case of the switch device of this embodiment, it is preferable that the front surface of the piano handle 2 and the front surface of the decorative plate 3 are on a same plane in the state of the piano handle 2 not being operated.

[0029] As in the case of the switch device of this embodiment, it is also preferable that the front surface of the piano handle 2 protrudes forward from the front surface of the decorative plate 3 in the state of the piano handle 2 not being operated.

exposed to the front surface side through the window hole, wherein

a height of a front surface of the piano handle from a front surface of the decorative plate in a state of the piano handle not being operated is approximately the same throughout an entire surface thereof, and

an indicator that indicates an ON/OFF state of the push-button switch is disposed in a pressing region of the piano handle.

2. The switch device according to Claim 1, wherein the indicator is constituted by an indication window that emits light, having different colors corresponding to the ON/OFF state of the push-button switch, toward the front surface side using a plurality of light emitting diodes which emits light of different colors, and displays the ON/OFF state of the push-button switch corresponding to a color of the light that is emitted toward the front surface side through the indication window.
3. The switch device according to Claim 1 or 2, wherein the front surface of the piano handle and the front surface of the decorative plate are on a same plane in a state of the piano handle not being operated.
4. The switch device according to Claim 1 or 2, wherein the front surface of the piano handle protrudes forward from the front surface of the decorative plate in a state of the piano handle not being operated.

Claims

1. A switch device, comprising:
 - a push-button switch of which contact is switched to ON/OFF by a pressing operation of a push-button disposed on a front surface thereof;
 - a piano handle of which one end is rotatably supported by the push-button switch, and which presses the push-button down when another end thereof is pressed down; and
 - a decorative plate that has a window hole for exposing the piano handle to a front surface side thereof, and is disposed in front of the push-button switch in a state of the piano handle being

FIG. 1A

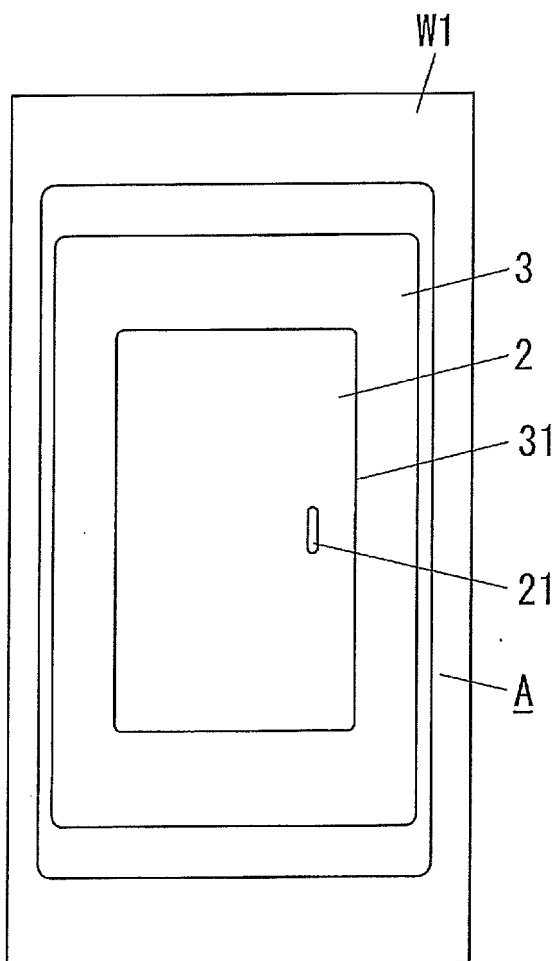


FIG. 1B

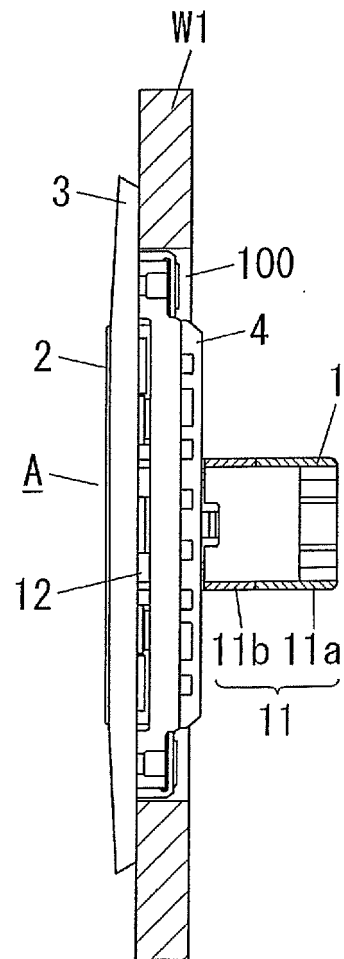


FIG. 2A

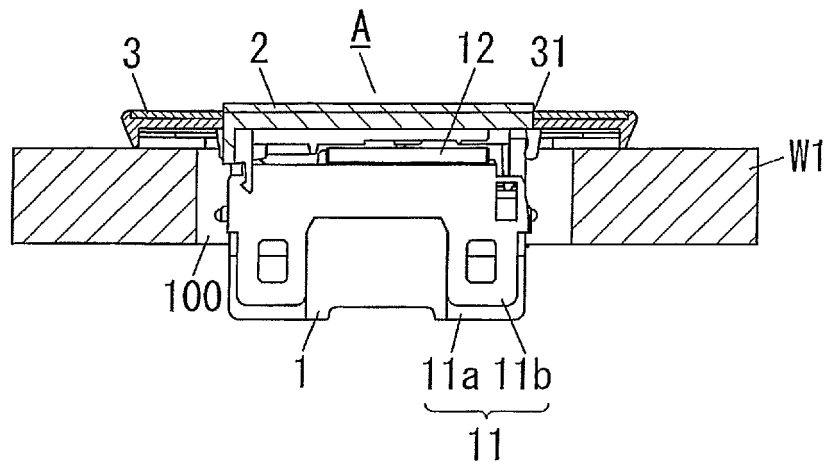


FIG. 2B

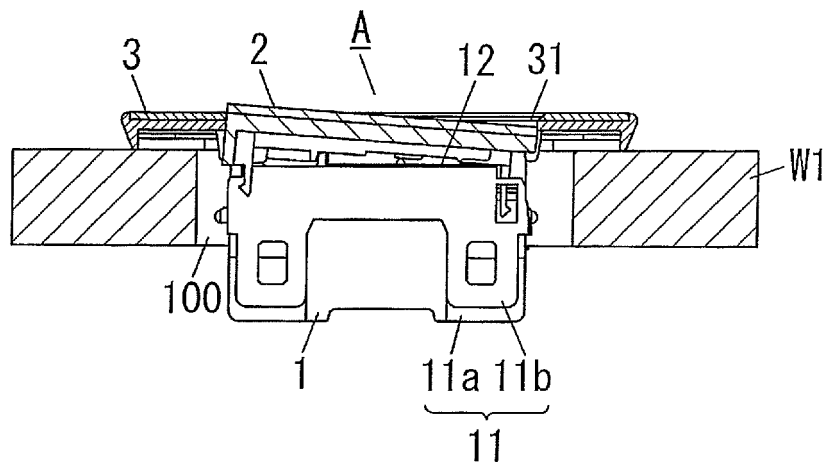


FIG. 3A

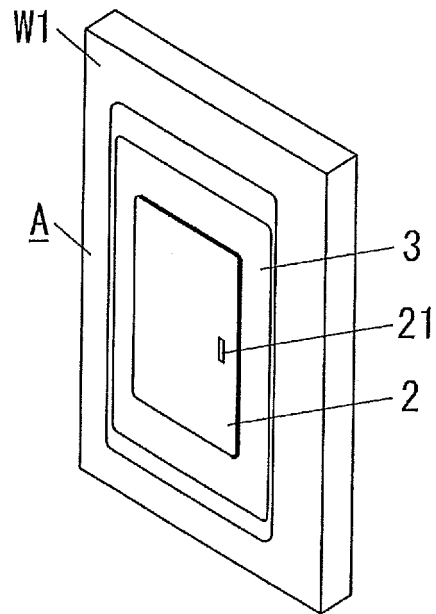
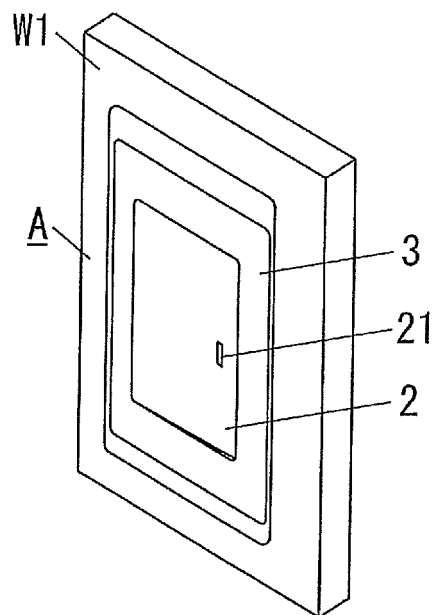


FIG. 3B



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2013/005798

A. CLASSIFICATION OF SUBJECT MATTER

H01H21/00(2006.01)i, H01H9/02(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H01H21/00, H01H9/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2013

Kokai Jitsuyo Shinan Koho 1971-2013 Toroku Jitsuyo Shinan Koho 1994-2013

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 61-173428 A (Matsushita Electric Works, Ltd.), 05 August 1986 (05.08.1986), entire text; all drawings (Family: none)	1, 4 2, 3
Y	JP 2003-37910 A (Matsushita Electric Works, Ltd.), 07 February 2003 (07.02.2003), paragraph [0024] (Family: none)	2
Y	JP 2006-331999 A (Toyoda Gosei Co., Ltd.), 07 December 2006 (07.12.2006), paragraph [0033]; fig. 3 & US 2006/0266633 A1	3

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
19 December, 2013 (19.12.13)Date of mailing of the international search report
07 January, 2014 (07.01.14)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2001176354 A [0002]